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Coimbatore - 641 043, Tamil Nadu, India

Department of Science and Technology
Government of India

Diamond Jubilee Celebrations

DST CURIE Sponsored

National Conference on

Home Science Towards Young India, New India

16th & 17th February 2018

Organized by

Faculty of Home Science

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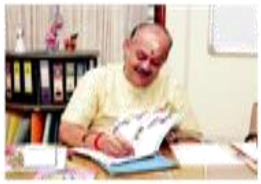

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Formerly Professor of Sociology & Director
International Center, University of Mysore
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Scientist F and Head
Bureau of Indian Standards, Coimbatore

Dr. P. Premkanna
Professor and Head
Department of Catering & Hotel Management
Hindustan College of Arts and Science, Coimbatore

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Dr. M. Komala
Sr.Assistant Professor of Human Development
Department of Studies in Food Science and Nutrition
Manasagangotri, University of Mysore

Dr. K.S. Pushpa
Professor of Home Science
Gandhigram Rural Institute, Dindigul

OVERVIEW

Concept of the Conference

Home Science is a unique discipline, the scope of which prepares young women learners for a career / vocational life in six branches namely Resource Management, Food Service Management and Dietetics, Food Science and Nutrition, Textiles and Clothing, Human Development and Home Science Extension Education and Communication. In the current era of advanced technology, knowledge on the scientific aspects engulfing Home Science as a lifestyle oriented subject for the young in 'New India' is a dire need - the germane behind the concept of the National Conference

Theme of the Conference

The National Conference will emerge as a common forum for participants from various disciplines of Home Science on the theme "Home Science Towards Young India, New India". The Conference would serve as a platform for Home Scientists, research scholars, students and other young minds to benefit from the interactions with leading professionals working in the field of Home Science.

Sub themes

Resource Management

- Resource Management for Wellness and Wellbeing
- Perspectives of Interior Design - New dimensions

Food Service Management and Dietetics

- Integrated Medical Nutrition Therapy to Nurture Young India - Challenges and Promises
- Cutting Edge Technologies in Food and Dietceuticals in digital era

Food Science and Nutrition

- Functional Foods and Nutraceuticals in Health, Degenerative Diseases and Metabolic Disorders
- Challenges in Food, Dietary Patterns and Lifestyle of Youth in 'New India'

Textiles and Clothing

1. Technological Advancement in Textile & Fashion

2. Eco friendly Approaches in Textile Processing & Waste Water Treatment

Human Development

- Emerging Global Trends in Life Span Development
- Child Care, Education and Inclusion for a Prosperous Nation

Home Science Extension Education and Communication

- Empowering Rural India
- Perspectives of Community Development

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Dr. T.S.K. Meenakshisundaram
Managing Trustee
Sri Avinashilingam Education Trust Institutions
Coimbatore - 43

Date :.....

MESSAGE

I am very happy to know that the Faculty of Home Science is organizing a DST Curie Sponsored National Conference on "Home Science towards Young India, New India on 16th and 17th of February 2018. I am sure the conference would serve as a platform to bring academicians and researchers together to exchange their research innovations in the field of Home Science and disembark on a concurrence to streamline the role of Home Scientists in restructuring a new India.

I appreciate the efforts and enthusiasm of every member of the Faculty of Home Science for organizing this conference on a topic which is of great relevance to build a healthy Nation.

I wish the conference a great success.

(Dr. T.S.K. Meenakshisundaram)
Managing Trustee

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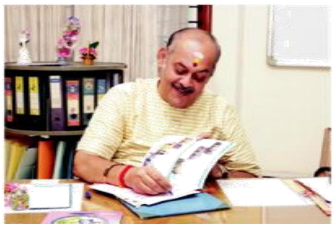
Date :.....

Padmashree Dr. P.R. Krishnakumar
Chancellor
Avinashilingam Institute for Home Science and Higher Education for Women,
Coimbatore - 43



MESSAGE

Home Science which is now renamed as Community Science is an important area of Science not only for safe guarding the social value system but also for developing and injecting novel technologies in different fields of Home Science that covers all walks of life through its branches like Resource Management, Food Service Management and Dietetics , Food Science and Nutrition, Textiles and Clothing and Extension Education with the sole intention of preparing highly skilled women entrepreneurs and service providers to make the home, society and the globe a peaceful and technologically empowered place for innovation and growth.

With tremendous increase in the information technology, the world has shrunk a global village. Multi-nationals have invaded the homes thus, new careers are emerging. To analyse the scientific opportunities in the study of different fields of Home science is in the need of the hour. Home Science as a field is extremely useful in enhancing the status of women and children for a good society. I believe that the deliberation in the two days event will sensitise social workers, academicians, researchers, policy makers and stake holders towards building a new India.

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Dr. Premavathy Vijayan
M.Sc., M.Ed., M.Phil., Dip.Spl. Edn. (U.K.), Ph.D.
Vice-Chancellor

Date :15.2.2018

Message

Home Science is a dynamic and ever growing field of education. It is an applied field built by bridging the various disciplines such as Resource Management, Food Service Management and Dietetics, Food Science and Nutrition, Textiles and Clothing, Human Development and Extension Education for the purpose of achieving the welfare and wellbeing of the family in an ever changing society. Being the core of family ecosystem, the faculty of Home Science educate individual for a better living.

The development of Home Science education reflects social pressures that are evident around the turn of the century. It is a need-based, professionally oriented education to assist family and community towards improved living. In the context of growing opportunities in the work environment and external world, the family assumes a significant role in shaping the citizens of tomorrow. The family is the main factor which protects the individuals from all external forces and creates the right type of atmosphere for students to grow into strong, independent to meet the challenges of life. Therefore, Home Science becomes the key subject in shaping the youngsters with relevant knowledge, competencies and prepares them to become efficient custodians and contributing citizens of the nation.

Premavathy Vijayan 15.2.2018
Premavathy Vijayan
Vice Chancellor

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Dr. (Mrs.) S. Kowsalya
M.Sc., M.Phil., Ph.D.
Registrar

Date : .....

MESSAGE

I am delighted to note that the Faculty of Home Science is organizing a DST CURIE sponsored National Conference on **'Home Science towards Young India, New India'** between **16th** and **17th February, 2018**. As the nation marches towards making a new digital India, translation of new ideas, knowledge, research and innovations is the need of the hour. Equipping young Home Scientists to take up new challenges in area of Resource Management, Food Service Management and Dietetics, Food Science and Nutrition, Textiles and Apparel Designing, Human Development and Home Science Extension Education would go a long way in sensitizing the young students mind towards creating new Society.

I congratulate and acknowledge the team for their meticulous effort to bring the various branches of Home Science under one roof in organizing this national that the deliberations of the National Conference would throw light on the new developmental policy implications on various branches of Home Science and career opportunities for young scholars and scientists. I wish the Conference all success.

S. Kowsalya
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Dean, Faculty of Home Science
Professor
Department of Textiles and Clothing
E-mail : vasugiraaja@gmail.com
Mobile No. : 94430 44416

Date : .....

Message

As the convenor and organising secretary, my greetings to all the participants of the DST CURIE sponsored National Conference on **"Home Science towards Young India New India" 16th &17th 2018**. This two days conference to mark our diamond Jubilee celebration is being organised to share the knowledge expertise of Home Scientist from different parts of India to deliberate on new challenges and research potential to build a new India, young India.

I hope that this conference will explore the talents of young home scientist to break the barriers of conventional research and adopt innovative technology to meet the contemporary challenges in society.

As a proud home scientist I take this opportunity to extend my warm wishes to our team for the successful conduct of this national conference.

I hope that we as a team benefit from the conference and get inspired to take up more and more research to benefit all.

Dean, Faculty of Home Science

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RESOURCE MANAGEMENT

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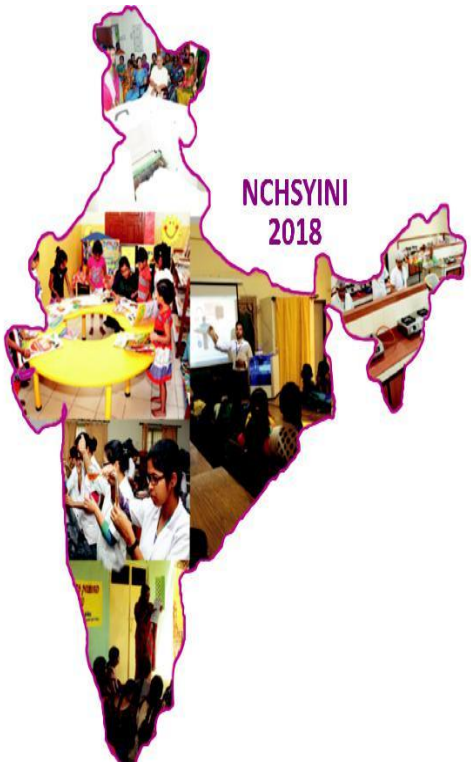
FOOD SERVICE MANAGEMENT AND DIETETICS



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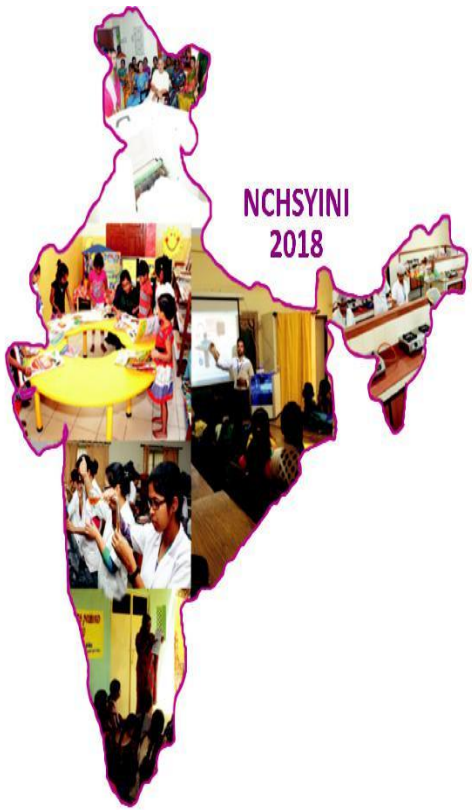
FOOD SCIENCE AND NUTRITION



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TEXTILES AND CLOTHING

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HUMAN DEVELOPMENT

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HOME SCIENCE EXTENSION EDUCATION

HOME SCIENCE EXTENSION EDUCATION

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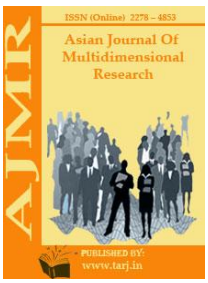

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UGC APPROVED JOURNAL

SPECIAL ISSUE ON

DST CURIE Sponsored National Conference on

"Home Science - Towards Young India, New India," 16-17 Feb 2018

Jointly Organized by the Faculty of Home Science.

AVINASHILINGAM INSTITUTE FOR HOME SCIENCE AND HIGHER EDUCATION FOR WOMEN, COIIMBATORE-43, TN, INDIA

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UGC APPROVED JOURNAL

SAFETY AND ERGONOMIC ASPECTS AS ENHANCED INTANGIBLE RESOURCES IN CAR SEGMENTS

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*Research Scholar,
** Professor and Head of Department of
Resource Management, Avinashilingam Institute for Home Science and
Higher Education for Women, (Deemed to be University),
Coimbatore, INDIA.

ABSTRACT

The car is a prime resource for all people in and around the world as it serves the major role in transportation as well as luxuriousness. The automobile industry keeps on designing and launching various innovative designs that satisfy their customer needs and desires. In recent times, the car industry has become more sensitive to the lacunae in the technological innovative aspects relating to safety and ergonomics that eventually have witnessed drastic changes in designing car interiors for the wellbeing of users. The car interiors have been designed with anthropometric standards for dimensional relationship between man and automobile and also considering various safety norms. This article reflects on such ergonomic and safety aspects introduced in various car segments as added tangible and intangible resources considering user friendliness of the vehicles.

KEYWORDS: *Anthropometry, Ergonomics, tangible resources, segments, user friendliness*

INTRODUCTION:

The automotive manufacturers are launching new models, variants of cars with the advent of science and technology improvements in the industrial sectors. Nowadays, the quality of safety and coziness remains a critical driver of user's satisfaction. User satisfaction is the prime concern for the automotive manufacturers and the vehicles have become techno - smart in the last few decades with the adoption of various advanced car features. Among the amenities provided by the manufacturers such as those for performance, luxury, graphics, pre and post service facilities etc., the **key strategies of user satisfaction encompass the aspects such as safety and ergonomic features** available in the car.

In this fast-moving era, mobility has become one of the key strategies for leading life and the anthropogenic race thus has become more dependent on cars (automobiles) for accomplishing their day to day activities. People spend most of their time in driving their own vehicle. Car user's opinions heighten towards ***"Value for money"*** and make them think, predominantly more on **one's personal intangible resources of health and safety** while driving them. Consumer's well being while driving has become the centre – stage concept for car designers. This concern in its wake has enhanced customization of components in various car segments. By considering these facts the automotive manufacturers try to keep pace with their users' changing consciousness on health and safety demands and launch more safer and ergonomic features in their respective car segments. Vehicle safety features have come a long way over the years (www.ancap.com.au, 2018).

- **Understanding Safety Features**: As per ANCAP Vehicle Safety Advocate, The combination of a sound structure, good restraint systems and active safety technologies provide the best chance of survival in a crash. The safety of a car is based on three key areas: structural integrity (shell of a vehicle), safety features, and Safety Assist Technologies (SAT). Advanced safety assist technologies help the driver in avoiding or reducing the severity of a crash.

- **Active and passive safety features**: According to Sivakumar and Krishnaraj (2013), the terms "active" and "passive" are simple but important terms in the world of automotive safety."Active safety" is used to refer to technology assisting in the prevention of a crash and "passive safety" to components of the vehicle that help to protect occupants during a crash. During the past decade car safety technology has changed in emphasis, according to Russ Rader of the Insurance Institute for Highway Safety, or IIHS. That change has been from "passive" safety technology to "active" technology. In the past, safety features have been about protecting people in crashes.
- **Human Factors:** According to Mitchell (2013), automobile design is quite a science, and the empirical designers look at global measurement data called anthropometry of various human populations or use dummies to simulate drivers, and create designs to fit the car users. Stanton (2014) opines that the 'Human Factors Aspects' refers to the physical, physiological, psychological and social constraints, concerns and considerations in 'Vehicle Design'. Human Factors scientists are concerned with human performance in technological systems with a view to optimization of the design of the system in terms of effectiveness, safety, comfort and well-being. Like all scientific disciplines, Human Factors is characterized by theoretical and methodological development together with empirical investigations. The latter tend to shift between studies in the world and studies in the laboratory.

With these points in view, where a ***consumer product (car) acts as both a resource and a facilitator of other resources***, a study was felt necessary to understand the design features incorporated in modern cars (automobiles) by selecting a target population and car showrooms where, ***though hidden to the naked eye one could see the presence of these tangible and intangible resources.***

METHODOLOGY:

Coimbatore is known for its industrial wealth and this renowned fame is being well utilized by Multinational as well as national automotive companies in Coimbatore and launching new concept cars models. It has become the hub for trying out new arrivals of automotive products with clusters of automotive companies available in Coimbatore city. Hence, Coimbatore was chosen as study area by adopting purposive sampling method to study the psychology of car users as well as the car retailers dealing with MNC and Indian make cars. A sample of 100 car users was selected from different occupational backgrounds (Doctors, Professors, IT and Government Employees, and Business Persons) and 12 car showrooms were chosen for the conduct of the study. Interview schedules and structured interview facilitated in collection of the required data.

Salient Findings: The salient findings of the study are presented under the following headings

1. **Segment classification in cars:** Consumers have a large platter based on the length of the automobiles, from the segments of A, A1, A2; B1, B2; C1, C2; D1, D2, and SUV Segments (as per SIAM classification).
2. **Vehicle Safety Features:** Boxes give the safety features incorporated in modern cars

Active and Passive Safety Features

Active safety features can help prevent crashes by providing the driver with better means of controlling the vehicle and avoiding hazards.
Source: Sivakumar and Krishnaraj (2013)

Passive safety features are designed to prevent or minimize injury to the vehicle's occupants, in event of crash. Some features help absorb crash forces and some may restrain and prevent from striking the occupants.
Source: Sivakumar and Krishnaraj (2013)

Active safety features	Passive safety features
Tyres	Crush zone and safety cages
Brakes	Frontal Impact Protection
Anti – Lock Braking System	Side Impact protection
Traction control and four wheel drive	Safety belts
Handling and stability	Air Bags

Audible warning devices	Seats
Seeing and Being seen	Head Restraints
Adjustability and comfort	Safe Vehicle Interiors
Minimizing driver distraction	Fire Prevention and Protection

Source: Sivakumar and Krishnaraj (2013)

3. Concern for Safety Aspects: This aspect was considered in the designing of the embedded components of the cars as explained under the following heads

a. Safety Components in Car Interiors and Exteriors

b. Safety Devices Set in Braking System

a. Safety Components in Car Interiors and Exteriors: Table explains the concerned data

TABLE.1 SAFETY COMPONENTS IN CAR INTERIORS AND EXTERIORS

Part	Safety aspects	Percent Responding					Part	Safety aspects	Percent Responding				
		P	GE	IT	D	BP			P	GE	IT	D	BP
Exteriors	Daytime Running Lights	20	5	-	20	25	Interiors	Adjustable Steering Column	85	55	35	95	60
	Fog Lamps	90	40	35	75	65		Blind spot Warning System	10	-	-	5	20
	Forward collision warning	20	-	-	10	20		Curtain Airbags	35	15	10	15	30
	Reverse motion camera	30	5	10	35	55		Driver Attention Detection	15	-	-	20	35
	Tyre Pressure Monitor	30	-	5	20	20		Drivers Knee Airbag	20	-	5	10	20
								Front Airbags Driver and passenger	45	5	15	50	40
								Passenger Knee Airbag	15	5	-	10	20
								Thorax Airbags With Head	20	-	-	30	25

P- Professor; GE –Government Employees; IT- IT Employees; D-Doctors; BP-Business People

Five and eight important safety components have been introduced in the exterior and interior parts of the cars respectively. Only doctors, Professors, and a lesser proportion of the businessmen were aware of the safety benefits that they had in their cars.

b. Safety Devices Set in Braking System: Table gives data on this score

TABLE 2.SAFETY DEVICES SET IN BRAKING SYSTEM

Safety Aspects	Percent Responding				
	P	GE	IT	D	BP
Active Braking Systems	95	75	30	85	100
Active Cruise Control	45	35	-	45	40
Antilock Braking System	70	65	30	65	60
*AEB	50	45	-	40	35
Brake Assist System	40	35	-	25	40
Electronic Stability Control	45	15	10	35	30
*ISA	10	5	-	10	30
Pedestrian Auto Emergency braking	5	-	5	15	25
Pre crash Safety System	10	-	-	10	25
Traction Control	25	-	-	35	25

***P- Professor; GE –Government Employees; IT- IT Employees; D-Doctors; BP-Business People**

***AEB-Auto Emergency Braking; *ISA- Intelligent Speed Assist**

Except for active braking system and antilock braking system, the consumer's awareness on their safe braking devices was found to be very meagre. As in other aspects only the IT personnel were found not to have given any heed to these aspects on the selected criteria. In this aspect, involvement of the government employees was found to be better.

3. **Ergonomic Factors Considered Important:** These aspects help the user in maintaining good posture while driving, without causing musculo - skeletal disorders, a health issue of high prevalence in recent years

TABLE.3 ERGONOMIC ASPECTS CONSIDERED IMPORTANT

Objective	Ergonomic aspects	Percent Responding					Objective	Safety aspects	Percent Responding				
		P	GE	IT	D	BP			P	GE	IT	D	BP
Functional Aspects	Adjustable steering	75	65	60	90	85	Cabin Allocation	Seating adjustment	100	95	100	100	100
	*EARM	100	80	50	85	100		Foot space and height	90	85	90	100	95
	Auto gear	55	30	20	35	45		Hand rest and grip	85	80	50	95	100
	*SMC	55	25	25	45	55		Head Restraints All	75	35	35	60	80
	Placement of controls(fro	95	55	45	95	90		*SPDP	10	70	55	80	10

	nt)								0				0
	Bluetooth and call facility	45	9	25	45	55		Interior Acoustic Environment	100	80	40	100	75
	Keyless engine starts	25	9	5	20	25							

(*EARM-Easy Adjustment Rear View Mirror; *SMC-Steering Mounted Controls; *SPDP-Seatbelt Pre tensioner Driver &Passenger

***P- Professor; GE –Government Employees; IT- IT Employees; D-Doctors; BP-Business People**

EARM, placement of controls and adjustable steering were the major functional ergonomic aspects mainly considered by the samples from among the seven ergonomic components provided by the companies. Contrarily, all the six important ergonomic aspects provided to improve cabin space allocation was known about by almost all the samples. Definitely ergonomic aspects which guarantee comfort and convenience soaked in safety were factors well appreciated by the samples.

CONCLUSION:

The study has therefore proved that both the **supply side and demand side** are becoming increasingly conscious about **the intangible resources of health and safety** in the cars that roll out into the market. **As these two resources vouch for the wellness and well being of users, these cars qualify well for being brought out as consumer – friendly products**.

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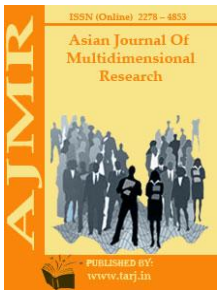

Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

AUTOMATED PARKING FACILITIES AS EFFECTIVE 'SPATIAL RESOURCE' ALTERNATIVES

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ABSTRACT

India is one of the fastest growing and resilient economies of the world having a booming automobile market. Parking demand often grows quickly, significantly and unexpectedly. As people get modernized, rise in luxury segments have led to increase in ownership of private vehicles and also their expectations with regard to parking. The negative impact of parking activities on the traffic and transportation scenario in most of the metropolitan cities of India is reaching an alarming stage. Parking is sensitive where it has impact on different segments of the population on the roads, who have to manage in most efficient and effective manner the task of parking. It has become a mandate for all public utility buildings to incorporate personal parking spaces. This paper highlights on the parking facilities provided in commercial/ essential services buildings' in terms of how ***space as a resource*** *is used and handled to tackle the issues of* ***ease in parking*** *and its influence on other tangible and intangible resources.*

KEYWORDS: *Automobiles, Parking Spaces, Commercial/ Essential Services Buildings*

INTRODUCTION:

Automobile have become indispensable to modern life like electricity and water. Cars also dominate the habit of shopping. Increasingly merchants also provide sufficient parking facility to attract customers as the life style of people has changed a lot. Parking pervades one's lives to the extent that one is substantially dependent on cars for everyday mobility state, Jakle and Sculle(2004). **Parking space** is an enclosed or unenclosed, covered or open area sufficient in size to park vehicles (Mandloi, 2016). Ingress and egress of vehicles to parking spaces shall be served by a driveway connecting them with a street.

Resource is anything people use or might want to use to achieve an end (Moore and Asay, 2013). People use resources to meet their physical needs of food, clothing and shelter. The industrialized world that people live today was created by uncovering and using new resources. Resources have certain characteristics that make them useable. A resource must have a purpose or utility. In the past few years, ***lack of space*** and facility to drop one's vehicle for a cause, in and around the city had become a recurring problem with increase in the number of vehicles on road considered so '***space***' is definitely a '***resource***' people require.

Automobiles are synonymous with mobility and freedom. A car is driven, on an average, two to three hours per day, spending the remainder of its time to be parked (Rajagopalan, 2011).With land scarce and available at an exorbitant price, it has become imperative to make the best use of available space. This had led to the birth of new parking solutions, to meet parking needs and catches the imaginations of many. There is a tremendous market potential for parking systems. InIndia, atpresent they are gradually increasing in its volume points out Kileda (2011).

A range of ***automated car-parking systems*** are available to suit various customer needs. For planners and developers seeking solutions, automated systems provide a new perspective. Architects can provide new dimensions to car-parking services and aesthetically adapt it to the building's architecture. In terms of cost, space, time consumed, there is no real alternative to an automatic-parking system, where large numbers of cars are parked or high-traffic volume is encountered. In India, the market is new and still developing, with few systems in operation states, Rajagopalan (2011).

In order to overcome the parking issue at high priority, most of the commercial and essential services buildings have switched over to accommodate modern parking facilities. Ramps are increasingly replaced by car parking in higher floors To get insight into these aspects, the new trend in parking facilities provided by the commercial/essential buildings was studied.

This paper highlights on the parking facilities provided in commercial/ essential services buildings', and their influence on how ***space, money, human safety and environmental factors as resources*** are saved and maintained using the new trend in parking systems. A preliminary study was conducted to understand the importance of parking facilities in commercial centers and other public buildings and observe different parking facilities that exist in use. This enabled identifying the significance of ***automated services and their influences on relevant resources*** better. The selected city has been coming up with multi-level kinetic parking systems worth Rs.130 Cr – in D.B. Road , Cross cut road & Town Hall has been designed to accommodate 1,990, 1,466 & 1,341 no's (including 2 & 4 wheelers) which costs around Rs.69.80, 32.99 and 28.84 Cr respectively (The Hindu, April 18, 2017).

OBJECTIVES OF THE STUDY:

- Locate different types of kinetic parking systems installed in the locale.
- Access their influence on tangible and intangible resources.

METHODOLOGY:

Coimbatore city was selected to conduct the study. The sample comprised of case study of six facility providers of both commercial and essential services buildings(one hospital, two office and three garment shops) which had installed either the four types of innovative parking systems selected adopting purposive sampling. Face to face interview, observation and a checklist formed the method and tool for the study. Purpose of the study was explained to the authorities of the facility providers in order to obtain the required data. The findings of case studies to find out the feasibility and their contribution to ***effective resource use*** presented under findings.

SALIENT FINDINGS:

- **Varients in kinetic parking systems**

  The varients in kinetic parking systems found during the study are:

  - **Puzzle Parking**
  - **Vertical Rotary System**
  - **Stacked Parking system and**
  - **Car Lift**

- **Contribution of the system to effective resource use:**

This aspect of the findings is delineated under the following sub heads

- ***Space – as social resource***

Exhibit 1: Different kinds of Kinetic Parking Systems

By installing these types of new parking systems the findings revealed that more number of cars could be parked without any issues with regard to crampedness, easy access to ingress and egress of vehicles and safety aspects. As all the systems restored to vertical systems, it enabled saving a lot of ground space required to park umpteen cars at a time. The selected hospital had allocated around 20,000 sqft including vertical space for more than 300 number of cars to be parked at a time whereas garment shops provide for upto 150 cars in around 10,000 sqft of vertical space. For offices an installation occupying less than 10,000 sqft vertical space was found sufficient which heldupto 50 where the minimum area required to park a car has been found out as 77 sq ft which varies depending upon the body type of the car. Number of floors alloted for operating this parking facility in the studied buildings and the number of levels are depicted in Table 1.

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TABLE 1. SPACE ALLOCATED FOR ACCOMODATING THE KINETIC PARKING SYSTEMS

Nature of business	Type of Innovative Parking	Percent Responding					
		Number of floors alloted for parking in the building			Number of parking levels in the parking system		
		Ground floor	B 1**	B 2**	Ground floor	Ground + level 1	Ground + level 2
Hospital (N=1)	Puzzle parking	100					100
Office (N=2)	VRS (stand alone)	50			50		
	Puzzle parking	50					50
Garment Shop (N=3)	VRS (stand alone)	33.3			33.3		
	Puzzle parking	33.3					33.3
	Stacked parking		33.3			33.3	
	Car Lift			33.3		33.3	

*Multiple Response **B 1 – Basement 1, B 2 – Basement 2 VRS – Vertical Rotary System

Even the vertical space can also be managed to fulfill its purpose of parking at various levels. Despite provision made in one or two basements, puzzle parking mainly could accommodate parking of cars in more than one level vertically (upto four levels) along with ground level. Similarly stacked and car lift too permitted upto ground and over basement level. It is clear that in general, puzzle system accomodates various levels of parking.VRS and stacked parking required only life size headroom, while puzzle parking required 7' – 10' headroom. Among the four, for car lifting the builders had to provide a height of 10' – 12' headroom to accommodate cars while lifting them.

- ***Cost – as an economic resource***

Cost for constructing these parking systems are given in Table 2.

TABLE 2. COST OF CONSTRUCTION

Nature of Building	Type of Innovative Parking	Percent responding				
		Cost of single pallet (in lakhs)		Total cost of the parking (in lakhs)		
		1 – 2	2 - 3	< 10	10 - 50	> 50
Hospital(N=1)	Puzzle Parking	100				100
Office(N=2)	VRS (stand alone)		50		50	
	Puzzle parking	50				50
	VRS (stand alone)		33.3			33.3

Garment Shop (N=3)	Puzzle parking	33.3				33.3
	Stacked parking	33.3			33.3	
	Car lift	33.3		33.3		

*Multiple Response

The cost of construction rather depended on the number of pallets to be incorporated. For single pallet except VRS which costed between two and three lakhs, others were available between one to two lakhs per pallet. Similarly as puzzle parking boasted of greater capacity (more than 100 cars), the cost of installation of puzzle parking also was found to be heavy. As expected VRS and puzzle parking were found to have been installed at an exhorbitant cost exceeding even 50 lakhs. Among the four, car lift emerged as the least expensive.**But all the premise owners expressed that they had capitalized on the issue of saving ground space (which could not be accessed for this cost in such busy areas which also showcase space crunch) at the same time benefiting from the attraction they have from consumers and the revenue they generated from the fees they levied which in the long run would break even.**

- ***Safety features – as human resource***

Exhibit2: Safety Features
Source: http://www.brightfutura.com

This part of the study analysed the safety measures found in the parking systems such as car set in brake, presence of human sensors, front and back mirrors, close side mirror, indicator that showed improper parking, ramp grip, non-brick construction etc. Seven different safety measures, as portrayed in Exhibit (2) have been devised to ensure safety when parking cars among which puzzle and VRS system utilized major five each. Only two aspects were considered by the other two. ***'Ergonomic' Concepts – as resources*** Puzzle parking had been recorded the minimum

temperature from 86 – 90^{o}F where VRS and stacked found to be within 90 – 94^{o}F and car lift between 94 – 98^{o}F. All the parking system rangedabove the optimum temperatureof 70 – 75^{o}F. Carlift has been recorded as the least noise producing, maximum level was reported in the puzzle parking, but ranged only within the optimum threshold limits.. Car lift parking depended only on artificial lights, whereas the others were found to have natural light too.

CONCLUSION:

Innovative Kinetic parking systems have had a good take off, which influences benefits in effective ***use /availability of resources*** – social, economic, human and environmental. Considered as one of the best decision to deliver anoptimalparking space to the consumer without any difficulty in parking their vehicles,which results in rich shopping, entertaining experiences and at emergency

moments. Invasion of these kinetic parking systems resulted in increased new business opportunities for manufactures at various levels. Increased number of kinetic parking system installation in the city witnesses the significance by providing and encouraging**maximum utilization of minimum space**, returngeneration, reduced construction, maintenance and operational cost, incorporating safety and ergonomical aspects, these systemsexcels in the glimpse of all type of its users, providers, dealers, suppliers and manufacturers.Let us expect surprises in the future.

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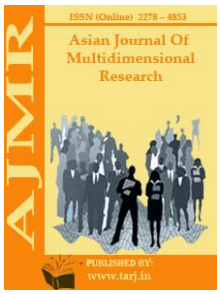

Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

ROLE OF YOUTH IN CREATING SUSTAINABLE ENVIRONMENT THROUGH ROOF TOP GARDEN

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ABSTRACT:

Developing terrace garden is current trend as it is more popular in metropolitan cities where there is serious dearth of space for developing organic roof top garden. Establishing terrace garden reduces the temperature of the home and improve aesthetic effect. Plants grown in the terrace keeps pollution away and provides fresh air which have the therapeutic value. As women dominate household food productions like income generative activities, rearing live stocks, kitchen gardening, terrace gardening and urban agriculture activities, they should be motivated to establish terrace vegetable garden. Thus the investigator made an attempt to motivate the youth to take up the terrace garden with the intention of cultivating vegetables by recycling the organic waste to create environment conservation.

KEYWORDS: *Environment, Organic, Pollution, Recycle.*

INTRODUCTION:

World trade agriculture is booming, yet food security is at unprecedented levels. Global food production needs to double by 2050 to feed a projected population of 9 million. In developing countries like India, Women and youth form the backbone of small holder agriculture. The role of education has changed the youth's attitude highly recognized and crucial to addressing the growing challenge of food security. As young adults face challenges in various aspects of their lives, it is essential for an individual to hold confidence in the ability to control one's environment which is known as self-efficacy. Women and youth farmers will bolster agricultural productivity, reduce hunger, promote economic growth and contribute to the achievement of the millennium development goals. At this stage, the task of upholding one's confidence is believed to produce a fruitful outcome in terms of subjective well being. They serve as producers, labors, professors and traders within largely domestic products. They also dominate household food productions like income generative activities, rearing live stocks, kitchen gardening, terrace gardening and urban agriculture activities.

According to Food and Agriculture Organization(2012) estimates, if women and youth have the same access to productivity resource as men, they could increase the yields on their farms by 20-30%; total agriculture output in developing countries by 2.5 -4% and reduce the number of hungry people in the world by 12-17%. Investments in youth and women's capacities to ensure more equitable access to innovative technology and training will strengthen the potentials of youth to take up the venture. Therefore skill development plays a pivotal role which should be adopted in the essential areas of career development, skill development and technical expertise to the youth for creating sustainable environment.

Even though India has the culture of growing a part of its own food in the backyards, recently there is an increase in the price of vegetables and greens. This might be due to lack of awareness in conservation of resources and scarcity of getting chemical free vegetables and greens. As organic vegetable cultivation preserves the mother earth, it could be adopted as an eco-friendly practices that improves our environment through efficient recycling of biodegradable waste (organic terrace .in). Focusing this theme in mind, the investigator gave training on preparation of compost and terrace garden with the following objectives:

1. To give training for the youth to recycle the household kitchen waste.
2. To educate them on terrace garden techniques and study the knowledge gained.

RESEARCH DESIGN:

Selection of locale and sample:

Salem district was selected as the locale of the study. One hundred students who showed interest and also enthusiastic to learn the terrace garden technique was selected. These students were studying in B.Com Course at Saradha college, who opted Entrepreneurship Development as part of their subject. The students were oriented in the following aspects:

A. Preparation of compost from Kitchen waste
B. Terrace garden techniques

A.Preparation of compost from Kitchen waste:

The training programme for youth helps to improve their knowledge and skill to identify and recognize opportunities in all sectors for self sustenance and improved livelihood. Two methods

of compost preparation at household level was explained to the youth by the investigator. Composting is the process of break down the carbon from the organic wastes (Kitchen and bio degradable) in the presence of air and water using microorganisms and small insects present in nature. The end product is rich in nutrients readily applicable and nutrients forming a part of healthy pot media. By segregating, recycling and composting the kitchen waste from every house, a family of four can reduce their waste into compost from 1000kg to less than 100 kg every year. From this type of compost preparation nearly 90% of all the household waste is converted into valuable compost which creates a clean and green environment will help to start compost journey to the youth (The Hindu, 2013). This training programme builds learning and enhance their skills by changing their efficiency through participation. The method of preparation of manure is as follows:

Method 1:

- Collect peels of vegetables and fruits, tea and coffee extracts, egg shells and other bio-degradable waste materials daily.
- Store these wastes in a 3'x4' plastic bucket with holes at the bottom for drainage and aeration.
- Once the container is 3/4th filled, add 7.5 Kgs of biodegradable waste for 250 grams cow dung. This is diluted with half liter water and poured on the collected waste.
- A thin cotton cloth is tied around the filled bucket and kept under the shade. Once in three days shake the container to make the content mix well and to ensure proper aeration.
- After 35 days, very dark and clumsy compost will be ready which forms an important ingredient for potting media.

Method 2:

- The following procedure is adopted for preparation of compost within a short period.
- Collect peels of vegetables and fruits, tea and coffee extracts, egg shells and other bio-degradable waste materials in 3'x4'plastic bucket daily.
- Once the container is filled, spread the collected waste on a thin sack for drying
- Place the sack directly under the hot sun and mix the collected waste with ash thoroughly.
- The drying capacity depends upon the intensity of the heat. Within 2 to 5 days manure will be ready.
- As the manure is prepared within a very short period, this method is followed for preparation of compost whenever required.

TERRACE GARDEN TECHNIQUES:

According to Housing Development Authority of India (HDAI), 90% of homes constructed under Indira Gandhi Yojana Niwas(IGYS) have flat roof surfaces. Since establishing roof top gardening is eco- friendly, investigator instructed youth regarding how to start terrace garden, where to get the resources like grow bags, seeds, saplings, growth promoters and other equipments. Requirement of 4to 6 hours sunlight for growing vegetables and greens on terrace, if sunlight is too harsh, use shade to prevent plants from getting scorched, which vegetables and greens are suitable for terrace and how to grow them the right mix of soil and how to take care of

the plants was also explained to them. It is advisable to always grow vegetables on southern or western space since plants will have sunlight and survive easily,

Knowledge Gained by Trainees

Although roof top garden is mainly intended to benefit the women students, it seeks to motivate and create awareness particularly the youth who aspire to cultivate vegetables. The methods followed for training to the youth were power point presentation, demonstration and lectures .Pamphlets, mono graphs were also distributed to the youth. Well prepared schedule was distributed to analyze the knowledge gained before and after attending the training programme. The following table 1 expresses the knowledge gained by the youth.

TABLE -1 KNOWLEDGE GAINED BY THE YOUTH.

S. No	Reasons	Knowledge Gained N-100 (in percentage)	
1	Vegetables and greens are free from pesticides	**Before**	**After**
2	Home grown vegetables and greens are tastier and delicious	48	90
3	Easy to implement on terrace as it involves simple technology	55	100
4	Essential for the current trend due to limited space	35	95
5	Helps to inculcate values to the children by watching the vegetables germination to fruiting stage	40	100
6	Gives mental satisfaction as we eat what we grow	36	100
7	Greens and vegetables are true nutrition to our family members	53	100
8	Recycling the waste gives sound atmosphere to the community and house	44	100
9	Helps to cut down the CO2 in air	65	100
10	Keep home cool as it reduces the temperature of the terrace	75	100
11	Kitchen waste is recycled effectively as it conserves mother earth	60	100
12	Reduce stress as it is closer to nature plays a role of de- stress center	70	95

The above table shows the knowledge gained by the students' community. It has created an impact on training programme to the maximum extent. The knowledge level has increased from 25 percent to 40 percent. Motivating youth to prepare manure utilizing the available bio-degradable waste was found to be more essential, as it is vital and most important resource for establishing terrace garden. The plate below indicates the active participation of the youth.

1

2

3

4

CONCLUSION:

Roof top garden is an important step to enhance the environmental sanitation by recycling the organic waste into essential ingredient for terrace vegetable cultivation. Segregating and recycling the kitchen waste creates a green and eco friendly environment. So terrace gardening can supplement the diets of the community and thereby it retains the cultural gardening practices by utilizing the locally available biodegradable wastes to grow vegetables. Hence terrace is the ideal place to grow vegetables domestically as a family based activity. Organic terrace garden is not only for the growing of crops, but the cultivation and perfection of human beings".

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PROSPECTS AND CHALLENGES FACED IN INSTALLING INSTITUTIONAL BIOGAS PLANTS

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ABSTRACT

The conventional energy sources of the world like coal and petroleum are diminishing fast. It has to be realized that the world's pantry of non-renewable natural resources does indeed have a bottom shelf. The treasury of natural gas, petroleum and coal will be exhausted one day. With the finite and rapidly depleting resources of oil, coal and natural gas, it has become a primary issue to find sources of renewable energy and its methods to reap them. The energy crisis has waked up to realise the fact that dependence on only one type of energy is not a right decision (Hazra, 2011). It is right time to solve the issue of energy crisis through wise use of readily available renewable energy resources like biomass, geothermal, solar and wind energy. A constant effort has to be taken to bring back the socio-ecological balance of nature in order to use the resources optimally and control the available resources. It is also very important to design the waste management system (Chaturvedi, 2000). Among the wide range of technologies available for treating municipal solid waste, bio-methanation appears to be the advantageous as it results in the manufacture of methane rich gas (biogas), a substitute of conventional fuel which is again used as organic fertilizer. This technique is also applicable for converting the wastes generated from public places such as markets, communities, hotels, hostels and other institutions for converting energy without any contamination which can be used as organic manure. Hence, an attempt has been made to study the appropriateness of Institutional Biogas Plant in solving energy crisis.

KEYWORDS: *Energy crisis, Waste management system, Conventional fuel, Institutional Biogas Plants*

INTRODUCTION:

The rapid rise in population, the awareness to improve the standard of living has resulted increasingly the energy needs constantly. To cope with the increasing needs of the population, a number of infrastructural facilities such as educational institutions, restaurants, industries, hospitals are established. The mushroom growth of educational institutions and industries at the outskirts of the city with attached hostels and canteens consumes enormous quantity of fossil fuels for catering to the needs of the inmates. The enormous waste generated in these hostels and canteens in the form of vegetable waste, leftover food and other organic waste should be channelized in an appropriate way to generate fuel, fertilizer and promote a clean environment.

In this context, the concerned authorities should conscientious their thought in utilizing organic waste for recovering energy to meet their cooking requirements in institutions for energy security and cleaner and safer environment. For facilitating better use of organic waste in large scale establishments, Institutional Biogas Plants are one convenient, cost effective and operationally viable device. Hence, an attempt has been made to study the appropriateness of Institutional Biogas Plants (IBP) in solving energy crisis.

METHODS AND MATERIALS:

This part of the study includes the following steps:

- Locale of the study
- Selection of Institutions

Tamil Nadu and Kerala are the States located in the Southern part of India have been chosen for the study. In Tamil Nadu 40 Institutions and in Kerala 10 Institutions were selected based on purposive sampling methods.

RESULTS AND DISCUSSION:

The social survey carried out by the researcher in 50 institutions revealed the trends and issues of IBP in the recent years. They are summated in the following headings.

1. Reason for installing Institutional Biogas Plants

2. Resource recovery and cost benefit in terms of fuel and money

3. Obstacles faced in execution

4. Prospects gained in using Institutional Biogas Plants

1. Reason for installing Institutional Biogas Plants

The most pressing problems such as energy crisis and waste disposal made the administrators to install Institutional Biogas Plant in their campus. Table 1 outlines the reason behind for their installation of IBP.

TABLE 1: REASON FOR INSTALLING INSTITUTIONAL BIOGAS PLANTS

Concept	Institutions* Percentage N:50
Achieving National millennium goal	100
Safe disposal of night soil	100
High cost and sudden hike in price of LPG	100
Recovery of energy from waste	96
Energy efficient technology	94
Relevant utilization of garbage and leftover foods	92
Appropriate technology	90
Restoring hygienic environment	84
Transport of waste material	78
High demand of LPG	76
Collection and storage of firewood	16

*Multiple responses

Achieving National millennium goal in energy efficiency made all of them to venture into this project. All of them unanimously expressed the safe disposal of night soil; high cost and sudden hike in price of LPG are the major issues in deciding the installation. Ninety per cent of the institutions weighed waste to energy as an appropriate technology to solve the problems.

a. Capacity wise Distribution

Depending upon the quantum and nature of foods prepared, the capacity of plant has to be decided.

Researches pointed out that a 2 cu.m capacity of the biogas plant is sufficient to cater to the needs of a household with four members. But for the large establishments, where large quantum of food has to be prepared a minimum capacity of 10cu.m biogas plant is needed. However, the biogas generated from these plants only supplement the other fuels but will not substitute the fuel completely.

Seventy per cent of the institutions had installed medium size gas plants ranging between 20cu.m, 25cu.m, 30cu.m and 35cu.m. Twenty per cent of the institutions had constructed huge capacity gas plants envisaging the future needs. Divine Retreat Centre at Thrissur, Kerala had constructed 85cu.m capacity gas plant with the help of funds contributed by the devotees. Bannari Amman Engineering College at Sathyamangalam had invested a sum of Rs 10 lakhs in constructing 90cu.m capacity biogas plant considering the large number of inmates of the hostel.

b. Waste disposal methods and associated problems

Prior to the installation of IBP, the authorities of institutions adopted various disposal methods and faced many problems in disposing the waste.

TABLE 2: WASTE DISPOSAL METHODS AND ASSOCIATED PROBLEMS

Waste disposal methods/Problems	Institutions* Percentage N:50
Night soil – Septic Tank	100
Frequency of clearance	100
Requires man power in cleaning	100
Overflow of tank	84
Garbage/Left over foods	56
Common dust bin	30
Pollution	28
Breeding ground for flies and mosquitoes	20
Unpleasant odour	24
Dumping	30
Unsightly appearance	28
Unhygienic environment	24
Rodent nuisance	16
Thrown in the drainage	24
Blockage Problem	22
Breeding ground for flies and mosquitoes	22
Water stagnation	20
Public vehicle	16
Non availability	6
No frequent clearance	6

* Multiple responses

Clearance of septic tank, over flowing of the tank and getting man power to clean it were the associated problems in disposing night soil. The garbage and leftover foods were disposed by dumping, throwing them in uncovered common dust bin and in the drainage prior to the installation. Rodent nuisance, mosquito breeding and blockage of drains made the surrounding unhealthy and unhygienic. The public vehicles clear the wastes only on the assigned date and not based on the accumulation of wastes.

2. Resource recovery and cost benefit in terms of fuel and money

The main aim of installing IBP in the Institutions was to recover fuel energy. The institutions were spending huge amount in using Liquefied Petroleum Gas as fuel for quantity cookery. The introduction of IBP paved way for them to minimize the usage of cylinders to a certain extent. However, it could not completely replace the usage of LPG. The reasons for not completely replacing the LPG are due to less effective heat produced in biogas (2600 kcal) compared to LPG (6000 kcal) and hence consumes more time for cooking. The food should be prepared and served to the inmates staying in the hostel in the specified timings. So to supplement the biogas they have to use LPG to complete the cooking in time. The cost benefit in terms of money for a period of one month for different capacities is given in Table 3.

TABLE 3: MEAN COST BENEFIT THROUGH THE INSTALLATION OF INSTITUTIONAL BIOGAS PLANT PER MONTH

Capacity (cu.m)	LPG cylinders/month			Amount spent for LPG Rs		Net savings Rs.
	Before	After	Savings	Before	After	
10	50	38	12	86,750	65,930	20,820
15	65	52	13	1,12,775	90,220	22,555
20	76	58	18	1,31,860	1,00,630	31,230
25	84	68	16	1,45,740	1,17,980	27,760
30	90	72	18	1,56,150	1,24,920	31,230
35	96	80	16	1,66,560	1,38,800	27,720
40	98	84	14	1,70,030	1,45,740	24,290
45	104	88	16	1,80,440	1,52,680	27,760
60	110	86	24	1,90,850	1,44,210	41,640
80	115	96	19	1,99,525	1,66,560	32,965
85	120	98	22	2,08,200	1,70,030	38,170
90	124	99	25	2,15,140	1,71,765	43,375

As per the statistics given by the authorities a considerable number of commercial LPG cylinders were saved through the installation of IBP. The saving of LPG cylinders is directly proportional to the capacity of the plant in that as higher the capacity, the more number of cylinders are saved.

3. Obstacles faced in execution

The authorities faced certain obstacles in operation of biogas plants. They are depicted in Table 4.

TABLE 4: OBSTACLES FACED IN EXECUTION

Obstacles Faced	Institutions* Percentage N:50
Initial Stage	
• Selecting the design	92
• Identifying agency	86
• Locating the area	84
• Investing the capital	72
• Appointing labourers	64
Operation	
• Identifying the feed stock materials	64
• Insufficiency of feed stock materials	52
• Training of personnel	44

Technical • Blockage • Non-availability of specific material • Leakage	 76 20 8
Acceptance • Awareness of the project • Social and psychological	 62 38

*****Multiple Responses

Ninety two persons have expressed that they were not able to decide the capacity, design structure and materials needed for construction. Identifying suitable agency for entrusting the work was a major issue in 86 per cent of the institutions. Deciding an ideal location for constructing the IBP had created a controversial opinion among the members as expressed by 84 per cent of the institutions.

4. Prospects gained

An array of benefits has been realized through the successful running of IBP can be seen in Table 5.

TABLE 5: PROSPECTS GAINED BY AUTHORITIES IN INSTALLING IBP

Views	**Institution Authorities* Percentage N:50**
Brings an ideal technology to the institutions	100
Utilizes waste to energy	92
Eliminates physical hazards	86
Returns the capital spent in 2-3 years	78
Removes the drudgery of clearing septic tank	78
Avoids stress and strain in getting LPG	76
Recovers fuel and manure resources	76
Creates scientific temper among inmates	72
Enriches the manurial value	68
Restores clean environment	62

* Multiple responses

All of them expressed that erecting IBP is an ideal technology in solving energy crisis. This shows the recent trend of switching over to alternate sources of energy in large scale establishments where enormous fossil fuels are used for cooking.

CONCLUSION:

We, in India are bestowed with vast natural resources as well as rich biological heritage. The day when fossil fuels get exhausted one needs to turn on only to the perennial sources of energy - the

radiating sun, the blowing wind, the surging tide and other sources of biomass, especially the misplaced resource 'Waste'. The day is not far off. These wastes find a proper place through recycling methods and generate most precious fuel-biogas with the initiation of the installation of IBP. The better use of organic waste in large scale establishments using Institutional Biogas Plants provides convenient, cost effective and hygienic environment. Continuous, conscientious and co-operative efforts on a large scale by Governments, Universities and Voluntary agencies will pave way towards achieving self-sufficiency in energy in effective use of Institutional Biogas Plants.

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Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

FINANCIAL AND SOCIAL CONSTRAINTS OF WOMEN ENTREPRENEURS

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ABSTRACT:

In today's world, women entrepreneurs are playing a vital role to become part of the global business environment for sustained economic development and social progress. In India, though women are playing the crucial role in the society, their entrepreneurial ability has not been adequately tapped and recognized due to the lower status of women in the community. The socio-economic development cannot be fully realized as long as its women are confined the subordinate position and their talents remain unexplored. Women entrepreneurs are becoming a reality nowadays due to pull and push factors with an urge to take up independent occupation. Entrepreneurship is the extraordinarily and challenging the task for women in India but if carried successfully can inculcate confidence in making them more conscious about their rights. There are number of obstacles faced by women entrepreneurs during start-up stage and running up of their enterprise. The constraints need to be informed and make a significant contribution towards the sustained economic development and social progress for the country. The present study tries to examine the status of women entrepreneurs and identify the financial problems faced in the running up of their enterprise.

KEYWORDS: *Women Entrepreneurs, financial problem, social problems, obstacles and start-up-stage*

INTRODUCTION:

"Obstacles are the stumbling blocks that often become the steppingstones to success".

Swahili

Women Entrepreneurs are highly increasing in the economies of almost all countries. The hidden business potentials of women have been with the growing sensitivity to the role and economic status in the society. The knowledge skill and compliance in business are the core reasons for women to come forward into business ventures. In traditional cultures, they were confined to within four walls and performing household activities. Women have to confront many additional problems of varying dimensions and magnitudes, which prevent them from realizing their full potential as entrepreneurs. Women entrepreneurs experience multidimensional constraints, (Ahmad et., al,2011). Problems faced by women entrepreneurship in India state that it's high time for women to come out of the drudgery of housework and express their creativity and entrepreneurship, (Kumari, 2012).

Today, women have not only safely entered into job situations, but have also immersed as professionals and executives in many fields. However, their entry into the fiercely competitive business world has a significant challenge. Women have owned and operated the business for decades, but they were not always recognized or given credit for their efforts (Hughes, 2012).

Women entrepreneurs play a critical role in the economy of the country with regards to income and employment creation, women are now very active both mentally and physically in regarding of business ventures and realized that they could do what men do, or even better than them regarding business ventures (Singh 2012). Women in India the relatively recent phenomenon and various programmes are being conducted to improve the status of women and their access to resources and to develop a realistic and well-designed plan and programme for promoting the women entrepreneurs, (Lerner, 2002).

OBJECTIVE OF THE STUDY:

The objective of the study was to highlight the significant financial and social constraints encountered by Women Entrepreneurs.

METHODOLOGY:

Survey as the method of securing relevant information concerning a phenomenon under study was used since it has the advantage of broader scope and accuracy of information, (Kothari, 2005). The study was mainly based on primary data collected from women entrepreneurs in Coimbatore City. A sample of 50 women entrepreneurs was selected through purposive sampling technique for the study. Purposive sampling technique is a non-random sample method which is based on factors like convenience in data collection, budget and time constraints. (Calmorin, 2008). The Interview schedule was the tool used for the collection of data. The interview schedule is unique in nature which involves the collection of data through direct verbal interactions between the interviewee and the investigator which permits an exchange of ideas and information besides possibility for clarifying doubts, it is a useful and reliable tool for collecting the relevant data,(Gupta 2007). The investigator ensured that the entire questions had the response. The collected data was consolidated, tabulated and analyzed using percentage analysis.

FINDINGS AND DISCUSSION:

Financial Constraints

Finance is the lifeblood of any enterprise. It has to be available at the right time in the right quantity. Availability of adequate financial support accelerates the success of a business. Entrepreneurs are unable to mobilize the needed finance, to make their dream come true. The women entrepreneurs are facing various financial constraints in mobilizing finance. Table I presents the financial obstacles faced by the selected samples.

TABLE .1 FINANCIALCONSTRAINTS BY THE SELECTED SAMPLES

Constraints	N-50	Percentage
Shortage of finance	14	28
Insufficient working capital	11	22
Delay in sanctioning loan	8	16
Inadequate Access to Finance	5	10
Elaborate Banking procedure	5	10
Ignorant on loan facilities	4	8
Non-availability of funds for initial investments	3	6

The data from Table I indicates that the major constraint faced by the women entrepreneurs wasshortage of finance (28 percent), followed by insufficient working capital (22 percent) , delay in sanctioning loan (16 percent), inadequate size of loan (10 percent) , elaborate banking procedure (10 percent), ignorant on loan facilities (8 percent) and non-availability of funds for initial investments (6 percent).

Social constraints

Apart from the financial constraints, there are certain social constraints which restrict the growth of women entrepreneurs. The time is taken up and the emotional burden created by these dual role responsibilities often interfere directly with the conduct of business for women in ways that do not apply to the majority of men. The social constraints by the selected samples are presents in Table 2.

TABLE 2.SOCIAL CONSTRAINTS BY THE SELECTED SAMPLES

Constraints	N-50	Percentage
Duel responsibilities	15	30
Uncertainty	11	22
Absence of family encouragement	10	20
Poor Exposure	6	12
Insufficient time	5	10
Indifferent attitude of the society	3	6

Table 2 reveals that the social constraints and expressed by the majority of the women entrepreneurs was the dual responsibilities (30 per cent), played by them as the women to

perform the role of homemakers .The other expressed were uncertainty (22 per cent), absence of family encouragement (20 per cent) , poor exposure (12 per cent), insufficient time (10 per cent) and six per cent of the women entrepreneurs are constraints indifferent attitude of the society.

CONCLUSION:

The present study was examined the problems of financial and social constraints by women entrepreneurs during startup stage and running up of their enterprise. Women entrepreneurs were facing various economic issue such as shortage of finance, insufficient working capital, delay in sanctioning loan, inadequate access to finance, elaborate banking procedure, ignorant on loan facilities and non-availability of funds for initial investment .Even though many successful women entrepreneurs in the country, but there are many challenges which women entrepreneurs face from dual responsibilities, uncertainty, the absence of family encouragement and society. There is a need of exceptional efforts in the field of women entrepreneurs to encourage and a group to makes the members want to succeed and instilling self-confidence in them.

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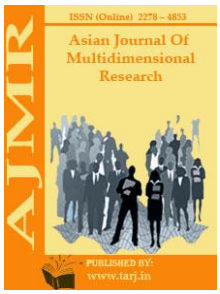

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UGC APPROVED JOURNAL

A STUDY ON THE IMPACT OF INCULCATING SPIRITUAL VALUES AMONG PRIMARY SCHOOL CHILDREN

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ABSTRACT

Spiritual values are the integrated values towards the spiritual development of children. The all-rounded development of children is incomplete without spiritual development and more specifically spiritual development is lacking without the cultivation of spiritual values. Spiritual values are not the momentary values but they are universally applicable values and affect our behavior inside and outside the society. This values help the children to be aware of the difference between the good things against bad things, truth against lie, patience against impatience, courage against fear, obedience against disobedience, peace against violence, and its effect and so on. This study is mainly aimed at identifying and assessing spiritual values among primary school children. The sample of 193 primary school children from I-V Standard of one Private School in Coimbatore City were selected for this study. Purposive sampling technique was used to select the school children. The tool selected for this study was interview schedule and training programme was also conducted for the selected school children with the objectives of (i) to identify spiritual values among primary school children (ii) to impart spiritual values education to the selected primary school children, and (iii) to evaluate the spiritual values imbibed by the selected primary school children before and after training programme.

KEYWORDS: *Inculcation, Spiritual values, Primary School children, Training programme, Positive changes.*

INTRODUCTION:

"Do not train children to learning by force and harshness, but direct them to it by what amuses their minds, so that you may be better able todiscover with accuracy the peculiar bent of the genius of each." -- Plato

The ideal of education has been very grand, noble and high. Education is a process by which society deliberately transmit its accumulated knowledge, skills and values from one generation to another. It is the basic for development and empowerment for every nation. It plays a vital role in today's world. (Singh, 2011)

Value is an element of shared symbolic system which serves a criterion or standard for selection among the alternatives of orientation which are intrinsically open in a situation. (Parson, 2002) Values in education are set according to the ever-changing needs of the society and the nation. Values are ideas that people see as worthwhile. They provide standards of conduct by which we measure the quality of human behavior. Values in education are set according to the ever-changing needs of the society and the nation. Though every nation is worried about the continuous corrosion values yet no serious action has been taken by any of the nations for the restoration of values. (Mohan, 2016 and Sindhwani & Kumar, 2013)

The primary or the elementary education has the initial years of formal and structured education during childhood. In primary education, the child stays in steadily advancing classes and move on to the secondary schooling. The children are usually kept in classes with one teacher who will be primarily responsible for their education and welfare for that particular year. The most notable feature of the primary education is the continuity of a single teacher in the class to build up a close relationship with the class. (http://education.newkerala.com/india-education/Education-Levels-in-India.html)

The primary stage consists of Classes I to V. i.e. of five years duration. Age limit for class I is 5 yrs. 6 months to 6 yrs. 6 months, for class II is 6 yrs. 6 months to 7 yrs. 6 months and so on. The enrollment in primary school starts from the age group of 5 years and continues till age 14. Elementary education mission in India looks after the facilities of the primary mode of education. The structure of primary school is preceded by pre-primary education and followed by secondary education. (https://www.classbase.com/countries/India/Education-System)

Spiritual values are the integrative values of human soul consisting of altruistic, humanistic, personal, divine, and affective values leading to spiritual growth of personality. Altruistic values refer to values promoting spiritual growth of personality such as Truthfulness, Kindness, Repentance, Reliance on God, Modesty, Unity, and Charity, and Love. Divine values which help us to love God and are the values for submission to God, such as Piety, and Compassion. And finally, Affective values helps to develop peace within self and live in harmony with others, such as Tenderness, Gentleness, and Contentment.(Nazamandand Husain, 2016)

The holistic development of children is incomplete without spiritual development and more specifically spiritual development is incomplete without the cultivation of spiritual values. Because spiritual values actually make us spiritual for example, without the values of compassion, humility, goodness, and truthfulness how could we expect transcendental experience? The values of truth, righteousness, peace, love and non-violence are found in all major spiritual paths. These **spiritual values** are also human values and are the fundamental roots of a healthy, vibrant, and viable work career.

Hence the present study was undertaken with the following objectives:

OBJECTIVES:

- to identify spiritual values among primary school children
- to impart spiritual values amongthe selected primary school children
- to evaluate the spiritual values imbibed by the selected primary school children

METHODOLOGY:

One private School in Saibaba Colony, Coimbatore, Tamil Nadu was selected as the area of the study. According to Gupta (2006) purposive sampling is that one can hand pick the 'right' cases to be incorporated in the sample and thus develop samples that are adequate in relation to one's research needs. Hence for this study purposive sampling was used. Questionnaire is a set of questions developed in an organized and ordered manner for gaining information from the people in relation to a given problem (Gupta, 2006). A schedule was designed to elicit information pertaining to the objectives of the study. The sample comprised of 193 school children from I-V Standard. Training programme was conducted in order to inculcate spiritual values among the selected school children. In this programme various method were used to teach the children like audio-visual aids, outdoor activities, competition, drama, posters, charts, slides etc. in this programme all children were asked to participate. The data were analyzed by percentage after the training programme to see the difference before and after the training programme.

MAJOR FINDINGS:

The finding on the study on "Impact of inculcating spiritual values among primary school children" are analyzed and presented under the following heading:

A. Sex wise distribution of the selected Primary School Children.

B. Class and age wise distribution of the selected Primary School Children.

C. Spiritual Values imbibed by the selected Primary School Children.

A. Sex wise distribution of the selected primary school children is given in Table I

TABLE – I
SEX WISE DISTRIBUTION OF THE SELECTED PRIMARY SCHOOL CHILDREN

SEX	NUMBER (193)	PERCENTAGE
Boys	107	55
Girls	86	45

The above table shows that out of 193 selected school children, fifty five per cent of the total number of selected school children were boys and the remaining 45 per cent of the selected school children were girls.

B. Class and age wise distribution of the selected primary school children is given in Table II

TABLE – II
CLASS AND AGE WISE DISTRIBUTION OF THE SELECTED PRIMARY SCHOOL CHILDREN

CLASS	AGE GROUP (years)	NUMBER (193)	PERCENTAGE
I	5 to 6	38	20
II	6 to7	39	20
III	7 to 8	44	23
IV	8 to 9	38	20
V	9 to 10	34	17

The above table shows that 20 percent of the selected school children fallsunder the age group between 5 to 6 years, 6 to 7 years and 8 to 9 years were studying in I, II & IV Standard, respectively.Twenty three percent of selected school children were under the age group between 7 to 8 years were studying in III Standard and eighteen per cent of selected school children falls under the age group between 9 to 10 years were studying in V Standard.

C. Spiritual Values imbibed by the selected Primary School Children of I, II & IIIIV and V Standard are given in Table III and IV

i. Spiritual Values imbibed by the selected Primary School Children of I, II & III Standard are given in Table III

TABLE – III
SPIRITUAL VALUES IMBIBED BY THE SELECETD PRIMARY SCHOOL CHILDREN STUDYING IN I-IIISTANDARD N= 121

Spiritual Values	I Standard (N-38)				II Standard (N-39)				III Standard (N-44)			
	Age Group (5 to 6 yrs)				Age Group (6 to 7 yrs)				Age Group (7-8 yrs)			
	Boys (N-23)		Girls (N-15)		Boys (N-21)		Girls (N-18)		Boys (N-27)		Girls (N-17)	
	BTP	ATP	BTP	ATP	BTP	ATP	BTP	ATP	BTP	ATP	BTP	ATP
Praying to God daily	65	91	80	93	76	95	56	94	63	93	76	94
Praying for everyone	43	83	67	87	71	90	67	89	56	81	59	82
Sharing things with brothers and sisters	57	87	73	87	52	81	72	94	63	85	76	94
Telling the truth	74	83	53	80	57	90	67	83	59	89	71	88
Helping friends in school	65	91	60	93	71	86	78	89	67	93	65	94
Obeying elders	61	70	47	73	76	95	72	94	70	85	53	88

BTP- Before Training Programme

ATP- After Training Programme

Table III showsthat after the training programme there was an improvement in the result of all the selected primary school children both boys and girls in the age group of 5 to 8 years studying in I, II &III Standard. Specifically the of **II Standard** and III Standard in the age group of **6 to 7** years and 7 to 8 years both boys and girls was noticed that there was an improvement after the training programme and also the difference between the gender in responding all the aspects of spiritual values. The results of selected primary school children after the training programme varies between the genders. In girls all the aspects of spiritual values shows the difference (range between 80 to 94 per cent) whereas in boys all the aspects of spiritual values shows the difference (range between 70 to 95 per cent) respectively.

ii. Spiritual Values imbibed by the selected Primary School Children of IV Standard are given in Table IV

TABLE – IV
SPIRITUAL VALUES IMBIBED BY THE SELECETD PRIMARY SCHOOL CHILDREN STUDYING IN IV-STANDARD N= 38

Spiritual Values	BOYS(17)		GIRLS(21)	
	BTP	ATP	BTP	ATP
Praying is a good habit	82	94	76	95
Develop good manners towards others	71	88	71	90
Forgiving other's mistakes	65	94	62	86
Treat others with kindness	65	82	57	95
Being honest and doing work sincerely	59	88	67	81
Develop equality among other peers	53	82	71	86

Table IV revealedthat after the training programme,all the aspects of spiritual values in girls shows the difference (range between 81 to 95 per cent) whereas in boys the difference (range between 82 to 94 percent) in all criteria of spiritual valuesfor the selected primary school children both boys and girls of **IV Standard** in the age group of **8 to 9** years in imbibing spiritual values. There is not much difference between boys and girls after the training programme.

iii. Spiritual Values imbibed by the selected Primary School Children of V Standard are given in Table V

TABLE – V
SPIRITUAL VALUES IMBIBED BY THE SELECETD PRIMARY SCHOOL CHILDREN STUDYING IN V-STANDARD N= 34

Spiritual Values	Boys (19)		Girls (15)	
	BTP	ATP	BTP	ATP
Being sincerely in studies	53	89	53	80
Helping the poor and needy	58	89	67	87
Concern for other's well being	53	84	73	93
Feeling guilty for bad action	63	79	60	87
Behaving calmly with others	47	74	67	80
Regular prayer is very essential	68	95	80	93

Table III shows that the result of training programme conducted for selectedprimary school children of **V Standard** in the age group of **9 to 10** years improved in all criteria.All the aspects of spiritual values in girls shows the difference (range between 87-93 per cent) after the training programme, whereas in boys the aspects of spiritual values shows the difference (range between 74-95 per cent) after the training programme.

CONCLUSION:

The training programme for the selected school children have played a major role on inculcating spiritual values among school children. Imparting spiritual values to children is a very important factor for them to deal with the other individuals in the society and to become a good citizen in the future. Through the analyzed table, it is noticed that there isimprovement in spiritual values imbibed by the selected primary school children between boys and girls compared after training programme.

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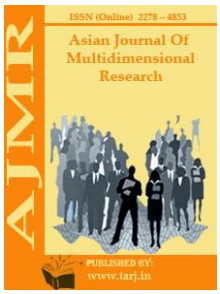

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CONTEMPLATION ON ITALIAN MODULAR KITCHEN

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ABSTRACT

A kitchen is an important component of the house. As the technology develops there is development in all sectors which makes humans work efficiently. This is applicable for kitchen sectors also, from the type of stove to the types of units. For Eg: The old Chula's are now replaced with flash induction and teppanyaki's. They are making life easier as these days most of the woman are working and they don't have time for cooking, the inventions of modular kitchens have helped them in work simplification and energy saving . Nowadays women prefer a more sophisticated and a well-equipped kitchen which helps create a interest in cooking. The more modernized they are the prices also goes up variably. There are many companies which do modular kitchen in India. Most of them import their kitchens from different countries such as Germany and Italy and other have their own factory.

KEYWORDS: *Modular Kitchen, Energy Saving, Homemakers, Aesthetically Designed*

INTRODUCTION:

"Home is where the hearth or the kitchen is"- Bill, 2007

A housewife usually spends a sizeable time in the kitchen. Hence it must be well located. A well-organized home is determined by a well-planned, good quality kitchen. It is the most lived in room and besides the most expensive room in the house also (Aggarwal, 2006). According to Clois (1984) new life styles, new concepts of planning and technological advances all play a role in transforming kitchen from dull and sterile work areas to cheerful, colorful centers for group living. Modular kitchen featured today are not just superbly functional and fully equipped; they are also aesthetically designed and extremely utilitarian. Malini (2002). Modular kitchen today have become the common way of life. Hence the investigator took an effort to find out the extent of satisfaction of the homemakers who own a modular kitchen through a study on **"Contemplation on Italian Modular Kitchen",** with the following intents:

- Find out the brands of modular kitchen available in the market.
- Find out the extent of satisfaction among the clients who have installed a popular brand of modular kitchen.

METHODOLOGY:

The methodology consisted of survey. Two different surveys were conducted to collect required information for the study namely:

A. Market Survey and

B. Household Survey

A. MARKET SURVEY

The market survey was conducted in the busy areas of Coimbatore city such as Saibaba colony, Peelamedu, RS puram and Trichy Road. For the study, ten shops which are selling modular kitchen were selected by "purposive sampling" method. The shops were selected on the basis of availability of product and the willingness of the shop owners to respond to the investigator, the popularity of the shop and ease of accessibility by the investigator. The interview schedule was formulated to obtain relevant and required information such as the general information of the shop, service extended, expenditure incurred, sale of the kitchen, different types of materials used, customer preference on types of finishes, details on the recent trends in kitchen and finishes for residential needs.

B. HOUSEHOLD SURVEY

Among the selected brands available in the shops surveyed the investigator selected a particular brand of modular kitchen company known as Cucine LUBE. It is a famous upcoming brand in Coimbatore. This company is an Italian based company who has 12 branches in India and many branches all over the world. The investigator met the owner of the company. They provided the necessary details to the investigator to conduct the survey. Though the clients were distributed in different places of Tamil Nadu and Kerala, the clients located in Coimbatore only were taken in consideration.

For the present study hundred families who have installed this particular brand of modular kitchen in their houses were selected by "purposive sampling" method. The required information was collected through the personal interview method with the use of interview schedule.

The results of the study on **"Contemplation on Italian Modular Kitchen"** are discussed under the following major headings.

i. The Results of the Market Survey Conducted.
ii. The Impression of the Home makers who had installed the LUBE Modular kitchen.

i. THE RESULTS OF THE MARKET SURVEY CONDUCTED

Sixty per cent of the showrooms surveyed were established during the year between 2000 and 2010. The number of modular kitchen designed by the selected showrooms per month varied between 4 to 10. All the selected shops were selling kitchen accessories and appliances along with modular kitchen. Sixty per cent of the selected respondents had related websites to advertise their products. Thirty percent of the select modular kitchens imported their kitchens from other countries like Italy and Germany. All the selected modular kitchen showrooms designed kitchen of all shapes as per the clients demand. . For fabricating the modular kitchen the primary materials used were medium density fiberboard, solid wood, and high density fiberboard and particle board by all the showrooms. Sixty per cent of the firms did not offer accessories with their kitchen since it is fully optional. In sixty per cent of the showrooms surveyed labour charges were not included in the price of the kitchen, since it varied with the options demanded by the homemaker. Brands like Inscape, Garnet No.1 and Kitchen Paradise took minimum period of 20 – 25 days for fabricating the units. For installation it took minimum of 2 –3 days and maximum of 4– 5 days for the selected modular kitchen. All the selected respondents gave discounts on modular kitchen installed by them to promote their business only during festive season.

ii. THE IMPRESSION OF THE HOME MAKER'S WHO HAD INSTALLED THE LUBE MODULAR KITCHEN

Maximum 76 per cent of the families surveyed belonged to nuclear type. Maximum 48 per cent of the home makers had college level education as their educational qualification. Regarding the income group of the families surveyed it was noted that 72 per cent and 10 per cent of the families belonged to high income and very high income group respectively. Eighty two per cent of the home makers revealed that they constructed their own house according to the needs and taste of the inmates. The plinth area of the houses of surveyed families ranged between 1500 sq.ft to more than 3500 sq.ft. The entire houses surveyed were constructed only within a period of two years. About 24 per cent and 26 percent of the families surveyed had invested between 75 lakhs to 1 crore and above 1 crore respectively for constructing their house.

Information on shape of the kitchen, plinth area of the kitchen, height of the counter top, cost of the kitchen, details about the hob, ventilation, work centers, finishes used, storage units provided, modern equipment provided and lighting provided in kitchenare discussed below.

All of them who had installed modular kitchen were designed by LUBE. 'U' shaped kitchen was opted by 32 per cent of the homemakers, followed by island kitchen (30 per cent). Maximum 47 per cent of the surveyed homemakers revealed that they had incurred an expenditure of 6 – 9 lakhs for the design they had selected for kitchen. Forty per cent felt that the cost incurred in designing the modular kitchen to be reasonable for the material and design involved. Seventy six per cent of the homemakers had preferred wet and dry kitchen while dry kitchen with separate wet area for washing was preferred by the rest of the homemakers. All those whose plinth area is less than 1500 sq ft. (18 per cent) had allotted less than 100 sqft for kitchen while 150– 200 sq

ft. was assigned for kitchen among 42 per cent of the households surveyed. The height of the counter tops are decided based on the height of the homemakers.

About 74 per cent preferred inbuilt hob for their modular kitchen. Maximum three to four burners were located in 42 per cent and 41 per cent of the hobs. The hobs were placed on eastern side of the kitchen so that the homemakers will cook facing the eastern direction. The general arrangement of the work centers varied according to the preferences of the homemakers. Maximum 46 per cent, 57 per cent and 64 per cent of the selected homemakers had provided 3–4ft for cooking, cleaning and preparation centers respectively. Maximum 55 per cent of the surveyed homemakers had installed the sink with a depth of about 9" –12". Double mixer tap was installed in 67 per cent of the kitchen. For ceiling, a majority of 77 per cent of thehomemakers had used paint. Fifty eight per cent of the surveyed homemakers had used high quality marble for their flooring. Majority of 82 per cent of the surveyed homemakers had used tiles for the kitchen walls.

The materials used in the shelf of the wall units and base units were particle board, solid wood, glass and stainless steel. Sixty two per cent of the homemakers opted for melamine finish, 58 per cent preferred solid wood finish for their shutters. Fifty nine per cent of the homemakers opted for stainless steel sink. Thirty eight percent of the selected homemakers used quartz for their kitchen counter tops, as they are non-porous, while 31 per cent of the homemakers opted for granite.

Light is a major requirement for performing efficient work in the kitchen. Both artificial and natural lighting according to the requirement of home makers were planned by the designers for their kitchen. Based on their suggestions lighting provisions were made in the modular kitchen. Every selected household had fixed tube lights as their general lighting, in the kitchen while 46 per cent of the homemakers opted for LED lights as they are power savers. All the selected homemakers informed that this particular brand of modular kitchen simplified their work ultimately. Maximum 92 per cent of the surveyed homemakers felt that their kitchen is easy to clean, reduces necessary work (87 per cent) and it saves time and energy (77 per cent and 62 per cent). These are the major reasons for the homemakers to opt for a Modular Kitchen.

CONCLUSION

Progressive women today no longer could spend hours together in the kitchen. The fitted kitchen or presently called modular kitchen relieves her from drudgery and encourage her to enter the job market. Cooking has become a hobby for most of the women. The development of the modular kitchen is one of the considerable triumphs for the professional designers. Though it was a great achievement, unless the general public could afford to buy or install one in their houses it cannot be considered as a real success. A time should come when the cost of modular kitchen could be brought down and when an average homemaker could afford one. It is only a hope that the day will be reached soon.

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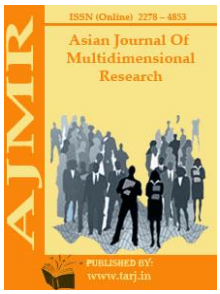

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

EMOTIONAL WELLBEING AND STRESS RELAXANTS FOR ADOLESCENT STUDENTS WITH ACADEMIC STRESS

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ABSTRACT

Academic life of a student plays a vital role in building their personality development. Students thrive to pinnacle in education and settle with good employment opportunities. Since educational efficiency is determined through academic performance, fear of poor results can lead to academic stress. There are various forms of academic stress and the symptoms can be psychological, physical and emotional. Students when anxious though appear to be calm, their brain never stops thinking. However, it interrupts their quality of life. Hence students can be trained to manage exam anxiety to enhance their quality of academic life. Therefore, it is necessary to study "Emotional wellbeing and stress relaxers for adolescent students with academic stress".Purposive sampling technique was adopted among 500 students studying in Higher Secondary schools in Chennai. A structured questionnaire pertaining to the objectives of the study was framed and used. The results analyzed through percentage analysis showed that the students were sometimes angry and this was their predominant emotional symptom of stress. Greater percent of students experienced restlessness followed by feeling of anxiety due to academic stress. The students were sometimes having irritability and frustration respectively. The students experienced depression, pessimistic thoughts and fearfulness. It is also inferred that the students felt helpless and hopeless as the emotional outcome. Some students felt guilty of shame and withdrew from others. Students followed some coping techniques to curb academic

stress for their academic and personal wellbeing. The results clearly show that the students relaxed by talking with friends, followed by listening to music and got relieved from stress. About half of the students preferred conversing with their parents and relatives while another half of the students got relieved from their stress by sleeping. About half the respondents had the practice of spending time in sharing jokes and having a hearty laugh. It was also evident that nearly less than half of the students stated to watch TV/Movie, to dissipate their stress. Few percent of the students spent time in doing hobby of their choice to relieve from academic stress. Some of the selected students had the practice of doing exercise and were spending time wandering outside as stress relaxant. When students stress coping skills outweigh the symptoms of stress, their wellbeing and quality of life improve appreciably.

KEYWORDS: *Academic Stress, Adolescents, Students, Stress Relaxers, Wellbeing.*

INTRODUCTION:

The modern world which is said to be a world of achievements is also a world of stress. Every moment of our life is affected by our wellbeing in a positive or negative way (Keys and Lopez, 2002). The goal is to balance life with time for work, relaxation, fun and resilience to hold up anxiety and challenges head on (Rao and Mohan, 2014). Education being one of the paramount importances is linked with the survival and progress of the students. Academic performance encompasses only the academic aspects like performance in examinations and related activities (Deshmuk, 2014). The overall performance of the children in the school and their quest for excellence add to their academic stress. The demands that evoke these patterned responses are referred to as stressors and emotions such as love, hate, joy, fear, challenge, anger as well as thoughts call forth the changes characteristics of the stress syndrome (Dupare, 2014). Method of counteracting the harmful effects of the emotional stress is the possibility of regular elicitation of the relaxation response. Stress relaxers aimed at fostering resilience in the life of student are recommended by psychologists. Resilient students would be those who, despite the odds against them, show positive adaptation by achieving appropriate developmental milestones.

OBJECTIVES:

- To identify the emotional symptoms among adolescent students arising out of academic stress and
- To find out stress relaxers adopted by them for their wellbeing.

METHODOLOGY:

The study sample consisted of 500 students studying in twelfth standard in Chennai city by adopting purposive sampling technique. A questionnaire was used for data collection. The collected data included types of symptoms of emotional stress and methods of stress relaxers followed by adolescent school students for their mental wellbeing. Data was consolidated and subjected to statistical analysis.

RESULTS AND DISCUSSION:

The results of the study cover two main aspects namely emotional symptoms among adolescent students arising out of academic stress and stress relaxers they follow for their academic and personal wellbeing.

Table I reveals the frequency of experiencing emotional symptoms of stress experienced by the students.

TABLE I
FREQUENCY OF EXPERIENCING EMOTIONAL SYMPTOMS OF STRESS BY THE STUDENTS

	Students Who Responded(N=500)					
Emotional Symptoms	**Always**		**Sometimes**		**Never**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Anger	120	24	270	54	110	22
Restlessness	78	16	259	52	163	32
Anxiety	84	17	237	47	178	36
Irritability	81	16	225	45	194	39
Frustration	61	12	224	45	215	43
Depression	71	14	213	43	216	43
Pessimistic thoughts	67	14	211	42	222	44
Fearfulness	104	21	210	42	186	37
Helplessness	53	11	189	38	258	51
Hopelessness	52	10	186	37	262	53
Guilt or shame	43	9	180	36	272	55
Withdrawal from others	36	7	145	29	319	64

It is evident from the Table I that maximum 54 per cent of students sometimes felt angry as predominant emotional symptom of stress. Nearly 52 per cent of students experienced restlessness followed by 47 per cent of students sometimes experienced anxiety due to academic stress. Around 45 per cent of the students sometimes felt irritated and frustrated. Nearly 43 per cent of students developed depression and 42 per cent of students were getting pessimistic thoughts and fear respectively. It is also inferred that 38 percent of students were feeling helpless and hopeless (37 per cent) as their emotional outcome. Some students (36%) felt guilty or shame while a few (29%) withdrew themselves from others. Pekuran (2014), elucidated that emotions can have a strong influence on learning and achievement. Therefore, it is important for teachers to understand, and to deal with the emotions experienced by students. Students experience many emotions during their period of study, and especially while taking up tests and examinations. These emotions can be positive or negative, and they can be intense and frequent. Some of these emotions are brought into the classroom from life outside the school. Many of them, however, originate within academic settings.

Table II depicts the frequency of stress relaxants widely practiced among students for their wellbeing.

TABLE II
FREQUENCY OF STRESS RELAXANTS FOLLOWED BY THE STUDENTS

	Student Who Responded (N=500)					
Stress Relaxers	**Daily**		**Sometimes**		**Never**	
	No.	**%**	**No.**	**%**	**No.**	**%**
Talking to friends	317	63	139	28	44	9
Listening to music	299	60	157	31	44	9

Conversing with parents/relatives	292	58	153	31	55	11
Sleeping	277	55	176	35	47	10
Sharing jokes / hearty laughing	249	50	166	33	85	17
Watching TV/Movie	219	44	190	38	91	18
Involving in leisure time activities	91	18	202	40	207	42
Exercising	80	16	169	34	251	50
Wandering outside	73	15	190	38	237	47

The results observed from Table II clearly indicate that majority (63%) of the students got relaxed while talking to their friends, followed by 60 percent of students who felt at ease while listening to music. About 58 per cent of students preferred conversing with their parents and relatives. Nearly 55 percent of the students slept to get relieved from stress and 50 percent of them spent some time in sharing jokes and laughing heartily. Larson et al., (2000) elucidated in some families, especially those in which the grandparents were themselves educated and members of the professional class, had an influence in the academic expectations of the student which piled up stress among them. It is evident that nearly 44 per cent of the students informed that they watch TV/Movie, to dissipate their stress, followed by 18 per cent who spent their leisure time in some hobby of their choice. Around 16 per cent of the selected students had a practice of doing some exercise and 15 per cent spent time by wandering outside to relax from their accumulated stress. Zarrett and Lerner (2008), opines involving students in sports, extra-curricular activities, positive pastimes, such as music and drama, arts and crafts, and religious activities, can help to buffer stress or negative situations experienced in daily life, and aid in positive youth development. They can also help to increase energy and focus, to fight illness, and get relieved from aches and pains (Christensen and Fatchett 2009). Mullick (2007), elucidated that leisure time activities enable the students to relax and be refreshed to tackle academic challenges in a better way. Leisure time activities could include socializing with friends and relatives; participating in social and cultural functions, organizing in participating in games, sports, picnics etc., indulging in social service; listening to music; reading; painting; drawing; embroidering; watching films, etc.

CONCLUSION:

Academic life is a bewildering maze marked by intense competition, parental and peer pressure along with unrelating dilemma of making right career choices. Students are plagued by confusion, doubts and negative thoughts. Top contributing and common emotional symptoms of stress found among adolescent students were anger, restlessness, anxiety, irritability and frustration. These excessive negative emotions in students should be reduced. A classroom culture should enable students to use energy provided by unpleasant emotions to promote their learning. The key to create such a culture is to raise students' confidence in their ability to solve problems, to focus their goals on mastering the learning material, and to regard mistakes as new opportunities to learn rather than considering as personal failures. Negative emotions among students are emotions that are experienced as unpleasant. Like positive emotions, negative emotions can vary in terms of physiological and psychological activation. Anxiety, anger and shame are activating negative emotions, whereas hopelessness and boredom are deactivating

negative emotions. Hence students should look for options to prevent negative academic emotions, or to reduce these emotions, if it seems to be occurring with high intensity and frequency. However, negative emotions could be used productively if suitable precautions are taken. Less intense versions of anxiety, self-related anger or shame can even promote learning if students are confident in their success. Most commonly practiced stress relaxers among adolescent students were talking to friends, listening to music, speaking to family members, sleeping and sharing lighter moments and laughing. Emotional wellbeing thus is all about how students think and feel about themselves. It includes being able to deal with academic challenges by adopting coping skills that gives required resilience like being relaxed, interacting with loved ones, indulging in physical activities, and positive thinking which help students to lead a fulfilled quality life.

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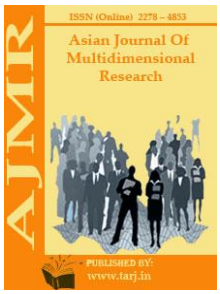

Asian Journal of Multidimensional Research (AJMR)

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COMPARATIVE STUDY ON ENTREPRENEURIAL SKILLS POSSESSED BY GOVERNMENT AND PRIVATE\AIDED COLLEGE STUDENTS IN CHENNAI CITY

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ABSTRACT

Entrepreneurship is a powerful force for economic growth and job creation; it makes economies more competitive and innovative. Entrepreneurship activities contribute towards the revitalization of the economy of developed countries and act as the engine of economic progress and job creation in developing countries (Zaitol et al., 2007). Currently, entrepreneurship skills are considered as one of key attribute for students if they want to successfully navigate the job market after graduation. Many employers prefer students with entrepreneurship expertise when hiring entry-level positions. They consider these students to be more accountable for their own actions, have team work skills and know how to execute. Students with entrepreneurship experience are also considered to have better communication and sales skills that are necessary to be successful in business today (Gem, 2006). Hence it was found to be essential to assess the entrepreneurial skills among college students. For the present study 500 college going women students were selected, among which 250 students were selected from three different government colleges and 250 students were selected from three private colleges by purposive sampling technique. Interview schedule was used to assess the various types of skills possessed by the selected students. Private\aided college students possessed better entrepreneurial skills when compared to government college students.

KEYWORDS: *Entrepreneurship, Entrepreneurial Skills, Government, Private\Aided, Students.*

INTRODUCTION:

Entrepreneurship plays an important role in the development of a country. If entrepreneurship is practiced by the members of a society, that society develops very rapidly. Particularly the economic prosperity of a country lies in the way the youth are recognized, believed and hoped to be the future economic leaders. Students have the responsibility to build the dreamed entrepreneurial community.

Brouwer (2002) states that the acquisition of entrepreneurial skills means possessing the ability to find and evaluate business opportunities, gather the necessary resources, initiate appropriate action to ensure success and to implement actions to take advantage of the opportunities for rewarding outcome. Lee and Chang (2006) conclude that the school and the education system play a pivotal role in predicting and developing entrepreneurial traits. According to Erhurum (2007) most entrepreneurial skills come by learning and practicing. Nevertheless, the various skills embedded in business related programmes need to be explored and learnt by it prospective graduates so as to succeed later as entrepreneurs.. Pandya (2016), states that skill development is also needed for jobs of higher productivity. Creating jobs and increasing productivity are at the top of agenda for policymakers across the world. For developing countries that are seeking to grow in an inclusive way and reduce poverty, the challenge of expanding employment and productivity is an end product. Skill development is essential for employability which is an important strategy in the fight against poverty. Accordingly, the poor should have a priority claim and easy access to opportunities for skill development. Sharma (2012) mentions that, entrepreneurial skills include initiative and the drive to motivate the team building create a shared vision, delegation of work and responsibility accordingly.

DESIGN OF THE STUDY:

The current study aims to investigate the entrepreneurial skills possessed by the selected college going women students. Five hundred female college students residing in Chennai city were selected by purposive sampling technique. Among the five hundred samples 250 samples were selected from government colleges and 250 students were selected from Private\aided College in order to compare the entrepreneurial skills possessed by them with respect to nature of college. Four types of entrepreneurial skills which is necessary to become a successful entrepreneur were assessed by using an interview schedule. The schedule was prepared in accordance with the objectives of the study. Data collected were classified, analyzed and tabulated.

RESULTS AND DISCUSSION:

Personal Details of the Samples

Table-1 represents the personal details of the selected samples

TABLE1: PERSONAL DETAILS OF THE SAMPLES

Personal Details	Nature of college			
	Government College		Private/ Aided College	
	N=250	%	N=250	%
Age a) 17-19	170	68	192	77

b) 19-21 c) 21 and above	76 4	30 2	50 08	20 03
Year of study a) First Year b) Second year	 130 120	 52 48	 203 47	 81 19
Course of study a) Commerce b) Computer Applications c) Computer science d) Economics e) Home science	 40 Nil 41 32 137	 16 Nil 16 13 55	 123 12 53 26 36	 49 5 21 10 15
Part time employment a) Yes b) No	 18 232	 7 93	 12 238	 5 95

Maximum 77 per cent of the private/aided college students and 68 per cent of the government college students belonged to the age group of 17-19 years; while 30 per cent of the government college students and 20 per cent of the private/aided college students were in the age group of 19-21 years and only three per cent of the private/aided college students and two per cent of the government college students were in the age group 21 and above years. Majority (81%) of the selected private/aided college students were from their first year of bachelor's degree. Maximum 52 per cent of the selected government college students were also pursuing their first year of under graduation, while, the rest were in the second year. The major courses they were pursuing according to the number in descending order among private/aided college students were Commerce, Computer Science, Home Science, Economics and Computer Applications. Among Government College students maximum 55 per cent were from home science group followed by computer science (16%), Commerce (16%) and economics (13%).Irrespective of the type of college in which the selected samples are pursuing their studies, only seven percent of the government college students and five percent of the private/aided college students had taken up part-time job

Personal skills Possessed by the Samples

Table 2 presents the information on personal characteristics possessed by the samples.

TABLE 2: PERSONAL SKILLS POSSESSED BY THE SAMPLES

Personal Characteristics	Nature of College in Percentage									
	Government College (N=250)					Private / Aided College (N=250)				
	A	O	S	R	N	A	O	S	R	N
Optimistic	46	20	25	8	1	57	10	20	11	2
Analytical thinking	46	21	28	5	0	47	31	14	6	2
Self Motivated	38	26	24	8	4	37	25	31	6	1
Dynamic	53	14	23	4	6	52	19	15	9	5
Hard working	43	17	26	12	2	38	21	24	6	11

Risk taking	38	16	29	12	5	49	18	23	6	4
Indulgent	34	22	23	16	5	28	27	21	15	9
Supple	48	16	24	8	4	38	22	26	4	10
Strategist	41	24	19	12	4	41	25	24	6	4

A- Always; O-Often; S-Sometimes; R-Rare; N-Never.

The Table above reveals that irrespective of the type of college in which the students are studying maximum number of students showed a positive trend in possessing the personal skills. Maximum 53 and 52 per cent of both government and private/aided college students respectively were always dynamic. When compared to private/aided college students greater percentage of government college students always possessed personal skills such as hardworking (43 per cent), indulgent (34 per cent) and supple (48 per cent).

They could develop these characters because of their exposure to growing from failure and being resilient. Similarly, when compared to Government College students a greater percentage of private/aided college students always possessed personal skills like being optimistic (57 per cent) and ready to take risk (49 per cent).

Inter Personal Skills Possessed by the Samples

Table 3 illustrate the percentage distribution of interpersonal skills possessed by the samples.

TABLE 3: INTER PERSONAL SKILLS POSSESSED BY THE SAMPLES

Interpersonal skills	**Nature of College in Percentage**									
	Government college (N=250)					**Private/aided college (N=250)**				
	A	**O**	**S**	**R**	**N**	**A**	**O**	**S**	**R**	**N**
Induce others	30	15	39	11	5	48	14	23	12	3
Entrust work	23	27	24	20	6	29	34	21	10	6
Competency to communicate	21	23	31	18	7	41	14	27	12	6
Attentive	48	20	22	4	6	61	12	20	2	5
Prudent	42	27	24	4	3	49	26	16	6	3
Diplomatic	42	20	17	15	6	43	21	24	4	8
Empathetic	53	24	13	2	8	68	14	7	8	3
Ethical	50	24	13	7	6	53	26	11	3	7

A-Always; O-Often; S-Sometimes; R-Rare; N-Never

All the interpersonal skills like inducing others, entrust work, competency to communicate, attentive, prudent, and empathetic were always possessed by the private/aided college students at a greater percentage than government college students. Important interpersonal skills such as entrusting work, competency to communicate, attentive, empathetic and ethical were never possessed by five to seven percent of the government college students. While, among five to eight per cent of students from private/aided college they never possessed the interpersonal skills such as entrusting work, competent to communicate, attentive, diplomatic and ethical. Hence these traits have to be inculcated among the students in order to develop them into a successful entrepreneur.

Critical and Creative Thinking Skills Possessed by the Samples

Information on the Critical and Creative Thinking Skills possessed by the samples is presented in Table 4

TABLE 4: CRITICAL AND CREATIVE THINKING SKILLS POSSESSED BY THE SAMPLES

Critical and creative thinking skills	Nature of College in Percentage									
	Government college (N=250)					Private/aided college (N=250)				
	A	O	S	R	N	A	O	S	R	N
Compassionate	46	35	16	3	0	52	33	12	0	3
Efficient in resolving problems	43	22	30	5	0	38	22	30	9	1
Identifying ones opportunities	51	19	18	10	2	39	25	26	7	3
Understand the trend existing	50	19	17	10	4	29	22	30	12	7
Ability for consecutive planning	39	22	27	8	4	49	27	15	6	3

A-Always; O-Often; S-Sometimes; R-Rare; N-Never

An entrepreneur should possess skills such as critical and creative thinking in order to critically analyze the situation and find out the solution. When analyzed for the critical and creative thinking skills possessed by the samples, a greater percentage of government college students revealed that they are always good at resolving the problem (51 per cent), better in identifying one's opportunities (51 per cent) and understand the existing trend (50 per cent), when compared to private/aided college students. Being compassionate (52 per cent) and the ability for consecutive planning (49 per cent) were the traits always possessed at a slightly higher percentage by private/aided college students when compared to government college students.

Practical skills possessed by the samples

Information on the practical skills possessed by the samples is presented in Table 5

TABLE 5: PRACTICAL SKILLS POSSESSED BY THE SAMPLES

Practical skills	Nature of College in Percentage									
	Government college (N=250)					Government college (N=250)				
	A	O	S	R	N	A	O	S	R	N
Goal setting	46	18	25	10	1	63	15	18	2	2
Clarity in setting destination	57	22	15	4	2	58	17	12	7	6
Initiating goal oriented activities	44	23	23	6	4	57	14	25	3	1
Developing competence to reach goals	56	13	21	7	3	48	17	28	5	2
Setting standards	50	28	17	1	4	57	28	9	4	2
Setting time limits	35	30	24	8	3	32	33	26	4	5

Seeking alternatives	57	15	18	8	2	38	31	13	10	8
Interrogating with family or friend while taking decisions	60	17	15	7	1	58	22	11	7	2
Consulting with experts	45	13	13	26	3	55	19	17	3	6
Taking decision with confidence	62	21	12	2	3	52	24	16	5	3

A- Always; O-Often; S-Sometimes; R-Rare; N-Never.

Practical skills are essential for any individual who is taking up entrepreneurship. While comparing the difference in practical skills possessed by the government and private/aided college students it was found that slightly an increased percentage of government college students always had developed the practical skills such as developing competence to reach goals (56 per cent), setting time limits to reach goals (35 per cent) and seeking alternative (57 per cent) and interrogating with family and friends while taking decisions (60 per cent). However private/aided college students were better in goals setting (63 per cent), initiating goal-oriented activities, setting standards (57 per cent) and consulting with experts (55 per cent).

SUMMARY AND CONCLUSION:

Maximum number of students showed a positive trend in possessing the personal characters. All the interpersonal skills like inducing others, entrust work, competency to communicate, attentive, prudent, and empathetic were always possessed by the private/aided college students at a greater percentage than government college students. Critical and creative thinking skills always possessed at a slightly higher percentage by private/aided college students when compared to government college students. While comparing the difference in practical skills possessed by the government and private/aided college students it was found that slightly an increased percentage of government college students always had developed the practical skills. Maximum 53 and 52 per cent of both government and private/aided college students respectively were always dynamic and ready to take up any challenges in life. On the whole the private\aided college students possessed better entrepreneurial skills when compared to government college students. Hence it is imperative to impart these skills among the students in order to prepare them for their future.

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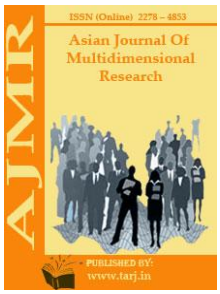

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UGC APPROVED JOURNAL

A STUDY ON THE WORK STRESS OF MEDICAL NURSES

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ABSTRACT

Work stress or occupational stress can be defined as the harmful physical and emotional responses that occur when the requirements of the occupation do not match the capabilities or resources of the worker. Occupational stress can lead to poor health and even injury. Sharma et al (2014) observes that the occupation of nursing has high levels of stress. Stress in nurses affects their health and increases absenteeism, attrition rate, injury claims, infection rates, and errors in treating patients. The objective of the study was to find out the different facets of stress among the medical nurses. A self - administered questionnaire was used for data collection. The results revealed that more than half of the nurses were aged below 30 years. A majority of them resided in rural areas. All of them were married. The monthly salary of a majority of them was below Rs. 10000 or less. All of them worked for six days a week and majority had to attend night duties twice a week. A substantial number of nurses experienced work stress. The occasions causing stress were reported as verbal abuse from doctors while on routine rounds in the wards. The factor causing work stress was reported as being posted in busy departments of the hospital. A majority of them reflected their work stress by feeling tensed up all through the day. Listening to music was adopted to relieve stress. Stress among nurses contributes to health problems and decreases their work efficiency. The healthcare set ups should acknowledge the problem and take preemptive steps to tackle the growing menace of chronic stress among the nurses who are expected to give sensitive quality patient care.

KEYWORDS: *Medical nurses, work stress.*

INTRODUCTION:

Work stress is defined as the harmful physical and emotional responses that occur when the requirements of the occupation do not match the capabilities or resources of the worker. While some workplace stress is normal, excessive stress can interfere with one's productivity and impact one's physical and emotional health. Sharma et al (2014) observe that the occupation of nursing has high levels of stress. Stress in nurses affects their health and increases absenteeism, attrition rate, injury claims, infection rates, and errors in treating patients. (Shirey, 2006).

OBJECTIVE OF THE STUDY:

The objective of the study was to find out the different facets of work stress among the medical nurses.

METHODOLOGY:

One hundred female medical nurses with permanent employment status from different units of hospitals in the Kollam district of Kerala were selected as the samples of the study using Random sampling method. Sampling criteria included nurses who were registered with State Nursing Council, registered as staff nurses, involved in direct patient care, employed at a hospital for at least one year. A self - administered questionnaire was used for data collection. Results were discussed and are summarized below.

RESULTS:

The major results of the study evolved are as follows.

1. Baseline Information

More than half of the nurses (56%) were aged below 30 years of age. A majority of 64% of nurses resided in rural areas. All of them were married with 72 per cent belonging to nuclear families with four family members or less. A significant 60 per cent of them earned a monthly income of Rs. 10000 or less and 64 per cent of them worked in the private sector.

2. Job profile of the nurses

For the job profile of nurses, details were collected on the duties performed, number of days of work a week, frequency of night duty assigned, number of patients given under their care and rotation of duties.

2. a. Duties performed by nurses

Nurses are the backbone of any healthcare unit. Their career encompass a range of duties and responsibilities. The duties performed by the nurses are depicted in Table 1 and Figure 1.

TABLE 1
DUTIES PERFORMED BY NURSES

Sl. No	Duties performed	Percentage of respondents *
1	Monitoring the health status of patients	100
2	Giving medicine to the patients	100
3	Drawing blood samples for laboratory tests	92
4	Preparing the medical records of patients	72
5	Attending emergency calls	56

6	Carrying blood samples to laboratories and obtaining test results	52
7	Giving vaccination	44
8	Helping with personal body care of patients	20

*Multiple responses

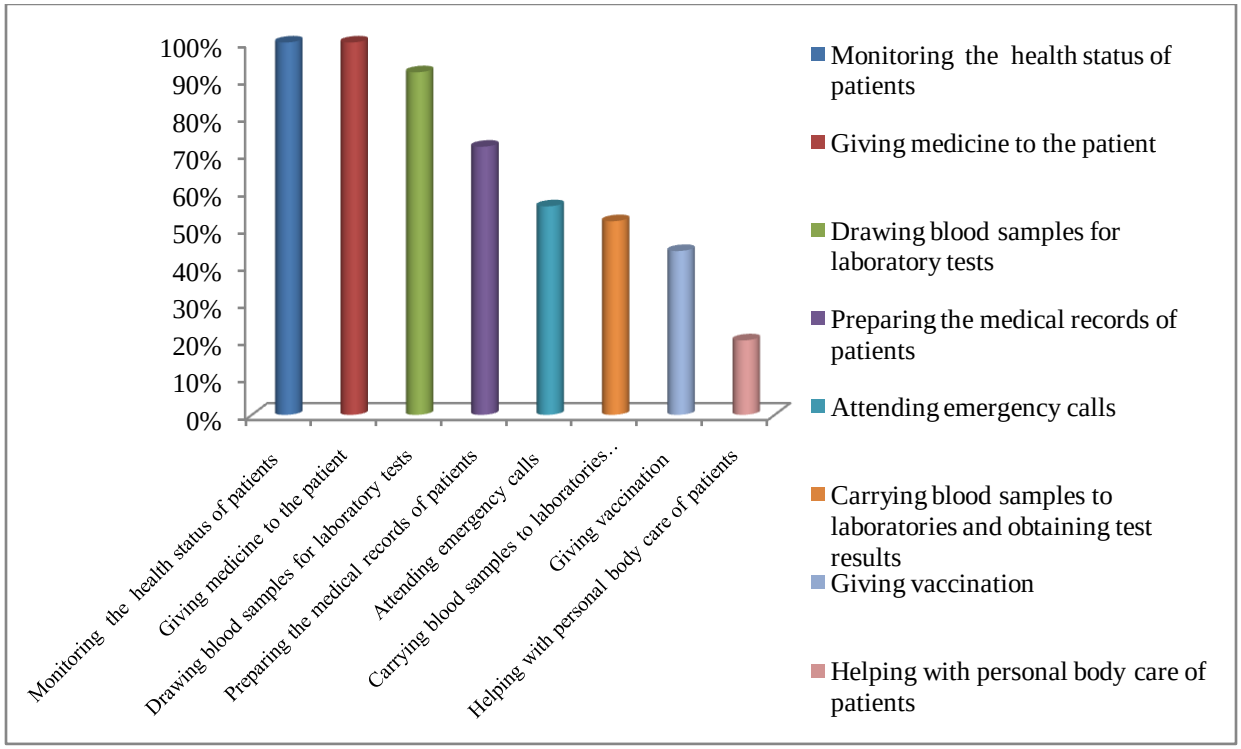

Figure 1: Duties Performed By Nurses

The duties performed by the nurses varied based on the work setting of the hospitals. It was revealed from Table 1 and Figure 1 that nurses had to perform multiple tasks at their work place. All the nurses had to monitor the health status of the patients and give medicines to them. The other duties performed by them were drawing blood samples for laboratory tests (92%), preparing the medical records of patients for documenting the patients' progress (72%), attending emergency calls (56%), carrying blood samples to laboratories and obtaining test results (52%), giving vaccination (44%) and helping with the personal body care of patients (20%).

2. b. Number of days of work in a week

All the nurses had to work for 6 days in a week. One day was an off - day from duty for all of them, irrespective of the type of hospital setting they were working in. The work time of nurses were arranged as three shifts comprising of two day shifts of six hours duration each and one night shift of 12 hours duration - the shift timing being 8a.m.to 2p.m, 2 p.m.to 8 p.m. and 8p.m. to 8 a.m respectively.

2. c. Frequency of night duty assigned

Night duty is quite common for nurses in hospital settings. However, the frequency of duty may vary with different hospital settings. Table 2 presents the frequency of night duty assigned to the nurses.

TABLE 2
FREQUENCY OF NIGHT DUTY ASSIGNED

Sl. No	Frequency of night duty assigned	Percentage of respondents
1	Twice a week	88
2	More than twice a week	12

It was revealed from Table 2, that a majority of 88 per cent of the nurses were assigned night duty twice a week and the remaining 12 per cent were assigned night duty more than twice a week causing domestic disruption in their lives.

2. d. Number of patients given under care

Every nurse would be assigned charge of a number of patients admitted in the hospital. Table 3 and Figure 2 present the average number of patients given under their care at a given time.

TABLE 3
NUMBER OF PATIENTS GIVEN UNDER THE CARE OF NURSES

Sl. No	Number of patients given under care of nurses	Percentage of respondents
1	10 patients or less	68
2	11 – 20 patients	24
3	21- 30 patients or more	8

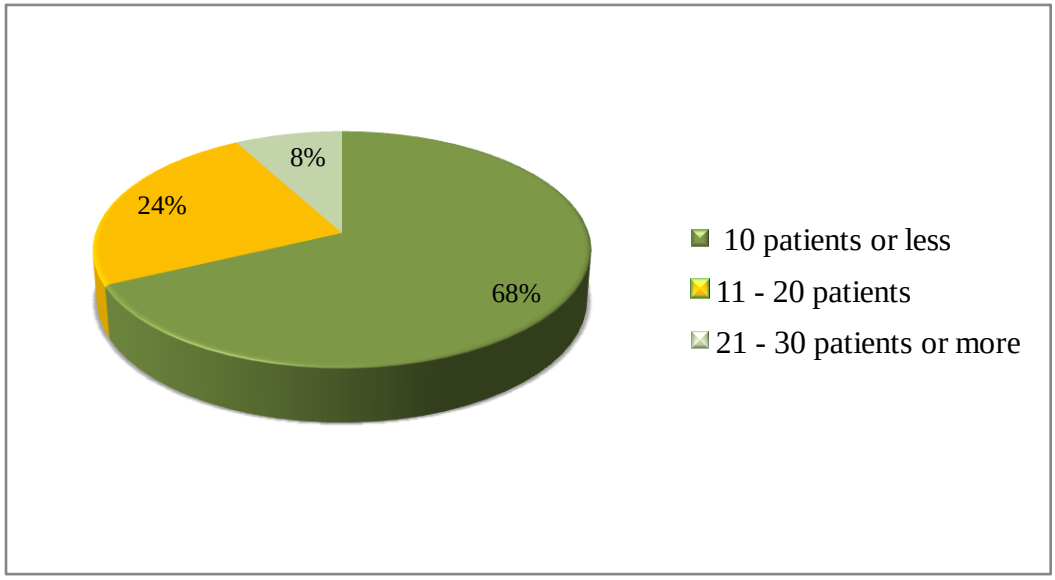

Figure 2: Number of Patients Given Under the Care of Nurses

It was revealed from Table 3 and Figure 2 that a majority of 68 per cent of the nurses were given charge of 10 patients or less at a given time, whereas, nearly a quarter of them(24%) were put in charge of 11-20 patients and 8 per cent were in charge of 21 -30 patients or more at a time.

2. e. Rotation of duties

Job rotation is a method of job design that allows employees to learn job skills from different departments. Nurses are often assigned duties on rotation basis in order to make them equipped with various nursing skills demanded by different medical departments. Table 4 and Figure 3 present the details on this.

TABLE 4 ROTATION OF DUTIES

Sl. No	Rotation of duties	Percentage of respondents
1	Works on rotation of duties	88
2	Do not work on rotation of duties	12

It was revealed from Table 4 and Figure 3 that majority of 88 per cent of nurses had been working on rotation of duties. The remaining 12 per cent of them were not.

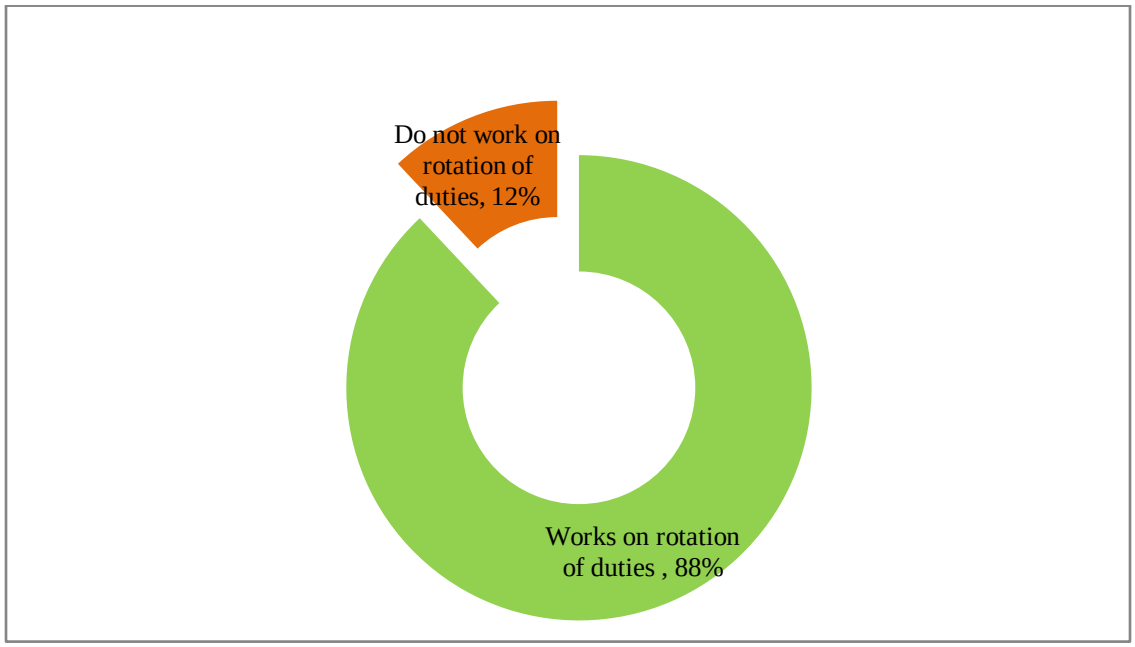

Figure 3 : Rotation of Duties of Nurses

3. Details on the stress at work place

Details on the stress at work place elicit information on the experience of work stress, occasions of experiencing work stress, factors causing work stress, ways of feeling stress, ways of reflecting work stress, measures adopted to relieve work stress, and suggestions for reducing work stress.

3. a. Experience of work stress

The presence of workplace stress is almost inevitable. The experience of stress by nurses at work place is presented in Table 5.

TABLE 5 EXPERIENCE OF WORK STRESS

Sl. No	Experience of work stress	Percentage of respondents
1	Experiences work stress	88
2	Do not experience work stress	12

It was revealed from Table 5 that a majority of 88 per cent of nurses experienced work stress. Gulavani and Shinde (2014) opine that stress in nurses has a cost for the individual in terms of health and well-being and for the organization in terms of absenteeism and turnover which indirectly affects the quality of care provided to the patients. However, 12 per cent of them reported not experiencing work stress.

3. b. Occasions of experiencing work stress

Stress at workplace is common. Mc Carthy (2010) identifies stress as a routine and accepted part of the health care worker's role. The occasions causing work stress for the nurses is presented in Table 6.

TABLE 6 OCCASIONS OF EXPERIENCING WORK STRESS

Sl. No	Occasions of experiencing work stress	Percentage of respondents*
1	Verbal abuse from doctors while on rounds	68
2	Verbal abuse from patients	64
3	Lack of support of co-workers	62

* Multiple responses

It was revealed from Table 6 that a majority of 68 per cent of nurses experienced work stress while being verbally abused by doctors, while doing the routine rounds in the wards. Another 64 per cent reported verbal abuse from patients as an occasion causing stress. Lack of support of co-workers was reported by 62 per cent of them as the occasion causing stress. This finding is in line with Adib -Hajbaghery et al (2012) who reported that poor relationships between nurses and other health care professionals is a major source of occupational stress among hospital nurses.

3. c. Factors causing work stress

Stress is a major cause for concern for many nurses at work. The factors causing stress at work are depicted in Table 7 and Figure 4.

TABLE 7 FACTORS CAUSING WORK STRESS

Sl. No	Factors causing stress at work	Percentage of respondents*
1	Being posted in busy departments	62
2	Insufficient pay packets	53
3	Absence of sufficient break time during duty hours	48
4	Assignment of non-nursing duties	40
5	Being assigned too many duties due to staff shortage	36

* Multiple responses

It was revealed from Table 7 and Figure 4 that different factors caused stress for nurses at work. A majority of 62 per cent of nurses reported being posted in busy departments including emergency departments and Intensive Care Units as the cause of stress. This result conforms to the findings of Gray and Anderson (2002) that stress among nurses was caused by the functions of the type of unit on which they work. More than half of the nurses (53%) reported insufficient pay packets causing stress to them as their salary and benefits are not proportional to their intense work input. This result emphasize that nurses in India are poorly remunerated compared to the world standards. The other factors reported to cause work stress were absence of sufficient break time during duty hours (48%) , assignment of non-nursing duties like cleaning of the wards, washing of linen etc.(40%), and being assigned too many duties due to staff shortage(36%).

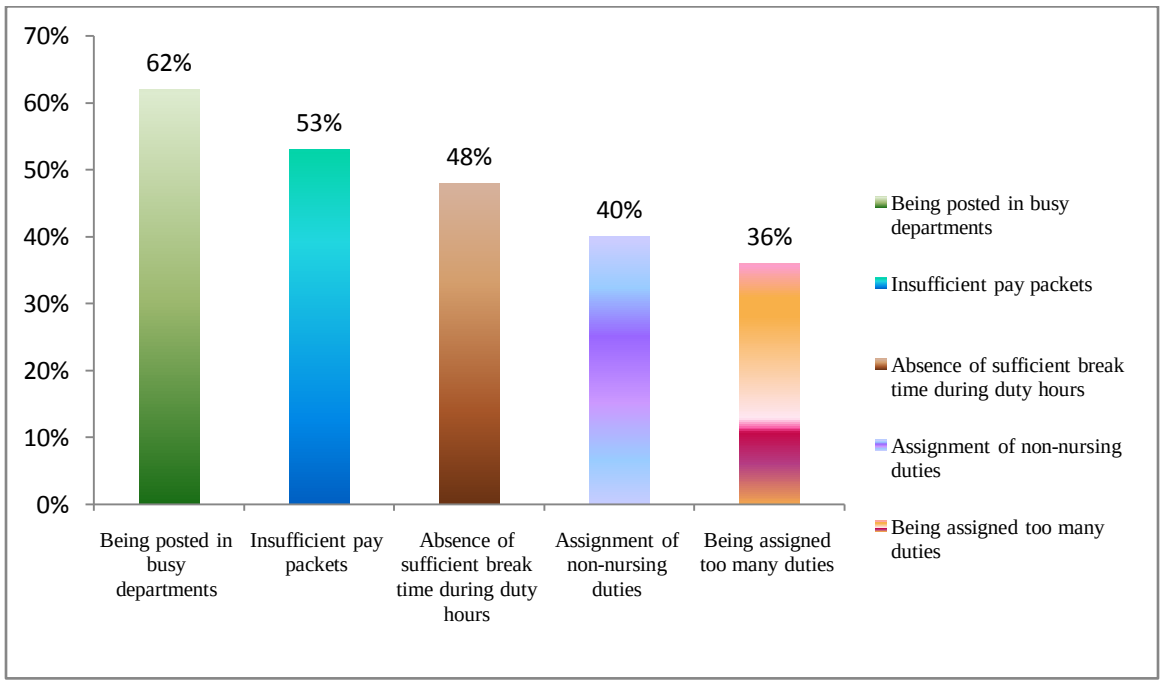

Figure 4: Factors Causing Stress at Work

3. d. Ways of feeling stress

Stress is manifested in different forms and as varied feelings. Table 8 presents the ways of feeling stress among the nurses.

TABLE 8 WAYS OF FEELING STRESS

Sl. No	Ways of feeling stress	Percentage of respondents*
1	Feels that things are not going to get better	60
2	Feels that life is worthless	28
3	Feels dejected and helpless	16
4	Feels everyone is un-empathetic	12
5	Feels running away from responsibilities	8

* Multiple responses

With regard to the ways of feeling stress, it was revealed from Table 8 that a majority of 60 per cent of the nurses felt that things are not going to get better. More than a quarter of them (28%) felt that life is worthless. While 16 per cent of them felt dejected and helpless, 12 per cent of them felt everyone is un-empathetic. Another 8 per cent of them felt running away from responsibilities. This result supports the opinion of Smeltzer (2008) that anxiety, frustration, anger and feelings of inadequacy, helplessness or powerlessness are emotions often associated with stress.

3. e. Ways of reflecting work stress

Work stress are reflected in different ways. Table 9 presents the details of work stress reflected by nurses.

TABLE 9 WAYS OF REFLECTING WORK STRESS

Sl. No	Ways of reflecting work stress	Percentage of respondents*
1	Feeling tensed up all through the day	68
2	Getting angry at family members	56
3	Shouting at patients	24
4	Remaining distant from co-workers	12

* Multiple responses

It was revealed from Table 9 that work stress was reflected in different ways by the nurses. Feeling tensed up all through the day was reported by 68 per cent of the nurses. Taking the stress back to home and getting angry at family members were reported by 56 per cent of them. It was disheartening to note that nurses who play a special role in supporting patients and their families by explaining patients' conditions, treatment options and providing emotional support to them were shouting at the patients, as reported by nearly a quarter of them (24%). This gesture compromises the quality of care expected from nurses as they lose compassion for patients and increase the incidence of mistakes and practice errors in nursing care. Another 12 per cent of them reported to be remaining distant from co-workers, as a reflection of work stress. These reflections of stress among nurses affects the self-confidence, lowers self-esteem and reduces job satisfaction, further affecting their career prospects.

3. f. Measures adopted to relieve work stress

The various measures adopted by the nurses to relieve work stress is given in Table 10.

TABLE 10 MEASURES ADOPTED TO RELIEVE WORK STRESS

Sl. No	Measures adopted to relieve stress	Percentage of respondents*
1	Listening to music	72
2	Sharing problems with co-workers	48
3	Talking to the hospital authorities	24
4	No measures were adopted	8

* Multiple responses

As revealed from Table 10, different measures were adopted by the nurses to relieve the work stress. A majority of 72 per cent of them reported listening to music. Another 48 per cent reported sharing problems with co-workers. A significant 24 per cent of them talked to the hospital authorities while another 8 per cent did not take any measures to relieve work stress.

3. g. Suggestions for reducing work stress

Suggestions on methods by which work stress can be reduced were given by the nurses, the details of which are presented in Table 11.

TABLE 11 SUGGESTIONS FOR REDUCING WORK STRESS

Sl. No	Suggestions for relieving work stress	Percentage of respondents*
1	Limiting the duties to nursing responsibilities alone	68
2	Employers should be empathetic to nursing staff	44
3	Increasing the ratio of the nurses to patients	38

* Multiple responses

With respect to the suggestions given by nurses for relieving work stress, it was noticed from Table 11 that majority of 68 per cent of them suggested limiting their duties to nursing responsibilities alone. A significant 44 per cent suggested that employers should be empathetic to nursing staff and 38 per cent of them suggested increasing the ratio of the nurses to patients, as a measure of relieving work stress.

CONCLUSION

Stress in nurses is an endemic problem and is on the rise. Stress among nurses contributes to health problems and decreases their work efficiency. Organizations must be sensitive to the dual stress of home and work faced by nurses. The healthcare set ups should acknowledge the problem and take preemptive steps to tackle the growing menace of chronic stress among the nurses who are expected to give sensitive quality patient care.

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Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

RESOURCE EMPOWERMENT OF TRIBAL WOMEN IN SENGUTTAIYUR, COIMBATORE DISTRICT, TAMIL NADU.

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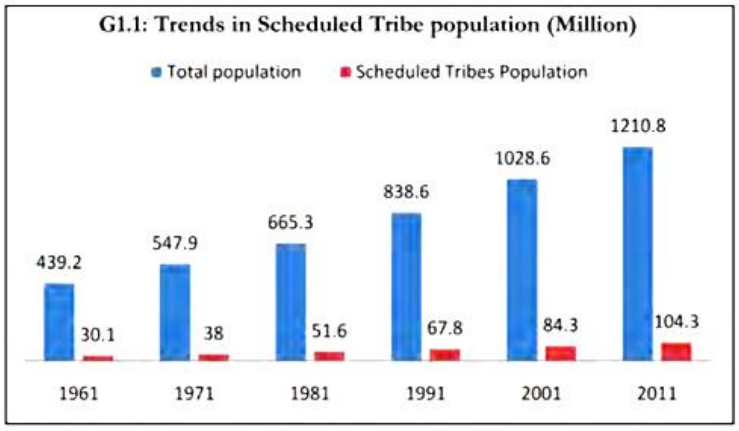
ABSTRACT

The women in present situation are proving considerable growth and development in their daily walks of life but still there are several people who need much care for their resource enhancement and empowerment. One among the minority groups who need much emphasis are tribal women. In tribal communities, the role of women is substantial and crucial. Tribal women play a significant role in the social and economic development of tribal communities as they contribute in various social, economical and cultural activities and recently they have also shown considerable contribution in political field, yet access to resources that can enhance their potential is found to be low. In this study an attempt was made to analyse the level of empowerment of tribal women reflecting their access to resources. The sample belonged to Senguttaiyur 'Irular' tribal village in Coimbatore District, Tamil Nadu and included 54 tribal women selected by convenience sampling. The data was collected by administering a published scale. Empowerment level of selected sample in all aspects was evident when their status of resourcefulness was found out. The findings pointed out that they were empowered only upto 22 per cent in terms of social and cultural aspects, and showed low level empowerment 13 per cent and 18 per cent respectively in terms of economic and psychological aspects.

KEYWORDS: *Tribal women, Empowerment and Minority Group.*

INTRODUCTION:

According to the Census of India 2011 the tribals constitute 8.6 per cent of the total population It has shown a steady increase in tandem with total population. Tribal women definitely are considered unique as they are the custodians for sustaining the tribal community.



Source: https://tribal.nic.in/ST/StatisticalProfileofSTs2013.pdf *(Retrieved on 24 Jan 2018)*

The principle of gender equality is enshrined in the Indian Constitution in its Preamble, Fundamental Rights, Fundamental Duties and Directive Principles. The Preamble of our Constitution not only grants equality to women but also empowers the state to adopt measures of positive discrimination in favour of women for safeguard. Articles 14, 15, 15(3), 16, 39(a), 39(c), 39(d) and Article 42 of the Indian Constitution are of specific importance in this regard.

Empowerment is viewed as the process of gaining control over one's lives including the control over one's material assets, ideologies and intellectual resources (Statistical Profile of Scheduled Tribes in India, 2013). It is also defined as the power of awareness and conscientization towards enhancing and building capacities that lead to greater participation by the individual in acquiring power on effective decision making and effective transformative action. Empowerment of women means to enhance and assert in the women themselves to take up the 'gender roles' assigned to them irrespective of the cultural setup of the society. This goal for tribal women is advocated by the Ministry by focusing on working for a holistic empowerment.

Previewing the legislations, to remove gender bias and bringing up new legal measures to meet the social and economic empowerment of women especially the tribal women is recommended. The constitutional provisions of the Government of India through its five year plans support tribal women in their growth and development (Ministry of Tribal Affairs, GOI, 2015), yet they face several challenges in their daily walks of life. Studies on how far such efforts have filtered to a minority group in a specific geographical area is also a felt lacuna.

RESEARCH METHOD:

A study was attempted to analyse the existing status of Irular tribal women residing in Senguttaiyur village of Coimbatore District, Tamil Nadu in terms of the social, economic, cultural, psychological and political empowerment . A sample size of 54 tribal women was selected by using Convenience Sampling method. Descriptive Research Design was adopted for the study to clearly explain the present situation to the tribal women, in specific on

empowerment aspects. The level of empowerment was measured using a published scale, Tayde and Chole Scale (2006), the findings of which led to planning and implementing an intervention programme.

SALIENT FINDINGS:

TABLE 1. DEMOGRAPHIC PROFILE OF THE SELECTED SAMPLE

S.No.	Particulars		Percentage Responding
1	Age group (range in years) (n=54)	16 - 25	7.4
		26 - 35	20.4
		36 - 45	**29.6**
		46 - 55	22.2
		56 - 65	11.1
		> 65	9.3
2	Marital Status (n=54)	Married living with spouse	72.2
		Widowed	27.8
3	Age of Marriage of Women (range in years) (n=54)	**< 18**	**53.7**
		18 - 24	40.7
		> 24	5.6
4	Age of marriage of Men (range in years) (n=54)	**< 21**	**31**
		21-27	43
		> 27	26
5	Age difference between husband and wife (n=54)	< 5	41
		' 05 - 10	44
		> 10	15
6	Type of Family (n=54)	Nuclear	46
		Joint	54
7	Size of Family (n-54)	Less than 4	22
		4 -6 members	43
		More than 6 members	35

1. Socio Economic Profile of the respondents: Data represented in Table 1 reveals that samples, those below 16 – 25 years and above 65 were found to be less represented. It was encouraging to record a maximum of about 30 per cent to be in their productive ages between 36 – 45 years followed by 22 per cent in 46 – 55 years.

All samples were reported to have been married among which 72 per cent were found to be living with spouse whereas the other 28 percent were widows.

Much against the Government stipulations that girls should be married away at 18 or above years of age, more than half were found to have been married away before 18 years, while one third of the men were married before the stipulated age of 21. Further the table indicates that nearly 95 percent of women were married before the age of 24. The age difference between the man and the wife at the time of marriage was found to be in the range between 5-10 years in 44 per cent of the families and less than 5 years age difference in 41 per cent of the samples.

It was encouraging to record 54 percent still belong to joint families, though a higher proportion in the nuclear families show that the tribes community are also moving towards setting nuclear families. Inference of type of family would be seen in the proportion of families with less than 4 members to be 22 per cent, 4 – 6 members as 43 per cent and more than 6 members to be 35 per cent.

2. Empowerment:

Figure 1. Pictorial Representation of Empowerment of Tribal Women

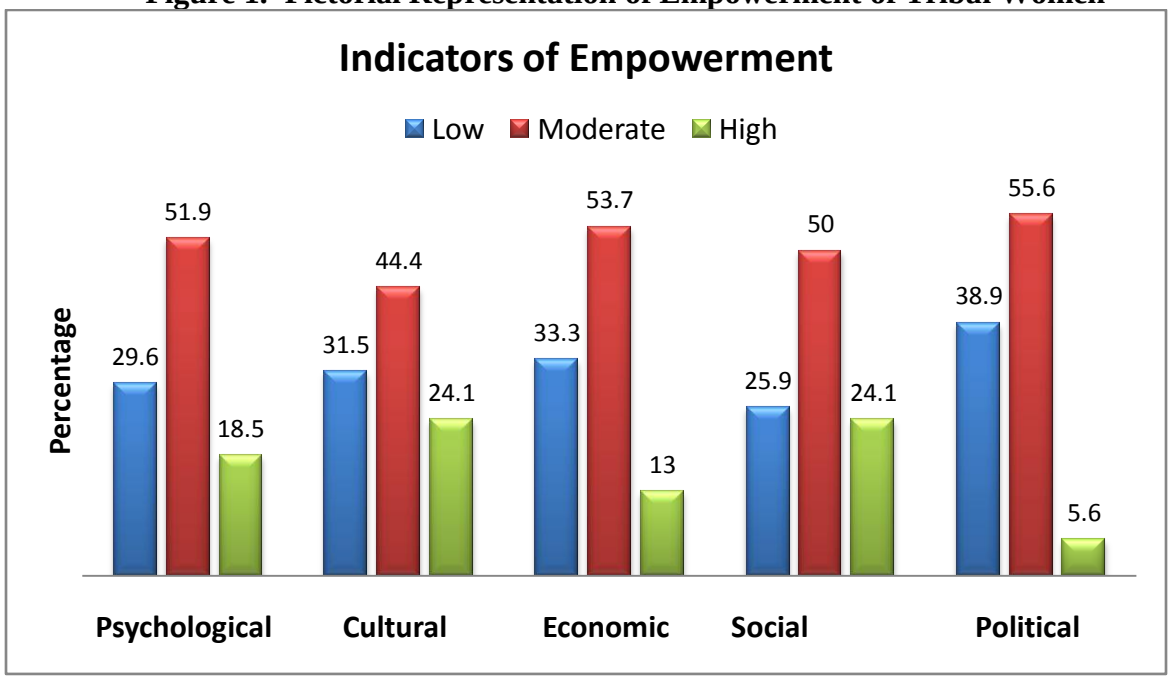


TABLE 2. EMPOWERMENT INDICATORS - STATUS QUO OF THE SELECTED SAMPLE

S.No	Indicators of Empowerment	Levels					
		Low		Moderate		High	
		Frequency	%	Frequency	%	Frequency	%
1	Psychological	16	29.6	28	51.9	10	18.5
2	Cultural	17	31.5	24	44.4	13	24.1
3	Economic	18	33.3	29	53.7	7	13.0
4	Social	14	25.9	27	50.0	12	24.1
5	Political	21	38.9	30	55.6	3	5.6

The existing status of the selected sample for empowerment indicators relating to five parameters namely psychological, cultural, economic, social and political was studied by administering the scale developed by Tayde and Chole (2006). Table 2 presents the level of empowerment of the selected sample. Approximately 25 to 39 per cent of samples revealed their status to be low on all four aspects. It was evident that this proportion of the population is still in the grassroots level of development. While a meagre population had showcased to be highly empowered, a majority of 44 to 55 percent had recorded to be lying only within the moderate scale. From these two aspects it can be surmised that firstly, they require intervention to improve their lot, and secondly that all the 54 sample households do not enjoy equal status and they differ in their access to many things based on a thin line of segregation. Exempting political empowerment, economic empowerment portrayed a dismal picture as 33 per cent of the samples featured low level of empowerment.

Hence intervention programme was planned along with the Tribal Welfare Department extending support through proper training facilities for starting up production units which helped them to make use of all available indigenous resources in the area, especially non-timber forest produces.

INTERVENTION:

The program devised as an intervention to enhance their economic status was drafted on the following lines:

1. **Social integration**
   - Counselling and Motivation by Experts
   - Forming self help group
   - Observing International Tribal Day
2. **Livelihood enhancement**
   - Financial help by networking with a National Bank
   - Mitigating resource crunch , infrastructure facilities and permission to collect MFP (Minor Forest Produce) by creating liaison with forest officials
   - Enhancing production skills through training at Krishi Vigyan Kendra, Coimbatore. Systematic intervention on collection, manufacture packing, labeling, sale of MFP, generate multiple skills
   - Training on attractive packing, better marketing and aggressive pricing
   - Channelising and enabling environment for production and marketing value added products through procurement of machinery by grant from Mahalir Vaazhvaadara Thittam, assistance from social entrepreneurs and NGO's
3. **Proactive efforts to ensure Civic benefits** - Solar borewell for additional source of water supply, health checkup, social awareness campaigns.

CONCLUSION AND FURTHER ACTION:

Empowerment cannot be achieved just by being in the receiving end. Being a proactive participant and creating routes for access has to be 'mutual'. This definitely requires an introduction or sensitivity to the issues and the assistance required both for government and marginalized groups.

Likewise the tribal and social welfare departments and voluntary organisations also should envisage involving tribal women in development programmes with the primary purpose of taking

the benefits to the beneficiaries. The tribal women could also be enrolled in the social welfare groups and activities in large number to enhance their capacities for women's empowerment intentions**.**

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UGC APPROVED JOURNAL

A STUDY ON PARTICIPATION OF PROFESSIONAL WOMEN IN ACTIVITIES WITH FAMILY MEMBERS

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ABSTRACT

Women during early days have boundaries but now they are not only empowered but also had robust careers. The changing nature at workplace coupled with changes in socio-cultural level has led to imbalance in the work and personal lives of employees all over. The present study was designed to assess involvement of women professionals in different activities with their family members. The study was conducted in Trivandrum and systematic sampling method was selected, in which a total of 500 married women with two or more years of work experience were taken. The study shows a significant association between different variables in the participation of activities with family members and employment sector. It was also found that all the attributes except eating meals and employment sector is found to be significant, the data also points out that communication between the family members were very low due to their work.

KEYWORDS: *Professionals, Employment Sector, Work-Family Balance*

INTRODUCTION

Women during early days have boundaries and were confined in kitchens, but now due to the access of higher education, they are not only empowered but also had robust careers. Today there is no profession where women are not employed as they have vital roles in different sectors. It was a tough challenge when women have to perform their duties both at home and office. As working women get married, she has to function as a wife, a mother and as a worker which may give rise to additional responsibility. Out-of-home work by mothers 'was analytically important for establishing whether it did or did not negatively influence the normative patterns of family life (Nisa, 2013).

Women today are breaking their boundary and are playing the dual role of balancing domestic life as well as professional life, giving a boost to their societal status in the process. The major problems for working women arise out of the dual responsibilities of the - domestic work as well as office work. Even though more and more women are coming out in search of paid employment and their families also need their income, the attitude towards women and their role in the family has not undergone much change (Kumari, 2014). The changing nature at workplace coupled with changes in socio-cultural level has led to imbalance in the work and personal lives of employees all over. Increasing demand, rising awareness among women, increasing stress levels, increasing family levels etc., have made it difficult for people to cope with their work and family lives (Mohanty, A. and Jena, L.K, 2016). This study was put forward to give an overview on the involvement or participation of married professional women in activities with family members.

OBJECTIVE

The present study was designed to assess the participation of women professionals in different activities with their family members, their communication with family members and their challenges in personal life.

METHODOLOGY

The study was conducted in Trivandrum, the IT destination in Kerala. A Pre tested interview schedule was used to collect the primary data and systematic sampling method was selected, in which a total of 500 married women with 250 from Technology Park and another 250 from government offices with two or more years of work experience were taken for data collection. Further analyses were carried out using statistical software SPSS 21.0.

FINDINGS

Due to the heavy work load and time constrain, women employees did not get enough time to do certain activities along with their family. Taken into account, the data was collected to find out the frequency of different activities done by the respondents along with their family, and the activities includes, activities related to children, recreation, helping friends or relatives, community services, watching television, eating meals and visiting religious places.

Participation in activities with family members

Activities involving meeting basic needs of the children, providing medical attention, helping them in doing homework, assisting them in educational activities, carrying them to school, to a doctor etc were considered in this study to assess child care.

TABLE NO: 1
DISTRIBUTION OF RESPONDENTS BASED ON ACTIVITIES RELATED TO CHILDREN

Activities related to children	Government	Private	Total	Chi square	P value
Always	123(49.2)	113(45.2)	236(47.2)	34.184[a]	0.000**
Sometimes	86(34.4)	44(17.6)	130(26)		
Never	2(0.8)	5(2)	7(1.4)		
Not Applicable	39(15.6)	88(35.2)	127(25.4)		

** Significant at 1 per cent level

The data regarding participation of professional women on activities related to children and employment sector reveals that 49.2 per cent of the respondents in government sector and 45.2 per cent of the respondents in private sector always do activities related to their children whereas only 17.6 per cent of the respondents in private sector and 34.4 per cent of the respondents in government sector sometimes do activities related to children. Based on the distribution, the two attributes were tested for independence and was found to be dependent (Chi square: 34.184[a], p value: 0.000) at 1 per cent level. The data also revealed that 25.4 per cent of the respondents in both the sector have no activities related to children. According to (Baliyan, 2014) the extent of participation of women in case of matters related to education of children, going to child's school functions and other women and child development programmes was not so high.

TABLE NO: 2
DISTRIBUTION OF RESPONDENTS BASED ON HELPING FRIENDS OR RELATIVES

Service/helping friends, relatives	Government	Private	Total	Chi square	P value
Always	57(22.8)	32(12.8)	89(17.8)	10.722[a]	0.005**
Sometimes	164(65.6)	173(69.2)	337(67.4)		
Never	29(11.6)	45(18)	74(14.8)		

** Significant at 1 per cent level

The table 2 reveals the association between services / help provided by professional women and employment sector, the data shows that only 12.8 per cent of the respondents in private sector always provided their participation in helping their friends or relatives while compared to 22.8 per cent of employees in government sector. It also shows that 18 per cent of the respondents in private sector did not provide any help to their friends or relatives which can be explained on the ground that these respondents find it really hard to have time for themselves by means of hobbies/leisure activities or maintain friendship. Based on the distribution of services/ helping friends or relatives and employment sector, the two attributes were tested for independence and was found to be significant (Chi square: 10.722[a], p value: 0.005) at 1 per cent level.

TABLE NO: 3
DISTRIBUTION OF RESPONDENTS BASED ON COMMUNITY SERVICES

Community services	Government	Private	Total	Chi square	P value
Always	35(14)	13(5.2)	48(9.6)	15.451[a]	0.000**
Sometimes	108(43.2)	96(38.4)	204(40.8)		
Never	107(42.8)	141(56.4)	248(49.6)		

** Significant at 1 per cent level

Table-3 points out the participation in community services of women professionals in different sector, and the data shows that more than half of the total respondents in private sector i.e, 56.4 per cent of the respondents does not participate in community services while 14 per cent and 43.2 per cent of the respondents from government sector does community services always and sometimes respectively. Based on the distribution, the two attributes community service and employment sector, were tested for independence and was found to be significant (Chi square: 15.451[a], p value: 0.000) at 1 per cent level.

TABLE NO: 4
DISTRIBUTION OF RESPONDENTS BASED ON WATCHING TELEVISION

Watching television	Government	Private	Total	Chi square	P value
Always	89(35.6)	46(18.4)	135(27)	19.066[a]	0.000**
Sometimes	145(58)	180(72)	325(65)		
Never	16(6.4)	24(9.6)	40(8)		

** Significant at 1 per cent level

The table 4 shows the distribution of watching television along with family members by professional women, and the data revealed that only 18.4 per cent of the respondents from private sector could always watch television along with their family while 35.6 per cent of the respondents in government sector always watched television. The data also points out that 9.6 per cent of the respondents in private sector never watch television with their family. The two attributes watching television and employment sector were tested for independence and was found to be significant (Chi square: 19.066[a], p value: 0.000) at 1 per cent level.

Among the different activities, eating meals was found to be done always with the family members by majority of the respondents both in government and private sector with 61.6 per cent of the respondents in government sector and 57.6 per cent of the respondents from private sector and the distribution of both the attributes was not found to be significant (Chi square: 0.873[a], p value: 0.646). According to St-Amour et al (2007) family meals are not only occasions for eating; they also offer important opportunities, as eating meals together has a positive emotional effect on parent-child relations.

TABLE NO: 5
DISTRIBUTION OF RESPONDENTS BASED ON RECREATION

Recreation	Government	Private	Total	Chi square	P value
Always	89(35.6)	39(15.6)	128(25.6)	46.476[a]	0.000**
Sometimes	150(60)	159(63.6)	309(61.8)		
Never	11(4.4)	52(20.8)	63(12.6)		

** Significant at 1 per cent level

The data furnished above reveals that recreation was not done along with the family by 20.8 per cent of the respondents in private sector compared to 4.4 per cent in government sector. The data also showed that only 15.6 per cent of the respondents from private sector always do recreational activities with family while 35.6 per cent of respondents from government sector preferred doing it with their family. Analysis was done to find the significance of the distribution of employment sector and recreational activities of professional women and it (Chi square value = 46.476[a], p = 0.000) shows a significant trend in the distribution and the value was significant at 1 per cent level.

The table 6 shows the association on participation of women professionals in visiting religious places and employment sector and the data reveals that 10 per cent of the respondents in private sector and 7.2 per cent in government sector never go to religious places with their family members. The distribution was tested for independence and was

TABLE NO: 6
DISTRIBUTION OF RESPONDENTS BASED ON VISITING RELIGIOUS PLACES

Visiting religious places	Government	Private	Total	Chi square	P value
Always	130(52)	90(36)	220(40)	13.007[a]	0.001**
Sometimes	102(40.8)	135(54)	237(47.4)		
Never	18(7.2)	25(10)	43(8.6)		

** Significant at 1 per cent level

Found to be significant (Chi square value = 13.007[a], p = 0.001) at 1 per cent level.

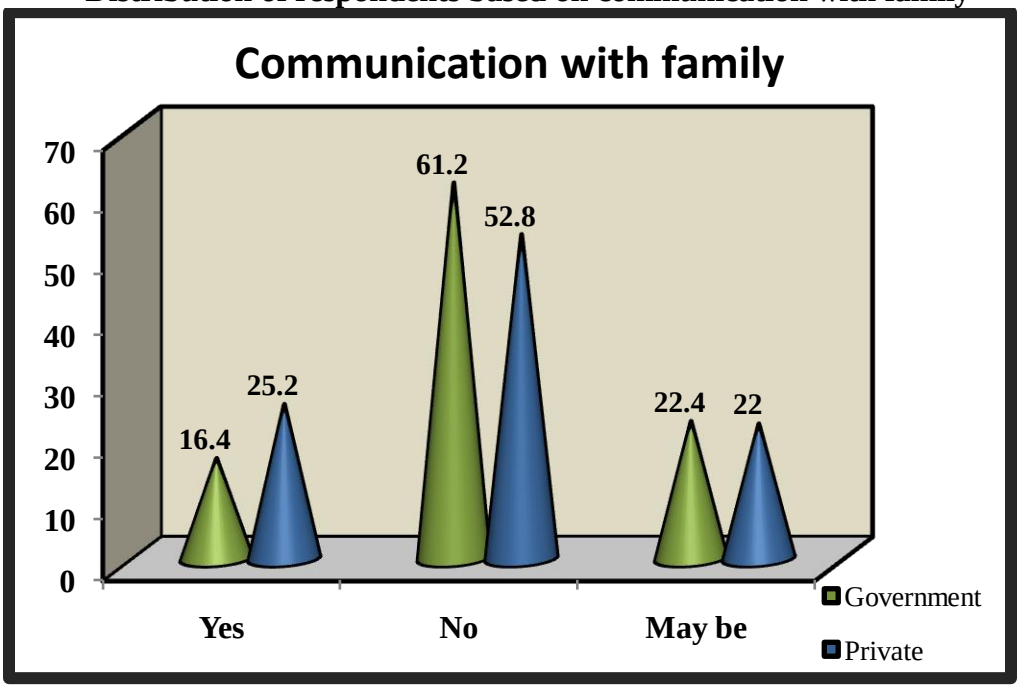
The data on the participation of activities with family members revealed that there was a difference in the frequency of activities between government and private sector. It showed that among the activities, community services were done by majority of the respondents from both the sectors.

Chi square was done to find significant association between different variables in the participation of activities with family members and employment sector, and it was found that all the attributes except eating meals and employment sector is found to be significant. A study by Delina (2013) shows a highest mean score among IT sector professionals that there isn't much time to socialize or relax with partner/ family. The married women working in this sector find it very hard to steal out time for their activities and to maintain friendships or relationships.

Communication with family

The data points out that communication between the family members were very low due to their work. Sixty one per cent and 52.8 per cent of the respondents in government and private sector responded that their communication with family member was not low due to their work where as 25.2 per cent of the respondents in private sector compared to 16.4 per cent of the respondents in government sector believed that their communication with family member were minimal due to their work. Based on the distribution of women employees according to the communication with family members and employment sector, the two attributes were tested for independence and the attributes were found to be dependent (Chi square: 6.210[a], df: 2, p value: 0.045) and is significant at 5 per cent level. Rashid and Rashid

Figure No: 1
Distribution of respondents based on communication with family



(2012) specified that long paid working hours limited the amount of time an individual could spent with family members. The shortage of time might make it difficult for employees to perform family duties and maintain family relationships satisfactorily.

CONCLUSION

The role of women has changed significantly in the past two decades and they have to balance between their professional and personal time. Juggling between the work and families and to maintain balance can have serious implication on the life of an individual. From this study it is understood that involvement of women professionals in different activities with family members is found to be low due to their busy work schedule and also their communication with family member were minimal due to their work. So the need for work-family balance of working women is very important. For good work family balance, fixing of priorities, fix schedule in such a manner to spent sufficient time with family, awareness on current working position and improvement in area when and where required is needed. Both government and private sector should also reframe the policies in order to balance family and life.

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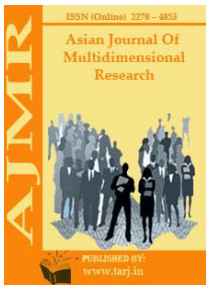

Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

NUTRIENT AND MICROBIAL QUALITY OF DEVELOPED MUFFINS USING HIBISCUS ROSA SINENSIS AND HIBISCUS SABDARIFFA

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ABSTRACT

There is a growing interest in the pharmacological evaluation of various plants used in Indian traditional systems of medicine. The use of alternative therapies, herbs, and supplements occurs at a very high rate among patients attending a variety of health care settings. The present era is concentrating on the alternative therapies for management of non communicable diseases. The Hibiscus genus (Malvaceae) contains several species many of which have been used medicinally and comprises of about 275 species in the tropics and sub-tropics. As the literature evidences shows the positive effect of usage of hibiscus genus in management of hypertension , an attempt was taken to develop muffins utilizing the flower of Hibiscus rosasinesis and calyces of Hibiscus sabariffa in form of powders separately and together and to assess its nutrient and microbial quality. Muffins was prepared keeping all ingredients constant and combining both Hibiscus rosasinensis flower powder and Hibiscus sabdariffacalyces powder separately and in combination. The overall accepted muffins were analyzed for the nutrients and microbial content using standard procedures. Muffins had energy 27.2 percent followed by carbohydrate 59.2, moisture 33.8, protein 2.31, fat 2.9, ash 1.64 and fibre 1.6 percent. A change in colour from mild to dark colour was observed during fifth day storage. The medical nutrition therapy focuses on patient centric counselling and prescribes the mode of usage of foods that were once considered to be avoided or restricted for the respective health condition Thus the new combination of using Hibiscus genus in muffins will find a place in management of the 'silent killer' disease.

KEYWORDS: *Traditional medicine, Hypertension, Hibiscus, Muffins*

INTRODUCTION

In India, Ayurveda medicine has used many herbs possibly as early as 1900 BC. Earliest Sanskrit writings such as the Rig Veda and Atharva Veda are some of the earliest available documents detailing the medical knowledge that formed the basis of the Ayurveda system *(Aggarwal and Sundaram, (2007).*Plants have provided mankind a large variety of potent drugs to alleviate suffering from diseases in spite of spectacular advances in synthetic drugs in recent years, some of the drugs of plant origin have still retained their importance. The use of plant-based drugs all over world is increasing. In spite of the tremendous advances made in the modern medicine there are still a large number of ailments for which suitable drugs are yet to be found. Today, there is an urgent need to develop safer drugs for the treatment of inflammatory disorders, diabetes, liver diseases, and gastrointestinal disorder. Hence, there is a growing interest in the pharmacological evaluation of various plants used in Indian traditional systems of medicine (Vyas2012).

George and Mansoor, (2001) opines the use of alternative therapies, herbs, and supplements occurs at a very high rate among patients attending a variety of health care settings. The herb *Hibiscus rosa-sinensis* native of China is a shrub widely cultivated in the tropics as an ornamental plant and has several forms with varying colours of flowers. The red flowered variety is preferred in medicine. The leaves and flowers have healing properties. Flowers have been found to be effective in the treatment of arterial hypertension and to have significant anti-fertility effect (Nadkarni, 1954 ., and Kurup, 1979).

Hibiscus Sabdariffa (*Roselle*) is a supplemental herb that is derived from the plant's calyces, which are the collection of sepals separating the blooming flower from the stem. The calyces have traditionally been steeped into tea where the anthocyanins (red-blue pigmentation) is steeped into the water and drank for medicinal purposes.Although it has a variety of claims medicinally, it appears to have evidence to support its role in reducing blood pressure in persons with elevated blood pressure (Morton ,1987).

The present era is concentrating on the alternative therapies for management of non communicable diseases. The medical nutrition therapy focuses on patient centric counselling and prescribes the mode of usage of foods that were once considered to be avoided or restricted for the respective health condition.

As the literature evidences shows the positive effect of usage of hibiscus genus in management of hypertension the present study was proposed to utilize the flower of *Hibiscus rosasinesis and* calyces of *Hibiscus sabariffa* in form of powders in formulation of muffins and to assess its nutrient and microbial quality .

MATERIALS AND METHODS

Developing muffins using Hibiscus rosasinensis and Hibiscus sabdariffa Muffin is a type of semi-sweet cake or quick bread that is baked in portion appropriate to one person. They are similar to cupcakes, although th usually less sweet and lack icing. Muffin gets their characteristic rise from baking powder or sometime baking soda instead of yeast. Muffins are often eaten for breakfast, alternatively they may be served for tea or at other meals (https://en.wikipedia.org/wiki/Muffin)

Sanzand and Fiszman, (2009) opines that Muffins are sweet, high-calorie baked products highly appreciated by consumers due to their good taste and soft texture. Traditionally, a muffin recipe is mainly composed of, Wheat flour -100g Sugar - 75g,Vegetable oil - 46g, Egg- 17g, Milk -

50ml.Simona, et al (2014) highlighted that the baking operation was done in an oven at 180°C/30 minutes. After which, the muffins were removed from the oven, cooled to room temperature, and put into plastic packs. Based on the literature the ingredients were chosen and the procedure for preparation of muffins was adopted.

Keeping all basic ingredients as constant in quantity three different muffins were prepared with incorporation of *Hibiscus rosasinensis*flower powder and *Hibiscus sabdariffa*calyces powder separately in three different levels such as 3g, 5g, and 7g. Third type of muffins was prepared in combining both *Hibiscus rosasinensis*flower and *Hibiscus sabdariffa*calyces powder in three different variations of 1.5g, 2.5g, and 3.5g each as shown in Table 1

TABLE – 1DEVELOPMENT OF MUFFINS

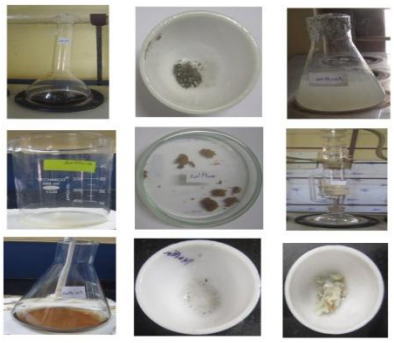
Product	**Variations**
Standard muffin AP+BS+BP+SM+UB+EG	
Product - 1 Muffin with HRS Variation I II III	 As in std muffins + HRS 3g As in std muffins + HRS 5g As in std muffins + HRS7g
Product - 2 Muffin with HSB Variation I II III	 As in std muffins + HSB 3g As in std muffins + HSB 5g As in std muffins + HSB 7g
Product - 3 Muffin with HRS+HSB Variation I II III	 As in std muffins + HRS+HSB 1.5g each As in std muffins + HRS+HSB 2.5g each As in std muffins + HRS+HSB 3.5g each

AP- All purposeflour,BS- Brown sugar,BP-Baking powder,SM-Skimmed milk, EW-Egg white HRS- Hibiscus rosasinensis,HSB - Hibiscus sabdariffa

Sensory Evaluation, Nutrient and Microbial Quality of Developed Muffins

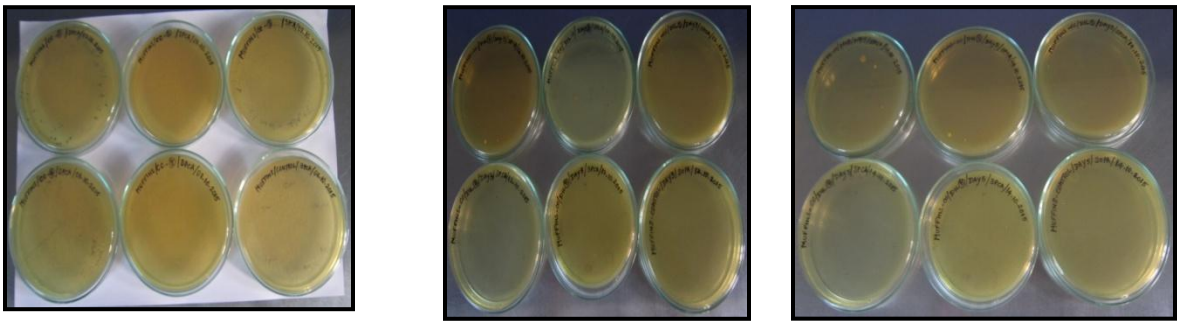
Muffins developed incorporating powders of hibiscus genus, wassubjected to sensory evaluation using 9 point hedonic rating from selected 10 panellists of bakery units.
Overall accepted muffins were subjected to nutrient analysis Plate 1. The methods of association of official analytical chemists (AOAC, 1990 and1995) were used for determination of ash, fat, crude fibre content of the samples. Indian standards method was used for determination of moisture and carbohydrates. The proximate values were reported in percentage and mg/100grams.

PLATE 1- NUTRIENT ANALYSIS



Standard procedures were followed in the counting and the identification of organisms(Plate 2) for 3rd, 5th and 7th day by placing the over all accepted muffins at refrigerator temperature in zip lock pouch.

PLATE 2- MICROBIAL ANALYSIS 3rd, 5th AND 7th DAY



RESULTS AND DISCUSSION

Standardisation of muffins

All purpose flour was utilised for the preparation of muffins with other ingredients such as brown sugar, unsalted butter, baking powder, skimmed milk and egg white as mentioned in the study.The variations of muffins, yield and cost is presented in table 2.

TABLE 2 YIELD AND COST OF MUFFINS

Ingredients(g)		**Total/weight In (g)**	**No. of portions**	**Weight /portion**	**Cost/portion In Rs**
Standard muffins APF+BS+BP+SM+UB+EW (150+85+1+75+10+60)		381	4	20	4.60
Product - I Muffins with *Hibiscus rosasinensis*					
Standard ingredients	**HRS**	**Total/weight In (g)**	**No. of portions**	**Weight /portion**	**Cost/portion In Rs**
	3g	384	4	20	5.7
	5g	385	4	20	6.4
	7g	387	4	20	7.2

Product - II **Muffins with *Hibiscus sabdariffa***					
Standard ingredients	**HSB**	**Total/weight In (g)**	**No. of portions**	**Weight /portion**	**Cost/portion In Rs**
	3g 5g 7g				
		384	4	20	6.4
		385	4	20	7.7
		387	4	20	8.9

Product - III **Muffins with *Hibiscus rosasinensis* and *Hibiscus sabdariffa***					
Standard ingredients	**HRS+HSB**	**Total/weight In (g)**	**No. of portions**	**Weight /portion**	**Cost/portion In Rs**
	1.5+1.5g 2.5+2.5g 3.5+ 3.5g				
		384	4	20	6.09
		385	4	20	6.4
		387	4	20	7.2

APF - All purpose flour, BS - brown sugar, BP - baking powder, SK - Skimmed milk, UB - Unsalted butter, EW - Egg white, HRS - Hibiscus rosasinensis flower powder, HSB - Hibiscus sabdariffa calyces powder.

Depending upon the ratio of *Hibiscus rosasinensis* flower and *Hibiscus sabdariffa*calyces powder added, the variance in cost is seen. Standard muffins and developed muffins in different variations weighed 381g. Totally four muffins were obtained which also remained the same for different variations. The weight of each muffins were 20g/portion. Food cost of muffins was different due to the price difference of the different variations of *Hibiscus rosasinensis* flower and *Hibiscus sabdariffa*calyces powder.

Sensory Evaluation

Table 3 shows the score obtained for the three types of muffins in different variations.

TABLE 3 -MEAN SCORE OF THE DEVELOPED MUFFINS

	Score for Muffins in Different Variations								
Sensory attributes	**3g**			**5g**			**7g**		
	HRS	**HSB**	**HRS+ HSB**	**HRS**	**HSB**	**HRS+ HSB**	**HRS**	**HSB**	**HRS+ HSB**
Appearance	7	7	7	6	7	6	5	5	6
Colour	8	7	8	7	6	6	4	4	4
Taste	8	6	8	6	5	6	5	6	4
Flavour	8	7	8	6	4	5	5	4	3

Texture	8	7	8	6	7	6	6	5	5
Over all Acceptability	7	7	8	6	7	6	6	5	4

The sensory score shows that the selected panellist rated like very much for the sensory attributes of colour, taste ,flavour, texture for the muffins prepared with incorporation of HRS and HSB powder equally of 1.5 g each, when compared to other variations and types.

Shelf life

The shelf life of muffins with 3g incorporation of HSB,HRS and in combination was observed for changes during storage at room temperature for a period of one week . It was noted that muffin prepared using *Hibiscus rosasinensis* flower and *Hibiscus sabdariffa* calyces powder variations did not show any change in colour and taste till third day. With regard to colour, muffins prepared using combination of *Hibiscus rosasinensis*sand *Hibiscus sabdaiffa* a change in colour from mild to dark colour was observed during fifth day. Growth of mucor was visibly noted in muffins developed using *Hibiscus sabdariffa* alone and in combination with *Hibiscus rosasinensis* after seventh day.

Nutrient analysis of overall accepted muffins.

An analysis of muffin nutrition shows that it is low in nutrients and has high glycemic index values since it is made of refined wheat flour. A high GI value results in increased blood glucose levels and may lead to increased carving and appetite for food. Muffins have virtually no vitamins or minerals but fruit based muffins and corn muffins may contain 1 to 2 percent of vitamin A and vitamin C (www.amilonline.com)

The table 4 gives the nutrient content of overall accepted muffins with 3g of *HRS and HSB.*

TABLE 4 NUTRIENT CONTENT OF OVERALL ACCEPTED MUFFINS

Nutrient analysed	**Computed values % W/W***	**Analysed values % W/W**
Moisture content	28.5	33.86
Total ash	2.3	1.64
Total fat	8.1	2.94
Crude fibre	3.6	1.6
Crude protein	15.5	2.31
Carbohydrate	41.0	59.25
Energy	120 K cal/100g	272.7 K cal/100g

**(David et al, 2010)*

From the table it was found that theover all accepted muffins analysed for nutrients had energy 272.7 Kcal percent followed by carbohydrate 59.2, moisture 33.8, protein 2.31, fat 2.9, ash 1.64 and fibre 1.6 percent when compared with the computed values by David et al ,2010.

Microbial quality of overall accepted muffins.

Needham et al, 2004 stated that microbiological spoilage is often the major factors limiting the shelflife of bakery products. Table 5 gives the microbial analysis of muffins

TABLE 5 -MICROBIAL ANALYSIS OF MUFFINS

Days	No. of colonies with corresponding dilution					Colony forming unit
	Dilution					
	10^{-1}	10^{-2}	10^{-3}	10^{-4}	10^{-5}	
0	0	0	0	0	0	0
3	0	02	0	0	0	$1x10^{-1}$
5	03	01	0	0	0	$2x10^{-1}$
7	03	01	05	05	03	$8.5x10^{-1}$

Muffins stored in cold temperature and analysed at 5th day and 7th day showed excess of microbial load when compared to 3rdday.Hence it is inferred that muffins should be consumed within three days storing it in refrigerator.

SUMMARY AND CONCLUSION

The muffins prepared using *H.rosasinesis* separately and in combination with *H.sabdariffa* were overall accepted in all attributes for 3g incorporation. It is clear that with increasing proportion of variations the taste and colour of muffins did not gain acceptance. The nutrient anlaysis shows that it can be recommended for hypertensive subjects as low in proximate nutrients and has been proved in literatures for hypotensive effective of Hibiscus genus. The medical nutrition therapy focuses on patient centric counselling and prescribes the mode of usage of foods that were once considered to be avoided or restricted for the respective health condition Thus the new combination of using Hibiscus genus in muffins may find a place in management of the 'silent killer' disease and the young India can start up with developing integrated approach of medical nutritional therapies.

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NUTRITIONAL PROFILE AND THE EFFECT OF A DEVELOPED DIETARY READY RECKONER IN TYPE II DIABETES PATIENTS

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ABSTRACT

To effectively manage diabetes, persons with diabetes have to learn and practice new, complex, uncommon behaviours like blood sugar monitoring, taking medications, keeping track of meal times, diet and exercise, besides dealing with their routine work, social and family life. Thus the study was carried out with the aim to evaluate the nutritional profile of type II diabetes patients and to assess the effect of a developed dietary ready reckoner in type II diabetes patients. A total of 500 outpatient type II diabetics were non-randomly selected for the study. Nutritional profile of the patients was assessed using standard tools adopting standardized methods through direct Interview method. The effectiveness of a developed dietary ready reckoner was carried out in subsamples. The selected parameters like Fasting Blood Glucose, Post Prandial Blood Glucose, HbA1c, body weight (Kg), BMI and Diabetes Related-KAP scores were compared in the pre-test and post-test phases of the study. The retention effect was evaluated after three months. The data were subjected to SPSS version 21.0 and methods such as Independent two sample t-test and One-way Anova were employed. One third of the patients had poor nutritional status and nutritional status of male patients was inferior to female patients. The dietary ready reckoner was effective in diabetes patients with regards to their blood glucose profile and KAP. If given sufficient time and constant reinforcement of guidelines, it would definitely help the patients to attain their goals in disease management.

KEYWORDS: *Non-Randomly, Complex, Medications, Keeping Track*

INTRODUCTION

Diabetes patients are more likely to suffer from poor nutritional status and they develop complications due to poor awareness regarding the disease and inadequate glycemic control. To effectively manage their condition, persons with diabetes have to learn and practice new, complex, uncommon behaviours like blood sugar monitoring, taking medications (self injecting), keeping track of meal times, diet and exercise, besides dealing with their routine work, social and family life. This calls for adjustment to previously established life style (Malathy et al, 2011). Thus the study was carried out with the aim to evaluate the nutritional profile of type II diabetes patients and to assess the effect of a developed dietary ready reckoner in type II diabetes patients.

MATERIALS AND METHODOLOGY

The study was carried out in two phases.

Phase I- Nutritional Profile of type II diabetes patients

A total of 500 type II diabetes patients who attended the outpatient department of Endocrinology wing of one of the leading hospitals in Thiruvananthapuram were non-randomly selected for the study. Details on demographic parameters, nutritional status indicators (ABCD analysis) as well disease profile of the patients were elicited using standard tools through direct Interview. From the data collected, three major indicators of nutritional status of the patients namely Food Habits Score (FHS), Dietary Nutrition Index (DNI) and Nutritional Status Index (NSI) were worked and interpreted by statistically analysing it using SPSS version 21.0.

Phase II- Effect of a developed dietary ready reckner in type II diabetes patients

To conduct this study 27 diabetes patients of various clinical types such as 10 normal weight, 10 overweight and 7 underweight patients were suitably identified from the macrosample pool based on a pre-fixed inclusion criteria. Pre-test post-test study design was adopted for this study. A Diabetes Related KAP (DR-KAP) was formulated. A dietary ready reckoner, the most important tool in this study was developed from the information generated during various stages of the study in MS-Powerpoint, which consisted of 68 slides under four major content areas namely Introduction about diabetes, Dietary management in diabetes, Dietary modification during exercise and Dietary adjustments during insulin injection.

CONDUCT OF THE STUDY

During the pre-test phase, the Fasting Blood Glucose (FBG), Post Prandial Blood Glucose (PPBG), HbA1c, body weight (Kg), BMI was recorded. Also DR-KAP was introduced and scores obtained were also recorded in the pre-test phase. In the post-test phase, the developed dietary ready reckoner was introduced to the patients and hand-outs were given for future reference. Soon after the session (post-test phase), their knowledge and attitude was assessed to examine the immediate effect of the reckoner. The patients were advised to strictly practice the reckoner for three months. After three months (delayed post-test), the retention effect of the dietary ready reckoner was evaluated by repeating FBG, PPBG, HbA1c, DR-KAP and body weight. Major statistical methods employed were Independent two sample t-test and One-way Anova.

RESULTS AND DISCUSSION

The results of the study are discussed under two sections.

Phase I – Nutritional Profile of type II diabetes patients

The selected patients consisted of 283 males and 217 females, and 52 per cent of the patients belonged to the age group of 45-60 years category. Physical Quality of Life Score (PQLS) of the patients indicated that close to one fifth of the patients (19.20%) had good scores.

In order to assess the food habits of the patients, the major dietary aspects were brought together to compute a FHS (Fig.1). FHS indicated that only one third (31.8%) of the patients have good FHS, better in the case of female patients (43.8%) when compared to the male patients (22.6%). The observation was statistically significant.

DNI was worked out from the nutrient intake data for calories, protein, fat, calcium, iron, retinol, thiamine, riboflavin and vitamin C available from the 24 hour dietary recall data according to the cut-off values for desirable and undesirable intake stipulated by Barigidad et al (1996) (Fig.2). It is very much noticeable that exact half of the patients more or less equally fell under the two categories, namely desirable and undesirable nutrient intake (DNI).

The nutritional status of the patients was determined by calculating a NSI for each patient. The anthropometric, biochemical, clinical and dietary factors were taken into consideration to calculate the NSI and the patients were distributed as shown in Fig.3. Overall the patients were more or less equally distributed in all the three categories from good to poor. But the nutritional status was comparatively better for female patients as shown by their high representation of 39.2 per cent over 28.7 per cent of the male patients in the good NSI category. The observation was statistically significant.

Phase II- Effect of a developed dietary ready reckner in type II diabetes patients

The effect of the developed dietary ready reckoner was evaluated through improvement in KAP, blood glucose profile and maintenance of healthy body weight in selected subsamples.

Effect of dietary ready reckoner on KAP of the patients

The result of improvement in KAP of the patients owing to intervention with dietary ready reckoner is presented in Fig.4. The results of the KAP during various phases had shown that there had been significant knowledge gain occurred between pre and post and also pre and delayed post-test phases. Overall, the result had also revealed that the reckoner had considerable influence improving their attitude. There was absolute improvement in practice scores in the pre and delayed post-test phases, which demonstrated that there had been remarkable increase in practice scores during the post-test phase due to knowledge, imparted using the developed dietary reckoner. Tukey simultaneous comparison t-values made it clear that there had been a considerably high statistical significance in KAP scores between pre and post intervention phases indicated by observed values greater than the critical value 2.39.

Effect of dietary ready reckoner on BG profile of the patients

The FBG, PPBG and HbA1c values of the patients obtained were compared during various phases of the study and conclusions were made (Fig.5). FBG values had dropped from 184.59 mg/dl in the pre-test phase to 174.70 mg/dl in the post-test and finally 160.74 mg/dl in the delayed post-test phases. Whereas PPBG values had statistically significant improvement from the pre (292.32 mg/dl), post (244.63 mg/dl) to the delayed post-phases (202.59 mg/dl). HbA1c also failed to bring forth significant improvement in the post-test phase eventhough the mean

values had dropped from 9.77 per cent in the pre-test phase to 9.04 per cent in the post-test phases.

Effect of dietary ready reckoner on body weight of the patients

Inorder to assess the effect of the developed dietary ready reckoner on the patients, three clinical types of diabetes patients such as normal weight, overweight ant underweight categories were picked up and intervened. The intervention with dietary ready reckoner was not able to cause any improvement in the body weight in any of the clinical types of selected diabetes patients. But overweight diabetes patients were found to have meagre weight loss and underweight diabetes patients had feeble weight gain in the delayed post-test phase. The diabetes patients under normal weight category maintained their weight throughout the study period.

CONCLUSION

Overall the selected patients were more or less equally distributed in all the three categories NSI from Good to Poor and nutritional status of male patients was inferior to female patients. It could be very well stated that the dietary ready reckoner was effective in improving the health status of diabetes patients with regards to their BG profile and KAP, much effectiveness was not observed in body weight. Given sufficient time, constant reinforcement of guidelines by the educators until gained knowledge and the changed attitude become a part of their life would definitely help the patients to attain their goals in disease management.

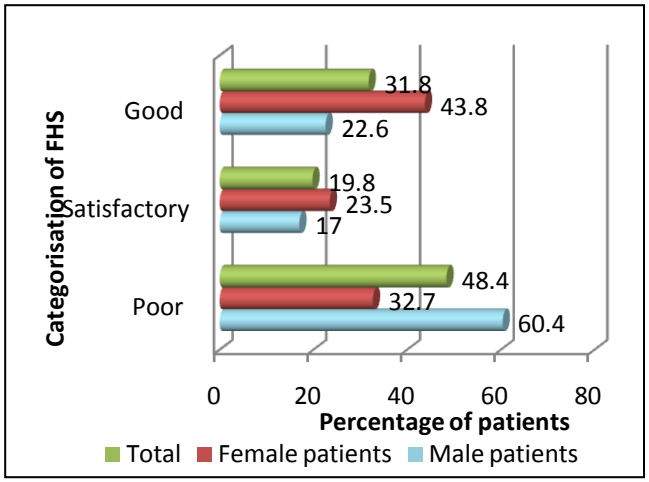

Fig.1. Distribution of the patients based on FHS

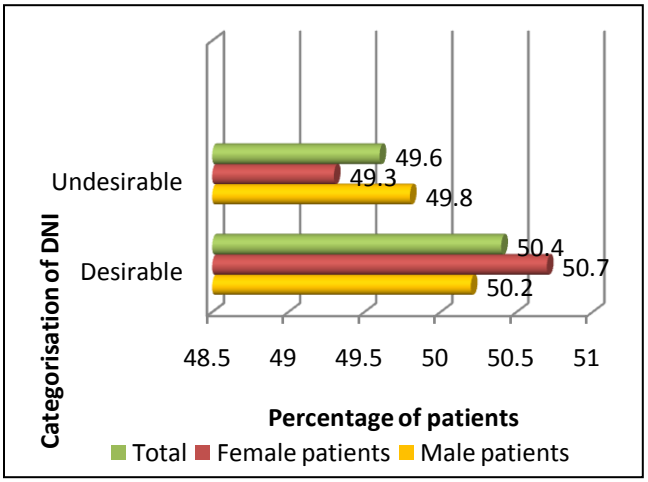

Fig.2. Distribution of the patients based on DNI

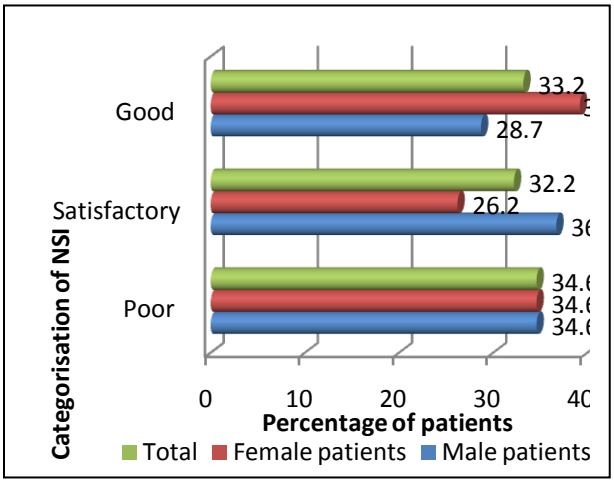

Fig.3. Distribution of the patients based on NSI

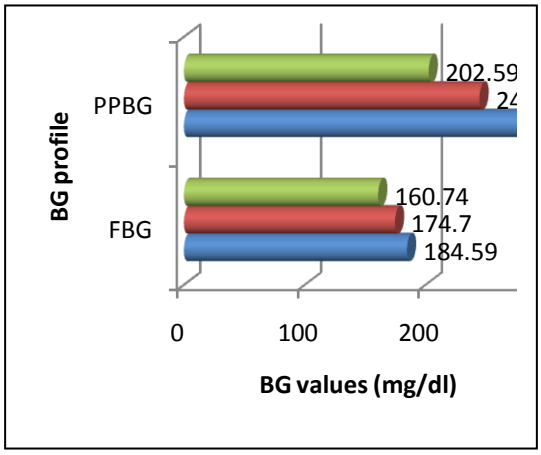

Fig.4. Mean FBG, PPBG values in the pre, post and delayed post-phases

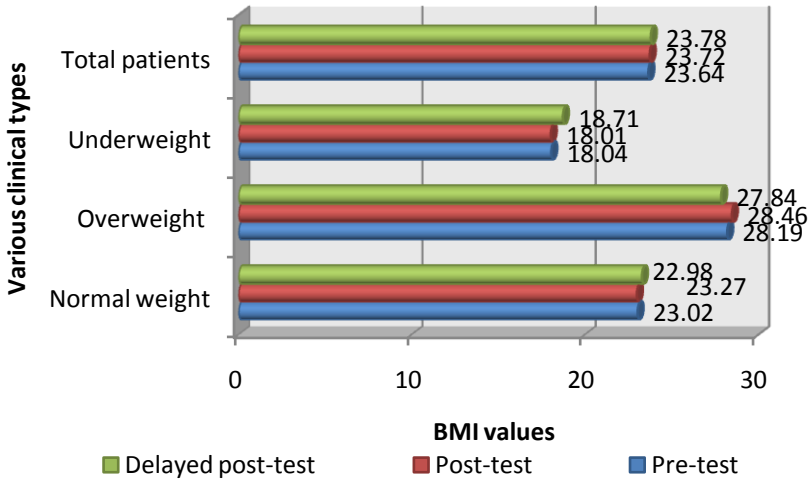

Fig.5. Mean BMI in the pre, post and delayed post-test phases

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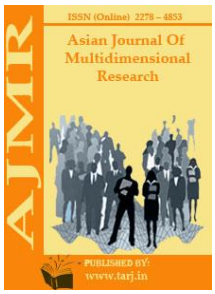

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PHYSICAL AND MENTAL HEALTH WELLBEING OF THE SELECTED TRANSGENDERS

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ABSTRACT

Present study focus on the physical and mental health of transgenders and to identify adjustable factors that version for health risks in this marginalized population. Two hundred respondents from Coimbatore city from the age group of 20-50 years were selected using stratified sampling technique. Biochemical parameters like heamoglobin, blood sugar and blood pressure, clinical assessment and BREF tool was used to assess the physical and mental well-being of selected transgenders. Out of 200 transgenders, forty six per cent transgenders exhibited symptoms for iron and vitamin B12 deficiency and 14 per cent and 26 per cent respondents fall under moderate and mild anemia status respectively with hemoglobin level (10-12 g/dl) and one per cent were found to be diabetic. Twelve per cent subjects were found moderate blood sugar potential risk of diabetic in future. The BREF tool scores of transgender sample were significantly different in the psychological health and social relationship domains. Transgenders had low scores in psychological health and social relation domains.

KEYWORDS: *Transgenders, physical health, mental well-being, blood pressure, anemia, blood sugar, hemoglobin*

INTRODUCTION

Transgender community includes Hijras, Eunuchs, Kothis, Aravanis, Jogappas, Shiv-Shakthis etc., who have been a part of Indian society for centuries. Globally around 14 million men are transgendered with 5.1 billion people aged 15+ worldwide , commonly cited clinic-based estimates suggest and around equal to the populations of countries like Kazakhstan, Equador and Cambodia, there are a lot of trans people in these countries[1]. In India five to six million transgenders are living but in Tamil nadu transgender population is 30,000, about 2,550 transgenders reside in Coimbatore city. It was great strides in trying to integrate transgender people into the society[2].

The highest proportion of the third gender population, about 28 per cent, was identified in Uttar Pradesh followed by 9 per cent in Andhra Pradesh, 8 per cent in Maharashtra and Bihar, over 6 per cent in both Madhya Pradesh and West Bengal and well over 4 per cent in Tamil Nadu, Karnataka and Odisha. Rajasthan accounted for over 3 per cent of the total transgender population and Punjab for 2 per cent[3].

Majority of transgenders suffer from discrimination, sometimes with a cumulative effect on physical and mental health and general well-being. On health grounds alone these people would benefit from rights advocacy.

Recent data examining the percentage of transgender individuals in the transgender population found that 4.1percent transgenders identify as diabetic. Specific regions of the country in America show a higher rate of 15.4 percent. Based on this information, it's estimated that 8.8 million transgenders (a subgroup with significant diabetes risk factors) are living in India of which 1.3 million have diabetes or at least five percent of the 23.6 million people with the disease. Transgender community has unique risk factors for developing diabetes and worse health outcomes[4]

Transgender men have a much higher incidence of Polycystic Ovarian Syndrome which in turn has a much higher incidence of hypertension, glucose intolerance and dyslipidemia. The most important modifiable risk factor for many transmen is tobacco abuse. Other modifiable risk factors include diet, exercise and control of hypertension, hypercholesterolemia and diabetes. There is a risk of liver damage and liver cancer with all testosterone formulations but this is minimal with all forms except oral or unless very high levels are administered. However, as with any drug that carries even a small risk of liver damage [5].

A psychological condition is considered a mental disorder only if it causes distress or disability. Many transgender people do not experience their transgender feelings and traits to be distressing or disabling, which implies that being transgender does not constitute a mental disorder itself. For these people the significant problem is finding the resources, such as hormone treatment, surgery and the social support they need, in order to express their gender identity and minimize discrimination[6].

Transgender people experience the same kinds of mental health problems that non transgender people have. However the stigma, discrimination and internal conflict that many transgender people experience may place them at increased risk for certain mental health problems. Discrimination, lack of social support and inadequate access to care can exacerbate mental health problems in transgender people, while support from peers, family and helping professionals may act as protective factors [7].

Heart disease remains a significant concern for men of all sexual orientations. Major risk factors for heart disease among men include tobacco use and alcohol use behaviors prevalent among gay men[8].

In some cases, gay men are at *increased* risk for several types of cancer including prostate, testicular and colon cancers. In addition, gay men as well as anyone who has receptive anal sex are at higher risk for anal cancer due to an increased risk of becoming infected with human papillomavirus (HPV), the virus that causes genital and anal warts. However, access to screening services may be severely limited due to issues and challenges in receiving culturally sensitive care [9].

METHODOLOGY

Selection of Sample

More number of transgenders resides in north and east part of Coimbatore city, no such study was carried out, so this area was chosen for the present study. Two hundred respondents from the age group of 20-50 years was selected using stratified sampling technique.

Biochemical Assessment

Biochemical test helps to diagnose deficiency diseases at the subclinical stage to confirm it as a diseased state[10]. The following biochemical analysis was carried out to ascertain the extent of nutritional deficiency disorder.

Estimation of Blood Glucose

For all the 200 subjects random blood glucose level was checked using glucometer. The random blood pressure value was then compared with standard value. Test of glucose can identify subjects who may have diabetes mellitus. A normal blood sugar level two hours after eating is less than 140 mg/dl. This ranges on more than occasion establishes a positive diagnosis[11].

Estimation of Hemoglobin

Hemoglobin estimation is done for screening the anemia subjects. Hemoglobin level is an useful index of the overall nutritional status, irrespective of its role in anemia[12]. Anemia has been recognized as being associated with protein energy mal nutrition.

For present study all 200 transgenders total hemoglobin content was assessed by withdrawing a drop of blood in the fingertip with using hemoglobin monitor and compared with ICMR standard of hemoglobin (2009). The subjects were identified as mild, moderate and severely anemic. The range for normal hemoglobin for men is about 13.5 to 17.5 g/dl.

Blood Pressure

The blood pressure for all the two hundred respondents was checked using oscillometric blood pressure monitor and based on the WHO classification of blood pressure (2009), the selected respondents blood pressure was classified as normal (130/85 mm/Hg), mild hypertension, (140/90 mm/Hg), moderate hypertension, (160/100), severe hypertension (180/110mm/Hg).

Assessment of Clinical Symptoms

Clinical symptoms is an attempt to identify the initial nutritional status as well as the interplay of the factor influencing the progression or regression of nutritional abnormalities[12]. All the selected respondents were assessed for the presence of symptoms of nutritional deficiency. The list of clinical signs and symptoms recommended by WHO (2003) was utilized in clinical examination. The investigator carried out the clinical examination with the help of physician.

Assessing the Mental Wellbeing of the Selected Transgenders

The researcher is using the WHO BREF Tool for present study. Assessment of mental health wellbeing of the community is the important objective of this study. The questions were posed to respondents and their response was noted by researcher.

BREF Tool Domains

WHO BREF tool on Quality of life questionnaire (QOL) by the WHO (1998) was used to assess the level of quality of life of the selected respondents. The QOL-BREF is a quality of life measure. It is an abbreviated from the WHO Quality Of Life tool. The quality of life as well as four specific domains, they are physical, psychological, social relationship and environment. Using a five point scale for each item, the subject circles the number that best represents their opinion, based on their life over the previous weeks. The five point scale ranges from "not at all" (as score of 1) through to completely (a score of 5). Higher score indicates a better quality of life. The validity of quality of life question is 0.51-0.64 and reliability is 0.9. The scoring norms provided by author are used to score 4 domains. Higher score QOL is good.

Physical and Mental Well Being

Relaxation therapy, thought stopping, cognitive restructuring, behavioral assignments were administered to the respondents individually to reduce their anger, negative emotions and to enhance the general well-being. **T**herapy was given to all respondents 4 times a week. On the whole, four sessions were given to all 200 respondents each session lasted for an hour.

Results and Discussions

Age Wise Distribution

Out of 200 transgenders 44.5 per cent of transgenders were in the age group of 31-40 years and 34 per cent transgenders belonged to the age group of 41-50 years, followed by 21.5 per cent transgenders were in the age group of 21-30 years[13].

Biochemical Parameter

The biochemical parameter like hemoglobin, random blood sugar and blood pressure assessed using standard procedures and the finding is projected in the following tables.

Hemoglobin Level

Hemoglobin level of selected transgenders is flashed in the Table II

TABLE II
HEMOGLOBIN LEVEL OF THE SELECTED TRANSGENDERS

Hemoglobin level* (g/dl)	Age (years)					
	20-30		31-40		41-50	
	Number	Per cent	Number	Per cent	Number	Per cent
Normal (14)	15	7.5	46	23	27	13.5
Mild (12.9-13)	18	9	33	16.5	1	0.5
Moderate (10-12)	9	4.5	7	3.5	11	5.5
Severe (<10)	1	0.5	3	1.5	2	1

***ICMR, standard value (2009)**

A total of 44 per cent transgenders had normal hemoglobin level was normal, out of study population 13.5 per cent and 26 per cent respondents fall under moderate and mild anemia status in the age group of 20-30 years and 31-40 years respectively with hemoglobin level (10-12 g/dl). Only less per cent (2.5 per cent) had hemoglobin level less than 8g/dl and remaining nine per cent respondents were not interested to give their blood sample, so these respondents were excluded from the study panel.

Random Blood Sugar Level

The random blood sugar level of the selected transgenders is presented in figure1

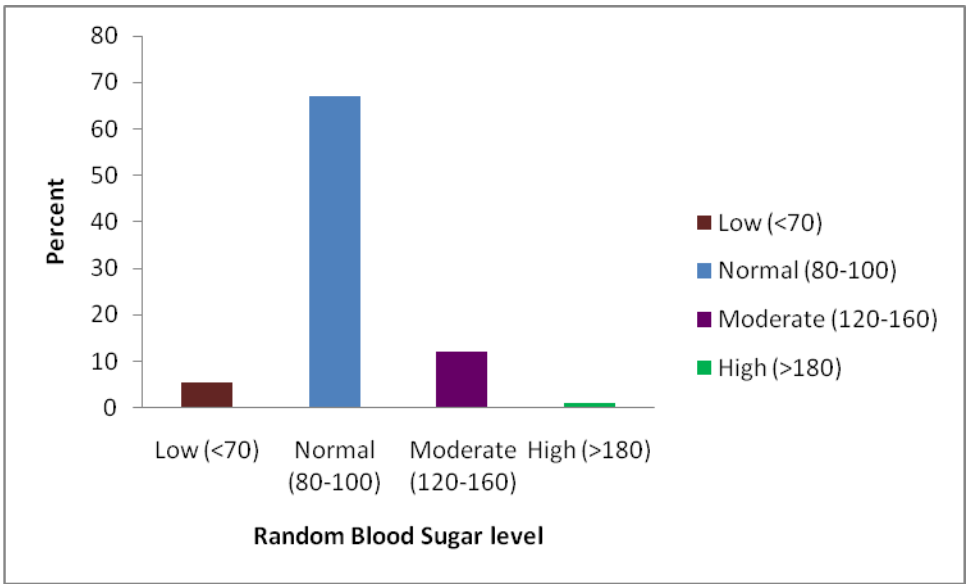

Figure 1
Random blood sugar level of the selected transgenders
(American Diabetic Association, 2012)

Figure 1, clearly indicates that, among the selected 172 transgenders, 67 per cent had normal blood sugar level who's random blood sugar level were within the range of 80-110mg/dl and only one percent were found to be diabetic. Twelve per cent subjects were found moderate blood sugar potential risk of being diabetic in future.

Blood Pressure Level

The selected transgenders were monitored for their blood pressure using aoscillometric blood pressure monitor and the corresponding results is figure 2.

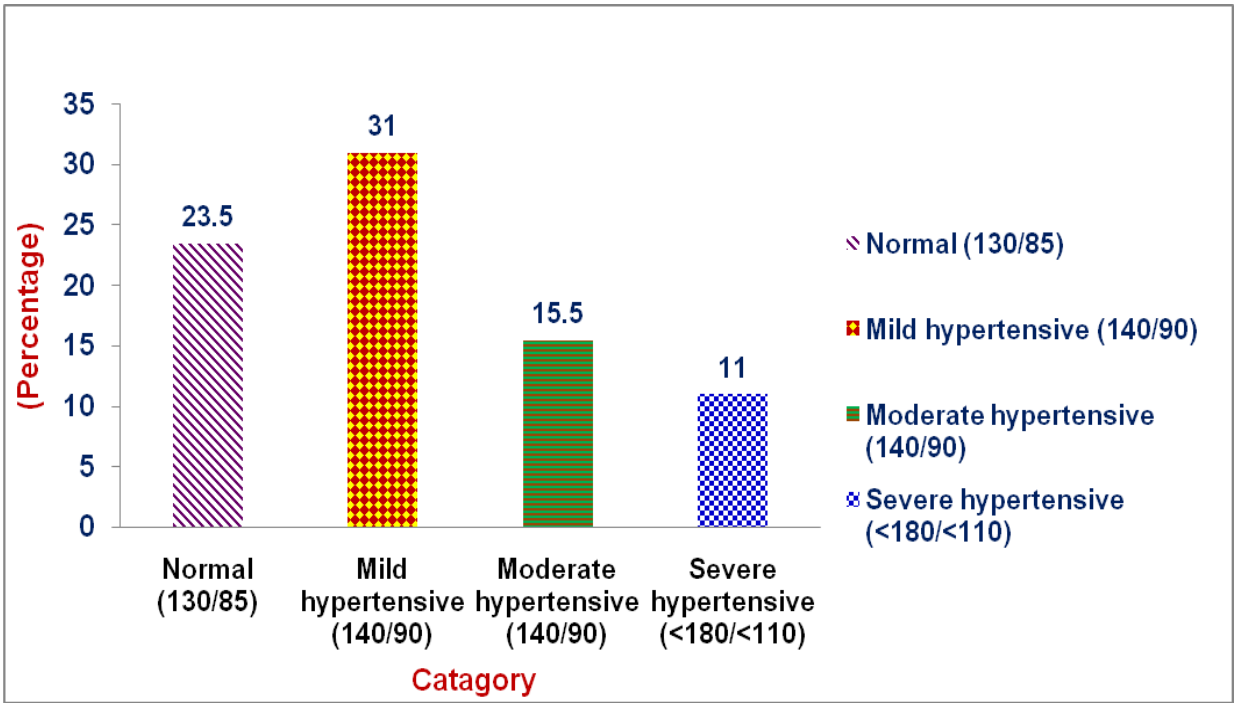

Figure 2
The Blood Pressure of the selected transgenders
*** WHO, standard value (2009)**

From the figure 2, it was evident that 31 per cent were found to be mild hypertensive with blood pressure (140/190mm/hg), followed by moderate hypertensive transgenders with 15.5 per cent. Also it was alarming to note that 11 per cent transgenders were severely hypertensive with blood pressure ranging between >180/>110mm/hg.

D. Clinical Picture

Using Jelliffe's table of clinical assessment the signs and symptoms of deficiency disorders for both micro and macro nutrient was observed for all the selected transgenders and the findings are tabulated in Table III.

TABLE III
CLINICAL SIGNS AND SYMPTOMS SHOWN BY THE SELECTED TRANSGENDERS

Signs and symptoms	Number	Percentage
Paleness of eye, dry skin	92	46
Dry, grayish hair, brittle nails	52	26
Painful joints	61	30.5
Spongy gums	27	13.5
Excess fat stores	11	10.5
Caries, bleeding gums and swollen gums	87	43.5
Weakness and fatigue	91	45.5

The table III indicates that 46 per cent transgenders exhibited symptoms for iron and vitamin B12 deficiency. Forty three per cent transgenders had dental carries which can be attributed to their habit of chewing tobacco and beetle nuts. In spite of having a normal hemoglobin level 18.5 per cent transgenders had pale eye, dry skin and gray hair which is common symptom for iron deficiency and painful joints is a classical symptom of calcium deficiency was reported among 30.5 per cent transgenders.

BREF Tool Domains

Physical Health Status among the Selected Transgenders

The table IV shows the physical health status of the selected transgenders.

TABLE IV
PHYSICAL HEALTH STATUS OF THE SELECTED TRANSGENDERS

Attributes	Number	Per cent	Mean ± S.D
Good	127	63.5	2.54±0.66
Average	54	27	
Poor	19	9.5	

This table reveals that 63.5 per cent of the subjects had good physical health status and the scores were higher than the other domain scores (psychological, social relationship, environmental satisfaction). Twenty seven per cent of them had average physical health status and only less per cent of subjects had poor health status. Finding of this study revealed that majority of the subjects had very good physical health sores.

Psychological Wellbeing among the Selected Transgenders

Psychological wellbeing is discussed in table V

TABLEV
PSYCHOLOGICAL WELLBEING OF THE SELECTED TRANSGENDERS

Attributes	Number	Per cent	Mean ± S.D
Good	13	6.5	1.34±0.59
Average	42	21	
Poor	145	72.5	

Current study found that transgenders had the lower scores for psychological health domains, because these respondents were always feeling anxiety and stress as a result of the poor economic status and discrimination. This table shows that 72.5 per cent had poor scores in psychological status and 21 per cent subjects had average scores. In this study majority of the subjects had very poor psychological wellbeing which may be due to lack of economic strides, appearance, social avoidance and lack of proper shelter, these factor positively affect the psychological wellbeing.

Social Relationship among the Selected Transgenders

Social relationship is discussed in table VI

TABLE VI
SOCIAL RELATIONSHIP AMONG THE SELECTED TRANSGENDERS

Attributes	Number	Per cent	Mean ± S.D
Good	14	7	1.29±0.58
Average	30	15	
Poor	156	78	

Based on BREF tool classification, it was found out that 30 per cent of the selected transgenders had an average social relationship scores from the above table it is clearly noticed that 78 per cent of the selected respondents had poor social relationship, this may be due to low self-esteem, mocking by public and financial limitation affects the social relationship.

The present study for line with the problems with in the transgenders community was more common among the transgenders showed six percent of the problems arise due to misunderstanding and four percent jealousy and two percent due to confusion and distribution of collection of money [14].

Environmental Satisfaction among the Selected Transgenders

Environmental satisfaction is discussed in table VII

TABLE VII
ENVIRONMENTAL SATISFACTION AMONG THE SELECTED TRANSGENDERS

Attributes	Number	Per cent	Mean ± S.D
Good	15	7.5	1.35±0.66
Average	34	17	
Poor	149	74.5	

The present study reveals that 74.5 per cent of transgenders had scored poor environmental satisfaction. They had poor satisfaction with their environment. Transgenders had more financial problems and lack of security. They had no opportunity for acquiring new information and skills. Transgender population may feel less willing to reveal their sexual orientation and receive less support from their family and friends.

Based on BREF tool, it was also found that majority of transgenders was dissatisfied with their environment due to lack of social support[17]. Transgenders are forced to live in an isolated area, when they do not have an access to get day to day information and no access for leisure activities, poor transport facility, afraid of being unsafe and they don't have enough medical facilities and hygiene was also found to be compromised[18]. Overall quality of life among the selected transgenders , twenty per cent had average quality of life and 72.5 per cent had poor quality of life is the general wellbeing of individuals and societies. The quality of life includes

not only wealth and employment but also the built environment, physical and mental health, recreation and leisure and social belonging. In addition, this study also assessed the relationship between violence both physical and psychological wellbeing found that there was no negative impact on respondent's quality of life. They want to patch with to their family, friends and community. Transgender in our society generally face more social discrimination than the rest of the population and the relationship with their family and friends can become more difficult and due to gender identity differences[15].

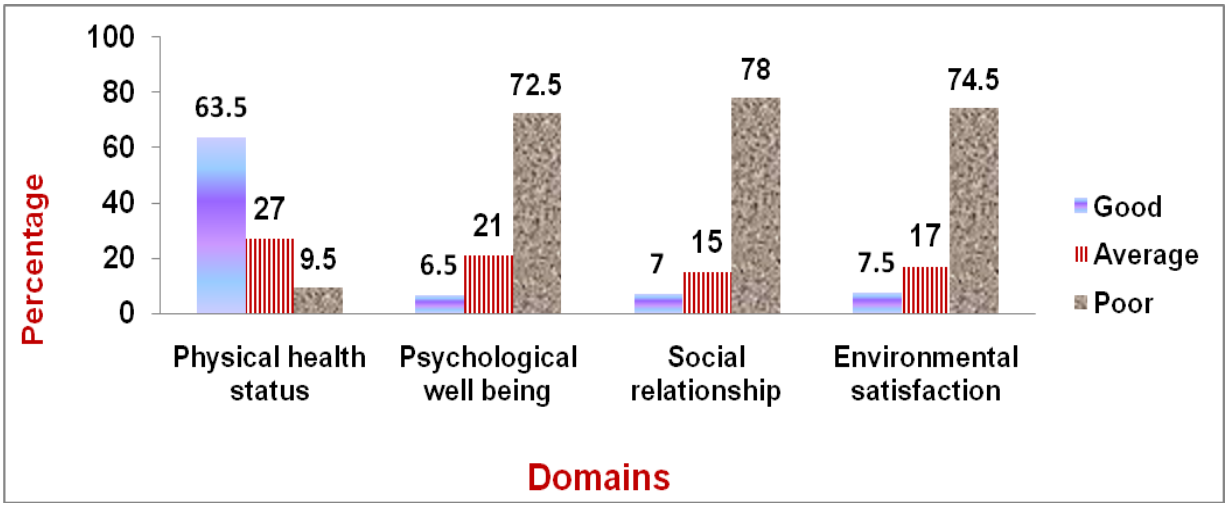

Figure 3
Comparative Scores for BREF Tool Domains

CONCLUSION

The quality of life of the transgenders has to be protected not only from major issues of discrimination and social bias but also from the health point of view, to enable this suppressed group of people to lead a healthy life and healthy lifestyle behavior should be created and re-enforced again and again to this marginalized section. Care and precautious measurement to protect the transgenders should be enforced can prevent the transgenders from risk of acquiring diseases relating to occupational hazards. Positive therapy and proper counseling leads to prevent their physical and mental wellbeing.

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Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

ASSESSMENT OF NUTRITIONAL STATUS OF MILD HYPERCHOLESTEROLEMIC ADULTS IN KOTTAYAM

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ABSTRACT

Most countries face high and increasing rates of cardiovascular disease. The contributing factors for the growing burden of CVDs are increasing prevalence of cardiovascular risk factors especially hypertension, hypercholesterolemia, diabetes, overweight or obesity, physical inactivity and tobacco use. The present study carried out with the objective of assessing the nutritional status of mild hypercholesterolemia. The study conducted in Kottayam district, Kerala. An interview schedule was formulated to collect information from the respondent. It was found that 22 per cent of the selected subjects were mild hypercholesterolemia. The study concluded that sedentary life styles, diet rich in saturated fats and total absence of physical activity will increase the risk of hypercholesterolemia. Most countries face high and increasing rates of cardiovascular disease. The contributing factors for the growing burden of CVDs are increasing prevalence of cardiovascular risk factors especially hypertension, Hypercholesterolemia, diabetes, overweight or obesity, physical inactivity and tobacco use. Majority prefer to consume egg as whole without removing the egg yolk. Fifty per cent of the selected subjects prefer deep fried snack items in the tea time.

KEYWORDS: *Hypercholesterolemia, Adults, Physical Inactivity*

INTRODUCTION

Adulthood is the period in human lifespan that complete physical and intellectual maturities have been attained. There is a gradual declines in the body functioning which accelerate as old age is reached. Throughout adulthood there is a progressive deposition of cholesterol in the arteries, and the heart muscle eventually grows weaker even in the absence of detectable disease. Most countries face high and increasing rates of cardiovascular disease. The contributing factors for the growing burden of CVDs are increasing prevalence of cardiovascular risk factors especially hypertension, Hypercholesterolemia, diabetes, overweight or obesity, physical inactivity and tobacco use. Cardiovascular disease (CVD) is the leading cause of death worldwide, and mortality due to CVD is higher in low- and middle-income countries [1] Hypercholesterolemia and hypertension are important modifiable risk factors for cardiovascular disease. Hypercholesterolemia is the presence of high levels of cholesterol in the blood. Elevated cholesterol in the blood is due to abnormalities in the levels of lipoproteins, the particles that carry cholesterol in the bloodstream. This may be related to diet , genetic factors and the presence of other diseases such as diabetes and an underactive thyroid. Hypercholesterolaemia was found in 63.8% of the participants in a study conducted in Kerala[2]. Hence the study was carried out with the objectives to find the prevalence of mild hypercholesterolemia in Kottayam district Kerala and assess the nutritional status of mild hypercholesterolemia patients.

METHODOLOGY

The study was conducted in Kottayam district, Kerala. Five hundred adult subjects irrespective of gender were purposively selected for this study. An interview schedule was formulated to collect information from the respondent on background information, anthropometric details, life style habits, diet history and medical history. Background information includes name of the subject, age, gender, educational status, occupational status and monthly income. In anthropometric details height, weight, waist circumference and hip circumference were measured. Life style habits elicit the information regarding exercise pattern, alcohol consumption and smoking pattern of the subjects. In the diet history likes and dislikes of the subjects were noted. Medical history reveals the past and present incidence of any diseases. All the details collected were tabulated and statistically analysed.

RESULTS

An equal percent (45%) of subjects belonged to 31-45 and 46-60 years. Only 10 per cent of the subjects belonged to early adulthood of 15-30 years.The peak incidence of heart attacks among Keralites occur in people 34 to 45 years[3].

All the subjects were educated. Forty per cent of the subjects were unemployed and leading sedentary lifestyle. Majority (79%) of the subjects did not do any kind of exercise. Twenty two per cent of the selected subjects were found to be mild hypercholesterolemic.

The total cholesterol level of subjects engaged in any kind of exercise is lower than that of subjects not having exercise (Figure 1).

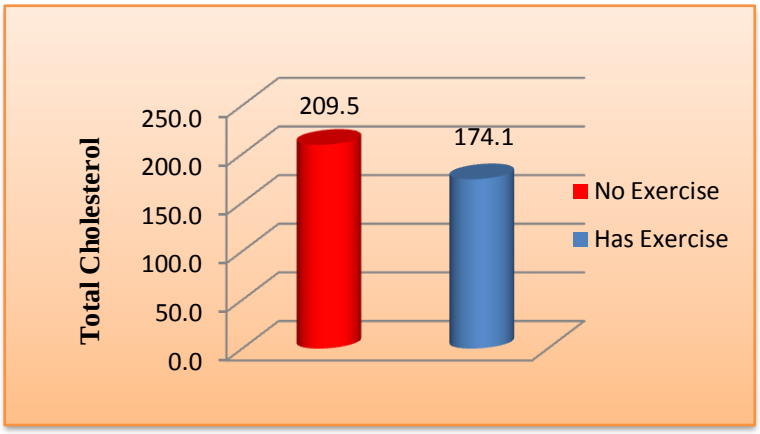

Figure 1 Exercise pattern and Total Cholesterol levels of Selected Subjects

Ninety one per cent of the subjects are non-vegetarians. They were taking non-vegetarian food mainly fish on daily basis and other meat products weekly or monthly. The total cholesterol levels of non-vegetarians were comparatively higher than that of vegetarians.

Diet history of the selected subjects revealed that majority were having raw fruits and vegetables. They like to have sweets, chocolates and ice creams. Majority prefer to consume egg as whole without removing the egg yolk. Fifty per cent of the selected subjects prefer deep fried snack items in the tea time.

It was found that the energy and protein requirement of the selected subjects was adequately met and there is an increased consumption of fat among the selected subjects. There is a strong positive correlation between fat and cholesterol that cholesterol increases with increase in intake of fat.

Out of the selected 500 subjects 50 per cent were found to be normal, but there are 36 per cent were overweight and 7 per cent obese.Table I shows that total cholesterol increases with increasing Body Mass Index.

TABLE I
CORRELATION BETWEEN TOTAL CHOLESTEROL AND BMI

BMI Category	Total Cholesterol Level			Total	Chi square value
	Desirable	Borderline	High		
Under weight	35 100%	0 0	0 0	35 100%	288*
Normal	200 79.7%	46 18.3%	5 2%	251 100%	
Overweight	25 13.8%	54 29.8%	102 56.4%	181 100%	
Obese	1 3%	8 24.2%	24 72.7%	33 100%	
Total	261 52.2%	108 21.6%	131 26.2%	500 100%	

CONCLUSION

Sedentary life styles, diet rich in saturated fats and physical inactivity will increase the risk of hypercholesterolemia.

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FOOD HABITS AND IMPACT OF NUTRITION EDUCATION AMONG CONSTRUCTION WORKERS

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ABSTRACT

Every living thing needs food to survive. In order to maintain good health, pure nutrition is a must. Each and every occupation is associated with specific health hazards and this call for different priorities and occupational health services. There are numerous occupations in the industrial sectors; one of the most hazardous industries is the construction industry, where it provides much needed work opportunities for some of the poorest and most marginalized sections of the society. The key factors in improving health outcomes are to consult and collaborate with workers to identify the problems and suggest solution to overcome the health barriers. In the present study, the awareness on health and nutrition among construction workers is very less, so it is important to educate them to make changes in their life style practices and dietary pattern. Awareness about nutrition and health can be created by imparting nutrition education. The area chosen for the study was Thadakkam (panchayat) at Coimbatore district. For the present study 150 families were selected by random sampling who showed interest and willingness to take part in the study. Both male and female belonging to the age group of 20 to 60 years were selected for the study by purposive sampling technique. Dietary details were collected; haemoglobin level was estimated existing knowledge on nutrition was collected. All the nutrients were increased slightly except the calories and the fat. There was a slight difference in the intake of fat and calories, but no significant difference. Haemoglobin level for males subsample was increased from 9.5 to 10.2mg/dl after imparting nutrition education in females from 9.6 to 10.1 and was statistically significant at five percent level. The nutrition education scores for males subsample was increased from 10.86 to 22.6 and for

females increased from 9.53 to 21.8 after imparting nutrition education and statistically significant at five percent level.

KEYWORDS: *Dietary pattern, Health, Construction workers, nutrition education.*

INTRODUCTION

"Good health requires provision of health care for prevention and treatment of disease and injury, good nutrition and a safe environment. The health of population has many links with other sectors such as economic, education, water and sanitation and gender"[1]**.** There are many different nutrients that need to be consumed in order to maintain good health. Even if a single micronutrient is missing or is in short supply, it can cause serious implications for the functioning of the entire body[2]**.** Now-a-days progress in technological development and industrialization, created changes in food habits and lifestyle, leading to health problems. The health problems that are parallel to economic development are largely those of chronic diseases like cardiovascular, hypertension, diabetes mellitus and cancer. Workers in the construction industry are at a significantly greater risk of health problems than workers in other industries, potentially leading to the development of chronic diseases, increased rate of injury and psychological distress[3]**.** The key factors in improving health outcomes are to consult and collaborate with workers to identify the problems and suggestsolution to overcome the health barriers. Work places should aim to implement programmes and service that ensure all workers can get involved, access support and make changes to their lifestyle, nutrition and dietary practices[4]**.** The main goals of nutrition education is, to help a person to make and maintain dietary changes, to formulate a healthy eating programmes, to improve their general health and wellbeing, to offer the individual for personal change and to work towards a sustainable healthier future using diet tips, body composition analysis and health coaching. The nutrition education is not simply to change nutrition habits formed generation ago but also to prevent acquisition of other irrational attitudes towards nutrition. Hence the present study was planned to collect information on dietary pattern, ascertain their existing nutrition knowledge, impart and study the impact of nutrition education[5].

METHODOLOGY

The area chosen for the study was Thadakkam (panchayat) at Coimbatore district. For the present study 150 families were selected by random sampling who showed interest and willingness to take part in the study. Both male and female belonging to the age group of 20 to 60 years were selected for the study by purposive sampling technique. Interview schedule with questions on their socio-economic background, lifestyle practices, general health information was adopted by the researcher for the current study.

Information on their psychological stress was also collected. For all the subjects (300) the haemoglobin estimation was done. Twenty four hours recall survey was carried out for 3 consecutive days for a sub sample of 15 subjects each of both the sex. A questionnaire on knowledge, Attitude, practice, was framed and distributed to the sub-samples in order to assess their existing nutritional knowledge and the scores were awarded. Based on their existing nutrition knowledge, imparting nutrition education programme was planned.Twice in a week for durationof 2 hours for 29days at a common place called Vivekananda social clubthe nutrition education was imparted to the selectedsub sample of 15 subjects each of both the sex.

At the culmination of the nutrition education programme the same questionnaire related to their nutritional knowledge was again distributed and assessed the impact of nutrition education programme by awarding the scores. Similarly before and after imparting nutrition education their anthropometric measurements were measured, haemoglobin level was estimated, and their mean food nutrients intake was also calculated to find out the impact.

RESULTS

A. Socio-economic Status and Lifestyle Practices of the Selected Subjects

Age Distribution

TABLE 1: DISTRIBUTION OF THE SELECTED CONSTRUCTION WORKERS ACCORDING TO AGE WISE (N-300)

S.No	Age in years	Males (N-150)		Females (N-150)	
		N	P	N	P
1.	20-30	32	21.3	37	24.6
2.	31-40	64	42.6	53	35.3
3.	41-50	35	23.3	34	22.6
4.	51-60	19	12.6	25	16.6

Table 1 represented that 21.3 percent of male construction workers and 24.6 percent of female construction workers were between the age group of 20-30 years respectively and 42.6 percent and 35.3 percent of male and female construction workers were in the age group of 31-40 years respectively.

Lifestyle practices

The data on the information of lifestyle practices of the selected construction workers are discussed as follows.

i. Smoking

All male construction workers had the habit of smoking. None of the female construction workers had the habit of smoking. Details regarding the smoking of the male construction workers given in the Table2.

TABLE 2: LIFESTYLE PRACTICES (N:300)

Particulars		Males (N-150)		Females (N-150)	
		N	P	N	P
Smoking					
Beedi	<5	16	10.6	-	-
	5-10	85	56.6	-	-
	10-15	35	23.2	-	-
Cigarette	<5	-	-	-	-
	5-10	14	9.3	-	-
	10-15	-		-	-
Other habits					
Chewing pan	Yes	132	88	27	18

	No	18	12	123	82
If yes	Pansupari	97	64.6	4	2.6
	Tobacco	13	8.6	1	0.6
	Betel leaves	21	14	9	6
	Betel nuts	-	-	13	8.6
	Others	-	-	-	-
Consuming alcohol	Yes	150	100	21	14
	No	-	-	129	86
If yes	Daily	45	30	-	-
	Once in a week	27	18	9	6
	Twice in week	73	48.6	-	-
	Rarely	5	3.3	12	8
Consumption of beverages	Tea	138	92	142	94.6
	Coffee	12	8	8	5.3
Frequency of taking tea	1-3 times	21	14	97	64.6
	4-6 times	113	76	37	24.6
	>7 times	3	2	8	5.3
Frequency of taking coffee	1-3 times	7	5	5	3.3
	4-6 times	4	2	2	1.3
	>7 times	2	1	1	0.6

Number of smoking beedies was ranged from 5-10 and the percentage was 56.6. Five to ten cigarettes were smoked per day by the construction workers and the percentage was 9.3

Eighty eight percent of male workers and 18 percent of female workers had the habit of chewing pan followed by that of 12 percent of male workers and 82 percent of female workers were not having the habit of chewing pan.

All the male workers had the habit of consuming alcohol and 14 percent of female workers consumed alcohol and out of that eight percent of female workers consumed alcohol rarely followed by 6 percent of female workers whose consumption was once in a week. Maximum of male workers (48.6 percent) consumed alcohol twice in a week,30 percent of workers whose consumption of alcohol was regular and 27 percent consumed once in a week respectively.

Ninety two percent of males and 94.6 percent of female workers had the habit of consumption of tea, 8 percent of males and 5.3 percent of females consumed coffee. It was found that 76percent of males and 24.6 percent of females had the habit of consumption of tea for 4-6 times per day followed by that of 14 percent of males and 64.6 percent of females consumed tea for 1-3 times a day respectively. More than 7 times the consumption of tea in males and females' was two percent and 5.3 percent respectively. Fivepercent of males and 3.3 percent of female workers had the habit of consumption of coffee for 1-3 times a day, 2 percent of males and one percent of female workers consumed coffee for 4-6 times a day respectively.

Biochemical Estimation

Estimation of Haemoglobin level of selected construction workers

The haemoglobin level of the selected construction workers given in the Table 3.

TABLE 3: ESTIMATION OF HAEMOGLOBIN LEVEL OF THE SELECTED CONSTRUCTION WORKERS (N:300)

Haemoglobin level (gm/100ml)	Males (N-150)		Females (N-150)	
	N	P	N	P
Normal (≥13g/dl)	48	32	23	15.3
Mild (9.5-13.0g/dl)	70	46.7	77	51.4
Moderate (8.0-9.5g/dl)	27	18	40	26.7
Severe (<8g/dl)	5	3.3	10	6.6

From the Table 3, it was clear that mild male anaemics were 46.7 percent followed by 18 percent moderate anaemics and 3.3percent were of severe anaemics respectively. In case of females 51.4 percent had mild anaemia followed by 26.7 percent moderate anaemia and 6.6 percent were of severe anaemia respectively. Only 32 percent of males and 15.3 percent of females had normal levels of haemoglobin.

Mean nutrients Intake

The mean nutrients intake of the selected sub-samples was given in the Table 4.

TABLE 4: MEAN NUTRIENTS INTAKE (N:30)

Nutrients	Reference value		Males (N-15) Mean±S.D	Females (N-15) Mean±S.D
	Male	Female		
Energy (kcal)	3800	2925	3850.3±392.3	3952.3±212.3
Protein (gm)	60	50	35.86±10.9	19.42±4.81
Carbohydrates(gm)	-	-	257.03±51.6	130.06±30.62
Fat (gm)	20	20	30.7±4.86	27.6±3.53
Iron (mg)	28	30	8.8±2.37	6.56±2.79
Calcium (mg)	400	400	495.3±136.6	379.2±105.3
Fibre (gm)	-	-	23.6±136.6	19.4±3.73
Vitamin-c (mg)	40	40	24.8±3.12	19.6±4.60

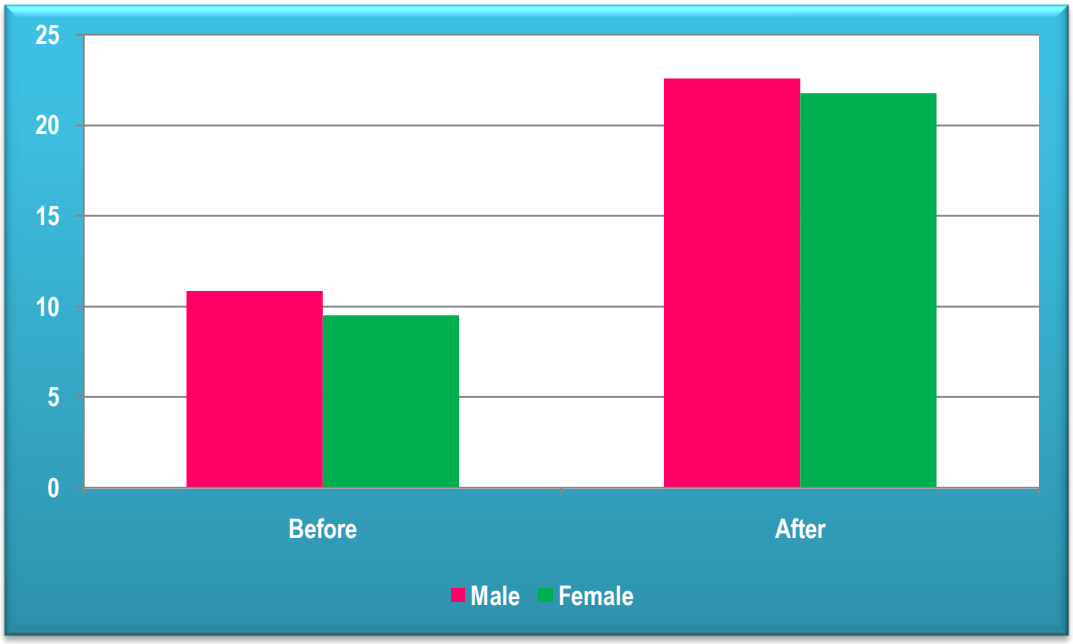
The mean nutrient intake was calculated and the mean values were obtained. The energy of both sexes was higher when compared to the Recommended Dietary Allowances due to high calorie diet. Protein, fat and iron level were less. With regard to calcium in males, it was higher, whereas in females it was less when compared with RDA.

Impact of Nutrition Education

In order to assess the impact of nutrition education the scores of nutrition knowledge before and after of the sub sample were evaluated. Similarly the haemoglobin levels and the mean nutrient intake of the subsample were statistically analysed.

i. Evaluation of nutrition education programme

Effectiveness of nutrition education programme was evaluated by distributing the same knowledge checklist to the selected sub sample after education programme. The t"score was statistically analysed and interpreted in the Figure 1.



*-Significant at <0.05

Figure 1: Evaluation of Nutrition Education Programme

Figure 1 revealed that the nutrition education scores for males sub sample was increased from 10.86 to 22.6 after imparting nutrition education. The increase was statistically significant at five percent level. Similarly in females the scores of the sub sample were increased from 9.53 to 21.8after imparting nutrition education and was statistically significant at five percent level.

Estimation of Haemoglobin level of the selected sub samplebefore and after education

The haemoglobin level was estimated before and after imparting the nutrition education programme and it was presented in the Table 5.

TABLE 5: HAEMOGLOBIN LEVEL OBTAINED BEFORE AND AFTER EDUCATION (N-30)

Males (n-15)			**Females (n-15)**		
Before Mean±S.D	**After Mean±S.D**	**'t' value**	**Before Mean±S.D**	**After Mean±S.D**	**'t' value**
9.5±0.77	10.2±0.75	16.06*	9.6±0.9	10.1±0.7	19.14*

*-Significant at <0.05

As presented in Table 5, the haemoglobin level for males sub sample was increased from 9.5 to 10.2 after imparting nutrition education for a period of 29 days. The increase was statistically significant at five percent level. Similarly in females the scores of the sub sample were increased from 9.6. to 10.1 and was statistically significant at five percent level.

Mean intake nutrient obtained before and after education

The mean nutrient intake obtained before and after education was presented in the Table 6.

TABLE 6: MEAN INTAKE NUTRIENT OBTAINED BEFORE AND AFTER EDUCATION (N:30)

Nutrients	Male (N-15)		Female (N-15)	
	Before education Mean±S.D	After education Mean±S.D	Before education Mean±S.D	After education Mean±S.D
Energy (kcal)	3850.3±392.3	3595.5±393.7	3952.3±212.3	3625.7±211.5
Protein (gm)	35.86±10.9	37.06±10.75	19.42±4.81	20.2±4.27
Carbohydrates (gm)	257.03±51.6	259.6±47.2	130.06±30.62	146.3±29.01
Fat (gm)	30.7±4.86	28.2±5.6	27.6±3.53	24.5±5.11
Iron (mg)	8.8±2.37	15.2±4.6	6.56±2.79	9.11±4.12
Calcium (mg)	495.3±136.6	510.7±128.3	379.2±105.3	387.6±104.87
Fibre (gm)	23.6±11.36	25.3±10.42	19.4±3.73	21.01±5.12
Vitamin-c (mg)	24.8±3.12	27.5±5.56	19.6±4.60	21.2±3.17

From the above Table 6, it was found that all the nutrients were increased slightly expect the calories and the fat. During imparting nutrition education the selected sub-sample were asked to reduce their calories and fat intake and they were asked to reduce the intake of fried items during brunch and to avoid in-between nibbling. Though there was no significant difference but there was a slight difference in the fat and calorie intake.

CONCLUSION

Each and every occupation is associated with specific health hazards and this calls for different priorities and occupational health services. The health of the construction workers has several determinants. Hence imparting good nutritional habits, maintain dietary changes and imparting nutrition education will improve the general health and well-being and thereby work towards a sustainable healthier future.

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UGC APPROVED JOURNAL

"EFFECT OF SUPPLEMENTATION OF MUDAKATHAN LEAVES (CARDIOSPERMUM HALICACABUM) ON SELECTED OSTEOARTHRITIS SUBJECTS OF SHILLONG"

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ABSTRACT

Osteoarthritis is a heterogeneous group of conditions that lead to joint symptoms and signs which are associated with defective integrity of articular cartilage, in addition to related changes in the underlying bone at the joint margins. According to the World Health Report 2002, osteoarthritis is the 4th leading cause of year lived with disease at the Global level. By 2030, a projected 67 million people will have doctor diagnosed arthritis around the world. In India the incidence of osteoarthritis is as high as 12 percent of the population. This high frequency of osteoarthritis in India is the consequence of its prevalence among women who fall victim to it. Osteoarthritis affects both men and women. In the present study 52 subjects were selected; socio-economic, anthropometry, lifestyle pattern and dietary intake were recorded. From the total sample a sub-sample of 18 were selected for the intervention. These subjects were at first analysed for their present symptoms using the WOMAC (Western Ontario and McMaster Universities) Index of Osteoarthritis and serum calcium level. They were then given a supplement containing Cardiospermum halicacabum powder of 2gm each for a period of 60 days. After the supplement, their symptoms were then again analysed using the WOMAC (Western Ontario and McMaster Universities) Index of Osteoarthritis as well as the serum calcium level. The results showed there was a significant improvement in their symptoms and serum calcium level.

KEYWORDS: *Osteoarthritis, Frequency, Socio-Economic, Anthropometry*

INTRODUCTION

Osteoarthritis is defined as "A heterogenous group of conditions that lead to joint symptoms and signs which are associated with defective integrity of articular cartilage, in addition to related changes in the underlying bone at the joint margins"[1] It is also referred to as osteoarthritis, degenerative joint disease, hypertrophic arthritis, degenerative disc disease and generalized osteoarthritis.[2] Osteoarthritis is widespread in middle to older aged people.

The cause of osteoarthritis are largely unknown but various factors such as aging, obesity, heredity, injury or overuse and joint trauma, muscle weakness and other diseases and type of arthritis seem to be the predisposing factors.[3] Clinical characteristics are joint pain, tenderness, limitation of movement, crepitus (crackling sound), occasional effusion and variable degrees of total inflammation, which is generally mild there are no systemic symptoms.[2,4] There are two kinds of osteoarthritis – primary and secondary. While primary osteoarthritis is a result of old age and is thought of as "wear and tear" osteoarthritis, secondary osteoarthritis is a result of a disease or an injury, which, in turn leads to it. Osteoarthritis mainly affect the hands, and diarthrodial, weight-bearing joints such as the knees, hips, and spine.[4]

The Global Burden of Disease 2000 study, published in the World Health Report 2002, estimates that osteoarthritis is the 4th leading cause of year lived with disease at the Global level. The World Health Organisation (WHO) estimates that 70 million Indian are its victims. Osteoarthritis is so common in India that it beats many other diseases like Diabetes, AIDS, Cancer and Hypertension.

An elderly person suffering from osteoarthritis should be careful to avoid being overweight and obese since excessive body weights adds stress to their joints which are already painful. A weight reduction programme should be instituted with osteoarthritis. Nutrition guidelines for them include achievement of normal weight, supplementation with glucosamine and chondroitin sulfate are believed to be ameliorate the symptoms of osteoarthritis by reducing inflammation and by aiding in the restoration of normal cartilage.[5] Large doses of dietary

antioxidants, including vitamin C, the α-tocopherols (Vitamin E), β-carotene, selenium and good multivitamin with trace minerals can be effective in osteoarthritis management.[6] According to Gopalan (2002), several strategies such as dietary diversification, supplementation, food fortification, genetic modification, promoting community and home gardens and nutrition education, have been worked out and implemented to control health problems of the vulnerable population especially elderly population in the community and also suggested that the food based approach is more durable and sustainable than a drug based approach.[7] Besides encouraging the used of environmental sources of nutrients, there is a need for the promotion of more potent herbal foods like *cardiospermum halicacabum*.

Cardiospermum halicacabum commonly known as Balloon vine, is an important medicinal herb belonging to the Soapberry family, the Sapindaceae. *Cardiospermum halicacabum* is a small genus of ornamental herbaceous or shrubby vine.[8] The whole plant is diaphoretic, diuretic, emetic, emmenagogue, laxative, refrigerant, rubefacient, stomachic and sudorific. It is used in the treatment of rheumatism, nervous diseases, stiffness of the limbs and snakebite.[9] The whole plant has been used as anti-inflammatory, as an antibiotic against many bacteria, as an antipyretic, as an antiparasitic, as an effective non toxic antifertility herb and as an analgesic.[10,11,12]

The preliminary phytochemical analysis of the whole plant extract showed the presence of various phyto constituents like alkaloids, polyphenols, phytosterol, fixed oils, total lipids, amino acids, total proteins, glycosides and cardiac glycosides, steroids, flavones and reducing sugars. It is reported that the plant contain quebrachitol, apigenin, proan-thocyanidin and stigmosterol.[13] Phytochemical constituents such as aglycones, triterpenoids, fatty acids and volatile ester have been reported.[14]

Phytochemical studies revealed the presence of sterols, carbohydrates, tannins and triterpenes in the petroleum ether extract; sterols, saponins, carbohydrates, flavonoids and tannins in the alcohol extract; sterols, saponins, carbohydrates, flavonoids and tannins in the aqueous extract. Triperpenoids were not found in any of the solvent extracts of stem. It also contains resin, non glucosidal bitter substance and large amount of potassium nitrate.[15]

Many health based programmes are made to reduce the prevalence of osteoarthritis. For initiating any type of developmental programmes for this elderly group of population, the most essential requirements is research evidence on the dimensions of the existing nutritional and health problems. In an effort to fill the existing lacuna in the information on the age, the present study was a small foot print to assess the effect of herbal supplement on the symptoms of the selected osteoarthritis subjects with the following objectives:

- To elicit information on the socio-economic status, lifestyle pattern, anthropometry and dietary pattern of the selected osteoarthritis subjects
- To supplement the selected subjects with *cardiospermum halicacabum* powder
- To impart education to the subjects on osteoarthritis through counselling
- To know the impact of supplementation on the symptoms of the selected osteoarthritis subjects

METHODOLOGY

The area chosen for the conduct of the present study was East Khasi Hills District, Meghalaya State. Government Civil Hospital, Shillong was selected for the conduct of the study because it is easily approachable and easy availability of the subjects.

A sample is a smaller representation of a large whole which is selected for the purpose of the present study. The investigator identified 52 osteoarthritis subjects in the age group of 30-80 years from the selected medical hospital, where a large number of the osteoarthritis subjects visited as ‘out patients’ over a period of more than 5 months. Purposive sampling method was adopted for the selection of **sub-samples of 18 subjects** who were used for supplementation study for a period of 60 days.

The sub-samples were in the age group of 50-75 years from various socio-economic status and income groups.

The purpose and procedure involved in the study were clearly explained to the sub-sample subjects. The subjects were effectively motivated to extend their full co-operation for the successful conduct of the study and they also assured their supplementation intake for a period of 60 days.

A detailed interview schedule was formulated to elicit information regarding socio-economic status like age, income, occupation, etc.; anthropometric measurements like height, weight, body

mass index, waist-hip ratio, etc.; dietary pattern and life style pattern such as exercise, additive habits like chewing tobacco and smoking.

The subjects were requested to rate their score of symptoms elicited in the score card which was adapted from Western Ontario and Mc Master Universities (WOMAC) osteoarthritis index and send forth for serum calcium test before taking the supplement.

The subjects were given 2g of the *cardiospermum halicacabum* powder per day for a period of 60 days in the form of soup and capsule supplement. After the intervention of 60 days, the subjects were again requested to rate their score of symptoms elicited in the score card provided which was adapted from WOMAC osteoarthritis index as well as send for serum calcium test.

The subjects nutritional status was assessed by using parameters like anthropometric measurements such as height, weight, Body Mass Index (BMI) and Waist to Hip Ratio (WHR).

RESULTS AND DISCUSSION

Socio-economic status of the selected subjects.

Information on age and sex of the selected subjects revealed that 27 percent of both male and female osteoarthritis are in the age group of 50-60years. The present study revealed that the onset of osteoarthritis was high after the age of 50 years in both the sexes. 4 percent are highly educated holding a professional degree, whereas 19 percent are recorded as illiterate and the remaining subjects were educated up to higher secondary or graduate and/or post graduate level. 59.6 percent of the selected subjects were from the nuclear family system and the rest 40.4 percent were from joint family system. 21 percent were from the low income group, 31 percent were from the middle income group and 35 percent were from the high income group.

Dietary pattern.

From the study, it was observed that 79 percent of the selected subjects were non-vegetarian and 21 percent were vegetarians. A higher percent (90%) consumed three meals a day and a lower percent (10%) consumed more than three meals a day. It was observed that 60 percent of the male subjects and 65 percent of the female subjects used mustard oil daily in their cooking method. Majority of the selected subjects (79%) regularly consumed tea with sugar and 15 percent consumed tea without sugar. The present study revealed that majority of the subjects (56%) consumed fibre rich foods in their daily diet and the rest (44%) rarely used fibre rich foods in their daily diet.

Lifestyle Pattern.

From the study, it was revealed that 71 percent of the selected osteoarthritis subjects carry out any physical activities when compared to those of 29 percent who do not do any physical activities. 15 percent of the selected subjects performed yoga and meditation when compared to the 85 percent who do not performed it. A meager percentage of 12 were indulged in excessive alcohol consumption as compared to the 88 percent who are not involved in drinking. A percentage of 23 of the osteoarthritis subjects have the habit of smoking cigarettes and the rest 77 percent are not in any habit of smoking cigarettes. 90.4 percent of the selected subjects were indulged in chewing either tobacco or pan masala or bettlenut as compared to the 9.6 percent who do not have the habit of chewing any.

Anthropometric Measurements.

It was revealed that none of the male subjects and 3 percent of the female subjects had their height measurements in comparison with the NCHS standards (177 cm for male and 163 cm for female) and the remaining 97 percent are all below the standard levels. About 20 percent of the male subjects were in the weight range of 66-75 kg which is close to the standard (71 kg for male and 58 kg for female) recommended by NCHS, whereas 19 percent of the female subjects were in this weight range.

The percentage of subjects who had normal BMI range (18.50-24.99kg/m^2) constituted 27 percent for male subjects and 35 percent for female subjects. It was revealed that none of the subjects was having an acceptable range (0.85-0.90) of waist to hip ratio but all of them lie in the unacceptable range (>1.00).

Clinical findings of signs and symptoms.

Table 1 shows the prevalence of the clinical signs and symptoms observed among the selected osteoarthritis subjects.

TABLE 1: CLINICAL SIGNS AND SYMPTOMS OF THE SELECTED OSTEOARTHRITIS SUBJECTS

Symptoms	Sex							
	Male N=15				Female N=37			
	Yes		No		Yes		No	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Pain	15	100	-	-	37	100	-	-
Muscular Spasm	11	73.3	4	26.6	27	73	10	27
Joint Stiffness	15	100	-	-	37	100	-	-
Swelling	7	47	8	53	22	59.4	15	40.5
Crackling Sound	8	53	7	47	25	68	12	32
Rest Pain/ Paraesthesia	2	13	13	87	5	13.5	32	86.4
Motor Paralysis	-	-	15	100	-	-	37	100
Loss of Motion	-	-	15	100	-	-	37	100
Change in Joint Shape	-	-	15	100	-	-	37	100

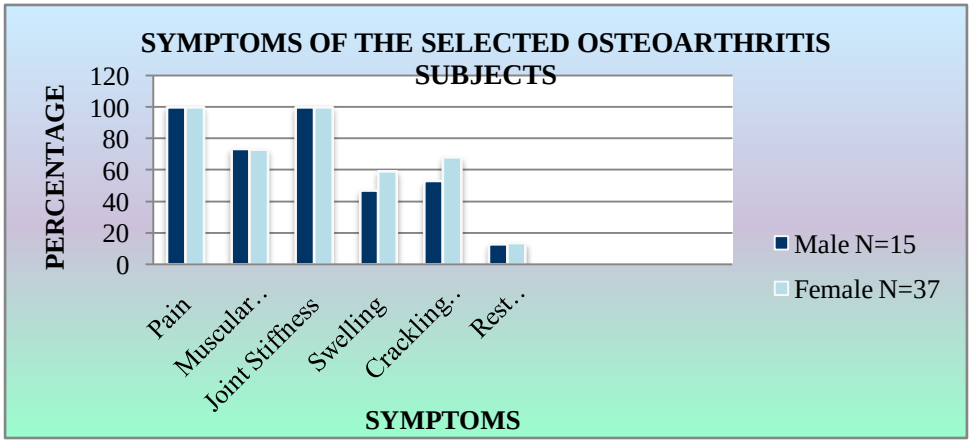

Figure 1: Symptoms elicited by the selected osteoarthritis subjects

It was clear from the study that all of the selected subjects experience severe pain and joint stiffness as the symptom of osteoarthritis. It was also seen that none of the subjects had experienced motor paralysis, loss of motion and change in joint shape in their course of the disease condition. Others also showed signs of muscular pain, swelling, crackling sound and numbness.

Table 2.a shows the Western Ontario and Mc Master Universities (WOMAC) osteoarthritis index profile of the selected osteoarthritis subjects.

TABLE 2.A: WOMAC OSTEOARTHRITIS INDEX PROFILE OF THE SELECTED SUBJECTS

Sl. No.	EXPERIMENTAL GROUP I				EXPERIMENTAL GROUP II				CONTROL GROUP			
	INITIAL SCORE		FINAL SCORE		INITIAL SCORE		FINAL SCORE		INITIAL SCORE		FINAL SCORE	
	Total score from 96	Per cent	Total Score from 96	Per cent	Total Score from 96	Per cent	Total score from 96	Per cent	Total score from 96	Per cent	Total score from 96	Per cent
1	28	29.2	15	15.6	30	31.3	19	19.8	41	42.7	32	33.3
2	22	22.9	8	8.3	24	25	9	9.4	36	37.5	36	37.5
3	20	20.8	10	10.4	26	27.1	12	12.5	38	39.6	35	36.5
4	23	23.9	14	14.6	32	33.3	20	20.8	47	48.9	47	48.9
5	24	25	7	7.3	28	29.2	15	15.6	57	59.4	49	51.0
6	26	27.1	12	12.5	22	22.9	8	8.3	61	63.5	62	64.6

From the present study it can be concluded that the selected subjects after the intervention period of 60 days, their persistent to the symptoms was greatly reduced. This was revealed through the total score of initial and final of the WOMAC osteoarthritis index.

Table 2.b shows the paired sample test of WOMAC osteoarthritis index profile of the selected subjects

TABLE 2.B: PAIRED SAMPLE TEST OF WOMAC INDEX OF OSTEOARTHRITIS PROFILE OF THE SELECTED SUBJECTS

Group	Mean±S.D		t-value	Significance
	Before	After		
Experimental Group I	23.83±2.86	11.00±3.22	10.740	**
Experimental Group II	27.00±3.74	13.83±5.04	21.911	**
Control Group	46.67±10.33	43.50±11.36	1.781	NS

Paired t-test was applied to find out whether before and after values of WOMAC osteoarthritis index differ significantly for experimental group I, experimental group II and control group. The calculated t-value of 10.740 and 21.911 of experimental group I and II respectively was found to be significant at 1% level. Whereas t-value of 1.781 of control group was found to be not significant.

Table 3.a shows the serum calcium profile of the selected subjects

TABLE 3.A: SERUM CALCIUM PROFILE OF THE SELECTED SUBJECTS

Sl. No.	NORMAL RANGE* (mg/dl)	EXPERIMENTAL GROUP I		EXPERIMENTAL GROUP II		CONTROL GROUP	
		BEFORE (mg/dl)	AFTER (mg/dl)	BEFORE (mg/dl)	AFTER (mg/dl)	BEFORE (mg/dl)	AFTER (mg/dl)
1	8.5-10.5	8.1	9.0	7.9	9.5	8.3	8.5
2		8.0	8.9	7.9	9.6	8.2	8.5
3		7.7	9.3	7.5	8.7	7.7	8.3
4		8.2	9.2	8.0	9.6	7.8	8.2
5		7.9	8.8	8.0	9.2	8.0	8.5
6		7.8	8.9	8.1	9.5	7.9	8.5

***Blood Test Results - Normal Ranges, Bloodbook.Com (2011)**

From the present study it was concluded that the selected subjects who were taking supplementation for a period of 60 days show a higher increase in their serum calcium level range when compared to that of the control group who were not given any supplement.
Table 3.b shows the paired sample test of serum calcium profile of the selected subjects.

TABLE 3.B: PAIRED SAMPLE TEST OF SERUM CALCIUM PROFILE OF THE SELECTED SUBJECTS

Group	Mean±S.D		t-value	Significance
	Before	After		
Experimental Group I	7.95±0.19	9.02±0.19	-9.562	**
Experimental Group II	7.90±0.21	9.10±0.26	-26.833	**
Control Group	7.98±0.23	8.18±0.23	-2.236	NS

Paired t-test was applied to find out whether before and after values of serum calcium differ significantly for experimental group I, experimental group II and control group. The calculated t-value of -9.562 and -26.833 of experimental group I and II respectively was found to be significant at 1% level. Whereas t-value of -2.236 of control group was found to be not significant.

CONCLUSION

From the study it can be concluded that value added foods like herbs supplement proved to be beneficial in improving the bone health and reducing the symptoms of osteoarthritis. Long term trial with food based supplements and herbal supplements may throw more light on bone health and for a healthy, pain free happy life.

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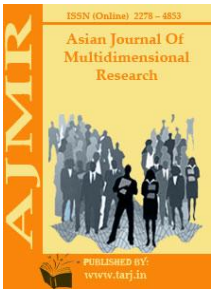

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DIETARY PATTERN AND PLASMA TOTAL ANTIOXIDANT CAPACITY OF HEALTHY INDIAN ADULTS.

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ABSTRACT

A diet rich in antioxidants can increase the antioxidant status and offer better health. A measure of the plasma antioxidant capacity and the influence of diet on the plasma Total Antioxidant Capacity (TAC) will provide valuable information on diet patterns that can be promoted to maintain a healthy life. Healthy adults in the age group of 30 – 60 years (n=134) were selected after screening for absence of disease, not taking supplements and having low stress levels. The dietary pattern was assessed using 24 hr recall and semi quantitative food frequency questionnaire. The plasma TAC of fasting blood was estimated using Ferric Reducing Antioxidant Power (FRAP) assay. The values for other blood parameters like fasting sugar, urea, creatinine, lipid profile and bilirubin were collected from hospital records. The food intake revealed that all the subjects consumed less than recommended levels of fruits and green leafy vegetables. No correlation was observed between plasma TAC and blood parameters except uric acid levels in which a positive correlation was observed. No correlation was observed between plasma TAC and body mass index of the subjects. Analysis of food intake across quartiles of plasma TAC reveal that green leafy vegetables contributed more towards the plasma TAC as less variation was observed in the intake of other food groups across the quartiles. Hence increasing the intake of green leafy vegetables at least to the recommended quantity could improve the plasma TAC level.

KEYWORDS: *Dietary Pattern, Plasma Total Antioxidant Capacity*

INTRODUCTION

Antioxidants play a very important role in the body's defence system against Reactive Oxygen Species, which are the harmful by products generated during normal cell aerobic respiration[1]. Antioxidants are also quenchers of free radicals and increasing the intake of dietary antioxidants may help to maintain an adequate antioxidant status and, therefore, the normal physiological function of a living system and play an important role in preventing diseases.The role of diet rich in bioactive plant based phytochemicals as an adjunct therapy is gaining importance with the awareness on the role of such natural compounds. In contrast to supplements of single antioxidants, the dietary Total Antioxidant Capacity(TAC) reflects all present antioxidants, including thousands of compounds, all of them in doses present in our usual diet, and even takes into account their synergistic effects. Plasma TAC will be a useful measure to assess the adequacy of intake of foods or the benefits of intake of antioxidant rich foods. The measure of antioxidant capacity of plasma considers the cumulative action of all the antioxidants present in plasma and body fluids, thus providing an integrated parameter rather than the simple sum of measurable antioxidants. A measure of the plasma antioxidant capacity and the influence of diet on the plasma TAC will provide valuable information on diet patterns that can be promoted to maintain a healthy life.

METHODOLOGY

Healthy adults in the age group of 30-60 years (N=2000) having normal blood parameters for fasting sugar, urea, creatinine, lipid profile and bilirubin were selected at random at Master Health Check Up centre in a hospital, a private lab and a health clinic. The sample was screened to be free from infection/disease, not under medication/supplements and having low stress level.

Psychological stress contributes to health disparities and through heightened inflammatory states can increase oxidative stress levels and DNA damage[2] and hence subjects with low stress levels were chosen. Stress levels were assessed using a validated stress inventory[3] and subjects having a score of 5 or less indicating low stress levels were selected.

A subsample of 134 was selected after screening and their background information on the family, socioeconomic status, education and lifestyle was collected using a structured questionnaire.Height and weight were measured by standard procedures and body mass index was calculated using the Quetlet index- weight (Kg)/height (m^2).

The dietary intake was assessed by 24 hour recall method and semi quantitative food frequency questionnaire. Food frequency based TAC values represent valid and reproducible estimates that may be used in nutritional epidemiology to assess antioxidant intake from foods[4]. The semi quantitative Food Frequency Questionnaire (FFQ) included questions to assess the intake of various food groups. The frequency of consumption of each food item in the semi quantitative food frequency questionnaire was converted to intake in grams by multiplying the standard serving size of each food as given in the questionnaire by the following values for each frequency option:Never = 0; less than once/month = 0.02; 1–3 times/month = 0.07; once a week/wk = 0.14; 2–4 times/wk = 0.43; 5–6 times / wk = 0.79; once a day = 1.0; 2–3 times a day = 2.5; and 4+ times a day = 4[5].

Fasting venous blood sample were collected from the selected adults after getting their consent. The blood sample was collected in EDTA (EthleneDiamine Tetra Acetic acid) tubes, centrifuged at 3000 rpm, at 4°C for 10 minutes and the separated plasma was immediately stored at 4°C. The plasma TAC values were assessed by FRAP method[6]. Trolox was used as the standard and values expressed as µmolTrolox Equivalents (TE). Secondary data on other biochemical parameters were collected from the hospital records.

RESULTS AND DISCUSSION

A total number of 134 subjects were selected of which 63 were males and 71 were females. A majority of the sample did not have any hereditary disease in the family.None of the subjects selected were suffering from any disease or were under any medication or had supplements.

Food Intake by 24 hour recall

The average intake of cereals and pulses among women was 230 g and 43g respectively.Green leafy vegetables were not consumed by a majority of the subjects. Hence the average intake is only 14 g which is 36 g less than the recommended intake. The average intake of root vegetables was 42 g. The intake of other vegetables was 40 g. Fruit intake varied widely across the subjects. Banana was the common fruit consumed among the subjects. Other fruits consumed were apple, orange and grapes.

The average intake of cereals among men was 327 g and rice was the most commonly consumed cereal, followed by wheat flour. The intake of pulses among men was 55g.The intake of green leafy vegetables was considerably lesser than the recommended level which was 12g as was observed among women. The intake of other vegetables was 68 g and roots and tubers was 50 g. The intake of fruits was also less than the recommended levels which averaged to 40g. An adequate intake of milk and higher intake of fats and oils was observed among men.

Nutrient content of the diet

All the subjects did sedentary work. The calorie consumption was less than the Recommended Dietary Allowance (RDA)[7] for Indians among both men and women. The average carbohydrate content of the diet was 267 g among women and 351 g among men. The protein intake by women was 44g which is 11g less than the RDA and in men it was 55g, which is 5 g less than the RDA. The total fat intake among men and women was 52.7 and 53.3 g respectively.Among women the calcium content was less than the RDA. The iron content was very less which was only 5.82g as against the requirement of 21g. The carotene intake was also less than the RDA. The folic acid content of the diet was 74 mg which was only 37 percent of the recommended levels. The Vitamin C content of the diet was also less the recommended levels. The magnesium content met the requirements but the zinc level was only 39percent of the RDA.

Among men the average calcium intake was 564 mg. The iron content of the diet was 7.95mg against the RDA of 12 mg but was higher than the diet of women.The carotene content of the diet met 92percent of the RDA which was 4433µg. The vitamin C content of the diet was 37.1 mg. The magnesium requirements were met by the diet and the zinc content of the diet was less than 50percent of the RDA.

Frequency of food Intake

Cereals, cereal products, coarse grains and pulses

All men consumed cereal daily, the major cereal being rice followed by wheat flour. Weekly consumption of coarse grains was observed in both men and women. Twelve of the men and eleven of the women consumed coarse grains once a week. Finger millet was the major coarse grain consumed as dosa, puttu and kazhi. Some consumed broken wheat as upma. 27 men and 52 women did not consume any coarse grains at all. All the selected subjects consumed pulses every day. Red gram dhal was the major pulse consumed followed by green gram dhal and whole. Roasted Bengal gram dhal was also considerably consumed as part of coconut chutney. Soyabean and red pulses like rajmah and red lentils were rarely consumed. Black gram dhal was consumed on a weekly basis as part of Idli and dosa. Bengal gram whole varieties, both white and black were consumed but it varied widely among subjects. A majority consumed the pulse twice or thrice a month.

Green leafy vegetables

The recommended guidelines advise a daily intake of 100g of green leafy vegetables[7] but a majority of the subjects did not consume them every day. Only two of the total sample selected consumed greens every day. While all the subjects consumed green leafy vegetables, 16 men and 38 women consumed them occasionally. 44 men and 30 women consumed weekly in which a majority consumed weekly once. Comparatively, the consumption was less among females than males. Amaranth varieties were consumed more than the other varieties. Coriander leaves were consumed more frequently, as some reported on daily basis but the average quantity consumed was very less to be considered. Spinach, mint leaves, fenugreek leaves were the other greens consumed.

Roots and Tubers

All the subjects consumed roots and tubers. Potatoes were consumed more frequently by a majority of the subjects. It was observed that potatoes were used at least once a week. This was followed by carrots, yam and radish. Beetroots were less popular and only 20 of the total subjects consumed beetroots occasionally. When considering the quantity of consumption potatoes and yam were consumed in higher quantities than the other vegetables. Root vegetables like colocasia varieties which were found to have high antioxidant capacity[8] were occasionally consumed.

Other vegetables

Ninety percent of the subjects consumed at least one of the other vegetables like ladies finger, beans, cauliflower, cabbage and gourd varieties. Thirteen women and four men reported they consumed one of these vegetables three times a week.

Fruits

While six men and 20 women consumed fruits occasionally, 24 men and nine women consumed it every day, mostly bananas. A majority of the subjects reported weekly consumption of fruits among which most of them consumed them once or twice a week. Apple, orange, watermelon and papaya were the other fruits consumed. Amla and guava which are rich in antioxidants were occasionally consumed.

Comparison of food intake between semi quantitative food frequency questionnaire and 24 hr recall

The comparison of food intake between semi quantitative food frequency questionnaire and the 24-hr recall is presented in Table 1.

TABLE 1
AVERAGE FOOD INTAKE FROM SEMI QUANTITATIVE FOOD FREQUENCY QUESTIONNAIRE AND 24 HR RECALL

Food Group	Men(n=63)		Women(n=71)	
	FFQ Mean	24 hr recall Mean	FFQ Mean	24 hr recall Mean
Cereals(g)	305	327	250	230.57
Coarse grains(g)	7.7	2	4	0.5
Pulses(g)	51.5	55.7	45	42.83
Green leafy vegetables(g)	15.9	12.4	11.2	13.7
Root vegetables(g)	54.1	49.2	40.5	42.3
Other vegetables(g)	75.1	68.5	45	40.1
Fruits(g)	55.6	58.03	38	40.9
Milk(ml)	320	292.67	245	258.7
Sugar(g)	27	22	25	21.8
Oils(ml)	35	28.1	33	29.33

The results of food intake from FFQ and 24 hour recall were comparable for cereals and pulses. The intake of green leafy vegetables, root vegetables and other vegetables was higher in FFQ than the 24 hour recall. The average intake of fruits in 24 hr recall was 58 g for men whereas it was 55 g by FFQ. The food intake by FFQ showed a higher consumption of oil than the 24 hr recall.

Body Mass Index (BMI) of the selected sample

53 of the men and 54 of the women were in the normal range but a majority in this group had BMI of 23 and above. Seven men and 15 women were in the pre-obese category. The average BMI of men was 23.8 ± 1.7 and the average BMI in women was 24.4 ± 2.03.

Plasma antioxidant status of Indian adults

Blood parameters and plasma TAC

The mean values for blood parameters which included, fasting sugar, lipid profile, urea, uric acid, bilirubin and haemoglobin were recorded. All the samples had the values within the normal range. The average blood haemoglobin level in females ranged from 9-12 in women. and the average level was 11.2g/dl whereas it ranged from 11.8 -15.2 in males, the average level being 13.5g/dl.

The plasma TAC values of men and women as estimated by FRAP method is represented in Table II.

TABLE II
PLASMA TAC OF THE SAMPLE

Age group(years)	Plasma TAC (µmol TE/litre) (Men(N=61))	Plasma TAC (µmol TE/litre) (Women(N=73))
31-40	681.1±111.06	532.07±99.7
41-50	667.7±120.6	539.05±103.5
51-60	602.8±123.5	541.9±72.1
Mean	650.5	537.67
Mean of both the groups(N=134) = 594.09 µmol TE per litre		

The plasma TAC of the selected sample ranged from 300 – 900 µmol TE per litre. The mean plasma TAC of women was 537.67 µmol TE which was less when compared to that of men which was 650.5 µmol TE. The intake of food was higher among men which may have influenced the plasma TAC levels and hence further study is wanted.

A similar observation was made when assessing the TAC of healthy human plasma by myoglobin induced oxidation of 2,2′-Azino-bis(3-ethylbenzthiazoline-6-sulfonic acid) (ABTS) with hydrogen peroxide and expressed as trolox equivalents, in which plasma TAC of men was 569±41µmol TE in men and 430±28µmol TE in women[9]. The plasma TAC of healthy controls in a study conducted to assess the level of total antioxidant capacity and serum adenosine deaminase in pulmonary tuberculosis patients and healthy subjects was reported to be 784.3 ± 190.0 µmol(Fe II)/L by FRAP method[10]. In a case control study on evaluating the relationship between cataract development and serum lipids, glucose as well as antioxidants, the plasma TAC was estimated in healthy controls(of both genders) was estimated to be 516.2 ± 138.7 µmols/L by FRAP method[11].

An analysis of variance between the two groups (men and women) showed a highly significant variance between the groups (F=8.995 and p<0.01).The mean value of Plasma TAC of the total sample was 594.09 µmolTE per litre.

Correlation between Plasma TAC and blood parameters

There was no significant correlation observed between plasma TAC and blood parameters except uric acid levels.

The correlation between plasma TAC and uric acid level was significant at 5 percent level in both men and women. In assessing the effect of rapid consumption of apple juice on blood antioxidant capacity, a strong significant correlation was observed between serum uric acid and plasma antioxidant capacity at all the analysed time points before and after juice ingestion[12]. Also, in concluding that acute elevation of uric acid as a protective factor and chronic elevation as a risk for disease, it was observed that uric acid contributes to 50 percent of the antioxidant capacity of the blood[13].

There was no significant correlation between plasma TAC values and the BMI of the selected subjects.The quartile values of plasma TAC in men and women is represented in Figures 1 and 2 respectively.

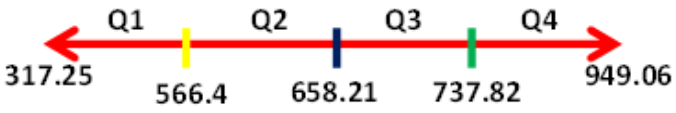

Figure 1
Quartiles of Plasma TAC in Men

Figure 2
Quartiles of Plasma TAC in Women

Consumption of food across quartiles of Plasma TAC in men

The consumption of food groups across the quartiles of plasma TAC in men is represented in Table III.

TABLE III
CONSUMPTION OF FOOD ACROSS QUARTILES OF PLASMA TAC IN MEN

Food group	Quartile 1	Quartile 2	Quartile 3	Quartile 4
Cereals and millets(g)	344.37	332.5	350.66	346.88
Pulses(g)	54.8	49.9	60.1	56.4
Green Leafy Vegetables(g)	12	14	13	16.5
Roots and Tubers(g)	49	53.4	49	47.2
Other vegetables(g)	43	33	37	40.7
Fruits(g)	49	51	59	74

As observed in Table III there was no trend observed in the consumptions of cereals and pulses. Similarly, among vegetables root vegetables and other vegetables did not increase across the quartiles. The consumption of green leafy vegetables was 12g in quartile 1 but it was 16g in quartile 4 showing that the consumption of green leafy vegetables has a profound influence on plasma TAC.

Consumption of food across quartiles of Plasma TAC in women

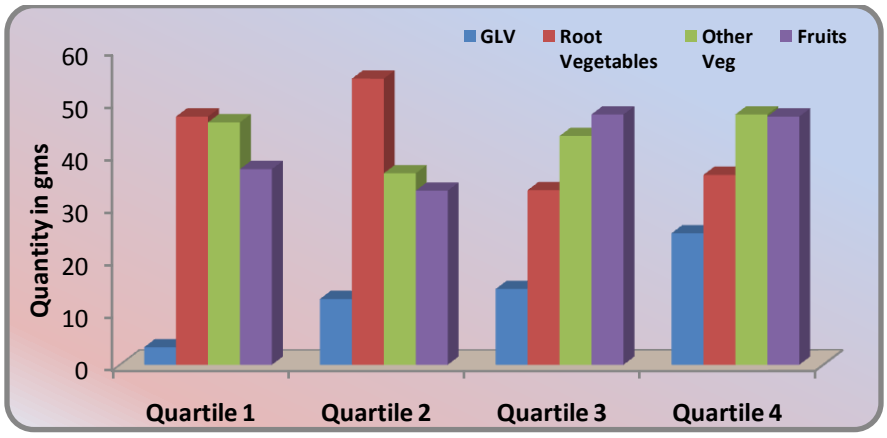

Figure 3: Consumption of Vegetables and Fruits across quartiles of Plasma TAC in women

A similar trend was observed in women with fruits and green leafy vegetables having a great influence on the Plasma TAC. Green leafy vegetables are identified as a rich source of beta carotene and apart from carotenoids, they contain many bioactive components and are found to have the highest antioxidant capacity than some fruits and root vegetables[14]. The intake of green leafy vegetables was 25g in quartile 4 whereas it was only 3.33g in quartile 1(Figure 3). The consumption of fruits, though did not vary much was higher in quartiles 3 and 4 than in the first and the second quartiles.

CONCLUSION

Among the selected sample it was observed that more than any other food group, consumption of green leafy vegetables influenced the plasma TAC values. This is despite the fact that the consumption was less than the recommended quantity. Hence inclusion of green leafy vegetables in the daily diet at recommended levels may serve at improving the plasma TAC of healthy adults.

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Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

MODE OF CONSUMPTION PATTERN OF MILLETS AND BAKED PRODUCTS IN COIMBATORE CITY

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ABSTRACT

Millets are power house of nutrition. Millets rank the sixth most important grain among the cereals. Bakery products are an item of mass consumption in view of its low price and with rapid growth and changing eating habits of people. A bakery product has become popularized in world wide. Bakery products such as cakes, bread, biscuits and pastries are in high demand. Hence the objectives of the study was to find out the mode of consumption of baked products and frequency of consumption of millets by both Urban and rural areas in Coimbatore district. A well structured questionnaire was used to carry out the survey, and data was collected by using simple random sampling technique. The data were statistically analyzed through percentage analysis and chi square. The result was found that 26 percent of the urban people consumed cake and bun by 20 percent. While 22 percent of the rural people consumed bread and rusk by 20 percent, only 6 percent consumed cookies in the rural areas and there was a significant difference at 1% and 5% level in the frequency of consumption of various types of millets. Therefore, it is evident that the mode of consumption of various types of baked products in both the urban and rural areas has become popular. Various types of millets are incorporating in various recipes, which show the society is aware about healthy living to combat the effects of life style disorders. Hence, the different types of millet can be replaced instead of using refined wheat flour in bakery outlets, variety of multi grains baked products can developed and popularized.

KEYWORDS: *Baked Products, Consumption, Millet, Frequency.*

INTRODUCTION:

Thegrain, millet is one of the oldest foods known to humans. People in Africa and India use it in many of their recipes (Amadou*et al*., 2011)**.** A variety known as finger millet was kept as long as five years in the form of unthreshed heads which were the longest lasting. In the present era of food scarcity there exists a need to diversify the use of these millets by developing various millet recipes (Begum,2007). Consumption of bakery products was not in the Indian culture; however with changing eating habits of the people and with rising western influence on food consumption patterns, bakery products today have got takers from all age groups in the country(Ahmed *et al*., 2014) .Baking, particularly the baking of bread, is one of the oldest of human activities indeed one of the oldest surviving papyri appears to be a set of instructions for making bread.Martin David (2013) studied the consumer preference towards bakery products and analyze the perception of consumers towards baked products. However, the study has some limitation as the study has been carried out only from the point of consumers from southern region of Tamil Nadu. The BRICS nations are eating plenty of bread, according to recent research surveyed by *Baking & Snack*,Brazil, Russia, India, China and South Africa bring plenty of momentum to the bakery market. By 2018, China's baking and cereals market will reach $47 billion, becoming the second most valuable in the world, according to Canadean, a London-based consumer goods market research firm. Only the U.S. baking market is worth more, but China is already the largest in volume.

METHODOLOGY

A consumer survey was carried out where 500 households were selected to find out the consumption pattern of millets and baked products. A well structured questionnaire was used for this purpose. A questionnaire is a list of questions used in survey method for collection of data (Paneerselvam, 2014).

Area of the study

The area selected for the study was Coimbatore city. The study was conducted both among the Urban and Rural area to find out the under exploited millets that are commonly consumed by the population through Simple random sampling. A Simple random sampling is a technique in which the sample is drawn that each and every unit in the population has an equal and independent chance of being included in the sample. (Kumar, 2011).

RESULTS AND DISCUSSION

The table –I represents the frequency of consumption of millets by both urban and rural areas, and has given in multiple response .

Frequency Consumption of Millets

Type of millet	Frequency of Consumption								Total	Chi2
	Daily	Weekly			Monthly			Occassionally		
		1	2	3	1	2	3			
Finger millet (Ragi)	25	19	8	5	3	4	7	13	84	11.905**
Pearl millet (Kambu)	20	7	13	3	7	8	12	5	75	14.760**

Foxtail millet (Tenai)	15	5	21	7	7	7	8	7	77	18.948*
Kodo millet (Varagu)	18	8	6	3	5	3	7	8	58	4.207*
Barnyard millet (Kudhiravaali)	15	12	5	4	8	7	9	10	70	6.686**
Little Millet (Samai)	20	10	8	2	13	4	8	9	74	7.405**
Sorghum (Cholam)	19	5	7	5	7	8	6	5	62	10.000**
Total	132	66	68	29	50	41	57	57	500	

* Multiple Responses (1, 2, 3 denotes once, twice, thrice)

** Significant at 1% level * - significant at 5% level

The above given Table -1 depicts the frequency of consumption of millets of both rural and urban population. The Chi2 value is 11.905 with DF-3, P-value < .008, 14.760 with DF-3, P-value <.002 and 18.948 with DF-3, P-value < .000. Hence, it is clearly shown that statistically significant at 1% and 5% level. Consequently, there seems to be a relationship between the type of millets and frequency of consumption in both the urban and rural areas.

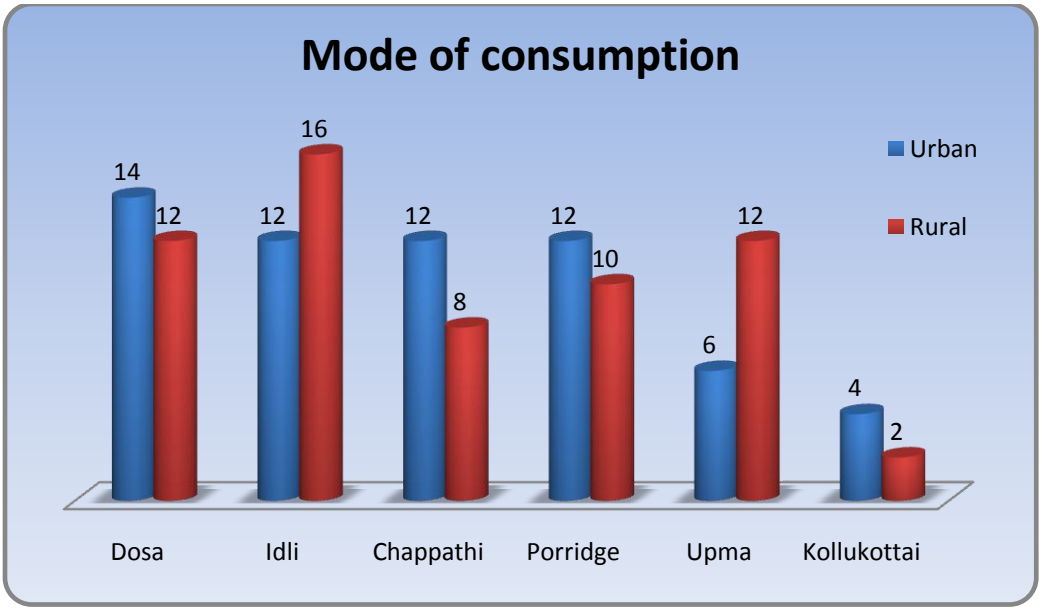


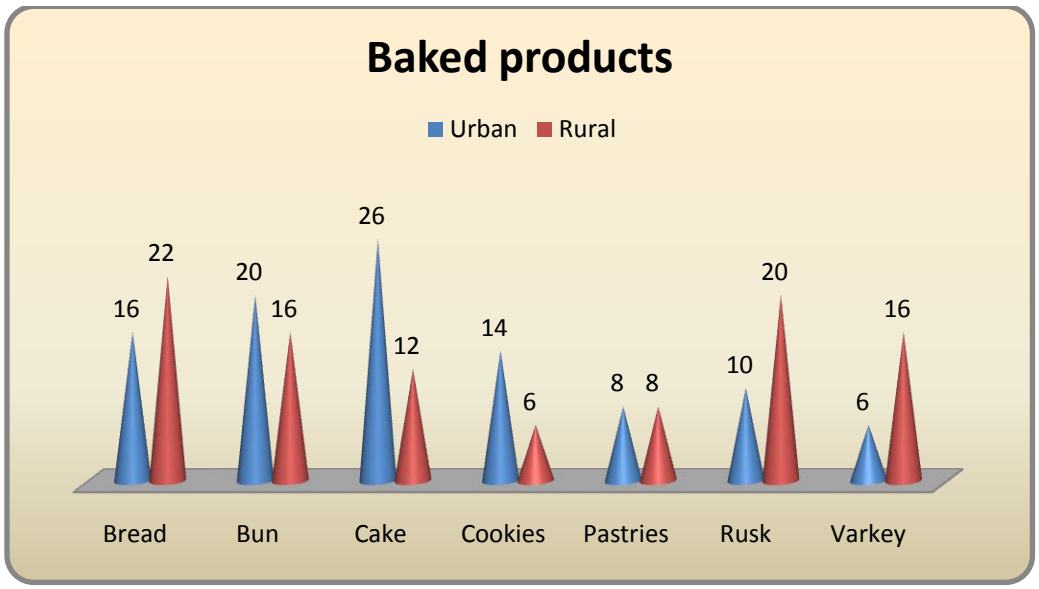
Fig.1 Mode of consumption of baked products by both the urban and rural population

People made varieties of recipes from different types of millets and consumed them in various forms. The above given Fig.1 describes the most commonly consumed recipes by rural and urban population. It was found that both rural and urban population consumed in the formed of dosa and idli. Only 6 percent consumed as uppma in the urban areas while in rural areas only 2 percent prepared kollukatai made from millet flour. They incorporated with other cereals and prepared nutritious items like chappathi, porridge, upma, kolkottai etc. The consumption pattern

for minor millets varies from region to region. In Southern Karnataka, 100% of the rural population and 94% of the urban population consume finger millet as a traditional food called 'Mudde' or 'Thick porridge'.'(Millet Network of India, MINI 2010)

Baked products have become popular and people consumed as a type of snacks. The Fig.2 show different type of baked products consumed by both urban and rural population.

Types of Baked products



The given Figure 2 indicates the type of baked products consumption of both the urban and rural population. About 26 percent of the urban people consumed cake and bun by 20 percent. While 22 percent of the rural people consumed bread and rusk by 20 percent, only 6 percent consumed cookies in the rural areas .Baked items have been prepared using these millets in the form of multigrain bread, biscuits, cookies etc. Bakery products are popular worldwide. Breads and biscuits are the most consumed products, but demand for other bakery items such as cakes, pastries, and cookies is also increasing(Young,2001).

SUMMARY AND CONCLUSION

The result clearly showed that 26 percent of the urban people consumed cake, while 22 percent of the rural people consumed bread and rusk by 20 percent, only 6 percent consumed cookies in the rural areas and there was a significant difference at 1% level in the frequency of consumption of various types of millets. In conclusion, it is evident that the mode of consumption of various types of baked products in both the urban and rural areas has become popular. Various types of millets are incorporating in the recipes, which show the society is aware about healthy living to combat the effects of life style disorders. Hence, the different types of millet can be replaced instead of using refined wheat flour in bakery outlets, variety of multi grains baked products can developed and popularized.

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UGC APPROVED JOURNAL

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ASSESSMENT OF ANTHROPOMETRIC INDICES OF SELECTED ELDERLY IN COIMBATORE CITY

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ABSTRACT

The present study was undertaken to assess the anthropometric indices of a selected group of elderly. The study was conducted in Coimbatore City. Three old age homes in Coimbatore City were selected for the study by Judgement sampling method. A total number of 100 elderly people from old age homes were selected for the study. Both male and female elderly subjects in the age group of 60-100 years were selected. An interview schedule was formulated to collect details regarding the background information and anthropometric measurements. The anthropometric measurements namely height, weight, circumferences of waist, hip and calf were recorded for all the 100 selected subjects. BMI and Waist-hip ratio were calculated for all the elderly people.The extent of normal weight, underweight, overweight and obese elderly were identified. It could be concluded from the present study that most of the elderly people belonged to the age group of 60-70 years in the old age home. Female elderly people were more compared to male elderly people.. The height, weight and body mass index of the elderly were reduced with advancing age in both males and females. As per BMI profile maximum number of elderly people was in the category of underweight. Overall, the female elderly registered greater body mass index as well waist-hip ratio compared to male.

KEYWORDS: *Elderly, Anthropometry, Body Mass Index, Waist-Hip Ratio, Obesity*

INTRODUCTION

Good nutrition is essential to good health throughout life, begining with prenatal life and extending through old age (Williams, 2005).Old age may be defined as regression of physiological functions accompanied by an advancing age. Malnourished populations do not have a long expectation of life

Ageing can be described as the progressive constriction of the homeostatic reserve of every organ system. The decline to a large extent is influenced by diet environment and personal habits as well as by genetic factors (Krause, 2008).Successful ageing is not longevity alone but also sufficient well being in multiple domains, socially, physically and mentally. Avoiding disease, engagement with life and maintaining high physical and cognitive function are the three major components for successful ageing(Srilakshmi, 2008)

Anthropometric values are closely related to nutrition, genetic makeup, environmental characteristics, social and cultural conditions, lifestyle, functional status and health. Anthropometric evaluation is an essential feature of geriatric nutritional evaluation for determining malnutrition, being overweight, obesity, muscular mass loss, fat mass gain and adipose tissue redistribution. Anthropometric indicators are used to evaluate the prognosis of chronic and acute diseases, and to guide medical intervention in the elderly. The aging process involves physiological and nutritional changes that are manifested by height and weight loss.

Hence, the present research is undertaken with the focus on assessing anthropometric indices of the elderly to understand the body fat composition.

METHODOLOGY

The study was conducted in Coimbatore city. A total of 100 elderly people who were residing in three old age homes namely St' Joseph home for the aged destitue situated in Podanur ,Anbalayammaruvazhvuillam situated in Vadavalli and Neyam old age home situated in Vadavalli were selected. These old age homes were selected as the authorities were co-operative and consented to give permission to carry out the study in their old age homes.

The elderly people were selected by random sampling method. Both male and female elderly subjects in the age group of 60 to 90 years and those who were willing to participate in the study were included. The exclusion criteria for the selected participants included Elderly subjects below 60 years of age, Subjects with abnormal mental health,Elderly people who are bed ridden and elderly people who are unwilling to participate.All the male and female elderly people above the age of 60 years were included for the study which comprised of 44 males and 56 females.

The survey and anthropometric measurements were taken from the elderly people at old age homes. Interview method is one of the important and powerful tools for the data collection in social research (Saravanavel, 2007)Awell structured interview schedule was formulated by the investigator to collect the details. The interview schedule included demographic variables such as age, formal education, occupational status, family situation and income. The measures analyzed were weight, height, body mass index (BMI), waist to hip ratio (WHR).

Anthropometric Measurements

Measurement of height

Height of an individual is principally a measure of skeletal long tissue (Jellifffe, 2001).The elderly people were made to stand erect looking on a leveled surface, without shoes and toes apart. The scale was placed over the head of the selected subject. Using tape, the reading was measured to the nearest 0.1 cm accuracy (Bamji*et al.,* 2009)

Measurement of weight

Body weight is the most widely used simplest method to assess the growth and development of an individual (NIN,2009). The Zero error of the weighing scale was checked before taking the weight. The elderly people were weighed with minimum clothing and without shoes and the weight was recorded (Bamji*et al.*,2009)

Body mass index

Body mass index is a simple indicator of total body fat or obesity. BMI is defined as the individual's body weight divided by the height in meter square and may be accurately calculated using the formula of Hall and Cole, (2006).

$$BMI = \frac{\text{Weight in Kg}}{\text{Height in m}^2}$$

Using the formula, body mass index of all selected elderly were computed and the extent of adiposity determined.

Measurement of waist circumference

The elderly people were made to stand erect with straight evenly balanced on both feet which were placed about 25 to 35 cm apart. The level of lowest rib and iliac chest and the mid auxiliary line were felt. The tape was passed round the waist horizontally between the lowest rib and iliac chest and the waist circumference was marked to the nearest millimetre.

Male waist circumference should be <40 inches (102 cm). Female waist circumference should be <35 inches (88 cm), (Centres for Disease Control and Prevention, 2010).

Measurement of hip circumference

Hip circumference was measured by making the elderly people stand with both feet together, and the hip circumference was taken. The tape was passed round the hip horizontally and measured. The circumference was marked to the nearest millimeter.

Waist-hip ratio

The waist-hip ratio assess the body fat distribution as an indicator of health risk. Obese persons with a greater proportion of fat in the upper body, especially in the abdomen, have android obesity. Obese persons with most of their fat in the hips and thighs have gynoid obesity (WHO, 2008). The waist-hip ratio was taken for all elderly people with the help of inch tape. The waist-hip ratio were calculated using the value of waist, hip circumference and the waist-hip ratio was calculated.

RESULTS AND DISCUSSION

Socio economic status of selected elderly

Table Ipresents the data onage and genderof the selected elderly subjects.

TABLE I
DISTRIBUTION OF THE SELECTED SUBJECTS ACCORDING TO AGE AND GENDER

Age (Years)	Male (n=44)	%	Female (n=56)	%	Total	%
60-70	13	6.5	22	11	35	17.5
70-80	14	7	19	9.5	33	16.5
80-90	16	8	15	7.5	31	15.5
90 above	1	0.5	-	-	1	0.5
TOTAL	44	22	56	28	100	50

From Table I it is evident that 35 percent of the elderly were in the age group of 60 to 70 years and 33 percent were in the age group of 70 to 80 years. The number of elderly people were more in 70 to 90 years. It is also clearly evident that the percentage of the elderly in all the age group were almost similar. Maximum number of elderly belonged to 60 to 70 years age group indicating lesser population in higher age groups.

Female subjects were more compared to male subjects. Above ninety years only one male elderly was there.

Educational Status

The selected elderly were classified according to their educational status and the results are shown in Table II.

TABLE II
EDUCATIONAL STATUS OF THE SELECTED ELDERLY

Education level	Male (n=44)	%	Female (n=56)	%	Total	%
Literate	29	14.5	38	19	67	33.5
Illiterate	15	7.5	18	9	33	16.5
TOTAL	44	22	56	28	100	50

From Table II it is observed that 33.5 percent of were literates. The number of literates were more when compared illiterates. In general 70 percent of the elderly were literates and 30 percent were illiterates.

Occupational Status

The elderly people in the old age home were not working. Only eight percent in males and 11 percent in females got some amount of money from their son, daughter or relatives. But some of them got minimum amount of earnings from other sources through government elderly schemes.

Anthropometric measurements

Body Mass Index

The body mass index was calculated from height and weight for all the selected elderly subjects elderly subjects. The mean BMI classified according to the mean BMI classification recommenced by World Health Organisation (2010) is presented in Table III.

TABLE III
DISTRIBUTION OF SELECTED SUBJECTS ACCORDING TO BMI CLASSIFICATION

Category*	**Male (n=44)**	**%**	**Female (n=56)**	**%**	**Total**	**%**
<18.5 Under weight	20	10	22	11	42	21
18.5 – 24.9 Normal	15	7.5	18	9	33	16.5
25- 29.9 Over weight	7	3.5	11	5.5	18	9
>30 Obesity	2	1	5	2.5	7	3.5
Total	44	21.9	56	28	100	50
Mean ± SD	**21.93 ± 3.91**		**20.9 ± 4.42**			

***World health organization (2010)**

Table III shows that only 16.5 percent of elderly had a normal body mass index, whereas 21 percent of the selected elderly were in the category of underweight. In category of overweight females were more when compared to males. Prevalence of obesity among males and females was only one to three percent.The mean values (BMI) of males and females were within normal range. Though the mean value was normal 21 percent were in underweight category. This was due to very less intake.

Waist hip ratio

The waist hip ratio for community dwelling and old homes for selected elderly.

TABLE IV WAIST HIP RASIO OF THE SELECTED ELDERLY

Category*	**Male (n=44)**	**%**
Normal (0.95)	8	7.4
Under weight (<0.95)	20	10
Obese (>0.95)	16	8
Total	44	25.4
Category *		
	Female (n=56)	**%**
Normal 0.85	18	9
Under weight (<0.85)	15	7.4
Obesity (>0.85)	23	11.5
Total	56	27.9

***Centre disease control and prevention, 2010)**

Distribution of elderly according to waist - hip ratio is shown in the Table IV indicate that 7.4 percent of male subjects and 9 percent of female subjects registered normal waist hip ratio. Eight percent of males and 11.5 females were in obese category.

Among both the gender females subjects had higher prevalence of obesity compared to males. The number of elderly in the underweight category was more in male (10%) elderly people than female(7.4%) elderly people.

CONCLUSION

It could be concluded from the present study that most of the elderly people belonged to the age group of 60-70 years in the old age home.Female elderly people were more compared to male elderly people. The height, weight and body mass index of the elderly were reduced with advancing age in both males and females.As per BMI profile maximum number of elderly people werein the category of underweight. Overall, the female elderly registered greater body mass index as well waist-hip ratio compared to male.

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MICROBIAL SAFETY OF STREET FOODS IN SELECTED LOCALES OF COIMBATORE- TAMIL NADU

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ABSTRACT

*Street food is the ones that are readily available on road side sold on a wheel of cart. Floating population of migrating workers and youngsters forms the main clienteles of this informal food industry. The microbial safety of these foods remains as a cause of concern. With the objective to ascertain the microbial safety of the street vended foods, a ranking on consumers preference of street foods from 200 clienteles selected at random was carried out. A total of 15 highly preferred street foods namely Mushroom, Pani- puri, Masal-puri, Egg fried rice and Vegetable fried rice, Egg Noodles , Vegetable Noodles, Chicken Biriyani, Coconut Chutney, Kara Chutney, Egg omelete, Mathimeen ((sardine fish fry), Neimeen, (*seer *fish), Nethilimeen (*Anchovies*) and Parota were purchased and were tested for microbial contamination by plate method. Characterization and confirmation of pathogen was also tested biochemically. The current paper projects the microbial safety of the five most commonly preferred and sold street foods in the selected locales of Coimbatore. All the five selected street foods street foods were highly contaminated by vibrio cholera* and *e-coli pseudomonas and staphylococci*

KEYWORDS: *Street Foods, Microbial Safety Of Foods, Staphylococci, Pseudomonas, E-Coli, Vibrio Cholera, Food Sanitation And Hygiene*

INTRODUCTION

In recent years there has been a notable increase in the consumption of "street foods" by general public. Street foods refers to any light meal eaten between regular meals. Every city, town and village in this vast country of over 1 billion people has its roadside stands and food hawkers. Indians eat street food as breakfast, lunch and dinner, as an afternoon snack (often taken home for "tea"), and during festivals when special dishes are prepared.

Street food is made to order and eaten on the spot where the dishes are usually eaten standing or on the move. Food safety of these foods is a major problem because many vendors have no access to clean water or disposal facilities, and often cook and handle food with dirty hands. Street food vendors are often unlicensed, untrained in food hygiene and sanitation, and work under unsanitary conditions[1]. Recent studies have indicated that ready to eat foods and food preparation surfaces may be reservoirs for microbial contamination. FAO further stipulates that street foods raise concern with respect to their potential for serious food poisoning outbreaks due to improper use of additives, the presence of adulterants, environmental contaminants and improper food handling practices amongst street food vendors[2].

Though street food vendors contribute to nations, economic status/ well being, there are also some public health challengers for both urban and rural population[3]because street foods are readily contaminated from different sources and they increase the risk of food borne disease. World health organization stated that millions of people fall sick or die because of eating unsafe food and therefor food safety has emerged as an important global issue with international trade and public health implications[4]. Hence the current study titled Microbial safety of street foods in selected locales of Coimbatore was carried out With the objective to ascertain the microbial safety of street vended foods,

METHODOLOGY

Evaluation of Microbial safety on selected street foods

i. Selection of food for Microbial Analysis

Based on the findings of the survey on the frequency and commonly consumption of street foods by the customers in the selected locales of Coimbatore, a total of 15 most frequently consumed food items namely Mushroom, Pani-puri, Masal-puri, Egg fried rice and Vegetable fried rice, Egg Noodles and Vegetable Noodles, Chicken Biriyani, Coconut Chutney, Kara Chutney, Egg omelete, Mathimeen, Neimeen,Nethilimeen and Parota were selected for evaluation of microbial safety.

The foods samples were purchased randomly from three out of 107 street food outlets studied comprising five sample from each outlets. The current paper projects the five most commonly consumed and sold street foods namely Parota (Indian bread made out of refined wheat flour.), Vegetable noodles, -Egg fried rice, Vegetable fried rice , Egg noodles .A portion of each street food items was purchased during the peak hours of most patronized time zone. The purchased food items were immediately transferred into a sterile pouch. The sterile pouch with food was kept in a thermocoal box and was taken to the microbial laboratory for analysis.

ii. Preparation of Sample

One gram of solid food sample was weighed by using electronic weighing balance and was transferred aseptically into the mortar and pestle, 10 ml of peptone (diluent) water was added to

the food sample and it was blended and homogenized for two minutes. The homogenized mixture was filtered using whatsman no -1 filter paper and was transferred into sterile test tube.

iii. Preparation of Nutrient agar / Broth

To a sterilized conical flask with 100ml of distilled water, 0.5g of peptone, 0.5g of Nacland0.3g of Beef extract was dissolved by boiling the mixture under a low flame with constant stirring. The mixture was autoclaved at 121˚C for 15 minutes.

iv. Serial Dilution

A Sterilized test tube was taken, the investigator pipette out nine ml of nutrient broth into it and added one ml of homogenized food sample . The broth was mixed thoroughly and the test tube was marked as dilution 10^{-1}. One ml of sample from dilution 10^{-1} was pipetted out into a second test tube containing nine ml of nutrient agar , mixed thoroughly and was marked as dilution 10^{-2} likewise a subsequent dilution till 10^{-10} was prepared in Laminar air flow chamber . All the 10 dilution were incubated at 37˚C for 24 hours.

v. Preparation of Agar /Medium

To a sterilized conical flask with 150ml of distilled water, 2.20 g of nutrient agar was added and it was dissolved by boiling. The dissolved mixture was mixed thoroughly using a sterile rod and was autoclaved at 121˚C for 15 minutes.

vi. Preparation of plating

Plating was done by spread plate method where 15ml of nutrient medium each was poured in ten sterilized petri plates and was allowed to solidify. The petri plates were marked and named in accordance with food sample and dilution. From each serial dilution of food sample (10^{-1}……10^{-10}) one ml of diluted food sample was pipetted out and added to the respective plates and was spread using sterile L-shaped rod. The prepared plates were then sealed using paraffin wax and was incubates at 37˚C for 24 hours[5].

vii. Bacterial Count

At the end of the incubation period, the plates with maximum number of colonies were selected and counted by using heamocytometer. Using a Sterile glass rod 0.5ml of food culture were taken into sterile test tube. A drop of trypone blue suspension was added to the test tube containing food culture and mixed well. Using a micropipette ,0.1ml of culture was pipetted out and was place on 4 chambers of heamocytometer and cover slip was placed. Using a microscope the gridlines of the heamocytometerwas focus at 10x objective[6].

The total colonies were counted using the formula:

Total colony=Total colonies x Diluent factor = colonies /g

viii. Identification and Characterization of isolates / Bacterial Identification

The isolated colonies of the tested street food samples were then morphologically characterized by gram staining methods to differentiate the presence of bacteria as gram^{+ve} and gram$^{-ve.}$ The principle behind the staining technique is that since the cell walls of gram positive bacteria has a stronger attraction for crystal violet, on application of iodine they retain the crystal violet colour and will remain purple after decolourization with alcohol. Whereas the gram $^{-ve}$ bacteria will be

colour -less after decolorizing with alcohol and staining with saffranin will make them appear pink[7].

ix. Bio-Chemical Tests

After the identification of gram^{+ve}and gram^{-ve}bacteria, the investigator was interested to identify and confirm the presence of pathogens in the selected street foods by using the following biochemical tests.

a. Catalase Test

To a sterilized glass slide , a drop of culture was placed using a sterilized loop. The glass slide was titled at angle , 3% of hydrogen peroxide was pipetted out and was added to the slide containing the culture. The presence or absence of bubbles formation on the slide was observed. The active reaction in the formation of bubbles indicates the presence of *staphylococci* and the absence of bubbles confirm the presence of *streptococci.*

b. Triple iron sugar test

To a sterilized test tube, 6ml of triple iron sugar medium was added. The test tube was tightly closed with a cotton plug and was autoclaved at 121˚C for 15 minutes. The sterilized agar medium was allowed to solidify. The solidified agar was incubated at 37˚C for 24hours and the food culture with maximum colony was added to the bottom of the test tube using a sterile loop and mixed well. The test tube was again incubated at 37˚C for 24 hours. The presence of ferment sugar and hydrogen sulphide gas at the end of the incubation period indicates presence of *Enterobacteriae.*

c. Indoletest

To a sterilized test tube 5ml of boiled tryptophan solution was added, using the sterilized loop the test culture was mixed thoroughly with the solution. A few drops of ammonia solution was added into the mixture and 10-15 drops of Kovac's reagent wasadded finally. The appearance of cherry red colour ring indicates the presence of *E-Coli* and*Vibrio sp*. Absence of ring or formation of thin ring indicates the presence of *Klebsiella, Salmonella, Shigella spp.*

d. Citrate utilization test

To a sterilized test tube 6ml of simmons citrate medium was added. The test tube was incubated at 37˚C for 24 hours. After the incubation period using the sterilized loop the food culture was added into the test tube and again it was incubated at 37˚C for 48hours. At the end of the incubation period, the presence or absence of colour changes was observed. Citrate positive culture was identified by the presence of a blue colour growth on the slant surface of the test tube. Citrate negative will show no growth and the medium will remain green. Convertion of green colourinto deep blue colour indicates the growth of pathogenic microorganisms namely, Klebsiellapneumonia, *Enterobacter* species, *Citrobacterfreundii*, *Salmonella* other than*Typhi* and *ParatyphiA*,*Serratiamarcescens*, *Proteus mirabilis* (minority of strains gives negative result), *Providencia*. Absence of colour change (citrate negative test) indicates the presence of *Escherichiacoli*, *Shigella*spp, *Salmonella*Typhi, *Salmonella*ParatyphiA, *Morganellamorganii, and Yersiniaenterocolitica.*

RESULTS AND DISCUSSION

Microbial Analysis:

Based on the findings of the survey on the frequency and consumption of street foods by the customers in the selected locales of Coimbatore, a total of five most frequently consumed food items namely porota, Egg fried rice , Vegetable fried rice, Egg Noodles and Vegetable Noodles were selected for evaluation of microbial safety. The foods were subjected for total colonies, gram staining and biochemical test for confirmation of specific pathogen , the results are presented in the following tables and discussed belowe.

TABLE I
TOTAL COLONIES COUNTS OF SELECTED STREET FOODS

S.No	Food Items	Total Count
1.	Parota	1870 ($1.9x10^{-3}$cfu /g)
2.	Egg fried rice	3600 ($3.6x10^{-3}$cfu /g)
3.	Vegetable fried rice	243000($2.5x10^{-5}$cfu /g)
4.	Egg Noodles	2140 ($2.2x10^{-3}$cfu /g)
5.	Vegetable Noodles	18800 ($1.9 x10^{-4}$cfu /g)

It was surprising to note that all the five street food sample had unsatisfactory total plate count (TableI). The permissible limit for possible microorganism should not. exceed 100 cfu /g (WHO 2004). Based on the above critical level, all the five food samples collected from the street food outlets were contaminated with too numerous microbial load. The highest colony of bacterial count was observed for vegetable fried rice [243000 (2.5×10^{-5})cfu /g)] followed by vegetable noodles[18800 (1.9×10^{-4}cfu /g)]. The heavy microbial load can be attributed to the poor sanitation , food handling and storage practices observed during the conduct of the study.

Presence of Gram positive and Gram Negative bacteria in selected foods

The following table II projects presence of Gram+ve and Gram-ve bacteria in selected street foods samples for main-dishes.

TABLE II
IDENTIFICATION OF ISOLATES

Food Items	Gram $^{-ve}$ bacteria	Gram $^{+ve}$ bacteria
Parota	Rod	Cocci
Egg fried rice	Rod	Cocci
Vegetable fried rice	----	Cocci
Egg Noodles	Rod	Cocci

Vegetable Noodles	Rod	Cocci
Chicken Biriyani	Rod	Cocci

Except for vegetable fried rice all the other foods showed the presence of both gram^{+}vecocci and gram^{-}ve rod.

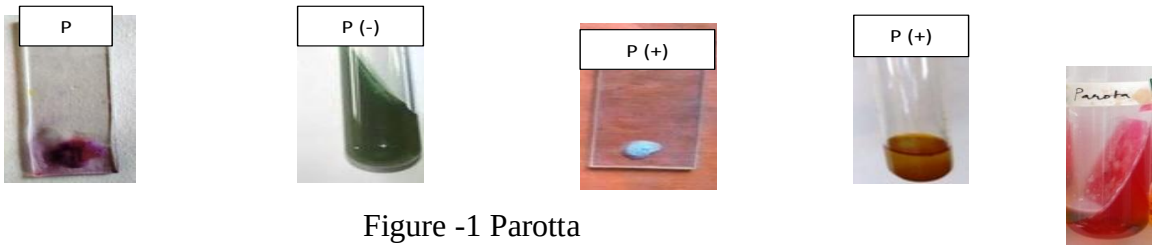

Figure -1 Parotta

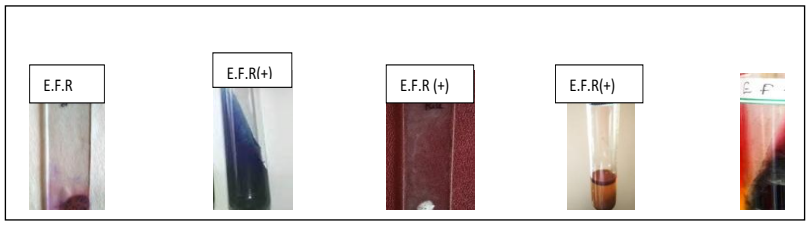

Figure-2 Egg Fried Rice

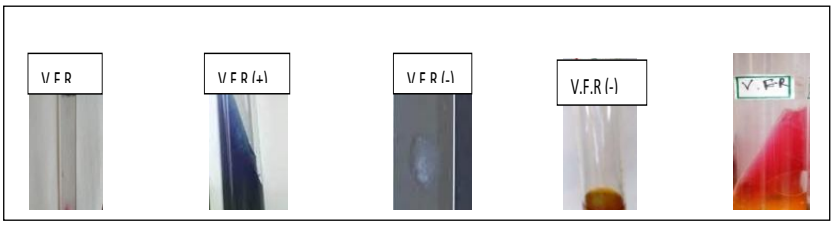

Figure -3 Veg Fried Rice

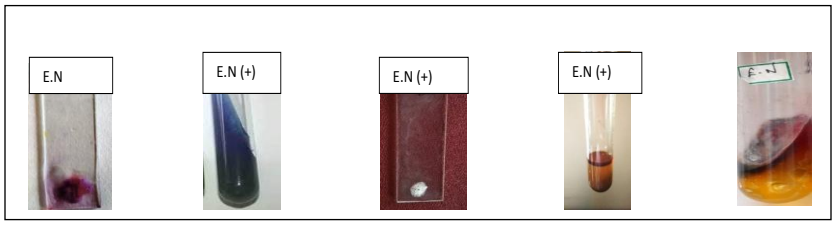

Figure- 4 Egg Noodles

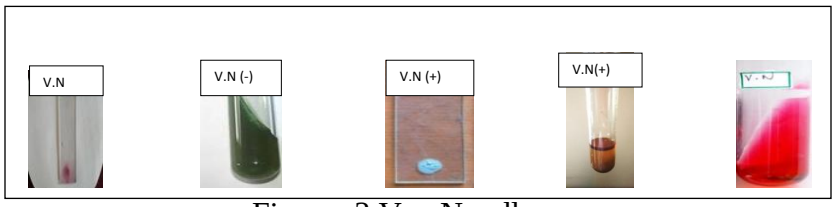

Figure -3 Veg Noodles

The following table projects presence of food borne pathogens in selected five street foods samples

TABLE VII
BIO CHEMICAL TEST FOR CONFIRMATION OF BACTERIA

Food Items	**C-Test**	**Cat Test**	**IT**	**TSI**
Parota	***Enterobacteriae (-)***	***Staphylococcus***	*Klebsiella,Salmonella, Shiegella*	*Pseudomonas aeuriginosa*
Egg fried rice	***Enterobacteriae (+)***	***Staphylococcus***	*E-Coli , Vibrio cholerea*	*Salmonella Typhimurium*
Vegetable fried rice	***Enterobacteriae (+)***	***Streptococci***	*Klebsiella,Salmonella, Shiegella*	*Salmonella Typhimurium*
Vegetable Noodles	***Enterobacteriae (-)***	***Staphylococcus***	*E-Coli , Vibrio cholerea*	*Pseudomonas aeuriginosa*
Egg noodles	***Enterobacteriae (+)***	***Staphylococcus***	*E-Coli , Vibrio cholerea*	*Salmonella Typhimurium*

(C-Test – Citrate test , Cat Test – Catalase Test, IT –Indole Test , TSI –Triple Sugar Iron test)

From the above table it is evident , that almost three out of five food sample showed the presence of *Enterobacteriae* positive and rest of two food samples namely (Parota and Vegetable Noodles) showed the presence of *Enterobacteriae* Negative. Except vegetable noodles and parota the rest of the three food samples were contaminated with *salmonella typhimuriuma* causative microorganism for food poisoning. Egg fried rice and vegetable noodles were found to be contaminated with *vibrio cholera* and *e-coli* which causes cholera and Gastro intestinal disorder. Similarly, Vegetable noodles was contaminated with *pseudomonas* a microorganism that causes genito urinary infection. Except for vegetable fried rice and chicken biriyani all the four food samples were contaminated with *staphylococci* which causes pneumonia and bone and joint infection.

CONCLUSION:

Unhygienic surroundings (where the foods were prepared and sold) like flowing sewage in open gutters, improper waste disposal system and inadequate water supply attracts house flies or fruit flies and increase the risk of food contamination. This study has demonstrated that some of the most popular types of ready-to-eat foods that are sold on the streets of Coimbatore are contaminated, and do not meet the required quality and safety levels. Some of the bacteria isolated such as*salmonella typhimurium, vibrio cholera and staphylococci* are potential enteric pathogens and are known to cause gastro intestinal disorder and *pseudomonas* also cause genitor urinary infection. Street foods therefore pose a health threat to the patron and efforts to reduce level of contamination in the street vending food should be taken up seriously by conducted work shop and awareness program to street food vendors to ensure quality and safe food. Formulation of cooking , food handling and storage standars should also be made mandatory among street food vendors.

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INVITRO ANALYSIS OF HIBISCUS ROSA SINENSIS AND IMPACT OF ITS SHARBATH ON MYOCARDIAL ISCHEMIA OF RATS

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ABSTRACT

Cardiovascular diseases have been gaining importance in India recently because of increased incidence of this disease. It is the first among top 5 causes of deaths in Indian population (rural vs. urban, economically backward vs. developed states, men vs. women and at all stages vs. middle age). So the occurrence of Cardiac diseases can be prevented by eating a healthy diet, regular exercise, maintaining a healthy weight and not smoking. .In this dietary management plays a major role to reduce the heart disease. The study was carried out with male albino Wister rats weighing 160-200 gm. Rats were pretreated with ***Hibiscus Rosa Sinensis sharbath*** *p. o for 21 days), Quercetin (50mg/kg) triturated in 1percentage Sodium Car boxy Methyl Cellulose and given through oral gavage for 21 days. Isoproterenol (85mg/kg) was mixed in normal saline and given by on 20th and 21st days. The biochemical parameters that were analyzed in both heart tissues and homogenate in blood. The study reveals that cardio protective effect of hibiscus rosa sinensis sharbath on myocardial ischemic rats. It has been traditionally used in medicine and culinary practices in India, as it is believed to possess cardio protective and lipid lowering properties. The present study is aimed to investigate the cardio protective effects of oral administration of hibiscus rosa sinensis sharbath.*

KEYWORDS: *Cardiovascular Diseases, Dietary Management, Hibiscus Rosa Sinensis Sharbath.*

INTRODUCTION

Cardiovascular diseases have been gaining importance in India recently because of increased incidence of this disease. It is the first among top 5 causes of deaths in Indian population (rural vs. urban, economically backward vs. developed states, men vs. women and at all stages vs. middle age). In 2000, there were an estimated 29.8 million people with CHD in India out of a total estimated population of 1.03 billion, or a nearly 3percentage overall prevalence. According to World Bank estimates, CVD had a 31percentage share in the total burden of disease in 2001 .In 2003, the prevalence was estimated to be 3-4perentage in rural areas and 8-10percentage in urban areas according to population based cross sectional surveys.

In recent years, there has been an increasing interest in finding natural antioxidants, which can protect the human body from free radicals and retard the progress of many chronic diseases. Natural antioxidants such as α tocopherol and ascorbic acid are widely used because they are regarded as safer and causing fewer adverse reactions.

Over the years, WHO advocated traditional Medicines as safe remedies for aliments of both microbial and non-microbial origins. The accepted Indian systems of medicines are Siddha, Ayurveda, Unani and homeopathy which uses herbs and natural resources in the formulations. Even though there are many plants treating heart diseases. Among them Hibiscus rosa sinensis have a high effect on ischemic diseases.

OBJECTIVES

- To carryout study investigating the protective effect of the *Hibiscus rosa sinensis* flowers sharbath in an myocardial ischemia.

METHODOLOGY

The study was carried out with 30 male albino Wister rats weighing 160-200 gm. They were obtained from the in-house animal facility.

The rats after adaptation were randomly divided into 5 groups of 6 animals each and treated as follows for 21 days:

Groups : Drug, Dosage and Route of Administration
Group 1: **Control:** vehicle- 1% Na CMC in Distilled Water,(2ml, p. o)
Group 2: **Negative Control:** treated with vehicle, (2ml, p. o) and then Isoproterenol 85mg/kg, (i. p) for 2 days (on 20th and 21st day).

Group3: Positive Control: Quercetin (50 mg/kg), (2ml, p. o) for 21 days and then Isoproterenol 85mg/kg, (i. p) for 2 days (on 20th and 21st day).

Group 4: ***Hibiscus Rosa Sinensis*** **sharbath Low dose** p. o for 21 days and then Isoproterenol 85mg/kg, (i. p) for 2 days (on 20th and 21st day).

Group 5: ***Hibiscus Rosa Sinensis*** **sharbath High dose** p. o for 21 days and then Isoproterenol 85mg/kg, (i. p) for 2 days (on 20th and 21st day).

Rats were pretreated with ***Hibiscus Rosa Sinensis*** **sharbath** p. o for 21 days), Quercetin (50mg/kg) triturated in 1% Sodium Car boxy Methyl Cellulose and given through oral gavage

for 21 days. Isoproterenol (85mg/kg) was mixed in normal saline and given by i. p. on 20th and 21st day.

RESULTS:

Rats that received oral doses of *Hibiscus rosa sinensis* sharbath did not manifest any clinical sign of toxicity. None of the doses tested could produce mortality in rats during the treatment period.

Table -1
BODY WEIGHT ANALYSIS:

GROUP	CONTROL	ONLY ISO	ISO + STD	ISO + LOW DOSE	ISO +HIGH DOSE
IN BODY WEIGHT	184± 5.86	173.33± 4.77^{ns}	180.333± 6.458^{ns}	153.333± 2.60***	158± 1.15**
FINAL BODY WEIGHT	195± 5.50	177.33± 4.514*	180.33± 4.424*	165.667± 1.45***	170± 1.03***

There was a slight change in the body weight. Similar to control group all the other groups namely only isoproterenol, isoproterenol+ low dose, isoproterenol+ high dose had significant weight gain except the isoproterenol+ standard group.

Table - 2
ESTIMATION OF SGOT AND SGPT

GROUP	CONTROL	ONLY ISO	ISO + STD	ISO + LOW DOSE	ISO +HIGH DOSE
SGOT (U/L)	113.2± 10.28	194.86± 15.11***	140.56± 8.643^{ns}	131.967± 9.96^{ns}	139.6± 7.219^{ns}
SGPT (U/L)	46.76± 2.643	112.133± 13.86***	104.23± 8.064***	74± 8.69^{ns}	58.16± 3.78^{ns}

On exploring SGOT on rats fed with hibiscus rosa sinensis sharbath was significantly increasing in negative control group. Whereas, with regard to SGPT, negative control group and ISO+Std had a significant increase. Such an increase in SGOT is usually found in most of the cardiac

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ailments and the of this group was induced cardiac ailment but as it was not treated with any drug or herb probably could have increased to a greater extent.

TABLE - 3
ACTIVITY OF CREATINE KINASE(C K) , LACTATE DEHYDROGENASE(LDH) :-

GROUP	CONTROL	ONLY ISO	ISO + STD	ISO + LOW DOSE	ISO +HIGH DOSE
CK(U/L) (Creatine Kinase)	104.2± 11.18	554.63± 115.89***	152.13± 14.44^{ns}	180.83± 13.03^{ns}	91.63± 1.351^{ns}
LDH(U/L)	762.933± 47.0706	1332.53± 43.2173***	1076.17± 16.5135**	875.867± 104.997^{ns}	753.533± 19.2959^{ns}

The above table on depicts the enzymatic levels of the experiment animals. As far as CK is concerned the negative control groups had a highly significant rise. Which may be attributed to the ischemic mechanism of cardiocytes that has been induced ISO and not treated with any drugs. However, ISO + Std group did not have a significant increase in CK levels of it are plausibly treated with the Std drug. Whereas, with regard to LDH both negative control & ISO+ Std groups have significant increase but yet only ISO at 1% level and that of ISO+ Std 5% levels. However, both the ISO+ Std and ISO+ high dose groups did not have any significant that pretreatment with hibiscus rosa sinensis sharbath probably protects. Myocytes from ischemia and its manifestations and to certain extent release of these enzymes.

TABLE – 4
ESTIMATION OF TOTAL PROTEIN

GROUP	CONTROL	ONLY ISO	ISO + STD	ISO + LOW DOSE	ISO +HIGH DOSE
TOTAL PROTEIN(mg/dl)	0.72± 0.006	0.95± 0.013***	0.48± 0.028***	0.66± 0.007*	0.43± 0.005***

In comparison with control group all the other groups namely ISO, ISO+ Std, ISO+ low dose, ISO+ high dose significantly differed in their protein levels.

TABLE -5
ESTIMATION OF SOD AND CATALASE

GROUP	CONTROL	ONLY ISO	ISO + STD	ISO + LOW DOSE	ISO +HIGH DOSE
SOD (unit/min/mg protein)	0.15± 0.001	0.22± 0.018***	0.11± 0.001^{ns}	0.13± 0.006^{ns}	0.10± 0.004**
CATALASE (µmole of H_2O_2 consumed/min/mg protein)	1.90± 0.023	1.93± 0.078	1.40± 0.085	1.48± 0.063	1.13± 0.11 ***

As cardiac ischemia condition was induced in negative control group and probably as it was treated with any drugs the SOD values have markedly increased (0.22±0.018, $p<0.001$). However, ISO+ high dose groups also had significant increase in the SOD levels, whereas, ISO+ high dose had a significant decrease in catalase levels at 1% level. Overall, such decrease in these enzymatic antioxidants of the hibiscus rosa sinensis sharbath treated groups could have probably ascribed to the phytochemicals particularly antioxidants of the flower.

TABLE -6
ESTIMATION OF GSH:

GROUP	CONTROL	ONLY ISO	ISO + STD	ISO + LOW DOSE	ISO +HIGH DOSE
GSH (µg/mg protein)	0.087± 0.003	0.11± 0.004^{ns}	0.050± 0.009*	0.091± 0.012^{ns}	0.046± 0.007**

The effect of hibiscus rosa sinensis sharbath on the activity of antioxidant enzymes in heart of control and experimental rats is depicted. Ischemic condition was induced in negative control group and probably as it was treated with any drugs the GSH. GSH was significantly increased

in the negative control and ISO+ low dose group. Whereas in ISO+ Std and ISO+ high dose groups the GSH level was reduced in comparison to that control group.

TABLE-7
ESTIMATION OF TBRS:

GROUP	CONTROL	ONLY ISO	ISO + STD	ISO + LOW DOSE	ISO +HIGH DOSE
TBRS (nmoles of MDA formed/mg protein)	0.42± 0.014	0.67± 0.039***	0.36± 0.005^{ns}	0.44± 0.065^{ns}	0.32± 0.014^{ns}

Myocardial TBRS was significantly high in the negative control group. Whereas ISO+ Std and ISO+ high dose groups had a significant reduction in there TBRS levels at 1% level. The decreased in TBRS is indicative of a suppressed oxidative stress.

CONCLUSION:

Management of cardiac diseases with a holistic approach, devoid of any side effects is now the major challenge to the medical system. This work highlights HRSS as novel cardio protective agent which provide a basis for the traditional use of it and proves that it could provide a cost effective and holistic remedy, without any side effects. From the literature review and pharmacological analysis support the traditional use of HRSS in nutritional aspect for the treatment of cardiac disorders.

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UGC APPROVED JOURNAL

TRANS Asian Research Journals

CONSUMPTION PATTERN OF PROTEIN RICH FOODS AMONG SELECTED ADULTS

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ABSTRACT

Daily intake of adequate amount of protein is essential for adults to maintain their muscle mass and to lead a healthy life. Care should also be taken to distribute the quantum of protein intake among the three meals a person consumes in a day and also one should make sure that the minimum RDA requirements for protein are met. High consumption of cereals, pulses, legumes, nuts , dairy products, poultry and fish are associated with improved/ enhanced nutritional status, that leads to better quality of life and be free from diseases and disorders. By considering the above facts the study was carried out to find out the frequency of consumption of protein rich diet by the selected adults. A private industry in Coimbatore was selected as the venue for the conduct of the study. For the study 500 subjects in the age group of 20-45 years were selected from both the gender based on their willingness to participate in the study. An Interview Schedule was prepared to collect information on their diet pattern and the frequency of protein intake. The collected data was analyzed to determine the protein intake of the selected subjects. The study presented a data on the meal pattern and eating style of the selected adult subjects. The consumption of protein rich sources like legumes, nuts and egg were found to be less than expected and can be improved for a well rounded diet. This would also improve their protein status. Awareness on the importance of meeting the RDA for protein was imparted to all the selected subjects.

KEYWORDS: *consumption, importance, determine*

INTRODUCTION

Daily intake of adequate amount of protein is essential for adults to maintain their muscle mass and to lead a healthy life.(Mishra 2014). Care should also be taken to distribute the quantum of protein intake among the three meals a person consumes in a day and also one should make sure that the mimimum RDA requirements for protein are met(Strup 2015)**.**

High consumption of cereals, pulses, legumes, nuts, dairy products, poultry and fish are associated with improved/ enhanced nutritional status, that leads to better quality of life and be free from diseases and disorders.(Anderson 2013).

Now high protein diets are even prescribed to promote lean mass, weight loss and avoid putting on weight again. Several subjects have reported success by way of shedding obesity/weight gain by following high protein diets (Madonna, 2014).

By considering the above facts the study was carried out to find out the frequency of consumption of protein rich diet by the selected adults.

METHODOLOGY

A private industry in Coimbatore was selected as the venue for the conduct of the study. This industry was selected because of the easy accessibility and availability of adequate number of adults who were ready to participate and cooperate in the study. Subjects for the study were selected using purposive sampling method. In purposive sampling method, a desired number of sample units are selected deliberately or purposely depending upon the object of the enquiry so that only the important items representing the true characteristics of the population are included in the sample (Kothari, 2005).

For the study 500 subjects in the age group of 20-45 years were selected from both the gender based on their willingness to participate in the study. An Interview Schedule was prepared to collect information on theirdiet pattern and the frequency of protein intake. The collected data was analyzed to determine the protein intake of the selected subjects.

RESULTSAND DISCUSSION

AGE AND GENDER

Table I describes the age and gender of the selected subjects

TABLE I
AGE AND GENDER OF THE SELECTED SUBJECTS

Age (in years)	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
20 - 25	96	23.4	23	22.5	119	23.2
26 - 30	89	21.7	23	22.5	112	21.8
31 – 35	127	30.9	32	31.3	159	31.0
36 – 40	57	13.9	13	12.7	70	13.6
41 – 45	41	10	11	10.7	52	10.1
	410	**99.9**	**102**	**99.7**	**512**	**99.7**

The above table indicates that maximum number subjects were in the age group of 31- 35 years in both male and female category and the minimum numbers of subjects were in the age group of 41 – 45 years.

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Eating pattern

Table II describes the eating pattern of the selected subjects

TABLE II
EATING PATTERN OF THE SELECTED SUBJECTS

Eating pattern	Male		Female		Total	
	Number	**Percent**	**Number**	**Percent**	**Number**	**Percent**
Vegetarian	78	19	30	29.4	108	21
Non vegetarian	311	75.8	58	56.8	369	72
Ova vegetarian	21	5.12	14	13.7	35	6.8
	410	**99.9**	**102**	**99.9**	**512**	**99.8**

Table II indicates 76 percent of male subjects were non vegetarian, 19 percent were vegetarian and only 5 percent were ova vegetarian, whereas among female subjects, 57 percent were non vegetarian, 29 percent were vegetarian and 14 percent were ova vegetarian.

Meal pattern

The table given below indicates the meal pattern of the selected subjects

TABLE III

MEAL PATTERN CONSUMED BY THE SELECTED SUBJECTS

Meal pattern	Male		Female	
	Number	**Percent**	**Number**	**Percent**
Less than three	41	10	22	21.5
Three meals	361	88	74	72.5
More than three	8	1.9	6	5.8
	410	**99.9**	**102**	**99.8**

The table given above indicates majority of both male and female subjects consumed three meals a day. 10 percent of male and 21 percent of female consumed less than three meals a day.

Frequency of consumption of protein rich foods

Table IVindicates the frequency of consumption of protein rich foods among the selected subjects.

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TABLE IV
EQUENCY OF CONSUMPTION OF PROTEIN RICH FOODS BY THE SELECTED SUBJECT

Food items	Men					Women				
	Daily	weekly	Fortnightly	Monthly	Occasionally	Daily	Weekly	Fortnightly	Monthly	Occasionally
Bengal gram (Roasted)	348	46	5	Nil	Nil	76	7	Nil	Nil	Nil
Bengal gram dhal	329	36	8	Nil	Nil	67	10	3	Nil	Nil
Black gram dhal	214	105	12	Nil	Nil	71	8	1	Nil	Nil
Red gram dhal	203	113	8	Nil	Nil	48	35	11	Nil	Nil
Fenugreek seeds	69	78	18	Nil	Nil	Nil	37	29	Nil	Nil
Green gram dhal	18	188	19	Nil	Nil	7	28	36	16	Nil
Pistachios	9	9	39	56	96	3	13	20	19	31
Almond	6	28	39	42	127	10	12	14	5	19
Cashewnut	6	28	148	85	118	2	18	28	22	17
Walnut	2	Nil	16	20	18	Nil	3	16	28	26
Horse gram dhal	Nil	162	18	29	8	2	27	41	15	3
Soyabean	Nil	28	137	38	10	Nil	16	28	27	17
Poppy seeds	Nil	193	89	Nil	Nil	Nil	36	28	15	6
Peanut	Nil	62	116	26	17	Nil	27	32	14	7
Flaxseeds	Nil	Nil	Nil	Nil	Nil	Nil	4	Nil	Nil	Nil
Milk	368	7	4	Nil	Nil	73	10	2	Nil	Nil
Curd	311	45	12	6	19	61	17	5	2	6
Cheese	Nil	Nil	4	16	35	Nil	5	16	29	17
Milk powder	Nil	Nil	4	18	21	Nil	6	11	3	17

Paneer	Nil	36	54	50	48	Nil	17	23	37	18
Malai	Nil	Nil	12	8	29	Nil	Nil	4	18	22
NON- VEGETARIAN										
Mutton	Nil	176	66	50	7	Nil	27	18	10	Nil
Chicken	6	211	40	34	26	Nil	32	11	10	5
Beef	Nil	50	78	62	10	Nil	Nil	3	1	Nil
Egg	29	178	59	50	16	5	43	18	5	1
Fish	11	180	48	33	22	2	21	23	5	4

The above table describes that bengal gram dhal, roasted bengal gram dhal, black gram dhal, red gram dhal, milk and curd were consumed in maximum quantity and on a daily basis compared to other sources. Green gram dhal, horse gram dhal and poppy seeds were par-taken by the participants once or twice a week. Likewise cashew nut, soya bean, Peanut and Paneer were consumed once in fortnight by the participants. Protein foods like pistachios, almonds, cheese, milk powder and malai were consumed occasionally.

In the Non vegetarian meal pattern, mutton, chicken, egg and fish were consumed by majority of the participants on a weekly basis. None of the female participants consumed beef on a daily or weekly basis. Very few subjects consumed beef on a fortnightly and monthly basis.

Chicken was the preferred non vegetarian food which was consumed by the maximum number of both male and female participants on a weekly basis.

CONCLUSION

The study presented a data on the meal pattern and eating style of the selected adult subjects.

The consumption of protein rich sources of food among the selected subjects revealed that they are not lacking in the protein intake in both vegetarian and non-vegetarian foods.

The consumption of legumes, nuts and egg were found to be less than expected and can be improved for a well rounded diet. This would also improve their protein status.

Awareness on the importance of meeting the RDA for protein was imparted to all the selected subjects.

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ADOPTION OF DIETARY CHANGES FOR WOMEN WITH CARDIOVASCULAR DISEASE RISK

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ABSTRACT

The rapid escalation of the risk factors such as changes in the dietary pattern was noted in urban Asian Indians and clearly stressed on the primordial intervention upon these individuals. Hence the present study was carried out with the objective to relate the effect of dietary changes among women with risk for cardiovascular disease. A total of 240 women from the age group of 20 to 50 years comprising students, home makers and the employed women from teaching profession and Textile Company in Coimbatore were set as the target group for the study by purposive sampling. The diet education and counseling was regarded as the primary strategy, during which the guidelines and the preventive measures for cardiovascular diseases. Women with high cardiac risk were 66.7 per cent and with medium risk was 33.3 per cent at pre intervention. The intervention including diet therapy proved to be effective with 29.2 per cent women at low risk and 70.8 per cent at medium risk for cardiovascular disease at post intervention and there was no woman in the high risk category after intervention.

KEYWORDS: *Intervention, Cardiovascular, Escalation*

INTRODUCTION

Modern lifestyle is responsible for the growth of heart disease among the Indian youth and the average age at which a person may suffer a heart attack has come down from 40 years to 30 years. Women generally live longer than men, but their lives are not necessarily healthy or happy, their extra years are increasingly compromised by chronic diseases and injuries[1]. The rapid escalation of the risk factors such as smoking, hypertension, dyslipidemia, diabetes and metabolic syndrome in the age of 30 to 39 years was noted in urban Asian Indians and clearly stressed on the interventions upon these individuals[2]. Therapeutic lifestyle changes have an enormous potential in preventing and controlling the risk of coronary heart disease. Because of their high prevalence of certain cardiovascular risk factors namely obesity, diabetes mellitus and greater salt sensitivity, therapeutic lifestyle changes have particular importance among the population[3]. Hence the present study was carried out with the objective to relate the effect of dietary changes among women with risk for cardiovascular disease

METHODOLOGY

A total of 240 women from the age group of 20 to 50 years comprising students, home makers and the employed women from teaching profession and Textile Company in Coimbatore were set as the target group for the study by purposive sampling.

In order to identify the high cardiac risk women, a Health Risk Assessment (HRA) formulated was used for the conduct of the study. The components of the HRA for cardiovascular disease were categorised as non-modifiable factors and modifiable factors. Non- modifiable factors namely age and familial tendency for cardiovascular disease, modifiable factors namely Body Mass Index, Waist to Hip Ratio, blood pressure, quantity of fat and oil, consumption of coffee and use of salt were elicited. Lifestyle pattern was elicited with the type of personality, pattern of physical activity such as exercise, yoga and meditation and type of stress. After the assessment of data, the women were categorised as low, medium and high risk based on the scores obtained for the Health Risk Assessment.

The diet education and counseling was regarded as the primary strategy for a period of three months for the women, during which the guidelines and the preventive measures for cardiovascular diseases were provided in the form of booklet and the power point presentation with the components including narrowing of blood vessel, stages of hypertension, multi- organ damage due to hypertension, modifiable and non-modifiable risk factors, symptoms, dietary guidelines and life style remedies to prevent cardiovascular disease were depicted in the pictorial forms with explanation in the local language for better understanding and to ensure easy reach of the information to the selected women. In addition, the dietary guidelines for the weight reduction in the form of pamphlets was issued to the high risk women. Healthy food choices by inclusion of foods high in fibre with whole grams, grains, raw vegetables and fruits, use of combination of oils and foods low in sodium were discussed.

RESULTS

I. Health Risk Assessment for Cardiovascular diseases among Healthy women

The Health Risk Assessment for cardiovascular diseases among healthy women aged 20 to 50 years are given below

Body Mass Index (BMI) of the women

Table 1 gives the Body mass Index of the Women

TABLE 1. BODY MASS INDEX OF THE WOMEN

Body Mass Index	Low risk (N = 8)		Medium risk (N = 171)		High risk (N = 61)		Total (N = 240)	
	N	%	N	%	N	%	N	%
Under weight (< 18.5)	3	37.5	12	7.0	5	8.2	20	8.3
Normal (18.5 – 22.9)	5	62.5	78	45.6	11	18	94	39.2
At risk of obesity (23.0 – 25.0)	-	-	27	15.8	17	27.9	44	18.3
Grade – I Obesity (25.1 – 29.9)	-	-	36	21.1	18	29.5	54	22.5
Grade – II Obesity (> 30)	-	-	18	10.5	10	16.4	28	11.7

Chi square value: 22.736 Degrees of freedom: 8 P Value: 0.0037

Out of 240 women, 39.2 per cent subjects had normal Body Mass Index and 8.3 per cent women were underweight. About 18.3 per cent women were at risk of obesity, whereas 22.5 per cent and 11.5 per cent subjects were grade -I and grade-II obese. The data showed that the grade II obesity was more among high risk group women followed by medium risk category which was not a healthy sign and might lead to health effects. The results of Body Mass Index of the subjects when statistically interpreted through chi-square test showed a significant association at one per cent level with different degrees of risk for cardiovascular disease.

Waist to Hip Ratio of the women

Table 2 gives the Waist to Hip Ratio of the Women

TABLE 2. WAIST TO HIP RATIO OF THE WOMEN

Waist to hip ratio	Low risk (N = 8)		Medium risk (N = 171)		High risk (N = 61)		Total (N = 240)	
	N	%	N	%	N	%	N	%
> 0.8	-	-	83	48.5	39	63.9	122	50.8
< 0.8	8	100	88	51.5	22	36.1	118	49.2

Chi square value: 1.821 Degrees of freedom: 2 P Value: 0.0016

Table III depicts that 50.8 per cent subjects had high waist to hip ratio above the normal value of 0.8 indicating abdominal obesity and 49.2 per cent subjects had less than 0.8. The interpretation of waist to hip ratio of the subjects showed statistical significance at one per cent level revealing higher degree of concurrence with waist to hip ratio with high risk for cardiovascular disease.

Amount of fat and oil used per day

The amount of fat and oil used per day is given in table 3

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TABLE 3. AMOUNT OF FAT AND OIL USED PER DAY

Amount of fat per day	Low risk (N = 8)		Medium risk (N = 171)		High risk (N = 61)		Total (N = 240)	
	N	%	N	%	N	%	N	%
< 20 grams	8	100	77	45	12	19.67	97	40.4
20 – 25 grams	-	-	62	36.3	35	57.38	97	40.4
> 25 grams	-	-	32	18.7	14	22.95	46	19.2

Chi square value: 24.736 Degrees of freedom: 4 P Value : < 0.0001

Table 3 reveals that about 40.4 per cent subjects consumed less than 20 grams of oil per day which was a healthy sign for the heart. On the contrary, the other 40.4 per cent women used four to five teaspoons oil and 19.2 per cent subjects used more than five teaspoons oil per day. Women were not aware of the use of combination of oils for contribution to different type of fats and most of the women used refined sunflower oil for cooking.

Consumption of coffee

Consumption of coffee is given in Table 4

TABLE 4. CONSUMPTION OF COFFEE

Consumption of coffee per day	Low risk (N = 8)		Medium risk (N = 171)		High risk (N = 61)		Total (N = 242)	
	N	%	N	%	N	%	N	%
< 3 cups	8	100	162	94.7	42	68.9	212	88.3
> 3 cups	-	-	9	5.3	19	31.1	28	11.7

The data revealed that there were about 88.3 per cent women consumed less than three cups of coffee per day. Whereas 11.7 per cent subjects consumed more than three cups per day among whom 31.1 per cent subjects belonged to high risk group and 5.3 per cent from medium risk category. Women in the high risk category consumed more amount of hot beverages especially coffee compared to medium risk category which contribute to a higher level of risks.

Use of salt in cooking

The amount of use of salt used in cooking used per day is given in Table 5

TABLE 5. USE OF SALT IN COOKING

Amount of salt used per day	Low risk (N = 8)		Medium risk (N = 171)		High risk (N = 61)		Total (N = 240)	
	N	%	N	%	N	%	N	%
> 1 tsp	3	37.5	132	77.2	56	91.8	191	79.6
< 1 tsp								

	5	62.5	39	22.8	5	8.2	49	20.4

Chi square value : 14.927 Degrees of freedom : 2 P Value : 0.0005

Table 7 gives the information about the amount of salt used in daily diet by the women. It showed that about 79.6 per cent subjects used more than one teaspoon salt per day among which 77.2 per cent subjects were at medium risk group, 91.8 per cent women at high risk group and 37.5 per cent subjects with low risk respectively. Whereas only 20.4 per cent women used less than one teaspoon per day in cooking.

EFFECT OF INTERVENTION ON HIGH CARDIAC RISK WOMEN

The effect of intervention on high cardiac risk women were studied with the changes observed at pre and post intervention and is discussed below

Body Mass Index of the Selected Women

Body Mass Index of the selected women is give in Table 6

TABLE 6. VARIATIONS IN BODY MASS INDEX OF THE SELECTED WOMEN

Body Mass Index	Pre – intervention		Post – intervention	
	N =24	%	N =24	%
Normal (18.5 – 22.9)	2	8.3	11	45.9
At risk of obesity (23.0 – 25.0)	6	25	8	33.3
Grade – I Obesity (25.1 – 29.9)	8	33.3	5	20.8
Grade – II Obesity (> 30)	8	3.33	-	-

Table 6 revealed that the subjects showed improvement in their body mass index in which women with normal body mass index category were 45.9 per cent, 33.3 per cent at risk of obesity, and 20.8 per cent with grade I obesity at post intervention.

Waist to Hip ratio

The variations in the Waist to Hip Ratio of the selected women is given in Table 7

TABLE 7. VARIATIONS IN WAIST TO HIP RATIO OF THE SELECTED WOMEN

Category	Pre – intervention		Post – intervention	
	N=24	%	N=24	%
≤ 0.8	6	25	17	70.8
> 0.8	18	75	7	29.2

The data showed that 25 per cent of women were with normal waist to hip ratio and 75 per cent with high waist to hip ratio at pre intervention and 70.8 per cent women were found with normal Waist Hip Ratio of less than 0.8..

Risk Category of the Selected Women

Risk category of the selected women is given in Table 8.

TABLE 8. RISK CATEGORY OF THE SELECTED WOMEN

Risk category	Pre – intervention		Post – intervention	
	N=24	%	N=24	%
Low risk	-	-	7	29.2
Medium risk	8	33.3	17	70.8
High risk	16	66.7	-	-

Women with high cardiac risk were 66.7 per cent and with medium risk was 33.3 per cent at pre intervention. The intervention including diet therapy proved to be effective with 29.2 per cent women at low risk and 70.8 per cent at medium risk for cardiovascular disease at post intervention and there was no women in the high risk category after intervention.

Summary and Conclusion

The study has highlighted the importance of proper dietary pattern along with the vital role of healthy and a balanced diet among the selected women. Women with her multiple role at home, career need to maintain health through balanced food pattern with healthy food choices, regular physical activity through proper exercises and cope up stress with yoga, meditation and relaxation therapy.

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FOOD AND NUTRIENT INTAKE AMONG SELECTED ADOLESCENT BOYS AND GIRLS

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ABSTRACT

Adolescent nutrition is an important link in nutrition throughout life. There is a dietary transition in the present day with all the lifestyle changes and hence the study was taken up to assess the food and the nutrient intake of selected adolescents. The objective of my study is to assess the nutritional status and dietary pattern and to find the relation between BMI and energy intake of adolescents. Sixty adolescents were selected by purposive sampling method in which 28 were boys and 32 were girls in the age group of 16-18 years based on the inclusion and exclusion criteria. The dietary pattern was assessed by 24 hour recall method. The incidence of underweight was prominent than obese, although majority of adolescents are normal. The food consumption among selected adolescents showed that there was negligible intake of green leafy vegetables and fruits among the adolescent group which could be a reason for lower dietary intake levels of iron, folic acid and vitamin C. The mean energy intake of boys was 1322.84±359.74 and girls were 1165.07±259.67 which shows that the boys energy intake is higher than the girls but not according to the recommended daily intake of adolescents. The energy intake and the BMI of adolescents were statistically analyzed and it showed a significant difference of p=0.0001 among both girls and boys. This shows that adolescents are still lagging in the nutrient intake especially in micronutrients which helps to lead a healthy life. Study of this type will help in identifying the dietary pattern so as to provide them nutrition intervention among adolescents.

KEYWORDS: *Adolescents, Energy Intake, BMI, Food Consumption, Dietary Intake,*

INTRODUCTION:

Adolescence is an important stage of physical growth and development in the lifespan of every individual and it is significant because adolescence in human life cycle lies in its proximity to adulthood. Adolescent nutrition is an important link in nutrition throughout life[1]. Growth during adolescence is faster than any other time in an individual's life except the first year. Good nutrition during adolescence is critical in order to cover the deficits suffered during childhood and should include nutrients required to meet the demands of physical and cognitive growth and development, which will provide adequate stores of energy for illnesses and pregnancy, and prevent adult onset of nutrition-related diseases. Dietary intake with respect to adequate availability of food in terms of quantity and quality (particularly, the mean caloric intake), ability to digest, absorb and utilize food and the social discriminations against girls can greatly affect the adequate nutrition of adolescents[2]. Therefore, diet in the early stage of life influences health not only during the physical development, but also later in life[3].

Body composition and dietary patterns acquired during this period are likely to be continued as adults[4]. Therefore, it is important for adolescence to lay out the foundation for chronic diseases prevention by the promotion and maintenance of healthful lifestyles[5].

The requirement of some of the nutrients is as high as, or higher in adolescents than in any other age groups[5]. Inappropriate dietary intakes during adolescence can have several consequences. Changing dietary habits and physical activity patterns because of rapid urbanization, modernization and technological transformation. There is a dietary transition in the present day with all the lifestyle changes and hence the study was taken up to assess the food and the nutrient intake of selected adolescents.

Objectives:

- Assess the nutritional status and dietary pattern of Adolescents.
- To find the relation between BMI and energy intake of adolescents.

METHODOLOGY:

Sixty adolescents (28 boys and 32 girls) in the age group of 16-18 years were selected by purposive sampling based on the following inclusion and exclusion criteria.

Inclusion criteria

- Adolescents belonging to 16-18 years of age
- Both boys and girls
- Willingness to participate in the study

Exclusion criteria

- Adolescents above the age of 18 years.
- Adolescents below the age of 16 years.
- Differently-able adolescents

Assessment of nutritional status:

The nutritional status of the subjects was assessed namely height (cm) and weight (kg) using standard methods. BMI was calculated and compared using Centers for Disease Control and Prevention, National Center for Health Statistics, 2000[6].

BMI= Weight in kg / Height in m^2

Weight Status Category	Percentile Range
Underweight	Less than the 5th percentile
Normal or Healthy Weight	5th percentile to less than the 85th percentile
Overweight	85th to less than the 95th percentile
Obese	Equal to or greater than the 95th percentile

Centers for Disease Control and Prevention, National Center for Health Statistics, 2000

The dietary pattern was assessed by 24 hour recall method. The data collected was statistically analyzed. The BMI was compared with that of energy intake of adolescents by using students t-test.

RESULTS AND DISCUSSION:

BMI of adolescents :

TABLE 1 BMI OF ADOLESCENTS

BMI	Boys (n=28)	Girls (n=32)
Underweight	9	11
Normal	16	14
Overweight	2	3
Obese	1	4

It was found that 9 boys and 11 girls were underweight and only one boy and 4 girls were obese indicating that underweight was seen to be present more than obesity among the adolescents. This indicates that although majority of adolescents are normal, it's evident that the incidence of underweight is common among adolescents.

Food intake among selected adolescents:

Table 2 shows the number of adolescent boys and girls consuming various food groups. This signifies that there was negligible intake of green leafy vegetables and fruits among the adolescent group. This has a direct relationship on the dietary intake of the adolescents. The below table shows that the foods consumed of green leafy and other vegetables along with fruits was lower although cereals, pulses and milk products are consumed by all adolescents and this could be a reason of lower dietary intake of iron, folic acid and Vitamin C (table 3&4).

TABLE 2: FOOD INTAKE BY ADOLESCENTS

Food groups	Consumption pattern	
	Boys	Girls
Cereals	28	32
Pulses	28	32
Green leafy vegetables	2	4
Roots and tubers	27	32
Other vegetables	20	26
Fruits	2	1

Milk and milk products	28	32
Sugar and jiggery	26	32
Fats and oils	28	32

Nutrient intake of boys and adolescents:

TABLE 3 NUTRIENT INTAKE OF BOYS

Nutrients	**RDA (2010)**	**Boys Mean±SD**	**Percentage intake**	**Percentage deficit**
Energy (kcals)	3020	1322.84±359.74	43.80	56.2
Protein (g)	61.5	31.22±9.03	50.76	49.24
Fat (g)	50	33.45±9.27	66.9	33.1
Iron (mg)	28	14.10±3.9	50.36	49.64
Folic acid (mg)	150	79.68±4.54	53.12	46.88
Vitamin C (mg)	40	38.43±5.84	96.08	3.92
Calcium (mg)	800	381.81±31.85	47.73	52.27
Carbohydrate*(g)		201.26±52.37		

TABLE 4 NUTRIENT INTAKE OF GIRLS

Nutrients	**RDA (2010)**	**Boys Mean±SD**	**Percentage intake**	**Percentage deficit**
Energy (kcals)	2440	1165.07±259.67	47.75	52.25
Protein (g)	55.5	30.88±14.30	55.64	44.36
Fat (g)	35	33.27±8.79	95.06	4.94
Iron (mg)	26	10.11±3.32	38.88	61.12
Folic acid (mg)	200	76.30±10.14	38.15	61.85
Vitamin C (mg)	40	37.47±6.97	93.67	6.33
Calcium (mg)	800	327.38±50.02	40.92	59.08
Carbohydrate * (g)		156.88±35.78		

*Carbohydrate RDA not available

The dietary intake among selected adolescents signifies that there is deficit in nutrients like energy, protein, fat, folic acid, iron, vitamin C and calcium (table 3&4). This result shows that the dietary intake among adolescents is lower and it is due to the reduction in consumption of the food groups. The intake of iron and folic acid is much lower which could be a reason as the consumption pattern of green leafy vegetables, other vegetables and fruits is considerably lower among the adolescents age group. The results also showed that the mean energy intake of boys (1322.84±359.74) is higher than of girls (1165.07±259.67). When both the mean energy intake was statistically tested it showed no significant among energy intake of boys and girls (p= 0.67).

Relation between BMI and energy intake among adolescents :

TABLE 5: COMPARISON BETWEEN ENERGY INTAKE AND BMI OF ADOLESCENTS

	Energy intake	BMI	P value
Boys	1322.84±359.74	21.54±2.61	0.0001
Girls	1165.07±259.67	19.92±2.9	0.0001

The energy intake and the BMI of adolescents were statistically analyzed in which $p < 0.05$. The result showed that it possesses an extremely significant among the variables. This signifies that there is a positive relation between the BMI and the energy intake among selected adolescents. The mean energy intake of boys was 1322.84±359.74 and girls were 1165.07±259.67 which shows that the boys energy intake is higher than the girls but not according to the recommended daily intake of adolescents 2010.

CONCLUSION:

The incidence of underweight was prominent than obese, although majority of adolescents are normal. In general, most of the adolescents consumed less of fruits and green leafy vegetables compared to the dietary guidelines given by ICMR, 2011. This shows that adolescents are still lagging in the nutrient intake especially in micronutrients which helps to lead a healthy life. Study of this type will help in identifying the dietary pattern among adolescents so as to provide them nutrition education on healthy food habits, life styles and importance of functional and traditional food which will help them to bridge the gap between knowledge and practice of dietary pattern. This will help in improving overall health and nutritional status of adolescents**.** This paves way that the adolescents still need intervention and they must educate themselves on healthy lifestyle.

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FORMULATION AND QUALITY EVALUATION OF ARROWROOT FLOUR INCORPORATED KUZHALAPPAM

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ABSTRACT

New product development is the process of developing, designing, or creating and refining a product. There is an increasing demand for traditional and healthy products among the people nowadays. Starchy root and tuber crops provide a substantial part of the world's food supply and can be used to meet the energy needs of the population. Arrowroot (Maranta arundinacea) is an underutilized local crop which has the potential to be developed as carbohydrate source and functional food. So in the present study kuzhalappam, a traditional Kerala snack was selected for incorporation with arrow root powder. Arrowroot flour was incorporated in kuzhalappam at10%, 20%, 30%, and 40% instead of rice flour in the standard recipe. The prepared products along with the standard were subjected to sensory analysis and most acceptable proportion was selected for shelf life study. The standard and selected proportion of arrowroot flour incorporated kuzhalappam was packed in Zip lock cover and aluminum foil and was kept in room temperature and analyzed for a period of 12 days to find the shelf life. In an attempt to create awareness about the benefits of arrow root flour and to find out the acceptability of the product a popularization study was conducted among 30 adult women. A questionnaire was used to assess the impact of the programme. The results of the sensory analysis showed that Product A with 10% arrow root flour scored the highest. The formulated product had a shelf life of eight days in both the packaging material after which there was growth of microorganisms.There was a positive impact in the popularization programme which was evident from the increase in the scores. All the adult women selected for the popularization study liked the formulated product.

KEYWORDS: *Microorganisms, Questionnaire, Kuzhalappam*

INTRODUCTION

New Product development may involve the modification of an existing product or formulation of an entirely new product which satisfies a newly defined customer's want or a market niche (Liu-Jiunian, 2010). The change of life style pattern and demand for convenience foods have increased the market for snack foods. Snacking is an effective way to fit extra nutrients into the diet and prevent overeating at meal times. Choosing healthy snacks is crucial. The underutilized root and tuber crops are hidden treasure of healthy nutritious food. These crops being rich in nutrition can solve the issues like 'Global Hunger Index', 'Malnutrition' and 'sustainable livelihood. Now in the context of climate change, they are gaining the status as best source of adaptive food, nutrition and livelihood. These crops are rich in functional food properties with nutritional potential and medicinal values. These underutilized root and tubers are rich in minerals, vitamins, antioxidants and dietary fibre. (Archana et al, 2015 Arrowroot has a large number of culinary uses. It is used in sauces, biscuits, jellies, cakes, puddings, fruit pie fillings, and glazes. The arrowroot powder is deficient in gluten, so it can be used as a replacement of wheat flour for baking process (Grundmann et al, 2011). Arrowroot (Maranta arundinacea) is an underutilized local crop potentially to be developed as carbohydrate source and functional food. Arrowroot is bland, making it suitable for neutral diets. The arrowroot help to soothe upset stomach, which is the reason why many health food stores in India display arrowroot cookies. Recent study suggested that the arrowroot flour is potential source of prebiotics (Harmayani et al, 2011).So the present study was undertaken to incorporate arrow root in traditional snack.

METHODS

Kuzhalappam a crunchy and tasty fried snack of Kerala was selected as the traditional snack for the incorporation of arrowroot flour. The arrow root flour was incorporated at 10%, 20%, 30% and 40% instead of the main ingredient rice flour in the standard recipe in the variations. The sensory attributes of the product was found out using a five point hedonic scale by a semi skilled panel comprising of 30 post graduate students of the department of Foods and Nutrition, Rathnavel Subramaniam College of Arts and Science. The product that scored the highest in sensory analysis along with standard was taken for shelf life study. The standard and selected arrowroot flour incorporated Kuzhalappam was packed in two packaging materials namely zip lock cover and aluminium foil at was kept at room temperature for 12 days to assess the shelf life. The microbial analysis was carried out on the 1^{St} day, 4th day, 8^{th} day and 12^{th} day. The sensory analysis was done after the microbial analysis by the same panel members. The cost incurred in preparing the standard and formulated kuzhalappam was calculated. The product was popularised among 30 adult women to create awareness about the health benefits of arrowroot flour. A questionnaire was given before and after the popularisation study to find the impact of the programme.

RESULTS AND DISCUSSION

The sensory analysis of the products showed that product A with 10% arrow root flour scored the highest mean score and was on par with the standard kuzhalappam. So it was selected for shelf life study. No Bacterial growth was observed up to 3^{rd} sampling i.e till 8^{th} day and on 12^{th} day bacillus species contamination was observed in the standard and selected product in both the packages. So it was concluded that the products were shelf stable for eight days.

TABLE I
MEAN SENSORY SCORES OF STANDARD AND ARROW ROOT FLOUR INCOPORATED KUZHALAPPAM

PRODUCT	APPEARANCE MEAN ± SD	COLOUR MEAN ± SD	TEXTURE MEAN± SD	FLAVOUR MEAN ± SD	TASTE MEAN± SD
Standard	5±0	4.76±0.4	4.86±0.34	4.7±0.46	4.86±0.34
Sample A	4.7±0.46	4.73±0.4	4.7± 0.4	4.63±0.55	4.56±0.50
Sample B	3.6±0.8	3.86±0.7	3.6±0.8	3.76±0.62	3.06±0.4
Sample C	3.2±0.7	3.1± 0.8	3.1±0.8	3.3±0.74	2.7±0.5
Sample D	2.8±0.7	2.6±0.6	2.8±0.5	3.2±0.6	2.7±0.5

TABLE II
MICROBIAL ANALYSIS OF STANDARD AND SELECTED ARROW ROOT FLOUR INCORPORATED KUZHALAPPAM

Day	Standard Kuzhalappam		Arrow Root Incorporated Kuzhalappam	
	Zip lock cover	Aluminum foil	Zip lock cover	Aluminum foil
Day 1	Good	Good	Good	Good
Day 4	Good	Good	Good	Good
Day 8	Good	Good	Good	Good
Day 12	**Satisfactory**	**Satisfactory**	**Satisfactory**	**Satisfactory**

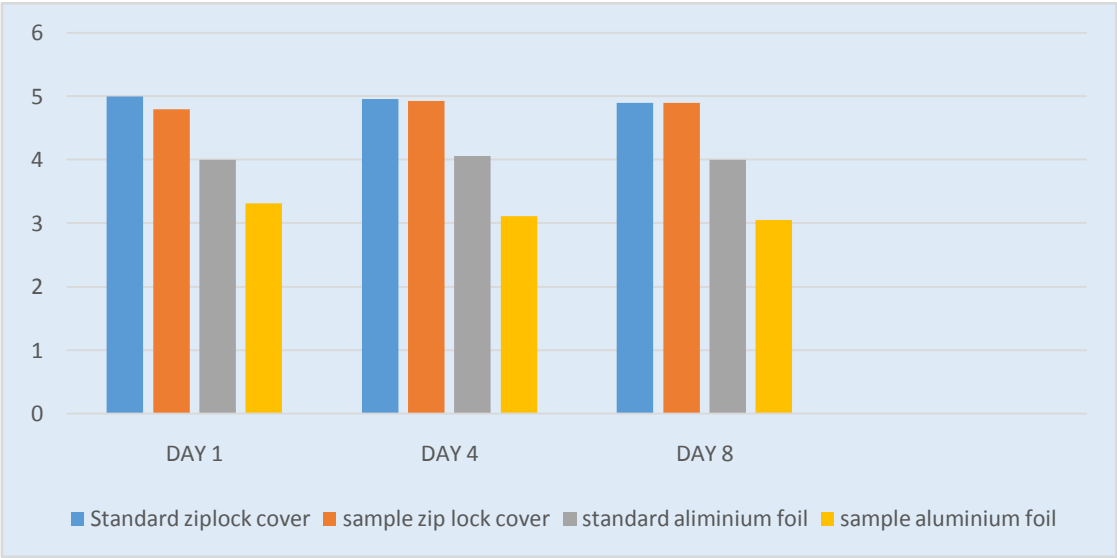

FIG I MEAN SENSORY SCORES OF STANDARD AND FORMULATED DURING STORAGE STUDY KUZHALAPPAM

The sensory scores obtained during the shelf life study showed that the organoleptic characteristics of products stored in zip lock covers were better. Incorporation of arrow root flour did not alter the cost of the product. The scores obtained in the popularization study shows that there was a gain in the knowledge about the uses and benefits of arrow root flour and all the women liked the sensory attributes of the arrow root incorporated kuzhalappam.

CONCULSION

It can be stated that inclusion of underutilized roots and tubers will add variety, enhance nutrient content of the diet and also provide valuable functional attributes which will promote the health of the individuals.

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NUTRITIONAL ASSESSESMENT OF ADULT POPULATION (21-59 YEARS) FOR DEGENERATIVE DISEASES

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ABSTRACT

In life span, adulthood is a stage and extends a significant period in an individual's life for maintenance of their health and well-being. People who are stressed over long periods tend to look haggard and it is commonly thought that psychological stress leads to premature ageing and the earlier onset of disease of the ageing. Stress is the cause of many diseases and diseases also causes stress. Due to stress degenerative disease is a continuous process based on degenerative cell changes, affecting tissue or organs. It is often contrasted with infectious diseases. The present study was under taken to assess the nutrition of adult population (21-59years) for degenerative disease. A total 300 samples were selected men (191) and women (109) randomly in the age group of 21-59 years in three hospitals. Anthropometric measurements, biochemical assessment, clinical assessment, dietary pattern, health status were taken in interview schedule. The result shows that 39% of the participants had diabetes, 27% had heart disease,15% and 9% of the participants had osteoporosis and osteoarthritis respectively. Minimum number of participants had cancer (2%) and chronic obstructive pulmonary diseases (0.3%). The participants involved in the study also had anemia (63%) and hypertension (34%).

KEY WORDS: *Health, Stress, Degenerative Disease, Health Status.*

1) INTRODUCTION

Health is defined by the world health organization as the "state of complete physical, mental, and social well-being and not merely the absence of disease" (WHO).[1] The major nutritional problem among population have shifted from nutrient deficiency diseases, which are common in the first half of the 20th century, to concern today about over consumption, poor dietary quality and poor food choices. People who are stressed over long periods tend to look haggard and it is commonly thought that psychological stress leads to premature ageing and the earlier onset of disease of the ageing. Stress is known to affect physical health, act as a risk factor for heart disease and lead to poorer immunity against infection.[2] The degenerative disease is a continuous process based on degenerative cell changes, affecting tissue or organs. It is often contrasted with infectious diseases. A disease is a particular abnormal condition that affects part or all of an organism.[2]

2) MATERIALS AND METHODS

The area chosen for the conduct of the study was in and around Tirupur district in Tamil Nadu, due to the familiarity of the investigator with this area. Intensive investigation were done to conduct clinical survey to elicit information on socio economic and dietary pattern, nutritional status and Categorise the patient based on different types of degenerative diseases.

Using the systemic random sampling technique, the target groups of adult participants of both gender were selected for the study. In the hospital, disease conditioned adult patients were targeted, till the required number of participants were obtain. A total of 300 adult participants aged between 21- 59 years, comprising randomly adults were taken.

In Anthropometric measurement height, weight was taken to assess BMI and waist hip ratio was taken for 300 subjects. Dietary survey constitutes an essential part of any complete study of nutritional status, providing essential information on food and nutrients intake, source of nutrients, food habits and attitudes.[3]Clinical examination was carried out with the help of physician for the selected participantssubjects to identify the nutritional problems. Biochemical diagnostic criteria for an metabolic syndrome was also considered for assessing the health status of the selected subjects. In this biochemical diagnosis haemoglobin, blood glucose level, total cholesterol and blood count were considered and used for all the selected participants to identify the presence of degenerative diseases.

3) RESULT AND DISCUSSION

Demographic profile regarding the gender, age, type of house, type of family, age, sex, educational qualification, occupation, family income and expenditure, type of activity, marital status and number of children of the selected participants were collected.

3.1) Anthropometric Measurement

Nutritional anthropometry is measurement of human body at different ages and levels of nutritional status. It is based on the concept that an appropriate measurement should reflect any morphological variation occurring due to significant functional physiological change.[4]

BMI provides a reasonable indication of the nutritional status of adults. The ratio of waist hip is an indicator of central obesity. Adult men with waist to hip ratio of ≥ 0.95 and women with ≥ 0.80 are considered as having central obesity.[4]

FIGURE I – BMI (N=300)

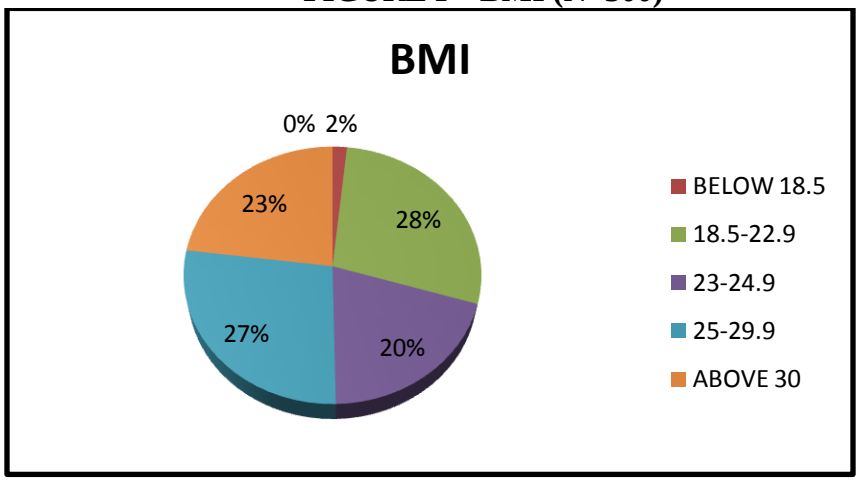

TABLE 1 - WHR

SNO	WHR	MEN	SUM	WOMEN	SUM
1	>0.85	28	191	20	109
2	>0.9	99		59	
3	1	64		30	
4	AVERAGE	63.6		36.3	

The result shows that 54.3% of men had waist hip ratio ≥0.95 and 36% of the women had waist hip ratio is ≥ 0.80.

3.2) Bio Chemical and clinical assessment

Biochemical assessment was done in laboratory such as haemoglobin, total cholesterol, blood glucose, blood count to assess the nutritional status and to identify specific nutritional deficiencies.[5]

In selected participants (191 men) 100 men were having haemoglobin level below 13.5-17.0 g/dl and 81 women are having >12.4g/dl haemoglobin. Among 300 participants 116participants were having diabetes mellitus due to blood glucose level. 257 subjects are> 200mg/dl of total cholesterol. 296 subjects blood count is normal.

Clinical assessment showed that among 300 selected participants 11 have atrophic, 83 have respiratory muscle weakness, 50 have oedema, bone/joint pain and muscle pain. 5 participants have calcium deficiency.

3.3) Dietary assessment

Dietary assessment was done to assess their dietary and nutrients intake. In 300 selected participantssubjects 280 was preferring non-vegetarian diet, 231 was using sunflower oil for daily consumption,69 selected participantswas using groundnut oil daily, 151 was consuming 3 meal per day, 207 participants are consuming tea, coffee 3-5 times a day, 295 participants were prefer to watch TV in their leisure time.

3.4) Categorise degenerative disease of the selected subjects

TABLE 2- HEALTH STATUS

SNO	DISEASE	NUMBER OF PERSONS AFFECTED	PERCENTAGE %	AVERAGE	SUM
1	Alzheimer's Disease	0	0	34.75	312.75
2	Cancer	6	2		
3	Diabetes II	116	38		
4	Heart Disease	81	27		
5	Chronic Obstructive Pulmonary Disease	1	0.3		
6	Osteoarthritis	26	9		
7	Osteoporosis	45	15		
8	Rheumatoid Arthritis	4	1.3		
9	Others			30.5	333.5
	• Hypertension	101	34		
	• Cataract	1	0.3		
	• Anemia	188	62		
	• Ulcer	4	1.3		
	• Peripheral Neuropathy	1	0.3		
	• Neuralgia	2	0.6		
	• Hypokensia	2			
	• Hypothyroidism	2			
	• Dyslipidemia	2			
	• Hypercholesteremia	2			

4) CONCLUSION

Among 300 selected participants, maximum had more than one degenerative diseases like diabetes mellitus, anemia and hypertension with CVD etc. thus, it was concluded from the present research thatdue to stress and life style modification like physicalinactivity is the cause of multiple degenerative disease in person.

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EFFECT OF LEMON JUICE SUPPLEMENTATION WITH POWDER OF CAULIFLOWER GREENS ON THE LEVEL OF HAEMOGLOBIN CONTENT AMONG THE ANAEMIC ADOLESCENT GIRLS

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ABSTRACT

The term adolescence means to 'emerge or achieve identity' among the girls especially in development and thinking, relatively new concept. WHO defines adolescence both in terms of age (spanning the age between 10 & 19 years) and in terms of a phase of life marked by special attributes. These attributes include rapid physical growth and development in physical, social and psychological maturity, but not all the same time refers to sexual maturity or the onset sexual activity. Development of adolescent includes mental process, adult identity and transition from total socio economic dependence and relative independence.Anaemia is the most important nutrient deficiency disease, most commonly prevalent among women, especially the women at the age of adolescence frequently encountered with the problem. In the recent years, there has been increasing attention towards anaemic adolescent girls. It is because of the prevalence of iron deficiency anaemia adolescent girls. Prevention of anaemia in adolescents is important as they are the future mothers. It can be prevented by providing iron rich food supplementation. Obviously, adolescence is the nutritional stress period for women with profound growth and increased demand for energy, protein, minerals and vitamins. In most of the cases the anaemia is caused due to deficiency of iron. The preliminary study revealed that the food items consumed by the vegetarian generally did not constitute the balanced diet and mostly deficient in iron. The study was carried out with the following ***objectives:***

- ✓ *200 adolescent girls includes 100 vegetarian and 100 from non vegetarian adolescent girls.*
- ✓ *The Criteria selected for analysis included socio economic status, life style pattern, the biochemical parameters such as hemoglobin, serum albumin and serum globulin, the clinical status of the subject including face, hair, eyes, mouth, lip, tongue, skin ect.*

- ✓ *The nutrient intake by food weight survey for three consecutive days and for the selected subject.*
- ✓ *The present study has been planned to investigate the supplementation of the lemon juice with powder of cauliflower leaves to determine the level of hemoglobin content and the status of anaemia among the adolescent girls.*

Methodology: *Anthropometric Assessment, Biochemical Assessment, clinical Assessment, Dietary pattern and nutritional assessment were determined to the nutritional status of adolescent girls. Questionnaire method was used to collect data corresponding with the general information, life style pattern, health status and assessment of nutritional status of the subjects.*
Findings: *The preliminary study revealed that the food items consumed by the vegetarian generally did not constitute the balanced diet and mostly deficient of iron. Anthropometric determination, clinical symptoms and haemoglobin status (11-14gm/ %) revealed that they were not upto the satisfactory level on the contrary, the mean haemoglobin level was (12.8gm/ %)among the non vegetarian adolescent girls which was higher than the mean hemoglobin content (10.2gm/ %) among the vegetarian adolescent girls. In order to overcome the problem alteration in the food items supplementation of green leafy vegetable was evolved as a strategy. Among the green leafy vegetables cauliflower greens could improve the blood haemoglobin level of the adolescent girls available information proves that, the iron content of cauliflower greens powder in lemon juice which could improve the absorption and utilization. Cauliflower greens powder in lemon juice could aliviate anaemia in moderate and severe anaemic adolescent girls. The progress of the research will provide new information regarding the food items as nutraceuticals and solution for the anaemia problems.* ***Adolescent girls as they not only constitute one tenth of its population but also influence the growth of remaining population. So the problems related to adolescent girls deserve special attention. Therefore considering the iron content of*** *cauliflower greens, which is rarely used as food, has been selected to find out the impact in improving the blood hemoglobin level of anaemic adolescent girl.*

KEYWORDS: *Adolescent girls, Hemoglobin, Anthropometric measurement, cauliflower greens Powder and lemon juice.*

INTRODUCTION

Adolescence (from Latin *adolescere*, meaning 'to grow up')is a transitional stage of physical and psychological development that generally occurs during the period from puberty to legal adulthood (age of majority). Adolescence is usually associated with the teenage years, but its physical, psychological or cultural expressions may begin earlier and end later. For example, puberty now typically begins during preadolescence, particularly in females.Physical growth (particularly in males), and cognitive development can extend into the early twenties. Thus age provides only a rough marker of adolescence, and scholars have found it difficult to agree upon a precise definition of adolescence.

The World Health Organization (WHO) defines **adolescent** as an individual in the 10-19 years teen age group and usually uses the term **young person** to denote those between 10 and 24 years. In this Module of definition have been used and also the terms **early adolescence** (10-14), **late adolescence** (15-19) and **post-adolescence** (20-24), because they are helpful in

understanding the problems and designing appropriate interventions for young people of different ages. The relevance of this classification in greater detail have been compared, and adolescent and youth-friendly reproductive services have been provided.

The negative health consequences of adolescents can pass from one generation to the next. For example, babies born to adolescent mothers have a high risk of being underweight or stillborn. They are also likely to suffer from the same social and economic disadvantages encountered by their mothers. That is why addressing the needs of adolescents is an intergenerational investment with huge benefits to subsequent generations

Adolescents – young people between the ages of 10 and 19 years are often thought of as a healthy group. Nevertheless, many adolescents do die prematurely due to accidents, suicide, violence, pregnancy related complications and other illnesses that are either preventable or treatable. Many more suffer from chronic ill-health and disability. In addition, many serious diseases in adulthood have their roots in adolescence. For example, tobacco use, sexually transmitted infections including HIV, poor eating and exercise habits, lead to illness or premature death later in life.

Iron-deficiency anemia is the anemia caused by a lack of iron.Anemia is defined as a decrease in the number of red blood cells or the amount of hemoglobin in the blood. When onset is slow, symptoms are often vague, including tiresome, weakness,shortness of breath, or poor ability to exercise. Anemia that comes on quickly often has greater symptoms, including: confusion,feeling like one is going to pass out and increased thirst. There needs to be significant anemia before a person becomes noticeably pale. Problems with growth and development may occur in children. There may be additional symptoms depending on the underlying cause.

The three main types of anemia are due to blood loss, decreased red blood cell production, and increased red blood cell breakdown.Causes of blood loss include trauma and gastrointestinal bleeding, among others. Causes of decreased production include iron deficiency, a lack of vitamin B12, thalassemia, and a number of neoplasms of the bone marrow.Causes of increased breakdown include a number of genetic conditions such as sickle cell anemia, infections like malaria, and certain autoimmune diseases. It can also be classified based on the size of red blood cells and amount of hemoglobin in each cell. If the cells are small, it is microcytic anemia. If they are large, it is macrocytic anemia, while if they are normal sized, it is normocytic anemia. Diagnosis in men is based on a hemoglobin content less than 130 to 140 g/L (13 to 14 g/dL), while in women, it is less than 120 to 130 g/L (12 to 13 g/dL).Further testing is then required to determine the cause.

Anaemia can be cured by supplementing the recommended dietary allowancesof diet with adequate quantity of iron rich foods. Besides increased intake of green leafy vegetables.

Among all the vegetables, the leafy vegetables have a very high protecttive food value. They are rich in calcium, iron and other minerals and in vitamin A and C. Besides, they are soft fibrous matter and provides the necessary roughage in the diet. In India, leafy vegetables are generally considered inferior than other vegetables like peas, cauliflower and tomato which are more palatable and appetizing. But the fact is that, the leafy vegetables when properly prepared are equally palatable and rich in nutrients , the leafy vegetables have greater recognition.

There are varieties of leafy vegetables under cultivation in India. Certain wild plants which such as *Alternanthera,Celosia, Portulaca* etc. are also used as leafy vegetables. Among the several leafy vegetables *Amaranthus* is one of the most important warm season leafy vegetable.

Among the green leafy vegetables cauliflower greens (*Brassica oleraceal varbotrytis*) which has a high amount of iron is which under exploited in Tamil Nadu. It is very much true that the growth and development of a nation depend heavily on the status and development of Adolescent girls as they not only constitute one tenth of its population but also influence the growth of remaining population. So the problems related to adolescent girls deserve special attention. Therefore considering the iron content of**cauliflower** greens, which is rarely used as food, has been selected to determine the impact in improving the blood haemoglobin level of anaemic adolescent girl**.**The results are presented and discussed in this article.

METHODOLOGY

Selection of the sample

The study was carried at the Government Higher Secondary School,Thiruthuraipoondi, Government High School, Nedumbalam and STET Women's College, Sundarakottai in Thiruvarur district.The School was selected because most of the students hail from rural and economically weaker section of the society and most of them are underweight and the food habits are very poor.

A total of 200 subject were selected using simple random sampling method. The subjects were in the age group of 13-18 years and included both vegetarian and non vegetarian anaemic adoloscent girls.

Conduct the study

Information on socio-economic status , dietary pattern and nutritional status of the anaemic adolescent girls. Questionnaire was specially designed to collect information on income per month, types of family, age, educational status, occupation, monthly food expenditure,meal planning and dietary pattern, since adolescent health and nutritional status were affected by poverty and inadequate intake of iron rich food items. The required information was also obtained through personal interview method.

Preparation of cauliflower greens powder and lemon juice

Cauliflower (*Brassica oleracea*) leaves were obtained is a single lot from local market. The leaves were separated from their stalks, washed under running tap water and were blanched for 10 to 15 second. After blanching the leaves were dried at room temperature for 1 to 2 h by spreading on filter paper followed by drying in hot air oven at 40°C for 4 to 6 h. The dried leaves were ground to fine powder, passed through 20 mesh seive and packed in air tight containers for further use Lemon juice was prepared by squeezed and standardized the recipe in the ratio of 100 : 0 (lemon juice ; cauliflower powder), 100: 10 (lemon juice ; cauliflower powder), 100: 20 (lemon juice ; cauliflower powder), 100: 30 (lemon juice ; cauliflower powder), 100: 10 (lemon juice ; cauliflower powder), 100: 40 (lemon juice ; cauliflower powder). The recipes were evaluated using well panelist with a scorecard using 5point hedonic rating scale to measure the sensory characteristics.

Assessment of nutritional status

To assess the nutritional status of all the 200 subjects of the selected anaemic adolescent girls was determined by anthropometric measurement such as height, weight and Body Mass Index (BMI), clinical examination, blood haemoglobin estimations and the food weighment survey were carried out, prevalence of anaemia among the 200 subjects weredetermined the content of haemoglobin values, estimated by Sahli's method. The information on level of nutrient intake,Sources of nutrient, food habits and attitudes were gathered by diet survey.

Dietary assessment

A three day food weighment survey was carried out for a selected subjects of anaemic adolescent girls those who consume vegetarian foods. The exact food intake of the individual was recorded for three consecutive days. The mean nutrient intake of the selected subjects were calculated using the ICMR food composition tables and compared with recommended Dietary Allowances.

RESULTS AND DISCUSSION

Socio- economic status

The socio-economic status of the 200 subject of the selected anaemic adolescent girls is presented in Table I. Majority of the families were of nuclear family.

TABLE I

Characteristics	Details	Number	Percent
Age group	13-14	85	42.5
	15 -16	65	32.5
	17-18	50	25.0
Types of family	Nuclear	176	88.0
	Joint	24	12.0
Food Pattern	Vegetarian	100	50.0
	Non-vegetarian	100	50.0
Monthly income of the families (in Rs.*)	2000 – 3000	128	64.0
	3000 – 4000	65	32.5
	4000 -5000	07	03.5
Educational status	High school	85	42.5
	Higher secondary school	65	32.5
	College	50	25.0

Awarness about anemia:

TABLE- II

S.NO	AWARNESS OF ANEMIA	NUMBER OF THE SUBJECT	
		YES	**NO**
1	Non vegetarian	62	38
2	Vegetarian	28	72

Table II indicates 62 percent of the subject had awareness about anemia and 28 percent of the non vegetarian and vegetarian subject, 38 and 72 percent of the non vegetarian and vegetarian subjects did not have awareness about anemia

Assessment of nutritional status :

Anthropometric measurement

TABLE -III

S. no	Mean anthropometric measurement	Non vegetarian	vegetarian
1	Height in (cm)	125-92+9.931	125.14 +8.66.7
2	Weight in (kg)	28.58 + 6.803	26.32 +5.811
3	Body mass index (BMI)	18.080 + 3.533	16.52 +2.827

The mean body mass index (BMI) was found to be 18 .080 + 3.533amongnon vegetarian subjects, andthe mean BMI was found to be16 .52+ 2.827 in vegetarian subjects. The BMI was lower among vegetarian group than the non vegetarian adolescent girls

Biochemical analysis of the subject :

TABLE- IV

S.NO	MEAN BIOCHEMICAL ANALYSIS (gm/dl)	NORMAL (gm/dl)	URBAN (gm/dl)	RURAL (gm/dl)
1	Hemoglobin	12-16	10.67+0.9163	8.15+0.7060
2	Serum protein	6.2-8.0	6.478+0.682	5.38+0.698
3	Serum albumin	3.5-5.5	4.84+0.339	3.30+0.227
4	Globulin	2.3-5.6	2.2498+0.437	2.15+0.423

Table- IV indicates that. the mean hemoglobin level was 10.67 +0.9163 gm/dl, the mean total serum protein was 6.478+0.682 gm/dl the mean serum albumin level was 4.84+0.339 gm/dl , and mean serum globulin level was 2.498+0.437 gm/dl among non vegetarian adolescent girls. Themean hemoglobin level was 8.15+0.7060 gm/dl the mean total serum protein level was 5.38+0,698 gm/dl, the mean serum albumin level was found to be 3.30+0.227 and the mean serum globulin level 2.15+0.423 gm/dl among the vegetarian adolescent girls.

Dietary background of the selected subject

Monthly food expenditure pattern of the family was randomly selected. It has been observed that most of the families nearly 72 percent consumed cereals, 28 per cent consumed pulses,and 10 per centof the subjects depends on roots and tubers,green leafy vegetables and fruits. Two third of the families did not spend on greens, instead of procured them in their garden. Majority of the subjects consumed egg weekly once and 32 percent of the subjects consumed chicken 15 days once and 48 percent of the subjects consumed fish weekly once and 29 percent of the subjects consumed meat 15 days once and 92 percent of the subjects never consumed liver. All the subjects consumed sunflower oil daily and 37 percent of the subjects consumed gingelly oil rarely and majority of all the subjects never consume coconut oil and 38 percent of the subjects never consumed groundnut oil.All the subjects consumed sugar daily and 39 percent of the subjects consumed jaggery rarely and 88 percent of the subjects never consumed honey.

Mean nutrients intake of the subjects

The mean nutrients intake of non vegetarian subjects including the mean value of energy intake 1914-92 kcal, the mean value of protein intake 47.91 gm, the mean value of fat intake 31.14 gm, the mean value of carbohydrate intake 290.746 gm, the mean value of iron 24.454 mg , the mean value of calcium 558.54 mg, the mean value of vitamin-A 498.5mg . Whereas vegetarian group ,the mean value of energy intake was1468.75 kcal.the mean value of protein intake was 22.99gm. the mean value of fat intake was 16.20gm, the mean value of carbohydrate intake was 125 gm ,the mean value of calcium was 350.11 mg the mean value of iron intake 9.270 the mean value of vitamin-A intake was 341.1mg.

Mean nutrients intake of the subjects

Table - V

S.no	Nutrients	Mean and nutrient intake of non vegetarian Subject	Mean and nurient intake of vegetarian subject	RDA	Deficit	
					Non vegetarian	Vegetarian
1	Energy (kcal)	1914.92	1468.75	1970	55.08	501.25
2	Protein (gm)	47.91	22.99	67	9.09	34.01
3	Fat (gm)	31.14	16.20	22	9.14	5.8
4	Carbohydrate (gm)	290.746	125.5	-	-	-
5	Calcium (mg)	558.54	35.11	60.0	41.46	249.89
6	Iron (mg)	24.454	9.270	19	+ 5.45	9.73

7	Vitamin-A(mg)	498.52	341.12	600		-101.5	258.88

CONCLUSION:

It is concluded that most of the respondents were not in good health condition. Dietary habits of the vegetarian adolescent girls had poor health whencompared to non vegetarian adolescent girls. The study showed that the prevalence of anaemia is of usually higher among the vegetarian group when compared to the non vegetarian group.

In the recent years, there has been increasing attention towards anaemic adolescent girlsBecause prevalence of iron deficiency anaemia is higher in adolescents. Prevention of anaemia in adolescents is important as they are the future mothers.It can be prevented by providing iron rich food supplementation.

Among the green leafy vegetables cauliflower green powder supplemented in fruit juices can be improved the blood haemoglobin content of the adolescent girls.Besides the iron content of cauliflower greens powder in fruit juices could improve the absorption and utilization. It is suggested that, the supplementation of cauliflower greens powder in lemon juice could alliviate moderate and severe anaemic in adolescent girls. Further, nutraseutical and therapeutic properties of this formulation need thorough investigation.

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SYNTHESIS OF ANTIBACTERIAL NANOCOATSIN FOOD PACKAGES USING MEDICINAL PLANTS AND NANOPARTICLES

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ABSTRACT

Than other countries in the world. The present study, wherein AgNP coats from four medicinal plants were undertaken. The best among them (coats and films) from Glycyrrhiza glabra were employed in the present study was undertaken with the following objectives to (i) Optimize Silver nanoparticles from four medicinal plants (ii) Identify the Silver nanocoat from medicinal plants with highest antioxidant, antimicrobial and anticancer potentials(iii) Coating of AgNP (Glycyrrhiza glabra) onto three food packages namely PET, Infant feeding bottles (PP) and Zip Loc covers (PE). The findings of the study showed that among the four medicinal plants, Glycyrrhiza glabra AgNP had a smaller particle size of 34.7 nm with highest suspension stability of -28.9 mV, compared to other AgNP of plant extracts. The FTIR confirmed the presence of phenols, which showed a narrow and sharper peak at 578.06 cm^{-1}, which could be one of the reason for its maximum antioxidant potential. In both the raw and AgNP (Glycyrrhiza glabra), the vibration bands at 1644.90 cm^{-1} with a shift to 1627.87 cm^{-1} indicate the presence of carbonyl groups in the NH amide linkages of protein. The SEM and TEM of Glycyrrhiza glabra AgNP showed spherical shaped homogenously distributed with an average grain size of 617.57 nm and 304.68 nm. Hence, 30 µl of Glycyrrhiza glabra nanoparticles was selected as the best colloidal solution for coating onto the food packaging material such as PET, infant feeding bottles (Poly Propylene) and Zip lock covers (Poly Ethylene).The difference between the efficacy of nanocoated and uncoated bottles interms of microbial growth inhibition was statistically significant (P< 0.01) against the control.

KEYWORDS: *Antioxidant, Antimicrobial, Microbial Growth,*

INTRODUCTION

Diarrhea is a common illness, referred as *global killer*, and thesecond leading cause of death among children less than five years of age. In India, the diarrheal mortality rate is estimated to be 300,000 children each year (Bassani*et al.,* 2010). The most common and dreadful species of diarrhea are the *enteropathogenic* species such as *E.coli, S.enterica and S.dysenteriae* respectively. These pathogens commonly spread through unsafe food and water. When stored in food packages like PET bottles, zip loc covers and infant feeding bottles, They make the food unfit for consumption and reduces the shelf-life.Hence, in the present study the parts of plants with medicinal potentials were selected from four different medicinal plants such as *Andrographispaniculata (leaves), Glycyrrhiza glabra (root), Curcuma longa (rhizome) and Leucasaspera (leaves)*. The present research findings of the nano-coated food packages, would help to prevent the diarrheal illness and increase the shelf-life of foods. Therefore, as an alternate to synthetic polymers, *Glycyrrhiza glabra* silver nanoparticles were synthesized and coated on to selected food packages.

OBJECTIVES

- To develop food containers with longer inhibition for diarrhea causing bacteria employing plant parts extracted with silver nanoparticles

METHODOLOGY

Four medicinal plants selected for the present study namely *Andrographispaniculata, Curcuma longa, Leucasaspera*and *Glycyrrhiza glabra* were dried. An attempt, was made to correlation existing between the nanocoated food packages and microbes to prevent the *Enteropathogenic*diseases.

1. Determination of Particle size and Zeta potential from medicinal plants

The mean particle size, stability and surface charge of synthesized silver nanoparticles were analyzed by using Malvern Zetasizer ZS 90.

2. To determine Antioxidant activity of synthesized Silver Nanoparticles (AgNPs) by FERRIC REDUCING ABILITY OF PLASMA as a measure of ANTIOXIDANT POWER (FRAP)

FRAP assay was performed according to the methods of Benzie and Strain (1999) with slight modification.

3. Antimicrobial Study

The test microbes included in this study were enteropathogenic bacteria such as *E.coli (MTCC 40), Salmonella enteric (MTCC3219)* and *Shigelladysenteriae (PSGIMS&R).* These cultures were obtained from MTCC, Chandigarh and PSG Institute of Medical Science and Research (PSGIMS&R).

4. Characterization of silver nanoparticles

The characterization of silver nanoparticles were carried out using the following techniques

a. Identification of *Glycyrrhiza glabra* constituents using Gas Chromatography (GC)

The GC analysis was performed using a SHIMADZU QP 5050A, GC/MS-5989Binstrument.

b. Identification of compounds by Thin layer chromatography (TLC)

To determine active compounds in the plant extract, thin layer chromatography.

c. Determination of functional groups by Fourier Transform Infra-Red Spectroscopy (FTIR)

Infra-red spectroscopy was used to examine the physico-chemical interactions among different components in a nanoparticle formulation by using FTIR.

d. Elemental Analysis using Energy Dispersive Auger X ray analysis (EDX)

The silver nanoaparticles of dried and powdered form were subjected for EDAX (Energy Dispersive Auger X –Ray) analysis for the determination of elements present along with the synthesized silver nanoparticles.

e. Morphological studies of synthesized *Glycyrrhizaglabra* silver nanoaparticles using Scanning Electron Microscopy (SEM)

Morphological evaluation of the synthesized silver nanoparticles was carried out using a Hitachi S-4700 microscope (Hitachi High-Tech Corp. Tokyo, Japan).

f. Determination of Structural and crystallinity studies by Transmission Electron Microscopy (TEM)

Transmission electron microscopy (TEM, 200 kV, JEOL- 2010) was used to determine the shape, size and internal morphology of the synthesized nanoparticles.

g. Determination of Anticancerous property by *MTT Assay and Gel Electrophoresis*

Hela and Liver carcinoma cell lines were seeded into a 96-well plate and incubated 24 hrs overnight at 37 °C to ensure cell adhesion and confluence in the wells.

5. Coating of silver nanoparticles onto the commercially available food packages against Enteropathogenic species

The food packages such as PET Bottles, Infant Feeding Bottles and zip-lock covers, were coated with highest concentration activity of AgNPs and compared with the standard packages (non-nanocoated), which were packed with acidic foods such as tomato puree and alkali foods, such as milk, It was inoculated with test organisms and tested for the efficacy of nanocoated food packages on these foods on storage.

RESULTS AND DISCUSSION

Characterization of Silver nanoparticles

Table I depicts the FRAP Antioxidant activity of Silver Nanoparticles from the four medicinal plants.

FRAP Antioxidant Activity of A_gNP from the four medicinal plants

TABLE I

Name of the Medicinal Plants	Concentration (µg)
Leucasaspera	132
Curcuma longa	395
Glycyrrhizaglabra	520
Andrographispaniculata	446

Glycyrrhizaglabra had the maximum antioxidant potential of 520 µg, when compared to *Andrographispaniculata* and *Curcuma longa.* It has been observed that *Leucasaspera* had the minimum antioxidant potential of 132 µg respectively. Of the four medicinal plants, *Glycyrrhizaglabra* showed the highest antioxidant activity and was selected for the study, due to presence of phytoconstituents in the plant. The antibacterial efficacy of*Glycyrrhizaglabra*AgNPconcentrations of 10, 20, 30 µl and control were tested in duplicates against *E.coli (MTCC 40), S.enterica (MTCC 3219)* and *Sh.dysenteriae (PSGIMS&R).* It was observed that 30 µl showed maximum zone of inhibition at 11mm, compared to the control of 3mm against *E.coli (MTCC 40).* The zone of inhibition was 15mm, compared to3 mm against *Salmonella enterica (MTCC 3219)* and inhibitory zone of 14 mm, compared to the control of 4 mm against*Sh.dysenteriae (PSGIMS&R)* respectively. Thus, it was observed that *Glycyrrhizaglabra*AgNP(30 µl) showed an excellent antibacterial activity with a maximum zone of inhibitionagainst the enteropathogenic species, compared to the control (plant extracts).

FIGURE 1– Agar Well Disc Diffusion *(Glycyyrhizaglabra)*

Among the different concentration of nanoparticle, 30 µl of *Glycyrrhizaglabra*AgNPs had the maximum antimicrobial activity of 64.18 per cent against *E.coli (MTCC 40),* 62.92 per cent against*S.enterica (MTCC 3219)* and 62.16 per cent against*Sh.dysenteriae (PSGIMS & R)* respectively. Therefore, 30 µl of *Glycyrrhiza glabra* nanoparticles was selected for coating onto commercially available food packages namely PET bottles, Infant Feeding Bottles and Zip Loc covers.

By Gas chromatography, the most abundant antioxidant compounds found in *Glycyrrhiza glabra* are the 9Octadecenal (RT=14.75) is an aldehyde compound, cis 9,10 Epoxyoctadecan-1-ol (RT =17.34) and Z,Z,2,5-Pentadecadien-1-ol (RT=20.71) are the major aldehyde andalcoholic compounds which possess the antimicrobial activity. Among the esters and organic acids, the most dominant fatty acids are tetradecanoic acids (RT=11.58), n hexadecanoic acid (RT=12.84) which are capable of scavenging free radicals, due to its antioxidant property. In addition, these phytocompounds of *Glycyrrhiza glabra*may act as a capping and reducing agent in synthesizing the silver nanoparticles.

TABLE II
FTIR OF GLYCYRRHIZAGLABRA

Medicinal Plants	Without AgNP	With AgNP	Functional Groups
Glycyrrhizaglabra	3396.90	3410.10	Alcohol OH stretch (H bonded) NH Amine stretch
	2315.35	2371.87	Protein/cellulose CH_2 bending second overtone
	1644.90	1627.87	C=C Alkene stretch, NH amide bending
	1528	1441.29	C=O stretching
	1221.42	1277.94	C-N Amine stretching
	703.52	715.10	Alkyl halide

Table II represent and FTIR (figure 2 A & B) confirms the presence of phenols, which shows a narrow and sharper peak at 578.06 cm^{-1}which is one of the reasons for its maximum antioxidant potential. Ivanova*et al.*, (2005) report that *Glycyrrhizaglabra*contains the antioxidant compounds viz., phenols which would act against scavenging the free radicals. Among the four medicinal plants, FTIR spectra of *Glycyrrhiza glabra* raw extracts (before reaction with $AgNO_3$)and AgNP (after reaction with $AgNO_3$)the characteristic band at 3396.90 cm^{-1} and 3410.10 cm^{-1} due to the coupled Alcohol OH stretch and NH amine stretching groups. It has been observed that FTIR of *Glycyrrhiza glabra* root and colloids shows the functional peak such as C=C, C-O-C, C=O, C-O and C-N corresponds to biomolecules like phenols, flavanoids and terpenoids, which are involved in reduction and capping of silver ions leading to effective chelation of silver nanoparticles. The greater interaction of water with silver could be the reason for OH stretching at 3410.10 cm^{-1} involved in capping of AgNP. In both the raw and AgNP *(Glycyrrhiza glabra)*, the vibration bands at 1644.90 cm^{-1} with a shift to 1627.87 cm^{-1} indicate the presence of carbonyl groups in the NH amide linkages of protein.The FTIR peak observed at 600 cm-1 and 760.77 cm^{-1}, (raw extracts) shows a shift from 625.29 cm^{-1} to 715.87 cm^{-1}, (AgNP) and confirms the presence of alkyl halide, contributing to the antibacterial action of nanoparticles.

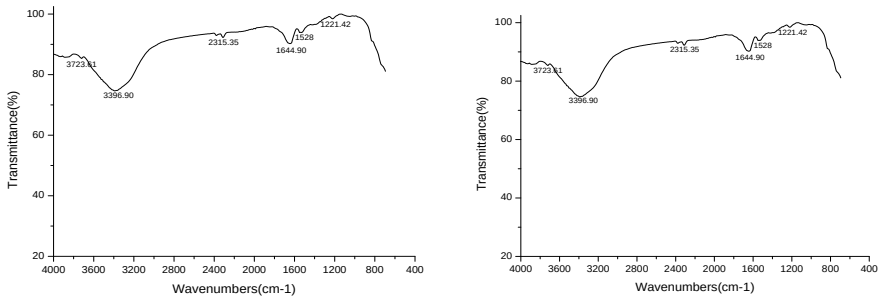

FIGURE 2 AAND B

Glycyrrhizaglabra **(A - Without AgNP)** ***Glycyrrhizaglabra*****(B - With AgNP)**

TABLE III EDX OF GLYCYRRHIZA GLABRA

Element	Wt %	At %
K	11.93	19.97
Na	35.85	41.75
S	02.22	01.86
Cl	47.39	35.78
Ag	02.60	00.64

Table III depicts that the EDX studies showed that the silver content was about 0.64 Atomic weight % which acts as a potent chelating and microbial inhibiting agent, along with the phytochemicals of the plant extract. The highest level of cationic impurity is observed in *Glycyrrhiza glabra* silver nanoparticles with impurity such as Sodium *of* 41.75 per cent. In addition, higher percentage of anionic impurity namely Chlorine and Sulphur of 35.78 per cent and 1.86 per cent respectively was observed. The higher percentage of impurities of Na and Cl of *Glycyrrhiza glabra* are due to the soil rich in minerals, which may vary based on its variedgeographical location.The SEM and TEM of *Glycyrrhiza glabra* Nanoparticles shows spherical shaped nanoparticles homogenously distributed with an average grain size of 617.57 nm and 304.68 nm (Figure 3 A and 3B).

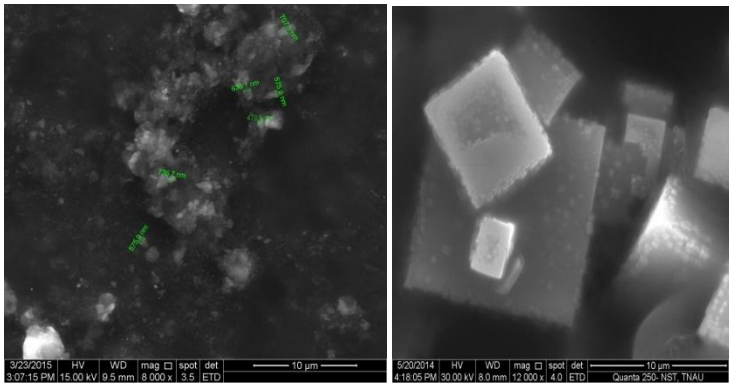

FIGURE 3 AAND B

SEM and TEM of *GlycyrrhizaglabraAgNP*

The Cell Viability determination was made using MTT assay which was studied for *Glycyrrhizaglabra* causing a significant cytotoxicity (Figure 4). From the analysis, it was found that 200 µl of silver nanoparticles showed 50 percent apoptosis in HeLacell line and 48 percent in human carcinoma apoptosis at a concentration of 200µl compared to control.

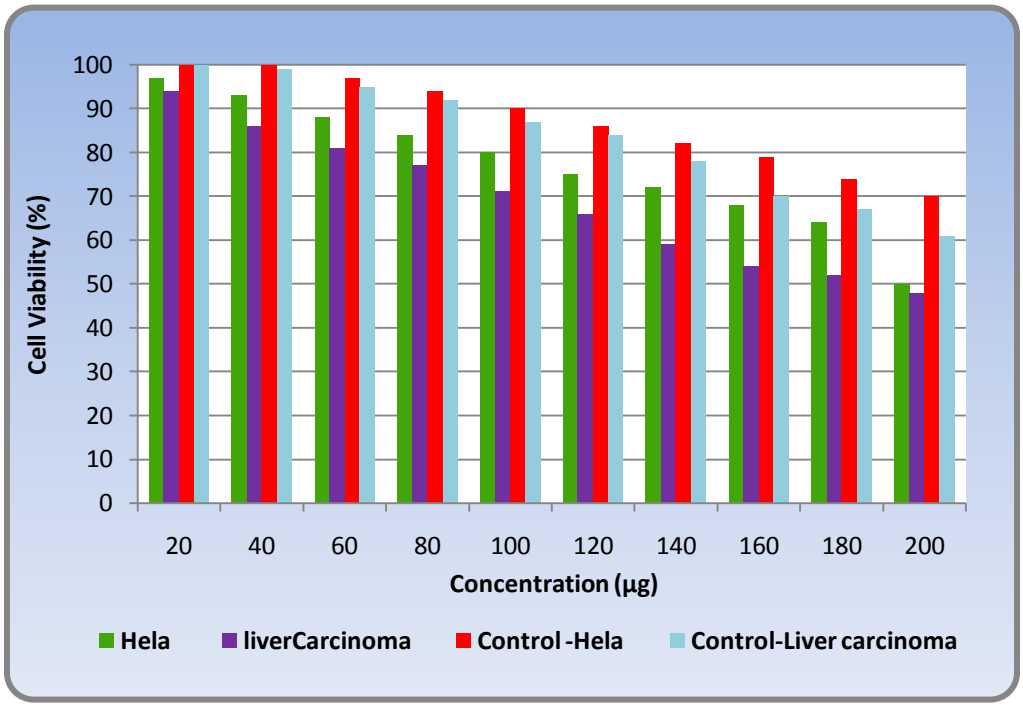

FIGURE 4 - MTT of Silver Nanoparticles *(Glycyrrhizaglabra)* against HeLa and Liver Carcinoma Cell Lines

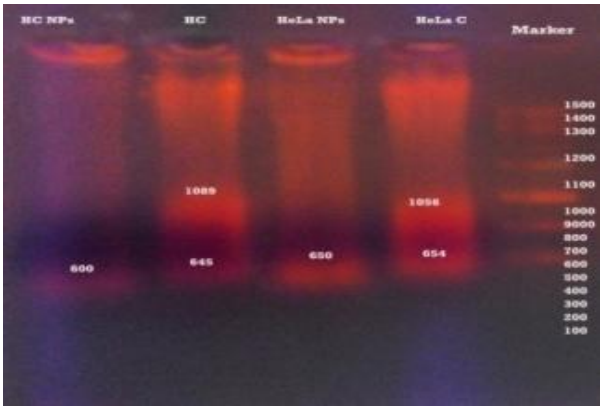

FIGURE 5 - Gel Electrophoresis against HeLa and Liver Carcinoma Cells

Figure 5 depicts that the silver nanoparticles (*Glycyrrhizaglabra)* has led to a longer tail DNA damage with HeLaand liver carcinoma cell lines compared with control and marker. It was observed that the DNA gel electrophoresis of DNA fragmentation was enhanced with increasing exposure to silver nanoparticles *(Glycyrrhizaglabra).* Hence, 30 µl of *Glycyrrhizaglabra*nanoparticles was selected as the best colloidal solution for coating onto the food packaging material such as PET, infant feeding bottles (Poly Propylene) and Zip lock covers (Poly Ethylene). The difference between the efficacy of nanocoated and uncoated PET bottles interms of microbial growth inhibition was statistically significant ($P< 0.01$).Similarly, Nanocoated PET bottles with lemon juice revealed that from 0day to 6th day, showed no microbial growth while control (uncoated) PET bottles had a higher microbial growth *S.dysenteriae (PSGIMS &R)*. At 2½ and 3 hour, the inhibitory activity decreased from 86.33 per

cent and 84 per cent, compared to the control (uncoated) PP feeding bottles which showed no inhibiton against *S.dysenteriae (PSGIMS &R)*. In nanocoated PP feeding bottles stored with lemon juice, there was no microbial growth from 0 to 3 hours, while the control (uncoated) had TNTC microbial counts in feeding bottles.

It was observed that the tomato puree stored in nanocoated zip loc covers showed the maximum inhibition of 87.67 per cent than the control (uncoated) against the *S.dysenteriae (PSGIMS & R)* until astorage period of ten days. These silver nanoparticles were found to be highly effective against the diarrheal species. Therefore, these nanoparticles coated onto surface of the food packages could inhibit the growth of microbial pathogens.

CONCLUSION

The nanocoated food packages containing silver nanoparticles *(Glycyrrhizaglabra)* are promising to microbial inhibition against food borne pathogens, thereby improving food quality and shelf life stability, which could be used in active packaging to the food industry in future.

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SOCIO ECONOMIC BACKGROUND AND DIETARY INTAKE OF FEMALE THANG -TA ATHLETES OF MANIPUR

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ABSTRACT

The investigator selected 84 female Thang-Ta athletes in the age group of 15-25 years from four main training centers i.e.Huyen Lallong Manipur Thang -Ta–cultural Association (25); Huyen Lallong Thang-Ta Academy (20); Association for Paona Memorial Art and Rural Development Services (19); Divine Cultural Thang -Ta Academy (20). They were divided into two groups depending on age category i.e 15-19 and 20-25 years. The mean age, height, weight and BMI of15-19 year group were 16.2±1.40yrs, 154.9±5.29cm, 51.4±7.32kg, 21.4±2.8 respectively. Similarly the mean age, height, weight and BMI value of 20-15 years were 21.94±1.52, 156.6±5.4, 52.5±7.50 kg, and 21.3±2.76 respectively. From the result it was found that, majority 78.6 per cent of female of athletes belonged to nuclear family system. All the athletes were Hindus. Majority 79.7 per cent athletes were from rural areas. Most of the Thang- Ta athletes were from agriculture families. On the basis of the HUDCO income classification (2010), majority 63.1 per cent female Thang -Ta athletes were from Low Income Group. Most of the athletes (52.4 per cent female) had high school level of education and none of the female athletes were illiterate. Their food and nutrient were intake were deficient. Macronutrient nutrient intake was disproportionate when compared with to the suggested Allowance by ILSI, NIN, and SAI,

(2007) for specific event. Nutrition education for the athletes as well as the indigenous coaches and nutrition intervention for athletes is the need of the hour.

KEYWORDS: *Athletes, Thang-Ta, Female, Macronutrient.*

INTRODUCTION

Thang – Ta is an indigenous and traditional sport of Manipur. This indigenous martial art influences today's Manipuri sports performances both at the national and international level. Physical fitness is a means for development of individual personality as a whole and includes adequate degrees of health, posture, physique, proper functioning of vital organs, nutrition, and good health habits, along with an adequate amount of endurance, strength, stamina, and flexibility (Raspal and Hoshiyar, 2013). Devi and Kumari (2014) report that female college athletes are 'not highly fit' individuals. Nutrition, in combination with adequate training, is considered an essential factor for success in sports at any age. However, in adolescent athletes, nutrition is particularly critical to supply the increased needs for training, in addition to the needs generated by the intense growth that occurs during the puberty spurt (American Dietetic Association, 1996; Cotunga Vickery, & McBee, 2005; Spear, 2005; WHO, 1995). An athlete needs to consume suitable food and fluid prior to, during, and after competition in order to maximize performance (Rodriquez et al., 2009; International Olympic Committee (IOC), 2011) Recommendations of sport-specific requirement for athletes to ensure that they consume sufficient total energy (TE) to meet the requirements, carbohydrate (CHO) to replenish glycogen stores, protein to aid in muscle repair and growth, as well as fluid to stay adequately hydrated (Rodriquez et al .,2009; Thomas *et al*., 2016; Tipton *et al*.,2007). Therefore the present study was undertaken to ascertain the Socio Economic background and Dietary Intake of Female Thang – Ta athletes.

METHODOLOGY

A purposive sampling techniques was adopted to select a total of 84 Thang -Ta female athletes in the age groups 15-25 years from four main training center i.e 25 athletes from Huyen Lallong Manipur Thang -Ta–cultural Association; 20 athletes from Huyen Lallong Thang-Ta Academy; 19 athletes from Association for Paona Memorial Art and Rural Development Services; 20 athletes Divine Cultural Thang -Ta Academy.The athletes were divided into two groups depending on age category i.e 15-19 and 20-25 years. The age of the athletes were recorded from the date of birth registered in their respective training center. Ethical approval was granted by the Institutional Human Ethics Committee, Avinashilingam Institute for Home Science and Higher Education for Women (AUW/IHEC-13-14/FSN-41), Coimbatore and the Local Human Ethics Committee from Manipur University (Ref. no. Ac / IHEF /MU/201/2014). A written consent was obtained from the participant.

Procedures

Physical characteristics parameters such as height, weight and BMI were recorded with suitable equipment such as height stadiometer for measuring height and weighing balance for measuring body weight. Dietary intake was recorded by using 24 hour recall method for 7 days to find out the true picture of intake.

RESULTS AND DISCUSSIONS

The salient findings of the study are given as below:

Table I Presents the of Socio Economic details of the Thang -Ta Athletes

TABLE I
SOCIO ECONOMIC DETAILS OF THE THANG -TA ATHLETES

Parameters	Criteria	Female Thang- Ta athletes	
		Number	Percent
Type of family	Nuclear	66	78.6
	Joint	18	21.4
Religion	Hindu	84	100
	Muslim	-	-
Type of Residence	Rural	67	79.7
	Urban	17	20.3
Occupation of the Head of the Family	Government employee	13	15.5
	Shopkeeper	5	5.9
	Driver	4	4.7
	Chaukidar	-	-
	Farmer	38	45.2
	Carpenter	24	28.5
* Family Income	Rs.5000(EWS)	31	36.9
	Rs.5001-Rs.10000 (LIG)	53	63.1
Education Qualification of Athletes	Illiterate	-	-
	Dropout	-	-
	High school	44	52.4
	Higher secondary	26	31
	Graduate	9	10.7
	Post graduate	5	5.9

Out 84 female Thang –Ta athletes, 53.6 per cent female athletes were in the age group of 15-19 years and 46.4 percent female Thang- Ta athletes were in the age group of 20-25 years. The present data revealed that more number of budding athletes in the age group of 15-19 years participated in Thang- Ta. It is encouraging to know that Thang- Ta is catching up with young athletes.

A majority 78.6 per cent of female of Thang -Ta athletes belonged to nuclear family system and remaining 21.4 per cent belong to joint family system. All the female Thang -Ta athletes were Hindus. Thang -Ta is an indigenous martial Art of Rural Manipur (Green, 2010). This is revealed in the results of the present study that majority 79.7 per cent female Thang-Ta athletes were from rural areas. Only 20.3 per cent female Thang -Ta athletes were from urban areas. Most of the Thang Ta athletes (45.2 per cent) were from agriculture families.On the basis of the HUDCO income classification (2010), majority 63.1 per cent female Thang -Ta athletes were from Low Income Group, while 36.9 per cent female Thang-Ta athletes were from Economically Weaker Sections. Most of the athletes 52.4 per cent female) had high school level of education and none of the female athletes were illiterate.

Table II presents the physical characteristics of the Athletes

Table II
Physical characteristics profile (N=84)

Age range	Mean age	Height (cm)	Weight(kg)	BMI
15-19(n=45)	16.20±1.40	154.9±5.29	51.46±7.32	21.42±2.84
20-25(n=39)	21.94±1.52	156.67±5.41	52.5±7.50	21.37±2.76

Table II represents the physical characteristics of female Thang -Ta athletes of Manipur. The mean age of 15-19 years age groups was.20±1.40 years and similarly 20-25 years age group was 21.94±1.52.The mean height, weight and BMI of Thang-Ta athletes in the age groups of 15-19 were 154.9±5.29cm, 51.46±7.32kg and 21.42±2.84 respectively. Similarly, the mean height, weight and BMI of Thang-Ta athletes in the age groups of 20-25 years were 156.67±5.41, 52.5±7.50 and21.37±2.76.All the athletes were having normal BMI in comparison of WHO(2007) classification. When compared to ICMR counterpart, athletes were 'fit' in terms of body weight but heights were shorter, this could be the difference in ethnicity.

TABLE III
MEAN FOOD INTAKE OF THE ATHLETES

Food	*Suggested allowance	Female Thang -Ta athletes			
		Age group 15-19		Age group 20-25	
		Actual intake	% excess/deficit	Actual intake	% excess/deficit
Cereal and millets (g)	400	481.07± 44.53	20.26	508.96± 52.79	27
Pulses (g)	40	12.41± 3.35	-68.97	13.06± 3.48	-67.35
Vegetables (g)	350	323.87± 24.46	-7.4	326.19± 31.03	-6.80
Root and	150	39.49±	-73.67	42.41±	-71.72

tubers(g)		13.97		12.34	
Fruits (g)	150	44.99± 15.31	-70	40.92± 11.54	-72.72
Milk and milk products (ml)	750	51.70± 44.26	-93.10	45.72± 12.79	-93.90
Meat (g)	250	44.72± 11.69	-82.11	45.18± 14.50	-81.92
Egg	50	12.18±4.39	-75.64	9.73± 3.05	-80.54
Fats and oil (g)	50	26.34± 5.24	-47.32	27.06± 2.66	-45.88
Sugar (g)	80	30.33± 5.82	-62.08	32.61± 5.36	-59.23

*ILSI, NIN and SAI (2007)

When compared with the suggested food allowance ILSI, NIN and SAI 2007) for specific event, the mean intake of cereal and millets of female Thang –Ta athletes was in excess (20.26 per cent) in the age group of 15- 19 years and 27 per cent excess in 20-25 years. All the food stuffs such as pulse, vegetables, roots and tubers, fruits, milk product, meat, egg, fats, oils, sugar were consumed at (68.97 per cent , 7.4 per cent , 73.67 per cent , 70 per cent , 93.10 per cent , 82.11 per cent , 75.64 per cent per cent , 47.32 per cent , 62.08% respectively) levels less than the suggested allowance. Similarly, all the food stuffs such as pulse, vegetables, roots and tubers, fruits, milk product, meat, egg, fats, oils, sugar consumed by 20-25 years were deficient at (67.35 per cent , 6.80 per cent , 71.72 per cent, 72.72 per cent , 93.90 per cent , 81.92 per cent , 80.54 per cent , 45.88per cent , 59.23per cent respectively).It was heartwarming to know there was less deficient in vegetable intake among Manipuri Thang- Ta athletes. It was found that the consumption of milk and milk product and low intake of high quality milk protein and specifically, of highly bioavailable calcium among Thang Ta athletes. Milk and dairy products consumption is essential for the formation of bones and maintenance of bone mineral density in female athletes, and inadequate calcium intake increases the risk of osteoporosis as they age (Maughan, Shirreffs, 2007).

TABLE IV
MACRO NUTRIENT INTAKE OF FEMALE THANG- TA ATHLETES

Nutrient	Female Thang -Ta athletes					
	Age group 15-19 (n=45)			Age group 20-25 (n=39)		
	Suggested Allowance	Actual intake	% excess/deficit	Suggested allowance	Actual intake	% excess/deficit

Energy (kcal)	3087.6 (60)	2497.4 ± 186.38	-19.2	3153 (60)	2638.30± 221.72 (50.20)	-16.3
Carbohydrate (g)	427.2 (8.3)	532.80 ± 67.85 (10.4)	24.7	436.2 (8.3)	579.10± 65.89 11.01	32.7
Protein (g)	128.6 (2.4)	56.31± 8.77 (1.1)	-56.3	131.4 (2.5)	64.70± 13.68 (1.2)	-50
Fat (g)	108.06 (2.1)	53.70± 9.22 (1.1)	-50.4	110.4 (2.1)	57.48± 5.94 (1.1)	-48.1
Ratio (C:F:P)	55:16:31	85:9:19	-	55:16:31	73:8:16	-

Per kg body weight parenthesis; C: P: F=Carbohydrate: Protein: Fat

The mean energy, carbohydrate, protein and fat intake of female Thang- Ta athletes in the age group of 15-19 years were found as 2497.4±186.38kcal, 532.80±67.85 (g), 56.31±8.77 (g), 53.70±9.22 (g) respectively. When compared to the suggested Allowance by ILSI, NIN, and SAI, (2007) for specific event, the intake was disproportionate; energy intake was 19.2 per cent deficient, carbohydrate 24.7 per cent excess, protein 56.3 per cent deficient and fat 50.4 per cent deficient. Therefore the energy contribution was disproportionate. The mean per cent energy contribution ratio of Carbohydrate :Protein : Fat intake was 85:9:19,it was against the suggested energy contribution ratio of Carbohydrate :Protein : Fat (55:16:31) for specific event. Similarly, the mean energy, carbohydrate, protein and fat intake of female athletes in the age group of 20-25 years were found as 2638.30±221.72 kcal, 579.10±65.89 (g), 64.70±13.68 (g), 57.48±5.94 (g) respectively. The energy intake was 16.3 per cent deficient, carbohydrate 32.7 per cent excess, protein 50 percent deficient and fat 48.1 per cent deficient. Therefore the energy contribution was of carbohydrate: protein: Fat was 73:8:16 which was against the suggested energy contribution ratio carbohydrate: protein: Fat (55:16:31).

Table V
Micro Nutrient Intake of Female Thang -Ta Athletes

Nutrient	Female Thang -Ta athletes					
	Age group 15-19			Age group 20-25		
	Suggested allowance ICMR 2010	Actual intake	% excess/deficit	Suggested allowance ICMR 2010	Actual intake	% excess/deficit
Thiamine (mcg)	1.0	0.78± 0.35	-22	1.4	0.89±	-33.42

					0.31	
Riboflavin (mg)	1.2	0.73± 0.43	-39.16	1.7	0.82± 0.32	-51.76
Niacin (mg)	14	10.53± 1.84	-24.78	16	10.95± 2.05	-31.56
Ascorbic acid (mg)	40	24.09± 6.12	-39.77	40	26.16± 5.43	-34.6
Iron(mg)	26	23.00± 4.47	-11.53	21	24.06± 2.75	14.57
Calcium(mg)	800	440.52± 130.50	-44.93	600	446.76± 93.53	-25.54
Beta carotene(mcg)	4800	2100.83± 784.48	-56.23	4800	2117.73 ± 807.01	-55.88

When compared with the suggested micro nutrient allowance given by ICMR (2010), the mean intake of thiamine, riboflavin, niacin, ascorbic acid, iron, calcium and beta carotene intake of female Thang- Ta athletes in the age group of 15-19 years were less (at levels 22 per cent, 39.16 per cent, 24.78 per cent, 11.53 per cent, 44. 93 per cent, 56.23 per cent respectively) than the suggested requirement. Similarly, the mean intake of thiamine, riboflavin, niacin, ascorbic acid, calcium and beta carotene intake of female Thang- Ta athletes in the age group of 20-25 years were less (at levels 33.42 per cent, 51.76 per cent, 31.56 per cent, 34.6 per cent, 25.54 per cent, 55.88 per cent respectively) than the suggested requirements, except mean Iron intake was slight excess at 5.1 percent levels.

CONCLUSION:

From the study it can be concluded that Thang- Ta is mainly practiced rural people of Manipur. Majority of the athletes were from low income group. Most of the athletes were come from agricultural families and all the female athletes were literate. The present data revealed that more number of budding athletes in the age group of 15-19 years participated in Thang- Ta. It is encouraging to know that Thang-Ta is catching up with young athletes. All the athletes were having normal BMI in comparison of WHO classification. Cereal and millets intake was in excess but there is less deficient in vegetable intake among Manipuri Thang- Ta athletes. It was found that the consumption of milk and milk product and low intake of high quality milk protein and specifically, of highly bioavailable calcium among Thang -Ta athletes. Macro nutrient intake was disproportionate among the female athletes. The investigator recommended that Nutritional Intervention is highly essential for the athletes as well as the indigenous coaches or trainer in order to improve diet quality with the inclusion of various food stuff such as whole grains, fruits ,vegetables diary product and better protein quality along with reduction saturated fat, low sodium and inclusion of sugar.

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DEVELOPMENT AND EVALUATION OF RHEOLOGICAL PROPERTIES OF FRUIT PUREE

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ABSTRACT

Diets high in fruits are widely recommended for their health promoting and antioxidant properties. The objectives are preparation and sensory evaluation of fruit puree and analysing its rheological properties. Based on the literature and availability, fruits namely tomato, amla, guava, strawberry and dates were selected. Fruit puree prepared was standardised and subjected to sensory evaluation. The rheological properties were studied using standard procedures. Sensory evaluation revealed that mean scores for strawberry puree was accepted with highest scores for all attributes of sensory evaluation when compared with the standard. The rheological properties revealed that there was a decrease in variation of viscosity with shear rate for same temperature with time whereas the variation of shear rate with shear stress for same temperature with time increased for the fruit puree. Hence fruit puree a sustainable nutritious food packed with photochemical can be consumed by all age groups at all times in combination with other food.

KEYWORDS: *Rheological, Increased, Viscosity, Nutritious*

INTRODUCTION

Fruits have historically held a place in dietary guidance and are widely recommended for their health promoting properties because of their concentrations of vitamins, especially vitamins C and A; minerals, especially electrolytes; and more recently phytochemicals, especially antioxidants and as a source of dietary fibre (Ottawa: Health Canada; 2007). Fruits provide all the nutrients for the humans to stay healthy. A diet rich in fruits can lower blood pressure, reduce the risk of heart disease and stroke, prevent some types of cancer, lower risk of eye and digestive problems, and have a positive effect upon blood sugar which can help keep appetite in check. Eating a variety of types and colours of produce give a mix of nutrients the body requires. Brightly coloured red, yellow and orange fruits; and cooked tomatoes satieties these requirements (*Hung et al.*, 2004). Eating a variety of fruits ensures an adequate intake of most micronutrients, dietary fibre and essential non-nutrient substances (Sandrine, 2005). Fruits are important source of fiber, vitamins and other biologically active substances that can favorably affect the pathogenesis of breast cancer through several biological mechanisms (*AICR*,2000, *Eliassen et al., 2012 and Farvid et al., 2015).* The World Health Organisation (WHO, 2013) advocates a daily intake of 400g of fruit for maintaining good health.

Amla commonly known as Indian gooseberry, is a wonder herb and one of the precious gift of nature to human health (Singhm *et al*., 2011). In addition to its tonic and rejuvenating function, ancient unani literature recommends its use in various diseases also, such as bleeding disorder, digestive system disorder, cardiac and respiratory disorders, liver diseases, urogenital disease and skin problems (Ghani and Advia, 2007). *Psidium guajava* L. known as Guava is a medicinal plant belonging to the family Myrtaceae. *P. guajava* is a well known traditional medicinal plant used in various indigenous systems of medicine (Mital *et al.*, 2011). Guava with high nutrition are included among super fruits, being rich in dietary fiber, vitamins A and C, folic acid; and the dietary minerals, potassium, copper and manganese. Strawberry *(Fragaria x ananassa Duch.)* is a soft fruit crop which belongs to the family Rosaceae andgenus Fragaria. Strawberries have highly desirable taste, flavor and is an excellent source of vitamins, potassium, fibreand sugars (Sharma and Sharma, 2004). As compared to other berry fruits, strawberries contain a higher percentage of vitamin C, phenolics and flavonoids (Hakkinen and Torronen, 2000). Strawberry is a good source of natural antioxidant. Strawberries help to reduce control morbidity and mortality from chronic diseases, cancer, heart disease and other human diseases. Date palm *Phenix dactylifer L.* is very important tree in the Arab world. The date itself is a high energy food item (Salalh and Naser, 2000). Antioxidant activity is recognized due to the wide range of phenolic compounds present in dates including p-coumaric, ferulic and sinapic acids, flavonoids, and procyanidins (Mansouri*et al*., 2005 and Gu *et a*l., 2003).

The fruits are preserved from age old times in order to consume them during other seasons when they are not available. One such method of preserved form of fruits includes preparation and preservation of puree. A puree (or mash) is a cooked food, usually vegetables or legumes, that has been ground, pressed, blended or sieved to the consistency of a soft creamy paste or thick liquid purées overlap with other dishes with similar consistency, such as thick soups, creams and gravies. Purées generally must be cooked, either before or after grinding, in order to improve flavour and texture, remove toxic substances, and/or reduce their water content. It is common to use puree as a meal for toddlers, babies and those unable to chew as sufficiently,*(Hamlyn, 2000 and 2012).* As there are very limited studies available on these lines, the present topic is of great concern. Considering the above mentioned nutritional and health benefits of the present

investigation entitled **"Development and Evaluation of Rheological Properties of Fruit Puree"** has beencarried out with the following **objectives:**

- Preparation of puree with fruits
- Sensory evaluation of the puree developed using fruits
- Analysing the rheological properties of the fruit puree

METHODOLOGY

Selection, development and standardization of the puree

Fresh, mature, ripened and intact fruits were purchased from the local super market.100g weighed quantity of fresh fruits namely tomato, amla, guava, strawberry and dates were selected for the study. The selected fruits were soaked in water for 20 minutes to remove the presence of unwanted dust particles, surface soil and micro organisms present in the skin.

The washed fruits were cooked in measured volume of water for a stipulated time. The fruits were cooked by closing the lid. The amount of water used, the time and temperature taken for cooking each of the fruit was standardized after repeated trials. Once the fruits were cooked thoroughly they were allowed to cool at room temperature. The cooked fruits were made into a smooth paste using a blender and salt, sugar and spices were added in weighed quantities as per the procedure after repeated trials.

Sensory evaluation of the puree

According to Lutz (2008), acceptance testing evaluated the attributes of colour, taste, visual appearance and overall acceptability using a nine-point hedonic scale, which was anchored at the ends with extremely liked (9) through extremely disliked (1). The fruit puree was subjected to sensory evaluation. Twenty five semi trained panellists were selected for evaluating the food product using sensory evaluation using 9 point hedonic scale. The panellists were asked to evaluate the food product comparing along with the standard.

Rheological property

Rheometry refers to the experimental technique used to determine the rheological properties of materials that is the quantitative and qualitative relationships between deformations and stresses and their derivatives. The rheological properties of the puree were analysed using Brookfield rheometer (AOAC, 2005).

Statistical analysis and interpretation of the data

The data obtained was consolidated and tabulated in which mean and standard deviation were computed. One way ANOVA was used to calculate the significance. The research design was presented for approval in the Institutional Human Ethics Committee and the ethical clearance approval was obtained.

RESULTS AND DISCUSSION

Standardization of fruit puree

The fruits selected are tomato (*Solanum lycopersicum L)*, amla (*Phyllanthus emblica)*, guava (*Psidium guajava L)*, strawberry (*Fragaria x ananassa Duch*) and dates (*Phenix dactylifer L)*. The cooking temperature, cooking time and water used for the development and standardisation

of the puree are recorded. The fruits namely tomato, amla and dates consumed 300 ml of water to cook the fruit completely whereas guava took 250 ml and strawberry took the least amount of water i.e. 30 ml to cook the fruit completely. The cooking time was 10 minutes and 33 seconds which was highest for the dates as the fleshy part was more in dates compared with other fruits. This was followed by tomato with 10 minutes and 29 seconds. All other fruits namely guava took 9 minutes and 30 seconds followed by amla with 8 minutes and 30 seconds, strawberry with 6 minutes and 20 seconds. It was observed that the cooking time was less than 10 minutes for the fruits guava, amla and strawberry. This may be due to more amount of water content in the fruits. Strawberry cooked at a temperature of 75° C which the minimum temperature was taken when compared with other fruits. Tomato cooked at 90° C followed by amla with 92° C, guava with 93°C and dates with 94° C. Dates took the highest temperature to get cooked.

Sensory evaluation of the fruit puree

The puree prepared from fruits namely amla, guava, strawberry and dates are discussed in terms of appearance, colour, taste, flavour, texture and over all acceptability. The results of the sensory evaluation of fruit puree are presented in Table I.

TABLE I
SENSORY EVALUATION OF THE FRUIT PUREE

Criteria	Standard	Amla puree	Guava puree	Strawberry puree	Dates puree	F value
Appearance	8 ± 0.28	7.96 ± 0.2	7.88± 0.33	8.6 ± 0.5	8.2± 0.57	0.561^{ns}
Colour	8.24±0.59	7.68±0.45	7.8 ± 0.40	8.72 ± 0.45	8.08± 0.27	3.60*
Taste	8.08±0.27	7.48± 0.50	7.64±0.48	8.64 ± 0.48	8.16±0.34	0.742^{ns}
Flavor	8.12±0.33	7.6 ± 0.5	7.92 ± 0.2	8.56 ± 0.50	8.36± 0.48	5.60**
Texture	8.36±0.56	8.04 ± 0.2	8.04 ± 0.2	8.72 ± 0.45	8.28± 0.54	3.492*
Over all acceptability	8.16±0.62	7.52± 0.50	7.76 ± 0.43	8.76 ± 0.43	8.24± 0.59	5.821**

** - Significant at 1% level; * - Significant at 5% level; ns - Not significant

The mean scores for appearance was highest with 8.6 in strawberry puree followed by 8.2 in dates puree, 7.96 in amla puree and 7.88 in guava puree. The mean scores for colour was highest with 8.72 strawberry puree followed by 8.08 in dates puree, 7.8 in guava puree and 7.68 in amla puree. The mean scores for taste was highest with 8.64 in strawberry puree followed by 8.16 in dates puree, 7.64 in guava puree and 7.48 in amla puree. The mean scores for flavor was highest with 8.56 in strawberry puree followed by 8.36 in dates puree, 7.92 in guava puree and 7.6 in amla puree. The mean score for texture was highest with 8.72 in strawberry puree followed by 8.28 in dates puree, 8.04 in amla puree and guava puree. The mean scores for overall acceptability was highest with 8.76 in strawberry puree followed by 8.24 in dates puree, 7.76 in guava puree and 7.52 in amla puree.

It is observed from the above table that the strawberry puree was accepted with highest scores for all attributes of sensory evaluation when compared with the standard. This was followed by the dates puree which is in comparison with the standard puree for all parametes of sensory evaluation. Amla and guava puree has lesser scores when compared with the standard puree and the scores were in the range between 7 to 8 i.e. like very much to moderately. It was observed

that no significant difference between appearance and taste of the fruit puree when compared with the standard. Colourand texture of fruit puree was significant at 5% ($p<0.05$) level when compared with the standard. Flavor and overall acceptability of the fruit puree was significant at 1% ($p<0.01$) level when compared with standard. Statistical analysis of the fruit puree presents that the taste was well comparable with the standard with no significant difference. Hence fruit puree like any other puree can be included in the daily diet.

Rheological properties of fruit puree

Tomato puree - The variation of viscosity for tomato puree with shear rate is represented in Figure 1.The range of shear stress for tomato puree was 0 to 70 Pa and the shear rate was 0 to 1,116 1/s. The maximum viscosity was 0.3990 Pa.s at a shear stress of 10.018 Pa and shear rate of 25.108 1/s. In this case, the viscosity decreases with shear rate establishing that tomato puree is shear thinning. The variation of shear rate with shear stress increases. Tomato puree exhibit non Newtonian shear thinning behaviour.

Amla puree - The variation of viscosity with shear rate for amla puree is represented in Figure 2.The range of shear stress for amla puree was 0 to 60 Pa and the shear rate was 0 to 1,258 1/s. The maximum viscosity was 0.8919 Pa.s at a shear stress of 50.025 Pa and shear rate of 56.088 1/s. In this case, the viscosity decreases with shear rate establishing that amla puree is shear thinning. The variation of shear rate with shear stress increases. Amla puree exhibit non Newtonian shear thinning behaviour.

Guava puree - The variation of viscosity with shear rate is represented in Figure 3 for guava puree.The range of shear stress for guava puree was 0 to 120 Pa and the shear rate was 0 to 210 1/s. The maximum viscosity was 2.2834 Pa.s at a shear stress of 40.007 Pa and shear rate of 17.52l 1/s. In this case, the viscosity decreases with shear rate establishing that guava puree is shear thinning. The variation of shear rate with shear stress increases. Guava puree exhibit non Newtonian shear thinning behaviour.

Strawberry puree - The variation of viscosity with shear rate is represented in Figure 4 for the strawberry puree. The range of shear stress for strawberry puree was 0 to 100 Pa and the shear rate was 0 to 700 1/s. The maximum viscosity was 1.9714 Pa.s at a shear stress of 20.017 Pa and shear rate of 10.153 1/s. In this case, the viscosity decreases with shear rate establishing that this sample in shear thinning. The variation of shear rate with shear stress increases for strawberry puree. Strawberry puree exhibited non Newtonian shear thinning behaviour.

Dates puree - The variation of viscosity with shear rate is represented in Figure 5 for the dates puree. The range of shear stress for dates puree was 0 to 100 Pa and the shear rate was 0 to1,300 1/s. The maximum viscosity was 0.8374 Pa.s at a shear stress of 10.018 Pa and shear rate of 11.964 1/s. In this case, the viscosity decreases with shear rate establishing that this sample is shear thinning. The variation of shear rate with shear stress increases for dates puree. Dates puree exhibit non Newtonian shear thinning behaviour.

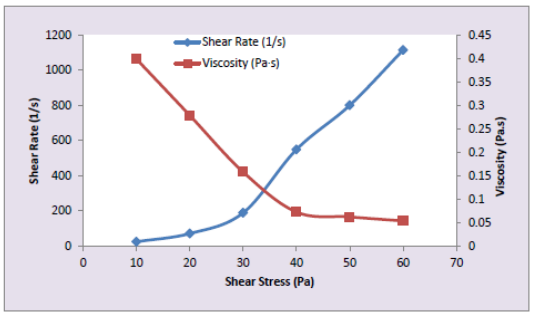

Figure 1-Tomato puree

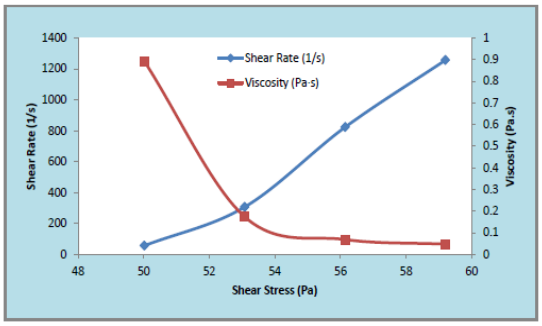

Figure 2-Amla puree

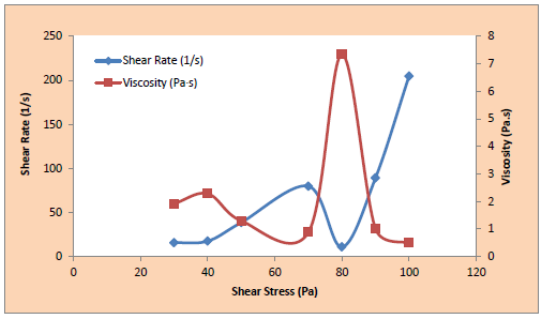

Figure 3-Guava puree

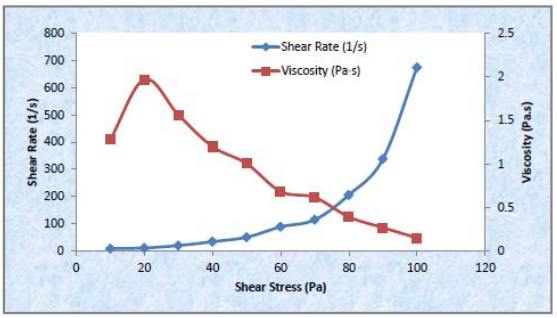

Figure 4-Strawberry puree

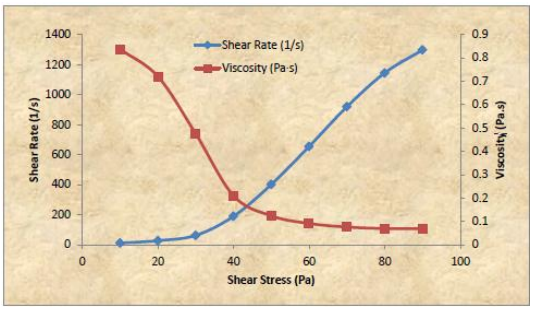

Figure 5-Dates puree

SHEAR STRESS, SHEAR RATE AND VISCOSITY OF FRUIT PUREE

Overall rheological property of the fruit puree is presented in Table II.

TABLE II
OVERALL RHEOLOGICAL PROPERTIES OF THE FRUIT PUREE

Puree	Variation of viscosity with shear rate for same temperature with time	Variation of shear rate with shear stress for same temperature with time
Tomato	Decreases	Increases
Amla	Decreases	Increases
Guava	Decreases	Increases
Strawberry	Decreases	Increases

Dates	Decreases	Increases

CONCLUSION

The study thus brings out the potentials of fruit puree in terms of rheological properties. Fruit puree can be used in the daily dietaries for children adding a variety to the diet along with the enriching nutrients. Purees can also be consumed by the elderly who have the problems of dentures. This help them to alleviate their nutritional status to carry out their daily activities with ease and comfort. Hence fruit puree a sustainable nutritious food packed with phytochemicals which can be consumed by all age groups at all times in combination with other food.

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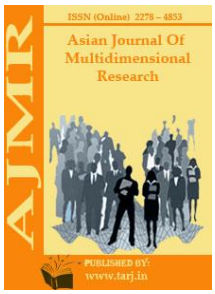

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

A STUDY ON EFFICACY OF GARLIC POWDER (ALLIUM SATIVUM) SUPPLIMENTATION ON TYPE II DIABETIC PATIENTS

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ABSTRACT

Diabetes mellitus is a systemic metabolic disease characterized by hyperglycemia, hyperlipedemia, hyper aminoacidemia, and hypoinsulinaemia it leads to decrease in both insulin secretion and insulin action and frequently associated with the development of micro and macro vascular diseases. Diabetes is a growing problem across the world. Obesity is also considered as key risk factor for type II DM. Garlic preparations have been widely used for prevention and treatment of cardiovascular disease and other metabolic disease, hence a study was conducted to evaluate the effects of Garlic powder supplementation on blood glycemic control in subjects with type 2 diabetes. 128 male and 122 female with Type II Diabetic in the age group ranging from 35-65 years were selected for this study. Out of the selected 250 NIDDM subjects, 100 samples were selected for the supplementation study. Subjects in the intervention group (n=50) consumed 25 gms of garlic powder twice a daily for a period of 90 days. Anthropometric indices including body weight, BMI and height and other baseline data were measured at the beginning and end of the trial.Glycemic status were measured at the pre and post intervention. The collected data were consolidated, tabulated and analysed by mean, standard deviation and 't' test. Supplementation with garlic powder caused a significant reduction in weight, BMI, Waist hip ratio, Fasting and postprandial glucose level in the experimental group.Garlic powder supplementation may help to control diabetes and its complications via improving glycemic parameters.

KEYWORDS: *Garlic, Glycemic Status, Lipid Profile, Anthropometric Measurements, Type 2 Diabetes*

INTRODUCTION

Diabetes mellitus (DM) is considered as a non-communicable disease and main public health challenge in developing and developed countries. Diabetes mellitus is a significant public health problem worldwide. It is associated with wide spread hormonal metabolic and micro vascular abnormalities as well as with disturbances of the function of many organs and systems (Agarwala.A.S *et al* 2010) Diabetes mellitus Type II which constitutes the major share of the diabetes burden in India is today considered one part of the metabolic syndrome also termed syndrome X or Reaven 's syndrome (Hazra .D.K.,2008) The prevalence of diabetes was 171 million in the year 2000. The total number of diabetic patients will be 366 million by the year 2030(Shaw JE *et al* 2010).

Obesity is also considered as key risk factor for TypeII DM.The association between increasing body mass index and greater weight gain and risk of diabetes is most pronounced among Asians, suggesting that lower cut off BMI values are needed to identify Asians at a higher risk of Diabetes(Shai *et al*,2006).There is also a probable indication that there is a preferential abdominal adiposity in Indians irrespective of the degree of general adiposity (Ramachandran *et al* 2002).Valdez et al,(2007) opined that type II diabetes is a genetic predisposed disease. Individuals with a history of diabetes in their parents or siblings were observed to have 2-6 folds high risk for diabetes. Type II diabetes have an increased prevalence of lipid abnormalities that contribute to higher rate of CVD.(Joyal *et al*,2004). Complications of diabetes affect almost all parts of the human body. Vascular complications of diabetes include neuropathy, nephropathy and retinopathy, and macro vascular disease, which is one of the major causes of mortality in patients. Hypertension is seen in 70% of diabetic patients. The risk of developing diabetes is two times higher in people with high blood pressure (Mohmmad *etal*2011) Hypertension is a risk factor for cardiovascular disease, and its control has great importance. High blood pressure and diabetes mellitus are two main risk factors for atherosclerosis, which is responsible for early inability and high mortality in diabetic patients. Before people develop Type II diabetes, they almost always have "prediabetes" –blood glucose levels that are higher than normal but not yet high enough to be diagnosed as diabetes. Recent research has shown that some long-term damage to the body, especially the heart and circulatory system, may already be occurring during prediabetes(DePaula, 2008).

Garlic has attracted particular attention of modern medicine because of its widespread health use around the world and the cherished belief that it helps in maintaining good health warning of illness and providing more vigor Sanjay K. Banerjee and subir K Maulik, 2002). Commercially available garlic preparations in the form of garlic oil, garlic powder and pills are widely used for certain therapeutic purposes, including lowering blood pressure and improving lipid profile (Elkayam etal, 2003). Garlic is known to possess a number of biologically active compounds having anticoagulant (Fukao et al., 2007), antioxidant (Banerjee et al., 2003; Lee et al 2009), antihyperlipidemic (Gupta and Porter, 2001) and antihypertensive effects (Verma et al., 2008). Garlic principle active agent appears to be allicin, a sulfur-containing compound that with its breakdown products gives garlic its characteristic odour (Elkayam etal., 2003). Allicin is formed enzymatic ally from an odorless precursor, alliin, when garlic cloves are mechanically disrupted (Alpers, 2009). The probable mechanism underlying garlic hypoglycemic effects most likely is increased insulin secretion and sensitivity (Birdee and Yeh, 2010).

METHODOLOGY:

Though many research studies have been carried out in this field, preventive and curative measures for this complex metabolic disorder have not yet been found out. At this juncture the prevalence data on Diabetes Mellitus have to be found out and supplementation studies need to be carried out to understand the prevailing situation in the society.

Subjects:

128 male and 122 female with Type II Diabetic in the age group ranging from 35-65 years were selected from the VMD Diabetic Clinic and Dia care Centre of Coimbatore city. The particular clinic was selected based on convenience .Out of 250 NIDDM subjects,100 samples were selected for the supplementation study and divided as Control group (n1=50)and Experimental group(n2=50).

Collection of base line information:

For obtaining the base line information of the selected Type-II Diabetic Subjects, interview method was chosen as it is the most widely used and effective tool for collecting primary data, a specially designed interview schedule was used to elicit information regarding socio economic status, nature of activity, medical history and nutritional assessment of the selected samples.The anthropometric indices were measured, at the beginning and at the end of the study. Nutrient intake data and fasting and post prandial glucose level were measured at the beginning and end of the intervention.

Preparation and supplementation of Garlic Powder

Garlic was bought and it was powdered .A 25gm of garlic powder was packed in polyethylene covers and distributed to experimental group. Dose of 25gm twice a daily was recommended for a period of 90 days. The garlic powder was mixed with water and consumed by the samples.

RESULTS AND DISCUSSION

The demographic characteristics of subjects are found that among 250 diabetic subjects 51.2 percent were male and 48.8 percent were female. Of the selected samples, majority of them were aged between 46-55 years. In the present study 21percent of male diabetic were of 35-45 years, Whereas 37.5 percent male and 32.78 percent female were of aged between 56-65 years. It is revealed from the data the majority of the diabetic subjects were married who have more responsibilities, tension and stress than single subjects.

TABLE- 1-MEDICAL HISTORY OF SELECTED DIABETIC SUBJECT (N=250)

S.No.	Family	Male		Female	
		No	Percent	No	Percent
1.	Father	66	51.56	59	48.36
2.	Mother	47	36.71	44	36.06
3.	Grand Parents	2	1.56	4	3.27
4.	Other relatives	13	10.15	15	12.29

Among selected male subjects 51 percent of the subject's father had diabetes, 37 percent of subject's mother and 1 percent of subjects grand parents have diabetes Ramachandran (2003) Stated that "if both father and mother have Diabetes there is 60 percent of chances of getting diabetes for their children". Among female diabetic subjects 48 percent of subject father had diabetes and 36 percent of subjects mother had diabetes.

TABLE-2 AWARENESS ABOUT HYPOGLYCEMIC FOODS (N=250)

S.No.	Hypoglycemic Foods	Male		Female	
		No	Percent	No	Percent
1.	Bitter gourd	65	50.78	58	47.54
2.	Fenugreek	63	49.21	62	50.81
3.	Kuvalam	7	5.47	2	1.63
4.	Navalseed	8	6.25	10	8.19
5.	Ekanayakam	6	4.68	4	3.27
6.	Chakarakolli	28	21.87	36	29.50
7.	Curry leaf	30	23.43	27	22.13
8.	Others	4	3.12	15	12.29

It is heart warming to note that more than 45 percent of male and female subjects were aware about bitter gourd and Fenugreek as hypoglycemic foods. About more than 20 percent of male and female diabetes were aware about chakara kolli and curry leaf as a hypoglycemic foods. Fenugreek has shown significant anti diabetic effect in experimental and clinical studies

Anthropometric Measurement of Selected Diabetic Subjects

Anthropometry gives the present nutritional status of a person throwing light on height, weight, BMI and WHR(liplain,2001).Table-4 depicts the anthropometric parameters measured before and after the garlic powder supplementation study.

TABLE-3
ANTHROPOMETRIC PARAMETERS MEASURED BEFORE AND AFTER THE GARLIC POWDER SUPPLEMENTATION STUDY

Group	Mean Weight Kg±SD		't' Value	Level of Significance	MeanBMI ±SD		't' value	Level of Significance	MeanWHR (mm)±SD		't' value	Level of Significance
	Before	After			Before	After			Before	After		

A.control Group (n1=50)	62.03 ±8.05	63.02 ±6.85	2.47	**	25.20 ±3.17	25.58 ±2.96	2.27	**	0.88 ±0.18	0.88 ±0.17	0.96	**NS**
B Experimental Group (n2=50)	61.63 ±7.27	58.46 ±6.55	5.96	ΔΔ	24.91 ±2.22	23.53 ±1.84	7.41	ΔΔ	0.88 ±0.18	0.87 ±0.16	0.19	**NS**

**Significantly higher at 1.00 percent level

ΔΔ Significantly lower at 1.00 percent level

NS Not Significant

From the results, it was clearly understood that there was no change in the weight of selected control group but slight reduction in the experimental group before and after supplementation. But there was statistically significant reduction in the mean body weight and BMI of the experimental subject.

The postprandial glucose level in the control group was 223±28.41mg percent at the initial period which raised to 246.0±27.39mg percent at the final period of the study. But the mean postprandial glucose level of the experimental group was 216.70±27.23mg percent initially was reduced to 174.40±27.92mg percent after supplementation. The statistical analysis clearly indicated that there was a highly significant increase in postprandial blood glucose level (at1.00 percent level)in the control group but a significant decrease at 1.00 percent level in the experimental group.

CONCLUSION:

Therefore it may be concluded that the garlic powder supplementation was highly effective in bringing about better control of the blood glucose level among type II Diabetic patients. The garlic powder supplementation can be popularized in hospitals and counseling centers through effective nutrition counseling.

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PHYTOCHEMICAL CONTITUENTS AND NUTRIENT COMPOSITION OF FRESH AND COOKED SOLANUM NIGRUM LEAVES

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ABSTRACT

Many herbal plants exhibit remarkable antioxidant potentials and nutraceutical properties. Solanum nigrum (black nightshade) is a medicinal plant belongs to Solanaceae family which exhibits high antioxidant content and used as a traditional medicine for various ailments. With this in view, the researcher aimed to study the effect of different cooking methods in the selected nutrient and phytochemical content in Solanum nigrum leaves and fruits which has cultivated under controlled conditions. The plants were cultivated in pre-prepared mud pots in a greenhouse at the Avinashilingam University for women, Coimbatore. After 3 month period the leaves were collected and subjected for different cooking methods such as boiling, pressure cooking, steaming, sautéing and microwave cooking. All the cooked samples and fresh sample of Solanum nigrum leaves were analyzed for its nutrient content such as ash, moisture, crude fibre, carbohydrate, protein, energy (calculated), vitamin C, calcium, iron, phosphorus and β carotene. The samples were analyzed qualitatively for their phytochemical constituents. The present study is an attempt to prove scientifically the influence of different methods of cooking in nutrient and phytochemical content of Solanum nigrum leaves and fruits as compared with its fresh samples.

KEYWORDS: *Solanum Nigrum, Cooking, Nutrient Content, Phytochemicals*

INTRODUCTION

Solanum nigrum (black nightshade) is a medicinal plant belongs to the family Solanaceae [1] which is named commonly as black nightshade or Makoi [2].

Various compounds such as glycoproteins, glycoalkaloids, and polysaccharides and polyphenols such as gallic acid, catechin, protocatechuic acid (PCA), caffeic acid, epicatechin, rutin etc. were also identified from *Solanum nigrum* which may be responsible for diverse nutraceutical properties of the plant [3]. Phytochemical such as alkaloids, flavonoids, tannins, saponins, glycosides, proteins, carbohydrates, coumarins and phytosterols were identified from different parts of the plant. The literature studies give remarkable evidences for the use of *Solanum nigrum* as a traditional herbal medicine for hepatotoxicity, ulcer and cancer. The plant has the potential to prevent hepatotoxicity and cytotoxicity and its use may improve functions of liver and kidney [4].

More detailed researches about the antioxidant potential of the plant may lead to the discovery of some herbal drug for treatment of cancer and other degenerative diseases in future. With this in view, the study was conducted with the following objectives.

- Application of different cooking methods on *Solanum nigrum* leaves
- Analyze the nutrient and phytochemical content of *Solanum nigrum* leaves subjected to different cooking methods

METHODOLOGY

Collection and pre-preparation of *Solanum nigrum* leaves for analysis

The *Solanum nigrum* plants used for the research purposes were duly certified by a taxonomist and cultivated in the green house at Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu. After 3-4 months of cultivation, the leaves were harvested from the cultivated plants, cleaned and stored for further nutrient and phytochemical analysis.

Cleaned *Solanum nigrum* leaves were subjected to different cooking methods namely boiling, steaming, sautéing, pressure cooking and microwave cooking at the Foods Laboratory, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women.

Analysis of nutrient composition of fresh and cooked *Solanum nigrum* leaves

The different nutrients namely ash, moisture, crude fibre, carbohydrate, protein, vitamin C, calcium, iron, phosphorus and β carotene of fresh and cooked *Solanum nigrum* leaves were analyzed by standard procedures in the Nutrition Laboratory, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women.

Identification of Phytochemicals in fresh and cooked *Solanum nigrum* leaves

Aqueous, methanol and ethanol extracts of fresh and cooked *Solanum nigrum* leaves were obtained by extracting 50g of accurately measured and finely ground fresh and cooked *Solanum nigrum* leaves with 500ml of distilled water, methanol and ethanol separately for 90 min followed by centrifuging at 4500 rpm. The supernatants were collected separately and the

extraction was repeated twice with residues. The collected *Solanum nigrum* leaves supernatants of aqueous methanol and ethanol were combined and lyophilized, stored below 0°C until further analysis [5].

Qualitative estimation was done for phytochemicals such as Alkaloids [6], Anthraquinone glycosides (Borntrager's test) [7], Cardiac glycosides (Keller-Killani test) [8], Coumarins [9], Flavonoids (Alkaline reagent test) [10], Glycosides [11], Phenols [9], Quinones [9], Saponins [12], Steroids (Salkowski test) [13], Tannins [14] and Triterpenoids [15].

RESULTS AND DISCUSSION

The results of the study are discussed under the following headings

Nutrient composition of fresh and cooked *Solanum nigrum* leaves

Nutrient composition of fresh and cooked *Solanum nigrum* leaves

Nutrient content of fresh and cooked *Solanum nigrum* leaves are given in Table 1.

TABLE 1. NUTRIENT COMPOSITION OF FRESH AND COOKED *SOLANUM NIGRUM* LEAVES

Sl. No.	Nutrients	Fresh *Solanum nigrum* Leaves	Cooked *Solanum nigrum* Leaves				
			Boiling	Pressure Cooking	Steaming	Sautéing	Microwave Cooking
1	Ash content (g)	1.0	1.0	0.8	2.0	4.7	1.0
2	Moisturecontent (%)	85.05	85.38	86.34	84.3	49.8	74.0
3	Crude Fibre content (g)	0.94	1.4	0.8	1.2	2.6	3.6
5	Carbohydrate (g)	10.2	10.7	11.0	10.2	11.0	11.0
6	Protein (g)	5.2	4.9	5.4	5.4	5.6	5.2
7	Iron (mg)	24	2.66	13.3	20	42.5	30.9
8	Calcium (mg)	192	180	100	184	144	176
9	Phosphorus (mg)	68.2	32	46.4	54.4	119	119

Calcium was found to be high in fresh leaves as compared with cooked leaves. Ash content (4.7g/100g), protein (5.6g), iron (42.5mg) and phosphorus (119mg) were maximum amounts in sautéed leaves. The pressure cooked leaves contained minimum amount of ash content (0.8g/100g), fibre (0.8g) and calcium (100mg). The boiled leaves exhibited minimum amount of protein (4.9g), iron (8.66mg) and phosphorus (32mg).

β carotene and vitamin C content of fresh and cooked *Solanum nigrum* leaves

The Vitamin C and β-carotene content of fresh and cooked *Solanum nigrum* leaves are exhibited in Figure 1 and 2.

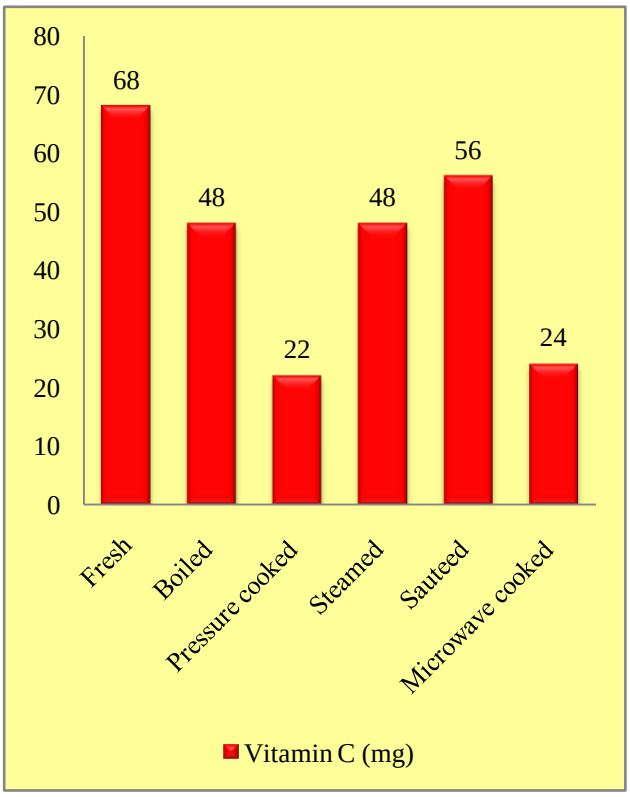

Figure 1.

Vitamin C content of Fresh and Cooked *Solanum nigrum* Leaves

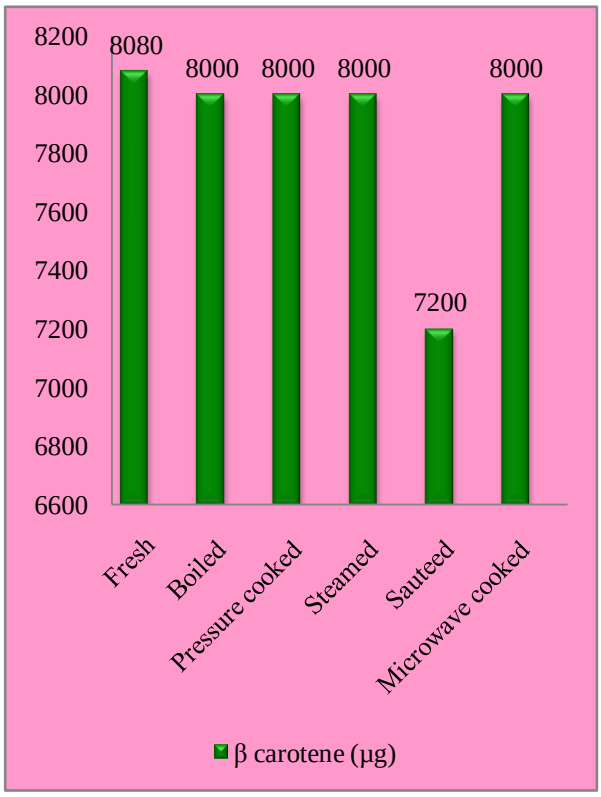

Figure 2.

β carotene content of Fresh and Cooked *Solanum nigrum* Leaves

Vitamin C was maximum in fresh leaves (68mg) when compared with cooked leaves. Sautéed leaves had maximum amount of vitamin C (56mg) and that of pressure cooked leaves had minimum amount of vitamin C (22mg).

β-carotene has antioxidant activity and prevents cancer and other diseases. Among the carotenes, β-carotene has the most antioxidant activity. Alpha-carotene has 50–54 percent of the antioxidant activity of β-carotene, whereas epsilon carotene has 42–50 percent of the antioxidant activity [17]. β carotene content was maximum in fresh leaves (8080 µg). All the cooked leaves except sautéed leaves exhibited the β carotene quantity of 8000 µg. The sautéed leaves had minimum β carotene content of 7200 µg. The β carotene concentration of fresh and cooked *Solanum nigrum* leaves can be suggested for conditions such as Vitamin A deficiency and can be consuming as a good source of antioxidant.

Phytochemical constituents in different extracts of fresh and cooked *Solanum nigrum* leaves

In the nutrient analysis for fresh and cooked *Solanum nigrum* leaves, steam cooked variation showed over all better nutrient content as compared with other cooking methods. Hence qualitative analysis for phytochemicals was done for the steam cooked leaves. The phytochemical constituents in different aqueous, methanol and ethanol extracts are presented in Table 2.

TABLE 2.
PRESENCE OF PHYTOCHEMICALS IN FRESH AND STREAM COOKED SOLANUM NIGRUM LEAVES

Sl. No.	Phytochemical	Fresh *Solanum nigrum* Leaves extract			Steam Cooked *Solanum nigrum* Leaves extract		
		Aqueous	Methanol	Ethanol	Aqueous	Methanol	Ethanol
1	Alkaloids	+	+	+	++	++	+
2	Anthraquinone glycosides	-	+	+	-	+	+
3	Cardiac glycosides	+++	+++	+++	+	++	++
4	Coumarin	+++	+	+	++	++	++
5	Flavonoids	++	+	+	++	++	++
6	Glycosides	++	+	+	-	+	+
7	Phenols	+++	+++	+++	+++	+++	+++
8	Quinines	+++	+++	+++	++	+++	+++
9	Saponins	+++	+++	+++	+	+++	+++
10	Steroids	+++	+++	+++	+++	++	++
11	Tannins	++	+++	++	+	++	++
12	Terpenoids	+	++	+++	-	++	+++

+++ appreciable amounts, ++ moderate amounts, + trace amounts, - complete absence

The cardiac glycosides are basically steroids with an inherent ability to afford a very specific and powerful action mainly on the cardiac muscle when administered through injection into man or animal [25]. Appreciable amount of cardiac glycosides, phenols, quinines, saponins and steroids were present in the aqueous, methanol and ethanol extracts of fresh *Solanum nigrum* leaves. Besides this, aqueous extract contained coumarin and ethanol extract contained terpenoids in appreciable amount. Coumarin consist of a large class of phenolic substances found in plants and are made of fused benzene and α-pyrone rings [26].

Appreciable amount of phenols were present in the aqueous, methanol and ethanol extracts of steam cooked leaves. Methanol and ethanol extracts of steam cooked leaves gave more phytochemicals as compared with its aqueous extract.

CONCLUSION

Application of different cooking methods leads to changes in the total weight either due to absorption of water or due to loss of water from the leaves. From the present study, it can be concluded that the presence of overall nutrients and phytochemicals are high in fresh leaves. Even though both in fresh and cooked forms of *Solanum nigrum* leaves are good source of nutrients such as iron, β carotene and vitamin C and had the composition of many phytochemicals such as alkaloids, coumarins, cardiac glycosides, flavonoids, phenols, quinone, saponins and steroids which are having remarkable nutraceutical properties in human health. Hence the plant *Solanum nigrum* leaves can be suggested as a good nutraceutical for many diseased conditions, especially life style diseases such as diabetes and hypercholesterolemia.

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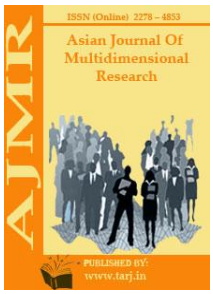

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INCORPORATION OF MORRIS BANANA POWDER IN BREAKFAST AND SNACK RECIPES

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ABSTRACT

Fruits and vegetables play an important role in healthy diet. High amount (i.e.) 300g of dried banana powder was obtained from banana slices dried using a cabinet drier. Sun drying, oven drying and freeze drying methods yielded 250g of banana powder, while shade drying yielded only 200g of banana powder, which was less when compared to other drying procedures. The banana was dehydrated by different drying methods like sun drying, shade drying, cabinet drying, freeze drying and oven drying. Banana contain 118 grams of fiber, potassium 9 grams, vitamin B6 33 grams, vitamin C 11 grams, magnesium 8 grams, copper 10 grams, manganese 14 grams, carbohydrate 24 grams, fiber 3.1 grams , protein 1.3 grams, fat 0.4grams. (Shinde and bensode et al.,2012). From the present study, it was concluded that cabinet drying was more suitable than other drying methods for incorporating in breakfast and snacks recipes. Six recipes were selected for the incorporation of banana powder three in Breakfast and snacks recipes. Breakfast recipes selected include idiappam, chappathi, paniyarum. Incorporation of banana powder to these products improved the taste and nutritional quality.

KEYWORDS: *idiappam, chappathi, paniyarum, Transportation*

INTRODUCTION

India is considered the fruit and vegetable basket of the world. Fruits and vegetables play an important role in healthy diet. Banana *(musasapientum)* is a popular fruit that is highly nutritious and delicious. Banana is one of the most important fruit crops grown in India. Banana is available throughout the year in India, there is a vast need to utilize for proper processing techniques. It could be processed into different value added products like powder, chips,wine and fig etc. (Aparcio, 2007)

Banana is rich in potassium and help to maintain healthy blood pressure, reduce cholesterol and lower the risk of heart disease. Ripe bananas contain serotonin, dopamine and norepinephrine. Banana contain 118 grams of fiber, potassium 9 grams, vitamin B6 33 grams, vitamin C 11 grams, magnesium 8 grams, copper 10 grams, manganese 14 grams, carbohydrate 24 grams, fiber 3.1 grams , protein 1.3 grams, fat 0.4grams. (shinde and bensode et al.,2012)

Banana contain dopamine which is an important neurotransmitter in the brain which affect mood and act as a potent antioxidant. Drying process is one of the alternative ways to preserve the food quality and increase its value.Banana powder is prepared by different drying methods like sun drying, shade drying, cabinet drying, freeze drying and oven drying. The banana powder is then incorporated into breakfast and snacks recipes. (Taylor,2007)

The objectives for the present study is to

- Identify the banana variety and prepare the banana powder by different drying methods like sundrying, shade drying, cabinet drying, oven drying and freeze drying.
- Incorporate the banana powder in selected breakfast and snack recipes.
- Standardize the recipes with various level of incorporation.
- Evaluate the acceptability of the developed recipes organoleptically.

METHODOLOGY

The methodology was carried out under the following headings:

1. Selection of banana and preparation of banana powder.

2. Development of banana powder incorporated breakfast and snacks recipes.

3. Sensory evaluation of banana powder incorporated recipes

Banana is a food that is recommended for several pathological conditions, including constipation and diarrhoea, due to its ability to normalize colon functions. Banana is considered to be a functional food of the prebiotic type.(Mastro et al., 2007).

Preparation of banana powder in different drying methods

Drying of food is one of the oldest and easiest methods of food preservation.

Dehydration is the process of removing water or moisture from a food product.

Removing moisture from foods makes them smaller and lighter. (Harrison et al.,2006)

Bananas are highly perishable due to their high moisture content and therefore very susceptible to postharvest losses during handling, transportation and storage (Benvenga et al., 2011)

The banana was dehydrated by different drying methods like sun drying ,shade drying,cabinet drying,freeze drying and oven drying.

Development of banana powder incorporated breakfast and snacks Recipes

Six recipes were selected for the incorporation of banana powder three in Breakfast and snacks recipes. Breakfast recipes selected include idiappam, chappathi, paniyarum. Incorporation of banana powder to these products improved the taste and nutritional quality. Snack recipes include kozhukattai, elaiadai and boli.

Table I presents the composition of ingredients used in breakfast recipe chappathi

TABLE - I
COMPOSITION OF INGREDIENTS FOR CHAPPATHI

Ingredients (g)	Standard	Variation1	Variation2	Variation3
Wheat flour	100	80	70	60
Banana powder	-	20	30	40
Oil(ml)	1	1	1	1
Water(ml)	50	50	50	50

Table II presents the composition of ingredients used in breakfast recipe idiappam

TABLE - II
COMPOSITION OF INGREDIENTS FOR IDIAPPAM

Ingredients (g)	Standard	Variation1	Variation2	Variation3
Rice flour	100	80	70	60
Banana powder	-	20	30	40
Oil(ml)	1	1	1	1
Water(ml)	50	50	50	50

Table III presents the composition of ingredients used in breakfast recipe paniyaram

TABLE - III
COMPOSITION OF INGREDIENTS FOR PANIYARAM

Ingredients (g)	Standard	Variation1	Variation2	Variation3
Paniyaram batter	100	80	70	60
Banana powder	-	20	30	40
Jaggery	50	50	50	50

Salt	1	1	1	1
Cardamom	1	1	1	1
Oil(ml)	10	10	10	10

Table IV presents the composition of ingredients used in snacks recipe Kozhukattai

TABLE - IV
COMPOSITION OF INGREDIENTS FOR KOZHUKATTAI

Ingredients (g)	**Standard**	**Variation1**	**Variation2**	**Variation3**
Rice flour	100	80	70	60
Banana powder	-	20	30	40
Coconut	50	50	50	50
Jaggery	50	50	50	50
Cardamom powder	1	1	1	1
Oil(ml)	5	5	5	5
Water (ml)	50	50	50	50

Table V presents the composition of ingredients used in snacks recipe Elaiadai

TABLE - V
COMPOSITION OF INGREDIENTS FOR ELAIADAI

Ingredients (g)	**Standard**	**Variation1**	**Variation2**	**Variation3**
Raw Rice flour	100	80	70	60
Banana powder	-	20	30	40
Powdered Jaggery	50	50	50	50
Roasted Bengal gram dhal	50	50	50	50
Fresh grated coconut	50	50	50	50
Salt	1	1	1	1
Oil(ml)	5	5	5	5
Water (ml)	50	50	50	50

Table VI presents the composition of ingredients used in snacks recipe boli

TABLE - VI
COMPOSITION OF INGREDIENTS USED IN BOLI

Ingredients (g)	Standard	Variation1	Variation2	Variation3
Maida	100	80	70	60
Bengal gram dhal	50	20	30	40
Jaggery	50	50	50	50
Banana powder	-	10	20	30
Cardamom powder	1	1	1	1
Oil(ml)	5	5	5	5
Water (ml)	50	50	50	50

Organoleptic evaluation

Sensory evaluation is a scientific discipline that applies principles of experimental design and statistical analysis to the use of human senses sight, smell, taste, touch and hearing for the purposes of evaluating consumer products.

Formulation of score card

A nine point hedonic rating scale was formulated, presented and used for conduction of organoleptic evaluation.

RESULTS AND DISCUSSION

The result of the study is presented under the following headings:

1. Preparation of banana powder by different drying methods

2. Incorporation of banana powder into breakfast and snacks recipes and sensory evaluation of the developed recipes

Table VII presents the data on the banana powder obtained using different drying process

TABLE –VII
DIFFERENT DRYING PROCESS OF BANANA POWDER

s.no	Drying methods	Quantity of raw banana (g)	Quantity of banana powder (g)
1.	Sun drying	500	250
2.	Shade drying	500	200
3.	Cabinet drying	500	300
4.	Oven drying	500	250
5.	Freeze drying	500	250

From the table VII, it is evident that the Morris banana selected for this study was subjected to different drying methods like sun drying , shade drying ,cabinet drying,oven drying and freeze

drying.High amount (i.e.) 300g of dried banana powder was obtained from banana slices dried using a cabinet drier. Sun drying, oven drying and freeze drying methods yielded 250g of banana powder, while shade drying yielded only 200g of banana powder ,which was less when compared to other drying procedures.

SENSORY EVALUATION OF THE DEVELOPED RECIPES

BREAKFAST RECIPES

The following table presents the mean acceptability scores of banana powder incorporated breakfast recipes

CHAPPATHI

Table VIII shows the mean acceptability scores of banana powder incorporated chappathi

TABLE –VIII
MEAN ACCEPTABILITY SCORES OF BANANA POWDER INCORPORATED CHAPPATHI

Variations	Appearance(Mean±SD)	Colour (Mean ± SD)	Flavour (Mean±SD)	Texture (Mean ± SD)	Taste (Mean±SD)	Over all acceptability (Mean±SD)
S	8.2±0.63	8.3±0.67	8.1±0.73	7.8±0.78	8.1±0.73	8±0.66
V1	8±0.66	8±0.81	8.2±0.63	8±0.66	8.2±0.78	8.3±0.67
V2	8±0.81	7.7±0.82	8±0.66	7.8±0.63	7.6±0.84	7.8±0.78
V3	8±0.94	7.8±0.91	7.9±0.73	8.1±0.87	8±0.94	8.1±0.87
T Test						
S vs V1	1.106^{ns}	1.274^{ns}	0.474^{ns}	0.886^{ns}	0.352^{ns}	1.274^{ns}
S vs V2	1.106^{ns}	3.000**	0.474^{ns}	0.000^{ns}	1.337^{ns}	0.761^{ns}
S vs V3	0.761^{ns}	2.057*	0.761^{ns}	1.554^{ns}	0.352^{ns}	0.474^{ns}

** - Significant at 1% level; * - Significant at 5% level; ns - Not Significant

Chappathi was prepared by incorporating banana powder at 20, 30 and 40 percent levels by replacing the wheat flour in the standard recipe. Chappathi prepared by incorporating with 20, 30 and 40 per cent of banana powder was taken as (V1),(V2) and (V3) respectively. From table VIII it is evident that 20 percent level of incorporate ion of banana powder in chappathi had the maximum score and has the highest overall acceptability.

IDIAPPAM

Table IX shows the mean acceptability scores of banana powder incorporated idiappam

TABLE –IX
MEAN ACCEPTABILITY SCORES OF BANANA POWDER INCORPORATED IDIAPPAM

Variations	Appearance (Mean±SD)	Colour (Mean ± SD)	Flavour (Mean±SD)	Texture (Mean ± SD)	Taste (Mean±SD)	Over all acceptability (Mean±SD)
S	7.9±0.63	7.9±0.56	7.6±0.51	7.7±0.48	7.7±0.67	7.6±0.51
V1	7.6±0.94	7.6±0.96	7.5±1.35	7.7±1.05	7.7±1.33	7.8±1.03
V2	7.6±0.82	7.6±0.84	7.7±0.82	7.7±0.82	8±0.66	8±0.47
V3	7.4±0.97	7.4±1.26	7.3±1.05	7.4±0.96	7.6±1.07	7.6±1.07
T Test						
S vs V1	0.180^{ns}	0.700^{ns}	0.037^{ns}	0.171^{ns}	0.147^{ns}	1.006^{ns}
S vs V2	0.258^{ns}	0.684^{ns}	0.561^{ns}	0.131^{ns}	1.394^{ns}	1.762*
S vs V3	0.667^{ns}	0.778^{ns}	0.610^{ns}	0.816^{ns}	0.147^{ns}	0.152^{ns}

* - Significant at 5% level; ns - Not Significant

Idiappam was prepared by incorporating banana powder at 20, 30 and 40 percent levels by replacing the rice flour in the standard recipe. Idiappam prepared by incorporating with 20, 30 and 40 per cent of banana powder was taken as (V1),(V2) and (V3) respectively. From table IX it is evident that 30 percent level (v2) of incorporation of banana powder in idiappam had the maximum score and has the highest overall acceptability.

PANIYARAM

Table X shows the mean acceptability scores of banana powder incorporated paniyaram

TABLE –X
MEAN ACCEPTABILITY SCORES OF BANANA POWDER INCORPORATED PANIYARAM

Variations	Appearance (Mean±SD)	Colour (Mean±SD)	Flavour (Mean±SD)	Texture (Mean±SD)	Taste (Mean±SD)	Over all acceptability (Mean±SD)
S	8.2±0.91	7.9±0.87	7.8±0.91	8.1±0.87	8.1±0.87	8.2±0.91
V1	7.9±0.56	8±0.66	7.4±0.84	7.6±0.84	7.9±0.91	8±0.66
V2	7.7±0.48	7.7±0.82	7.5±1.08	7.8±0.91	8.2±0.99	7.8±1.03
V3	7.8±0.78	8.1±0.87	7.6±0.96	7.7±1.05	8±1.10	7.9±1.10
T Test						
S vs V1	1.453^{ns}	0.924^{ns}	2.185*	2.573*	2.774*	2.478^{ns}

S vs V2	0.913 ns	3.479*	4.878**	6.868**	6.618**	2.893 ns
S vs V3	2.115*	0.298 ns	0.000 ns	0.978 ns	0.899 ns	0.188 ns

* - Significant at 5% level; ** - Significant at 1% level; ns - Not Significant

From table X, it is evident that the mean scores of banana powder incorporated paniyaram decreased as the level of incorporation increased.The overall acceptability of banana powder incorporated paniyaram was found to be acceptable at V1 20 percent level of incorporation. The mean scores of paniyaram was 8± 0.66,7.8 ±1.03 and 7.9±1.10 for 20,30 and 40 percent respectively. There was no significant difference between S and V1 (20 percent), S and V2 (30 percent) and S and V3 (40 percent) level of incorporation.

SNACKS RECIPE

The following figures presents the mean acceptability scores of banana powder incorporated snacks recipes.

KOZHUKATTAI

Figure I shows the mean acceptability scores of banana powder incorporated kozhukattai

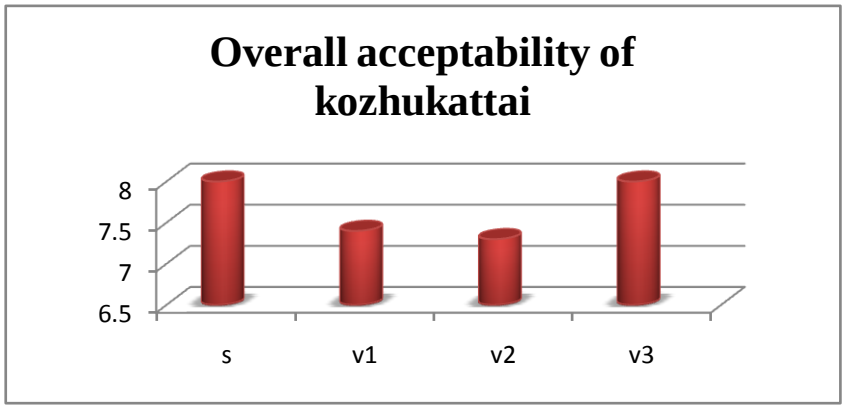


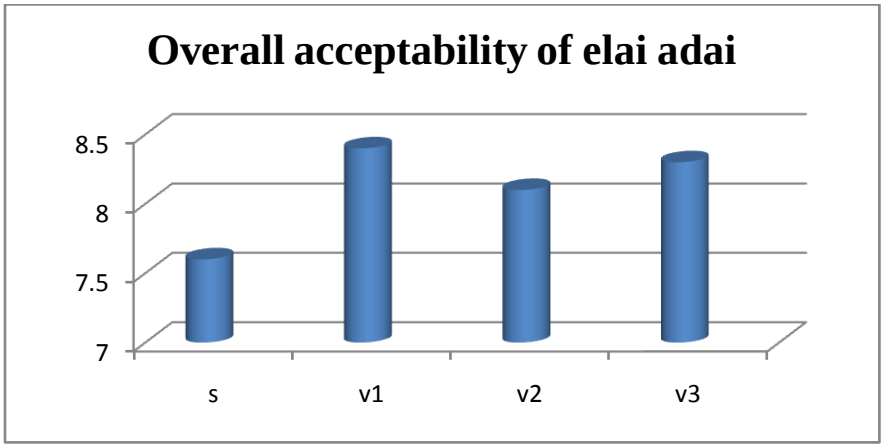
FIGURE I

The overall acceptability of standard kozhukattai scored highest scores with 8.0 ± 0.70. The mean scores of the banana powder incorporated kozhukattai was 7.4± 0.80,7.3 ± 0.80 and 8 ± 0.30 for 20,30 and 40 percent respectively. There was significant difference at one percent level ($p<0.01$) in S and V1 (20 percent), S and V2 (30 percent) and S and V3 (40 percent) level of incorporation.

ELAIADAI

Figure II shows the mean Acceptability Scores of Banana powder incorporated Elai adai

FIGURE II

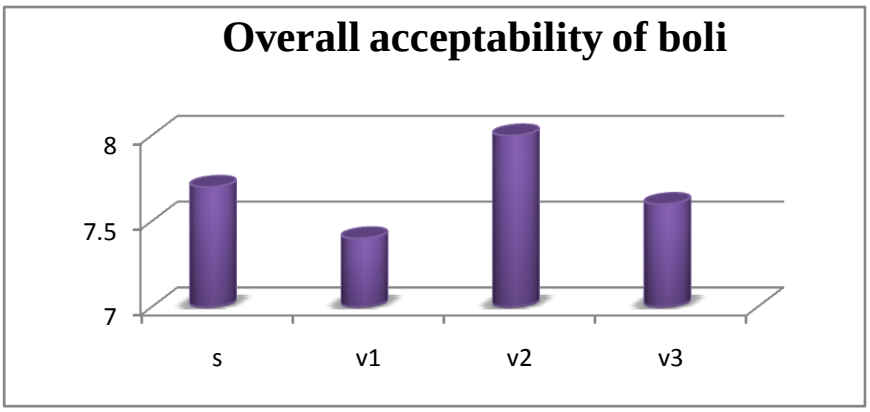


The overall acceptability of elai adai was highly acceptable at 20 percent level of incorporation. The mean scores of elai adai was 8.4 ± 0.69, 8.1 ± 0.31 and 8.3 ± 0.67 for 20,30 and 40 percent respectively. There was no significant difference between S and V1 (20 percent), S and V2 (30 percent) and S and V3 (40 percent) respectively.

BOLI

Figure III shows the mean Acceptability Scores of Banana powder incorporated bol

FIGURE III



The overall acceptability of boli was highly acceptable at 30 percent level of incorporation. The mean scores of boli was 7.4 ± 0.51, 8 ± 0.66 and 7.6 ±0.96 for 20,30 and 40 percent respectively. There was no significant difference between S and V1 (20 percent), S and V2 (30 percent) and S and V3 (40 percent) respectively.

CONCLUSION

From the present study, it was concluded that cabinet drying was more suitable than other drying methods for incorporating in breakfast and snacks recipes. Cabinet dried banana powder incorporation was highly acceptable up to thirty percent level in breakfast recipes and fourty percent level in snacks recipes.

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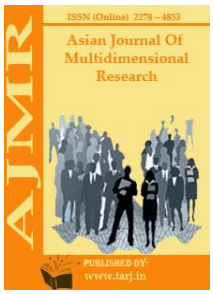

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

PHYTONUTRIENTS: A KEY TO STRESS MANAGEMENT

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ABSTRACT

Free radicals are highly reactive and highly specific molecules with unpaired electrons and are relatively unstable. They cause oxidation to nearby bimolecular such as DNA, carbohydrates, proteins and lipids resulting in homeostatic disruption. Oxidative stress is a condition occurring as a result of excessive production of free radicals over antioxidant defensive system in our body. Oxidative stress plays a vital role in the occurrence of various diseases and disorders such as cardiovascular, pulmonary, rheumatoid arthritis, cancer, diabetes mellitus, infertility etc. Phytonutrients are antioxidants found in plants which possess high medicinal potential towards oxidative damage. The present study aims at the evaluation of phytonutrient content in Trachyspermum ammi L. (ajwain seeds), a widely used culinary spice with therapeutic values. The ajwain seeds were collected, cleaned and powdered and extracted and were assessed for its antioxidant and anti inflammatory properties which revealed significant and interesting results.

KEYWORDS: *Free Radicals, Oxidative Stress, Antioxidants, Phytonutrients, Ajwain Seeds*

INTRODUCTION

Free radicals are molecules having an unpaired electron which attacks the nearby molecules to pair with their electrons in order to attain stability. It leads to the oxidative damage of biomolecules such as DNA, protein, carbohydrates and lipids and results in disruption of their homeostasis. Oxidative stress is a physiological burden arising out of imbalance between free radicals and antioxidant defense system which contributes to a wide variety of diseases and disorderssuch as cardiovascular, pulmonary, rheumatoid arthritis, cancer, diabetes mellitus, infertility etc. Antioxidants are defined to be the neutralizing agents fighting against oxidative stress. Phytonutrientsare antioxidant substances produced by plants such as polyphenols, phenolic acids, tannins, flavonols, isoflavones and curcuminoids which act as natural protectors.*Trachyspermum ammi Linn* commonly known as ajwain seeds belonging to family Apiaceae is a plant with multiple and significant medicinal values. The seeds of ajwain are bitter, pungent and act as anthelmintic, carminative, laxative and stomachic. The seeds also cure abdominal tumors, abdominal pains and piles and bears anti-inflammatory and antioxidant activities (Sadiq *et al*., 2012). The present investigation is designed to analyze the phytonutrients content and therapeutic properties of ethyl acetate (Ea) fraction of methanolic extract of ajwain (*Trachyspermum ammi* L.) seeds and its sub-fractions**.**

OBJECTIVES:

- To assess the phytonutrient content of ethyl acetate fraction of methanolic extract of ajwain seeds and its sub-fractions
- To assess the antioxidant and anti-inflammatory properties of Ea fraction and its sub-fractions using in *vitro* methods and models.

METHODOLOGY

A part of methanolic extract of ajwain seeds designated as Me extract was used for investigation and the extract was dissolved in water and fractionated successively with the solvents of increasing order of polarity, *viz.* hexane (He), dichloromethane (DCM), ethyl acetate (EA), n-butanol (nBu) and water (Aq) and each extract was evaporated to dryness and was stored in a glass vial at 4^{o}C until used for various analyses.

Sub-fractionation of Ea fraction of ajwain seeds was carried out by column chromatography using various eluting systems viz. I) hexane, II) hexane:chloroform (3:1), III) hexane:chloroform (1:1), IV) hexane:chloroform (1:3), V) chloroform VI) chloroform:ethyl acetate (3:1), VII) chloroform:ethyl acetate (1:1), VIII) chloroform:ethyl acetate (1:3), IX) ethyl acetate, X) ethyl acetate:methanol (3:1), XI) ethyl acetate:methanol (1:1), XII) ethyl acetate:methanol (1:3) and XIII) methanol gradiently. Four sub-fractions from ethyl acetate fraction of ajwain seeds designated as E1–E4 were obtained from following combinations: i) E1-chloroform: ethyl acetate (3:1) ii) E2-chloroform:ethyl acetate (1:3) iii) E3-ethyl acetate: methanol (3:1) and iv) E4-ethyl acetate:methanol (1:3).Before use, Ea fraction and the sub-fractions (E1-E4) were re-dissolved in various solvents as required at different concentrations and used for *in vitro* assays

RESULTS AND DISCUSSION

Preliminary phytonutrient screening of Ea fractions of methanolic extract of *Trachyspermum ammi* L. seeds and its sub-fractions were performed for the presence of carbohydrate derivatives, amino acids, flavonoids, tannins, polyphenols, glycosides, sterols and terpenoids and saponins. The study indicated the presence of all the above mentioned compounds in different levels in the

Ea fraction and its sub fractions. Ea fraction exhibited a higher level of the phytonutrients than its sub fractions. Among the sub fractions, E3 showed highest concentration which was nearer to Ea fraction.The results pertaining to qualitative analyses of Ea fraction of methanolic extract of ajwain seeds and its sub-fractions for biomolecules viz., carbohydrates, amino acids **(Table 1)**, flavonoids, tannins, polyphenols **(Table 2)**, glycosides, sterols, terpenoids, and saponins (**Table 3)** are furnished as follows.

TABLE 1
QUALITATIVE ANALYSES OF EA FRACTION OF AJWAIN SEEDS AND ITS SUB-FRACTIONS (E1-E4) FOR CARBOHYDRATE DERIVATIVES AND AMINO ACIDS

Test	Ea	E1	E2	E3	E4
Carbohydrates					
a. Molisch test	+++	---	+	+	++
b. Fehling's test	+	Traces	Traces	++	---
c. Barfoed's test	++++	+	+	+++	+
d. Benedict's test	+++	+	+	++	Traces
Amino acids					
a. Ninhydrin test	++++	+	+	++	+++
b. Millon's test	++++	++	+	++++	+
b. Hopkin's-Cole test	++	+	+	+	+
c. Erhlich's test	++	+	Traces	++	+
d. Pauly's test	++++	+++	+++	++++	+++

Ea: ethyl acetate fraction; E1-E4: sub-fractions of ethyl acetate fraction

TABLE 2
QUALITATIVE ANALYSIS OF EA FRACTION OF AJWAIN SEEDS AND ITS SUB-FRACTIONS (E1-E4) FOR FLAVONOIDS, TANNINS AND POLYPHENOLS

Test	Ea	E1	E2	E3	E4
Flavonoids					
a. Sodium hydroxide test	++	+	+	++	+
b. Sodium acetate test	+	+	+	+	+
c. Sulphuric acid test	+++	--	--	++	+
Tannins and polyphenols					
a. Ferric chloride test	+++	+	+	+++	+

b. Potassium ferricyanide test	+++	---	---	+++	Traces
c. Potassium dichromate test	---	---	---	---	---

Ea: ethyl acetate fraction; E1-E4: sub-fractions of ethyl acetate fraction

TABLE 3
QUALITATIVE ANALYSIS OF EA FRACTION OF AJWAIN SEEDS AND ITS SUB-FRACTIONS (E1-E4) FOR GLYCOSIDES, STEROLS AND TERPENOIDS AND SAPONINS

Test	Ea	E1	E2	E3	E4
Glycosides					
a. Legal's test	+	--	--	--	--
b. Keller killani test	+	--	--	--	--
Sterols and terpenoids					
a. Leibermann buchard's test	++	+	+	++	+
b. Salkowski test	++++	++	++	++++	+
Saponins					
a. Foam test	+++	+	+	++	+

TABLE 4
PHENOLIC COMPOUNDS IN EA FRACTION OF AJWAIN SEEDS AND ITS SUB-FRACTIONS (E1-E4)

Sample	Total Phenolics (mg/100g GAE)	Total flavonoids (mg/100g RE)	Total flavonols (mg/100g RE)
Ea	225±0.03	42.3±0.04	35.3±0.05
E1	16.82±0.3	4.60 ±0.04	8.69±0.03
E2	32.83±0.02	5.60±0.03	12.57±0.02
E3	69.6 ±0.03	13.8±0.01	19.80±0.02
E4	11.6 ±0.04	1.34 ±0.03	1.19±0.04

The extract of the seeds were assessed for different *in vitro* assays like antioxidant activity and anti-inflammatory activity using routine assays such asCupric Reducing Antioxidant Capacity (CUPRAC) and inhibition of hyaluronidase activity respectively. (Riddhi and Yogesh, 2014).

***In vitro* antioxidant activity of Ea fraction of ajwain seeds and its sub-fractions (E1-E4)**

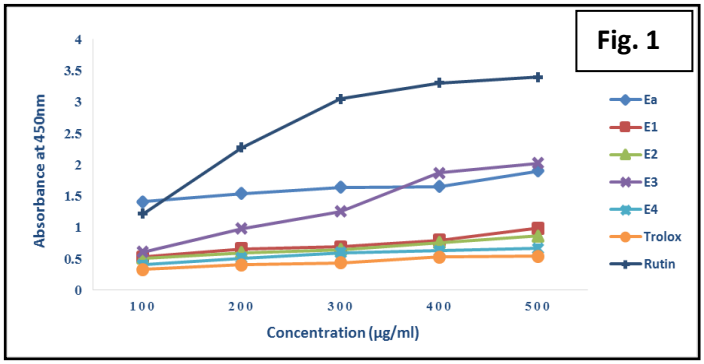

Fig.1.shows the concentration dependent cupric reducing antioxidant activity (CUPRAC) measured in terms of increase in absorbance at 450nm exhibited by Ea fraction of ajwain seeds and its sub-fractions. The highest activity was detected in EA followed by E3 as observed by higher absorbance values. Sub-fractions E1 and E2 showed moderate activity as the concentration increased from 300-500 µg/ ml. Among all sub-fractions, E4 was found to have very less activity.

***In vitro* anti inflammatory activity of Ea fraction of ajwain seeds and its sub-fractions (E1-E4)**

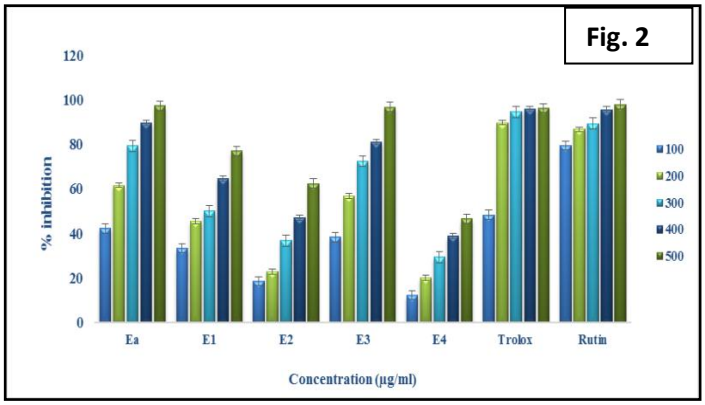

Fig. 2shows the inhibition activity exhibited by Ea fraction and its sub-fractions of *Trachyspermum ammi* L. on hyaluronidase. The present study reported significant hyaluronidase inhibition activity exhibited by all test samples. Highest activity was found in Ea fraction followed by E3 with IC_{50} value 119µg/ml and 135µg/ml respectively. All other samples also showed similar activity as their concentration was increased.

CONCLUSIONS

The spice, ajwain (*Trachyspermum ammi* L.) seeds, under investigation had good amount of phenolics, flavonoids and flavonols. Ethyl acetate fraction and its sub-fractions exhibited efficient radical scavenging activities, significant anti-inflammatory activities by virtue of different types of phytochemicals present in the ethyl acetate fraction of *Trachyspermum ammi* L. E3 sub-fraction which exhibited similar antioxidant potential to that of ethyl acetate fraction (Ea) revealed the presence of more potent compounds in it. *Trachyspermum ammi* L., possessing varied phytochemicals showing versatile therapeutic properties has proven the key role of phytonutrients in stress management.

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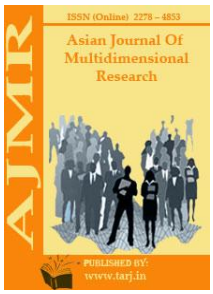

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

DEVELOPMENT AND ACCEPTABILITY OF JACKFRUIT BASED INSTANT SHAKE MIX

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ABSTRACT

Jackfruit, the world's largest edible fruit, which is indigenous to India can be recognized as a miracle fruit due to its nutrient profile, health benefits and greater potential for value addition. The fruit is highly seasonal and most of the fruits remain wasted due to lack of improper utilization. Hence, the present study entitled "Development and acceptability of jackfruit based instant shake mix" was conducted to exploit the potential of raw jackfruit flour. The shake mixes were prepared with varying proportions of pre gelatinised jackfruit flour, skimmed milk powder and sugar. The shake mix with 100 per cent skimmed milk powder served as the control. Organoleptic evaluation of the prepared shakes were done by a panel of selected judges using a nine point hedonic scale. Based on sensory evaluation, the shake mix prepared with 50% raw jack fruit flour was found to be the most acceptable with a mean score of 8.71 followed by shakes prepared with 60% jackfruit flour and (mean score 8.35) 70% jackfruit flour (mean score 8.26) . The possibility of producing diversified products from jackfruit flour can bring about an era of prosperity with the right mix of employment generation and profit.

KEYWORDS: *Jackfruit flour, Pre gelatinization, Instant shake mix.*

INTRODUCTION

Jackfrui (*Artocarpus heterophyllus Lam.*) belong to the *Moraceae* family and it is an and underutilized fruit crop which has got great yield potential and excellent nutritional qualities. It is abundantly seen in India, Bangladesh, and in many parts of Southeast Asia (Rahaman *et al*., 1999 Despite of its huge yield per tree than most of the fruit crops, it is not classified as a commercial fruit and is rarely grown on regular plantation scale (underutilized crops). Jackfruit has earned the well-deserved name "Poor man's food" due to its numerous culinary uses and high

fruit is a good source of vitamin A and C and minerals like phosphorus, iron and calcium (Reddy *et al*., The weight of the fruit varies from 3.5 to 10 kg and sometimes it may reach up to 25 k The market potential of jackfruit can be promoted if the fruits are made available to the consumer in a ready to eat or ready to cook form throughout the year. Moreover it has become necessary to open new avenues for its better utilization, as traditional uses have already become stabilized. There lies a great opportunity for non-traditional uses of jackfruit in the form of convenience foods (Kumari *et al*., 2015). It is necessary to develop acceptable products from the indigenous underutilized fruits that cannot be easily marketed in the fresh form. The change in perceptions, economic considerations, westernization, urbanization, busy times schedules, increased women employment and increased per capita income made the convenient foods more acceptable (Anand, 2011). Development of novel products that suits all age group people will increase the marketability of such underutilized fruits. Value added products prepared from underutilized fruits would play a significant role not only for domestic market but also for export (Srivastava and Sanjeev, 2002). Studies reported that raw jackfruit flour is suitable for the development of different products like noodles and *papads*. Hence the current study investigate the suitability of raw jackfruit flour as an ingredient for the development of instant shake mix.

MATERIALS AND METHODS

availability during the season. The raw fruit has got great demand as a vegetable, while the ripe

Selection and collection of jackfruit:

The study was carried out using the *koozha* cultivar of jackfruit because of its high availability and lower utilization. Raw mature (90-110 days) fruits were procured from the local households of Thrissur district. Other ingredients namely homogenized milk, skimmed milk powder, and sugar were purchased from the local market.

Processing of flour from raw jackfruit bulbs:

The method suggested by Kumari *et al.* (2015) was adopted for the processing of the harvested fruit. The freshly harvested fruits were cleaned and bulbs and seeds separated and then subjected to further processing. The bulbs were blanched after slicing. The blanched jackfruit slices were immersed in potassium meta bi sulphate and dried at 80°C and milled to get the fine powder.

Pre gelatinization is a relatively simple modification treatment that makes starches dispersible cold water. This pre gelatinised starch is an important ingredient in the development of food products. Jackfruit flour (100 g) was suspended in 250 ml of water and heated to 80 °C 15 min with continuous stirring. The starch paste was allowed to slowly cool down. The gelatinised starch was dried in a hot-air oven at 60 °C and finely powdered. The powder was through a 40 mesh size to get uniform flour.

Preparation of shake mixes

Shake mixes were prepared using varying proportions of pre gelatinised jackfruit flour (PG-JF), skimmed milk powder (SMP) and sugar (S). The treatments used are given in table 1.

Table 1: Treatments for preparation of jackfruit based instant shake mixes

Treatment	Combinations
T0	Control (100% skimmed milk powder)
T1	70% PG JF + 30% SMP
T2	60% PG JF + 40 % SMP
T3	50% PG JF + 50% SMP
T4	40% PG JF + 60% SMP
T5	30% PG JF + 70% SMP

(PG JF – Pre gelatinised jackfruit flour, SMP – Skimmed milk powder)

Fifteen grams of sugar was added to all the treatments. The treatment T0 served as the control. Shakes were prepared by adding 30g shake mix to 100 ml of milk.

Organoleptic evaluation

A series of acceptability trials were carried out using simple triangle test at the laboratory level and selected a panel of ten judges between the age group of 18-35 years as suggested by Jellinek (1985). The organoleptic evaluation of the shake mixes were carried out by preparing shakes with these mixes. The reconstituted shakes were evaluated organoleptically by the judges using a 9 point hedonic scale.

Proximate compositional analysis of the shake mixes

The crude protein, crude fat, crude fibre, total ash and moisture content were determined according to the standard methods of AOAC (1994). The digestible carbohydrates were calculated by the difference. Analysis were carried out in triplicate.

Statistical analysis

The data were statistically analysed using Kendall's co efficient of concordance and t test.

RESULTS AND DISCUSSION

Organoleptic evaluation of the shake mixes

Sensory evaluation is the expression of an individual like or dislike for a product as a result of biological variation in man and what people perceive as appropriate sensory properties. It is a unique source of product information not easily obtained by other means (Iwe, 2003).

All the prepared shake mixes were organoleptically evaluated by the panel of judges. The mean score obtained for the organoleptic qualities of each treatment were statistically analysed using Kendall's coefficient of concordance and the mean scores were worked out. The mean score for different treatments are presented in Table 2.

TABLE 2: MEAN SCORE FOR ORGANOLEPTIC EVALUATION OF JACKFRUIT BASED INSTANT SHAKE MIXES

Treatments	Sensory Attributes					
	Appearance	colour	Flavour	Texture	Taste	Overall acceptabilit
T_0	8.155 (2.90)	8.711 (4.03)	7.488 (2.37)	7.533 (1.93)	7.466 (1.97)	7.422 (1.70)
T_1	8.02 (3.53)	8.622 (3.27)	8.088 (3.43)	8.466 (4.3)	8.044 (3.00)	8.088 (2.97)
T_2	8.066 (3.57)	8.733 (4.20)	8.066 (3.37)	8.555 (4.60)	8.222 (3.63)	8.133 (3.07)

T_3	8.2 (3.60)	8.511 (3.57)	8.333 (4.67)	8.444 (4.20)	8.6 (5.23)	8.711 (5.37)
T_4	8.2 (3.67)	8.555 (3.13)	8.155 (3.93)	8.303 (3.20)	8.266 (3.87)	8.355 (4.13)
T_5	8.311 (3.73)	8.533 (2.80)	8.044 (3.23)	8 (2.73)	8.155 (3.30)	8.266 (3.77)
Kendalls W	0.036	0.206	0.210	0.379	0.386	0.480

An index was worked out for each treatment using mean ranks obtained for all the six parameters [Appearance (X_1), colour X_2, flavour X_3, texture X_4, taste X_5] as $W_1 \times X_1 + W_2 \times X_2 + W_3 \times X_3 + W_4 \times X_4 + W_5 \times X_5$ + where W_1, W_2, W_3, W_4, W_5, weights assigned to the different ranks under taste, texture, flavour, colour appearance and overall acceptability as 5,4,3,1.5,1.5 respectively. The weight were assigned logically. The results are presented in table 3.

TABLE3: MEAN SCORE AND TOTAL INDEX FOR ORGANOLEPTIC EVALUATION OF JACKFRUIT BASED INSTANT SHAKE MIXES

Treatments	**Sensory Attributes**					**Total index**
	Appearance (1.5)	**Colour (1.5)**	**Flavour (3)**	**Texture (4)**	**Taste (5)**	
T_0	12.23 (8.15)	13.06 (8.71)	22.46 (7.48)	30.132 (7.53)	37.33 (7.46)	159.75
T_1	12.03 (8.02)	12.93 (8.62)	24.26 (8.08)	33.86 (8.46)	40.22 (8.044)	171.83
T_2	12.09 (8.06)	13.09 (8.73)	24.19 (8.06)	33.77 (8.44)	41.11 (8.22)	173.06
T_3	12.30 (8.20)	12.76 (8.51)	24.99 (8.33)	34.22 (8.555)	43.00 (8.60)	**179.55**
T_4	12.30 (8.20)	12.83 (8.55)	24.46 (8.15)	33.21 (8.30)	41.33 (8.26)	174.26
T_5	12.46 (8.311)	12.79 (8.533)	24.13 (8.044)	32.00 (8.00)	40.75 (8.15)	171.74

The index worked out helped to identify the best treatment by considering the organoleptic qualities. The treatment T3 (50% pre gelatinised jackfruit flour and 50% skimmed milk powder) has got the maximum total index (179.55) and was selected as the best treatment. The least total index was attained by the control (100% skimmed milk powder). The overall index of the treatment shows a trend to increase from T1 to T3 and this may be due the fact that as the amount of jack fruit flour increases, it provides body and consistency to the final products which in turn increased the acceptability of the product. The total index of treatments T4 and T5 tends to gradually decrease as the flavor, texture and taste decrease with further increase in jackfruit flour.

Howard et al. (2009), reported that the most acceptable formulation for the instant peanut beverage included equal amounts of peanut flour, sugar, and nonfat dry milk. Usha et al. (2010) prepare an instant weaning mix with 10%, 20% and 30% incorporation of pumpkin flour to varying proportions of rice flour, green gram flour and germinated sorghum flour and the sensory analysis revealed that the complementary food mix with 20% pumpkin powder fortification had good sensory qualities. Bhatnagar (2002) prepared Vit.C incorporated instant *anjeer* shake mix with varying composition of Vit. C (5mg,10mg, 20mg, 30mg and 40mg/ serving). The study find out that the overall acceptance increases from 5mg to a maximum of 20mg/serving incorporation and then gradually decreases and the 40% incorporation got the least acceptability.

Proximate analysis of the food sample

The esults of the proximate analysis of the two samples (control and the selected best shake mix) are depicted in the table 3. All values are expressed in percentage (%).

TABLE 3: PROXIMATE ANALYSIS OF THE SAMPLES

Nutrients	Treatments		t value
	Control (T_0)	Shake mix (T_3)	
Carbohydrate	84.463	86.74	16.40*
Crude protein	10.359	7.281	97.270^{NS}
Crude fat	1.218	3.209	10.926*
Crude fibre	0.057	0.188	22.82^{NS}
Total ash	3.152	2.241	6.120*
Moisture content	5.173	3.924	26.482*

*Significant at 0.05% level

Proximate composition is the term usually used in the field of feed/food and means the

6 components of moisture, crude protein, ether extract (crude fat), crude fiber, crude ash and nitrogen free extracts, which are expressed as the content (%) in the food, respectively.

There is a significant difference in the carbohydrate content of the developed shake mix and control. The carbohydrate content of the two samples were 86.74% and 84.46% respectively. The carbohydrate content of raw jackfruit flour is 74.12g/100g (Kumari and Divakar, 2016) and that of skimmed milk powder is 52g/100g (Anon., 2005). Mushumbusi (2015) reported that the carbohydrate content of processed jackfruit is higher than the raw jack fruit. And this may be due the increase in carbohydrate content as moisture is reduced in the processed state. These results justify the increased carbohydrate content of developed shake mix.

The protein content of raw jackfruit varies from 2.0 to 2.6g/100g and that of ripe fruit is from 1.2 to 1.9g/100g (Ko *et al.,* 1998). The protein content of the control shake mix is 10.35% and that of the selected shake mix is 7.28%.The crude protein of the developed shake mix is less than the control but the reduction is not significant, and this result is in agreement with the findings of Kumari and Divakar (2016) who reported a reduction in the protein content of the jackfruit based noodles than the control. The protein value of skimmed milk 35g/100 (Anon., 2005) and that of jackfruit flour is 1.05g as reported by Munishamanna (2012), and this can be attributed to the high protein value of control shake mix which contain 100% skimmed milk powder.

The crude fat content was 3.20% in the developed shake mix and that of control was1.21%. Vazhacharickal *et al* (2015) reported the fat content of jackfruit varies from 1 to 4g per 100g and Swami et al. () found out the fat content of jackfruit flour as 7.2%. This may be the reason for the significant increase in the crude fat content of developed shake mix than the control.

From the Table 3, it is evident that the crude fibre content of the shake mix is 0.18%, which is higher than the control (0.057%) but the difference was non-significant. Kumari and Divakar (2016) conducted a study to develop jackfruit based noodles and reported the fibre content of jack fruit flour as 4.06g/100g and the also concluded that as the amount of Jackfruit bulb flour is increased in treatments, the value of fibre content was also increased. The reason for high fibre is attributed to the jackfruit especially *Koozha* cultivar. The quantity of crude fibre in jackfruit fluctuates from 0.33 to 0.40% (Ong *et al.,* 2006). While the level of soluble dietary fibre is comparable with other fruits, the insoluble fraction of fibre is found to be much higher than that of soluble fibre (Nahar *et al.,* 1993; Rahman *et al*., 1999).

Ash is important in terms of nutrition because it tells how dense the minerals are in a particular food sample. Generally, low ash content indicates that the food product analyzed is not a rich source of minerals. Both the control and the jackfruit shake mix contain considerable amount of ash. There was a significant difference in the ash contents of control and selected shake mixes, and the values were 3.15 and 2.24 respectively. Patel and De (1977) analyzed roller dried *khoa* powder for its nutrient composition and reported that the samples has 3.1 per cent moisture, 33.8 per cent fat, 27.2 per cent protein, 30.6 per cent lactose and 5.3 per cent ash. The ash content of skimmed milk powder ranges from 8.2 to 8.6% (U.S.Dairy Export Council, 2005) where as that of jackfruit is 7.16% (Swami et al.,). This may be the reason for the high ash value of control shake mix than the jackfruit shake mix.

Moisture provides a measure of the water content of the sample and for that matter its total solid content. It is also an index of storage stability of the flour. The lower the moisture content of flour, the better its shelf stability and the quality. According to FSSAI (2010), the moisture content of fruit based beverage mix/powdered fruit based beverage should not be more than

5.0%. The moisture content of the jackfruit shake mix was 3.924% which is less than that of the control. The reduced moisture content observed in the shake mix make it suitable for long term storage.

CONCLUSION

Jackfruit can be referred as the miracle fruit owing to its nutritional profile and great potential for value addition. The fruit is mostly wasted during season due to ignorance and lack of post-harvest management. Developing acceptable products can reduce the wastage and make the fruit an economically profitable one. From the study it was evident that an acceptable instant shake mix can be prepared from pre gelatinised jack fruit flour. Pre gelatinization of the flour provided body and consistency to the final products which in turn increased the acceptability of the product. The possibility of producing such novel products from jackfruit bring about an era of prosperity with the right mix of employment generation and profit.

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ASSESSMENT OF NUTRTIONAL STATUS AND DIETARY PATTERN OF FISHERMEN IN COASTAL AREA OF PUDUCHERRY

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ABSTRACT

The study was conducted in five per cent of the households through adopted random sampling method in coastal region of Puducherry. All active male fishermen among age group of 19-60 years (n=948) were involved in the study to assess the relationship between nutrient intake, protein-calorie adequacy, and chronic energy deficiency was documented. The data was collected through the interview method. The results were computed, by using SPPS packages (20.0 Version). Nutritional status among fishermen observed that 28.8 percent were suffering from CED, 63.3 percent had ideal body weight and 7.9 percent were overweight and obese. The nutrient intake of the fishermen was significantly different ($p<0.05$) among all the age groups. Energy and micronutrients were inadequate below the suggested level of RDA whereas protein intake was met 70 percent and fat content was sufficient in the diets. Among the factors studied the economic situation and inadequate macronutrients and micronutrients ($p<0.05$) exhibited a significant relationship with protein-calorie inadequacy and prevalence of chronic energy deficiency of fishermen.A good nutrition practices and significance of balanced diet it is influenced to improve the nutritional status of fishermen population.

KEYWORDS: *Fishermen, Nutrient intake, Protein-calorie adequacy and Chronic Energy Deficiency.*

INTRODUCTION

Health is considered as a fundamental human right and a worldwide social goal and it is also a vital aspect to facilitate the personal wellbeing and economic escalation. Fish and fisheries is an important sector in most of the developing and developed countries of the world from the standpoint of income and employment generation [1]. At present, in India, fishermen are facing a massive stress on health direct, which eventually affect the quantum economy's output. Poor health status of the fishermen has an impact not only for fishermen but also their families. Fishermen with poor health and nutrition are more likely to give less food and less sufficient care for their family which clearly reflects the high morbidity pattern. Malnutrition is widely prevalent in all strata of population [2]. Fishing at sea is probably the most dangerous occupation in the world. The fishery is exact as solitary of the bright and flourishing industry in coastal states of India. Puducherry being as one of the coastal regions has a large population of fishermen. Puducherry fishermen can be classified as Maritime and inland fishers and with this massive population, the real crux is on the health and nutritional status of the maritime fishers which is an unsolved issue addressed community with this as a basis this research is aimed at assessing the diet and nutritional status of maritime fishermen in the Puducherry.

METHODOLOGY

Study design

This community based cross-sectional study was adopted using multi-stage stratified random sampling procedure which was carried out in the coastal areas of Puducherry. A total number of 517 Households, constituting active male fishermen in the age group of 19-60 years participated in the study. Data were collected after obtaining the approval from the Institutional ethical committee. The data were collected directly from the selected Households fishermen through personal discussions and interviews regarding the various aspects. A pre-tested questionnaire was used for the collection of the data.

Anthropometric assessment

Anthropometric measurements such as weight and height were measured in all the selected fishermen by using standard equipment. Body Mass Index (BMI) was computed from these data, using the formula BMI= weight (kg)/ height cm^2. The fishermen were further categorized on the different degrees of Chronic Energy Deficiency (CED) scale (James classification) [3].

Dietary assessment

For assessment dietary intake 24hr recall method was used. The dependability of this method was better by using semi- quantitative food stuff frequency questionnaire to measure the intakes of common substance and to minimize common cause of error. Using standardized value of the laboratory, the consumed food data was converted to raw food equivalence and based on this percent adequacy was calculated. RDA and food composition tables (ICMR, 2010 & Gopalan *et al.*, 2011) [4&5] was used to compare the average nutrient intake and excess/deficit of macro nutrient intake. Protein-calorie adequacy status of fishermen was categorized according to the age group. Gaussian distribution with a coefficient variation of 15per cent was used to predict the protein and energy requirement curves. In terms of defining the protein- energy adequacy status, 70 per cent of requirement i.e. requirement-2SD was used as the intercept for the different age groups of the fishermen surveyed. The percentage of calories that was derived from protein in relation to the total calories present in the diet was expressed as energy –protein ratio.

Analysis of data

The data were analyzed statistically by using SPSS version 20 to the demographic profile, the degree of the nutritional status and chronic energy deficiency of the different age group of fishermen variables with the frequency distribution, Mean, and Standard deviation test for each variable surveyed. Analysis of variance was used to utilize to test for significant variance of each age group of fishermen population data collected.

RESULT AND DISCUSSION

Socioeconomic profile of the fishermen

The general picture pertaining to the social economic profile of the fishermen (n=948) is presented in Table -1. The study revealed that majority that is 52.7 percent of the population was in the age group of 26-35 years and 23.5 percent of the fishermen were between 36-45 years of age followed by fishermen in the age group of 19-25 years (15.8 %) and only 2.5 percent of the fishermen were in the age group of 54-60 years. It was noticed that 81.7 percent of the fishermen families were found to be as a nuclear family, whereas only 17.5 percent are found to be in a joint family and only 0.8 percent of the fishermen extended family. As far as the type of qualification is the conserved majority of the population has only finished high school education (68.3%) which is followed 23.4 percent of the population who were illiterate. Among the selected population 50.6% of the fishermen were under the low-income group (0-3000) and 39.6 percent of the fishermen populations are had the income in the range of Rs. 3001-5000. Only meager 7.9 percent of the population was earning above Rs.5000/- per month.

Socioeconomic variables	**Percent (%)**
Age group (years)	
19-25	15.9
26-35	52.7
36-45	23.5
46-55	5.4
56-60	2.5
Type of family	
Extended	**0.8**
Joint family	**17.5**
Nuclear family	**81.7**
Type of qualification	
Diploma	**2.5**
Graduate	**5.3**
Post graduate	**0.5**
High School	**68.3**

Illiterate	**23.4**
Income (₹)	
0-3000	**50.6**
3001-5000	**39.6**
5001-10,000	**7.9**
>10,000	**1.9**

Table 1: Socioeconomic profile of the fishermen

Foods tuff (g/day) of 19-60 year age group of Fishermen.

Foodstuff percent adequacy intake of the fisherman population is summarized in Table-2. The consumption pattern was diverse depending on each age group of fishermen. The mean intake of cereal and millet was not significant ($p>0.05$) among the various age group. The highest intake was found in the age group of 26-35 years (223 g/day). In contrast, the poor intake was found to be in the age group of 56-60 (202 g/day). The intake of legumes and pulses showed a significant increase ($p<0.05$) among various age group. However, intake of legumes and pulses were lower in the age group of 36-45 years (26.8g/day) comparatively with other all the age group. The intake of green leafy vegetables was found not significant ($p>0.05$) in all the age groups although intake was observed less than 50 percent levels of RDA. The intake of other vegetable was noted high in the age group of 26-35 years (92.8g/day) comparatively with the other age groups of 19-60 years. The intake of roots and tubers of the all the age groups were observed in the range of 25-30g per day and not met suggested a level of ICMR RDA. Fruits were observed in all the age group among the fishermen which rarely used. The consumption of fish was found to be better in all the age group which could be due to easy availability of every day of coastal areas. Consumption of milk and milk products such as curd was a common product in negligible amount among all the age group which only meeting the half of the level of RDA. Oil and fat consumption level was found to be a lower level in all the age group. The sugar and jaggery consumption was lower since they were consumed in extremely low quantities either.

TABLE – 1: FOOD STUFFS (G/DAY) AMONG 19-60 YEAR FISHERMEN (N=948)

Age (Group)	**Food Stuffs**									
	Cereals and Millets	**Pulses and Legumes**	**Leafy vegetables**	**Other vegetables**	**Roots and tubers**	**Fruits**	**Milk and Milk products**	**Fish**	**Fats and oils**	**Sugar and Jaggery**
19-25	214.8±24.6	33.5±10.3	4.9±3.1	89.6±52.4	22.1±14.8	18.8±10.4	173.8±56.7	56.2±12.4	8.3±4.2	19.2±10.8
26-35	222.8±21.3	30.1±11.6	4.7±2.8	92.8±63.6	29.8±21.5	28.5±14.7	175.8±52.4	65.0±22.7	7.9±3.8	18.5± 9.4

36-45	218.7±18.8	26.8±13.0	3.1±1.5	75.0±46.2	26.5 ± 16.8	15.6 ± 9.6	188.7 ± 59.4	61.3±23.6	8.3±2.4	19.8±11.4
46-55	211.3±25.6	32.8±12.8	4.2 ± 2.4	83.3±39.8	20.7 ± 12.6	23.8 ± 15.7	179.2 ± 60.4	58.6±20.9	8.8 ± 4.7	19.7 ± 10.3
56-60	202.4±21.1	32.9±11.2	3.5 ± 1.8	64.9±51.2	13.5 ± 10.3	16.2 ± 13.4	163.7 ± 72.4	54.6±18.4	8.5 ± 5.2	18.2 ± 11.2
p-Value	0.032 NS	0.000*	0.013 NS	0.000*	0.321 NS	0.000*	0.000*	0.017 NS	0.000*	0.000*
RDA#	460	40	50	60	50	30	150	-	40	30

ICMR (2010), Mean, ± Standard deviation, NS- Not Significant, * significantly different (p≤0.05)

TABLE – 2: NUTRIENT INTAKE (G/DAY) OF 19-60 YEAR FISHERMEN N=948

Age group	**Nutrients**								
	Energy (Kcal)	**Protein (g)**	**Total Fat (g)**	**Calcium (mg)**	**Iron (mg)**	**Vitamin A (mg)**	**Thiamin (mg)**	**Riboflavin (mg)**	**Niacin (mg)**
19-25	1351±112	40±2216	19±1.15	375±1.82	19±1.33	470±3.19	1.18±0.01	0.63±0.01	13.9±0.09
26-35	1350±123	47±25.70	20±0.94	378±5.20	19.25±0.799	471±2.53	1.2±0.08	0.6±0.08	13.6±0.06
36-45	1352±127	48.8±21.22	18±1.94	372±1.56	18.19±0.47	473±1.49	1.19±0.00	0.62±0.01	13.8±0.12
46-55	1339±125	40.2±22.28	19±0.94	369.18±3.59	18±1.24	469±1.33	1.18±0.01	0.61±0.01	13.4±0.14
56-60	1330±112	39±10.94	18±1.56	359±4.37	17±1.76	460±0.66	1.17±0.00	0.59±0.01	12.9±0.04
p-value	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*	0.001*	0.000*
RDA	**2875**	**60**	**20**	**400**	**28**	**600**	**1.4**	**1.6**	**18**

ICMR (2010), Mean, ± Standard deviation, NS- Not Significant, * significantly different (p≤0.05)

In coffee/ tea in the regular frequency consumption. Hence their generally all foodstuff contribution to the protein and calorie content was inadequate

Average Nutrient intake of 19-60 year age group of Fishermen.

Dietary nutrient intake of Fishermen among the age group of 19-60 years was determined by way of 24-hour recall method was presented in Table-3. The intake of energy was found inadequate bellow the suggested level of ICMR RDA in all the age groups of the fishermen. Among which the intake of energy was very low in the age group of 56-60 years (1330 Kcal) and age group of 46-55 years (1339 Kcal). However, Protein was found to be in all the age groups of fishermen met 70 per cent of RDA recommended level which could be due to intake fish. The protein intake of all the age group was found in the range of 39-49g per day, whereas lowest intake of protein (39 g/day) was observed in the age group of 56-60 years and highest (49 g/day) was seen in the age group of 36-45 years. Intake of fat was noted the significant difference ($P<0.05$) among various age group and found to be in equivalence with the RDA level which was in the range of 17 - 20 g per day of all the age group of fishermen. Calcium intake from the diet for the age groups surveyed was found to be on average with the RDA. Highest calcium intake was seen all the age group in the range of 355-378 mg per day except in the age group of 56-60 which is 359 mg per day. The iron intake was inadequate the recommended levels suggested by ICMR (RDA2010) [4] in all the age groups which found to be in the range of 17-19 mg per day, however, the vitamins such as vitamin A, Thiamin, Riboflavin, Niacin intake were studied among the various age groups of the fishermen. It might be observed that most of the vitamin intake was below the recommended levels which were less than 70 per cent of the RDA which could be due to low intake of green leafy vegetables in their diet.

Distribution (%) of Protein-Calorie Adequacy of 19-60 year age group of Fishermen.

The percentage distribution of protein-calorie Adequacy of fishermen according to the age group (19-60) years was presented in Table 4. The protein-calorie adequacy was calculated for the fishermen based on the diets consumed. The protein-calorie inadequacy (11.8 %) were noted in all the age groups. It could be noted that in the age group of 56-60 years the protein-calorie inadequate were found higher (20.5 %) and followed by lower protein-calorie inadequate was 5.8 percent in the age group 26-35 years. It could also be noted that with an increase in age from 35 years and above the percentage of fishermen adults in the category of protein and calorie adequate were decreasing. This could be well correlated with the decrease in the intake of cereals and pulses. Among all the age group 35.7 percent of fishermen were in the category of protein inadequate and calorie adequate. The highest protein deficient and calorie adequate/sufficient diet was in the age group (56-60) years. In the age group 36-45 and 46-55 years, the percentage of the protein deficient and calorie sufficient were 17.1% and 12.4 respectively. Further, in the age group 46-55 years, 51.3 percent of the fishermen were in protein adequate and calorie inadequate. As we could also see that the p-value is greater than the significant levels (0.001), we can conclude that there is a strong relation between groups and the protein adequacy ratio.

Prevalence (%) of chronic energy deficiency among fishermen

Nutritional status of the fishermen was passed Chronic energy deficiency based on the BMI was presented in Table-5 which was calculated as weight (kg) divided by height (m^2) and the prevalence of chronic energy deficiency was classified based on James classification (James et al 1988) [6]. Prevalence of chronic energy deficiency was found no significantly ($p>0.001$) among all age groups of fishermen. Approximately 23 and 27 percent of the fishermen can be classified

as CED III, CEDIA, and CEDI, reflective of consumption of less fat and lean body masses. Further, in the all age group of fishermen was graded as normal (40.5 %) according to James classification, of which the least percentage (30.6 %) was noted in the age group 56-60 years. The prevalence of overweight and obesity were slightly higher among fishermen community. Majority of the fishermen population are falling under the category of the low weight and normal.

TABLE 4: DISTRIBUTION (%) OF FISHERMEN AGE GROUP BY PROTEIN - CALORIE ADEQUACY N=948

Age groups (Year)	Protein calorie adequacy status				Chi-square test
	P-C-	P-C+	P+C-	P+C+	
19-25 (150)	12.4	20.6	40.6	26.4	
26-35 (500)	5.8	13.2	24.7	56.3	
36-45 (223)	7.5	17.1	31.5	43.9	
46-55 (51)	9.6	12.4	51.3	26.7	336.68
56-60 (24)	20.5	30.2	30.6	18.7	(p>0.001)*

+: Adequate; - : Inadequate, NS- Not Significant, * Significantly different (p≤0.001

TABLE-5 PREVALENCE (%) OF CHRONIC ENERGY DEFICIENCY OF FISHERMEN

Nutrition Grade*	Age wise distribution				
	19-25	26-35	36-45	46-55	56-60
CED III(<16.0)	5.9	1.3	2.7	0	0
CED II(16.0-17.0)	18.8	6.5	15.4	3.4	0
CED I (17.0-18.5)	20.2	10.3	12.7	24.2	22.6
Low –Normal(18.5-20.0)	18.4	21.1	20.1	16.2	38.2
Normal(20.0-24.9)	35.9	53.4	40.6	42	30.6
Overweight and Obesity (≥25.0)	0.8	7.4	8.5	14.2	8.6
Chi Square test	365.6 (p>0.001)#				

CED- Chronic Energy Deficiency, * Significantly different (p≤0.001)

CONCLUSION

The result revealed that diets of fishermen were an inadequate nutrient in terms of low intake foodstuff, the percent of diets in the age group of 46-55 and 56-60 years were noted low while comparing to another age group of fishermen. However, 35.4 percent of fishermen observed

adequate Protein and inadequate calorie which could be emphasized the major source of their protein were in fish sources. Intake of nutrient and food items were found to below the RDA levels which reflected on their BMI.

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DIETARY HABITS AMONG MIDDLE ADOLESCENCE AND THEIR ASSOCIATION WITH NUTRTIONAL STATUS

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ABSTRACT

Adolescence is a transitional period, which begins from the earliest signs of secondary sexual characteristics development due to the hormonal changes and ends when a person has achieved adult status. During this period the changes in lifestyles and food habit often occurs resulting in additional chances to expand healthy food choices options. In this back drop it was very interesting to understand the association of dietary habits, stream of subject opted and the nutritional status. Hence the present study was taken up with the objective to evaluate the impact of dietary habits among middle adolescence and their association with nutritional status. 400 students studying in pre-university colleges with Science (42%), Arts (15%) and Commerce (43%) stream between the age group of 17 to 19 years were selected using purposive random sampling techniques. Findings reveal that a greater extent of students was belonged to upper middle economic status. Higher proportion of students studying in Arts stream had less satisfactory food practices and nutritional knowledge compared to the students studying

commerce and science streams (P <0.001). Majority of student's BMI was below the normal range. Moderate to severe anemia was observed among the subjects. Statistically significant correlation (P= 0.001) among the nutritional assessment with the Knowledge, Attitude and Practice was noted. Noticeably with the dietary habits and stream of subject opted in association with the nutritional status. Hence forth to conclude, the data proves beyond doubt that nutrition interventions and education strategies is necessary for promotion of healthy eating habits in adolescents.

KEYWORDS: *Adolescence, Dietary practices and nutritional knowledge, Nutrition interventions and education, Nutritional assessment*

INTRODUCTON

Adolescence is derived from Latin word adolescere which means 'to grow up'. WHO defines adolescence as the section of people between the ages of 10-19 years. There are three stages in adolescence, early adolescence (11-14 years of age), middle adolescence (15-17 years of age) and late adolescence (18-21 years of age). In India there are 243 million adolescents constituting to 21.4% of the country's total population. [1, 2, 3]

After infancy, adolescence is the stage where the vigorous physical growth takes place due to the hormonal changes in the body making adolescence an vulnerable period of life. It is a transitional period between childhood and adulthood, which begins from the earliest signs of secondary sexual characteristics development and ends when a person has achieved adult status[1]. Due to the drastic increase in physical growth and development there is a greater demand for nutrients and calories. However, adolescence is considered to be the period of changing lifestyles and food habit affecting both nutrient needs and intake and their additional chances to affirm food choices and expand or narrow healthy options. Nutrition plays a key role during these stages; nutritional deficiencies can have permanent impact on an adolescent's over all development. To meet the nutritional requirements of the adolescents it is essential to practice healthy eating behavior. A study observed that adolescents have the poor eating habits usually skip a meal particularly breakfast with girls skipping meals more than boys. Eating disorders like anorexia nervosa or binge eating, peer pressure, lack of time and lack of nutritional awareness may be the reasons for skipping of meals.[4, 5, 6]

Globalization and urbanization have greatly influenced people's food pattern and influenced many to opt for attractive and high-calorie fast foods, popularly called as junk foods. Among younger generation the trend of fast food/ junk food culture is emerging. The easy availability, taste, cost effectiveness; marketing strategy and peer pressure are making the fast food more popular among them. This universal problem of junk food consumption by larger mass and its effects on health requires focus and health education to contribute to its reduced consumption and inculcating healthy food habits for a better living among adolescence. According to a study junk food consumption is closely associated with perverse alteration on nutritional status and health of adolescence. Financial status of the family was also the influencing variables in the consumption of fast food along with commercial advertisements, media and urbanization. Another study conducted on adolescence revealed that 30% of the students were not aware of the health effects of junk foods, food quality, nutritive value, food chemicals and its ill effects on human health. A cross-sectional study carried out showed that there is close association between

increased frequency of fast food consumption in a week with overweight or obesity among adolescence.[7, 8, 9, 10, 11]

A comparative study of Knowledge, Attitude, Practice of nutrition and non-nutrition student towards a balanced diet showed that there were remarkable differences in their nutrition knowledge, Attitude and practice scores, breakfast eating habits and the concept of a balanced diet. This study recommends the necessity on possessing more attention towards nutrition among students as they are the future parents and professionals. Emphasis related to correct nutrition should be given creating a learning environment in the college campuses. Since students spend in the college this opportunity can be utilised for promoting nutrition knowledge, the attitude and practices among them.[12, 13,14]

Thus, there is an immediate need for knowledge emphasizing about healthy eating habits, nutritive values of foods, unhealthy foods and its implications on health and measures for preventing should be considered for awareness building and induce health education for bringing a change towards better eating practices.

Therefore, the present prospective observational nutritional study was undertaken to evaluate the impact of dietary habits among middle adolescence and their association with nutritional status with the following objectives

OBJECTIVES

1. To understand nutrition status and dietary practices of selected adolescence.
2. To understand the Knowledge, Attitude and Practice about nutrition and food habits.
3. Correlate the nutritional assessment with the Knowledge, Attitude and Practice.
4. To evaluate the dietary habits and stream of subject opted in association with the nutritional status.

METHODOLOGY

A total of 400 students studying in pre-university with Science (42%), Arts (15%) and Commerce (43%) stream between the age group of 17 to 19 years were selected using purposive random sampling techniques from the pre-university colleges. Standardized tools and reference measures were used for collecting the subjective information. Personal data including demographic and socio-economic status, dietary pattern, food behavior, nutritional awareness, and KAP about nutrition were elicited with the oral interview questionnaire method. Anthropometric assessments such as height, weight, body mass index were analyzed using NCHS/WHO references. Biochemical analysis was done for estimating the hemoglobin level using heamoglobinometer and further categorized according to WHO classification for anaemia. The collected information from the nutritional survey on the subjects was consolidated and computed with descriptive analysis using XSTAT PRO750.

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RESULTS AND DISCUSSION

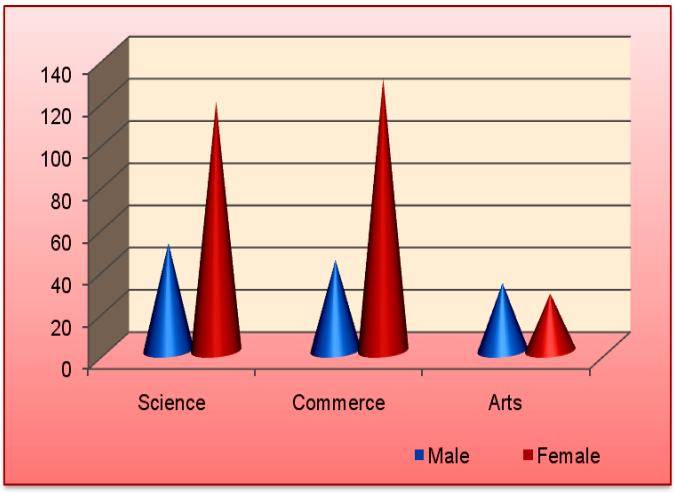


FIG.1: DISTRIBUTION OF STUDY POPULATION

Most of the subjects belonged to a higher socio- economic status with better findings varied by socio-economic status indicator. They were in the age group between 17 to 19 years. Out of 400 subjects 68.5% were girls and 31.5% were boys. 90% of the study population belonged to nuclear family.

Fig.1 indicates that 30%, 25% and 54% of boys were from Science, Arts and Commerce subjects respectively. Similarly, 70%, 75% and 46% of the girls were from Science, Arts and Commerce subjects

Table-1 shows that 40% of boys and 54% of girls were vegetarian; remaining 60% and 36% consumed fleshy food. The diet pattern was mainly of cereals, pulses, root and tubers, milk and milk products, greens, and other vegetables being food items of daily menu. Most of them followed three meals per day. Skipping of meals was observed more in girls than in boys. This might be due to some reasons like they have misconception that skipping of breakfast helps in losing weight. Another common reason might be a busy lifestyle. Some of them opined that, avoiding tea and snacks helps them to lose their weight. Data so obtained shows that frequency of eating out is more (40%) in boys when compared to girls (24%) daily. However, 40% women revealed that eating out once in a week is necessary. This gives them break at least for few hours from their monotonous lifestyle.

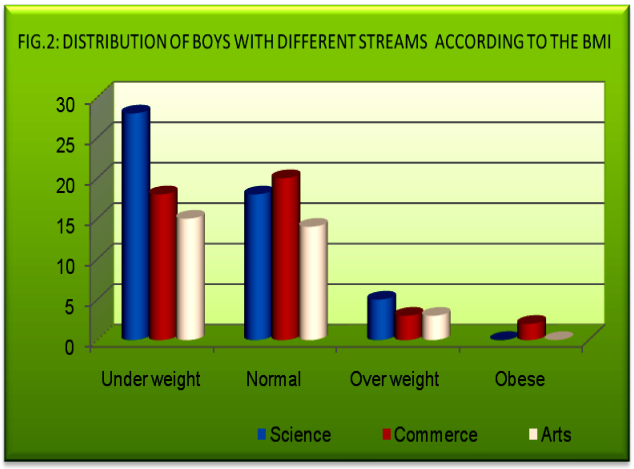
TABLE-1 MEAL PATTERN OF THE SUBJECTS

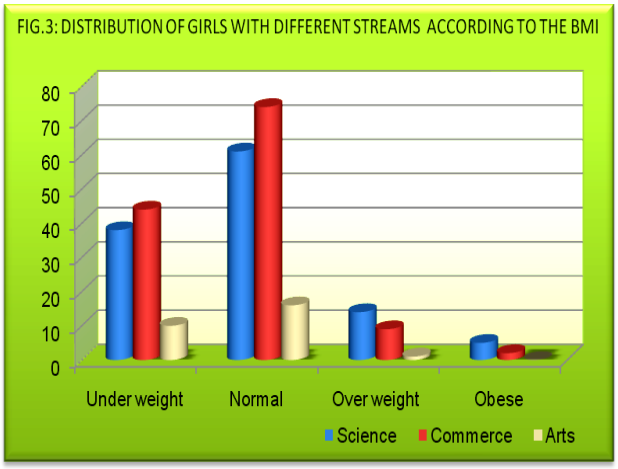
Characteristics	BOYS (%)	GIRLS (%)
Vegetarian	40.0	54.0
Non-Vegetarian	60.0	36.0
Meal Pattern		
Two meals	20.0	26.0
Three meals	76.0	58.0
Four meals	6.0	12.0
Skipping of meals		
Yes	76.0	62.0
Breakfast	36.0	32.0
Lunch	30.0	---

Snacks	16.0	20.0
Supper	6.0	12.0
Outdoor eating frequency		
Never	6.0	2.0
Daily	40.0	24.0
Weekly twice	26.0	10.0
Weekly once	16.0	40.0
Monthly twice	6.0	12.0
Monthly once	6.0	12.0

The frequency of food in subjects depicts that; Cereals like ragi, rice, jowar and wheat were consumed daily by the students. Pulses like tur dal is consumed daily while other pulses were consumed weekly, monthly or occasionally based on their availability. Less quantity of nuts and oil seeds are used daily. It was surprising to see that consumption of snacks was high (60%) among the study group. The study depicts that subjects were in favor of consuming non-nutritious food. The results were observed by other authors.[4, 5, 6]

Fig. 2 and 3 provides the detailed information of BMI among the subjects. Distribution of subjects by their BMI is evidenced in the fig. 2 that 22%, 14% and 12% of male subjects from science, commerce and arts stream respectively were under weight. However, number of overweight and obese subjects was 4-2% only. From the figure 3 it is evident that girls were more in normal range of BMI (22, 27 and 6%) than boys in all the three streams. However, 14%, 16% and 4% of the girls were under weight.





∗ **P= 0.01 at α level P<0.05**

∗ **P= 0.001 at α level P<0.05**

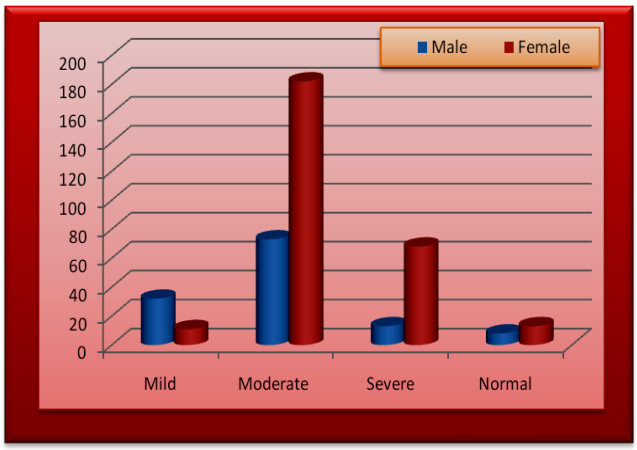
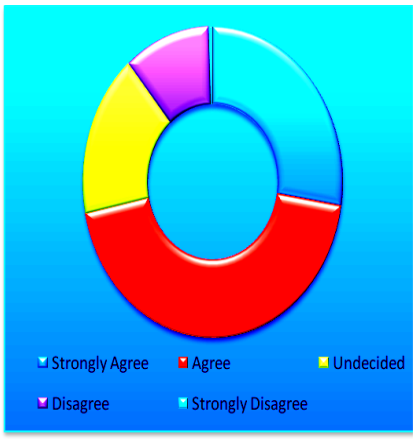


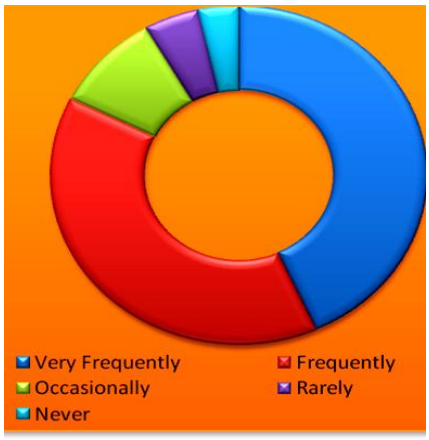
Fig. 4 will detail us with the hemoglobin status. Overall 80% of the girls were with moderate anemia, followed by 25% of them with severe anemia. This micro nutrient deficiency may be due to faulty food habits. However, boys were better than girls.

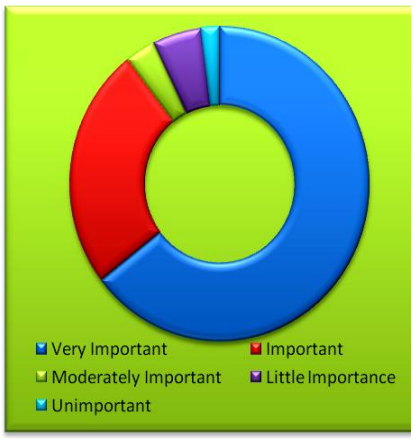
80% of the girls from science and commerce stream were suffering from moderate anemia, while 24% of boys from the stream fall in the moderate anemia. than students with Arts subject. However, only 2-5% of both boys and girls were in the normal range from all the stream.

FIG.4: DISTRIBUTION OF STUDY POPULATION ACCORDING TO THE

KNOWLEDGE, ATTITUDE AND PRACTICE







∗ P= 0.02 at α level P<0.05 **∗ P= 0.001 at α level P<0.05** **∗ P= 0.01 at α level P<0.05**

FIG.5: DISTRIBUTION OF STUDY POPULATION ACCORDING TO THE KNOWLEDGE LEVEL

FIG.6: DISTRIBUTION OF STUDY POPULATION ACCORDING TO THE APTITUDE LEVEL

FIG.7: DISTRIBUTION OF STUDY POPULATION ACCORDING TO THE PRACTICE LEVEL

Understanding of student's nutritional knowledge, attitude and practice will ensure to determine the areas of improvement on healthy eating. From fig. 5, 6, and 7 it is very much clear that students had insufficient understanding of nutrients, balanced diet and the implications on health, but it will not transform completely to behavior change. Media played a leading role as an information source. Most of the students were not aware of health dangers of soft drinks and less intake of fruits and vegetables. The study revealed the limitation in sufficient nutrition knowledge among students. Average total knowledge score for healthy eating was 48.95 ± 11.4, which was shown to be significantly different between males and females. Female students' awareness regarding healthy eating tended to be higher than their male counterparts ($P < 0.001$). Higher proportion of students studying in Arts stream had less satisfactory food practices and

nutritional knowledge compared to the students studying commerce and science streams (P <0.001).

The correlation among variables showed statistically significant correlation (P= 0.001 at α level P<0.05) among the nutritional assessment with the Knowledge, Attitude and Practice. Similarly, the dietary habits and stream of subject opted in association with the nutritional status (P= 0.001 at α level P<0.05).

CONCLUSION

Adolescence is a transitional period between childhood and adulthood, due to the drastic increase in physical growth and development during this period, there is a greater demand for nutrients. Nutrition plays a vital role during these stages; nutritional deficiencies can have permanent impact on the overall development. This study indicates that adolescents had an imbalanced diet, which was not only considerably low in several essential nutrients, but also high in some nutrients. They had acceptable nutritional knowledge but less attitude and practice which was evident in their dietary habits and food intake.

Thus, necessity of developing nutritional interventions and education strategies aiming promotion of healthy eating habits in adolescents is indispensable because nutrition knowledge, nutrition attitude, and dietary behavior are related to one another.

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NUTRITIONAL PERCEPTION AND CONSUMPTION OF HEALTH FOOD DRINKS

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ABSTRACT

The objective of the present study was to explore the preference and nutritional perception for consumption of health food drinks by young adults. A total of 100 respondents of different age group including young adults were selected by convenient sampling method and surveyed for influencing factors for consumption, consumption pattern and nutritional perception for consumption of health food drinks using a questionnaire. Young adults between 15 and 25 years of age were higher in consumption of health food drinks and their choice was flavour on the selection of brand of health food drinks. Consumption pattern revealed that young adults preferably consumed at breakfast time, but not on skipping of breakfast. Boost, Horlicks, Complan and Bournvita were in the sequence of order of consumer satisfaction. Nutritional perception such as feeling energetic, active, increasing body growth, stamina, mental abilities, bone strength, provision of vitamins and minerals were considered on the consumption of health food drinks. The study confirmed nutritional and health benefits that could be preferred by young adults and hence paved the idea to formulate nutritional and nutraceutical supplements to young adults.

KEYWORDS: *Health Food Drinks, Consumption Pattern, Nutritional Perception, Young Adults*

INTRODUCTION

"Youth" is defined as a stage of life between 15 and 24 years of age while adolescents are referred between 10 and 19 years of age according to WHO (Wein, 2010 & Ferrari, 2011). Youth is the productive stage of life and the health and development of youths counts on national development to lead in to young India. However, the present sedentary life style and energy dense and micronutrient deprived dietary changes predisposes young adults in to health challenging situation in India. Although traditional dietary practices stands for preservation of health, prevailing modern dietary habits cannot be curtailed among present young adolescents and adults. It is a great challenge for food scientist and nutritionist for the formulation of foods with traditional processing, but in modern instant available form so that the acceptability of such foods cannot be denied by young adults. Fortunately, health food drinks are also a choice in modern dietary habits by young adults.

India, the world's largest malt-based drinks market, accounts for 22% of the world's retail volume sales. These drinks are traditionally consumed as milk substitutes and marketed as a nutritious drink, mainly consumed by the old, the young and the sick.

Health food drinks are categorized in to white drinks manufactured from Glaxo Smith Klime(GSK) Consumer Healthcare and brown drinks with chocolate base like Cadbury's Bournvita. There is an ever increasing demand for nutritional and energy supplements in the modern world. Health drinks provide nutrition and energy for both adolescents and adults (Tamilselvi and Kirubaharan, 2011 & Jacob *et al*., 2012).

With this background, the study was aimed at consumption pattern and nutritional perception of health food drinks so that the study could pave the nutritional and nutraceutical ideas in the formulation of functional and nutraceutical supplements satisfying the requirements of young adults.

METHODOLOGY

Selection of area: The area selected for the conduct of the market survey was Coimbatore. This area was selected because it was familiar to the investigators.

Selection of respondents: Health food drinks consumers were target of the study and hence 100 respondents were selected through convenience sampling method. Non random samples are used when the representativeness is not particularly the primary issue (Pathak, 2008). This method is also known as accidental sampling because the respondents whom the researcher meets accidentally are included in the sample (Tripathi, 2000).

Collection of data: Data were collected through questionnaire on consumption pattern and nutritional perception for health food drinks. Questionnaire was categorized in to three section including factors influencing the consumption, consumption pattern and nutritional perception of health food drinks and standardized through descriptive research design.

Analysis of data: Data were analysed to investigate the significance of difference in consumption and nutritional perception of health food drinks with respect to influencing factors using chi-square test by SPSS version 18.0

RESULTS AND DISCUSSION

Results are discussed under the heads such as factors influencing the consumption pattern and nutritional perception of health food drinks

TABLE 1
FACTORS INFLUENCING THE CONSUMPTION OF HEALTH FOOD DRINKS

I. Personal Factors		Respondents (N = 100)	Chi-square Value
Gender	Male	64	10.361 P=0.016*
	Female	36	
Age	15 - 20	25	39.178 P=0.000*
	20- 25	35	
	25 -30	23	
	30 - 35	17	
Educational Qualification	SSLC	8	24.676 P=0.003*
	HSC	12	
	UG	36	
	PG	44	
Monthly Income (Rs)	5000 - 10000	7	17.43 P=0.008*
	10000 - 15000	41	
	15000 - 20000	52	
	>20000	0	
II.Product characteristics	Cost	0	60.167 P=0.000*
	Flavour	59	
	Clinical Effects	17	
	Neighbours	3	
	Packaging and quality	10	
	Nourishment	11	

*Significance at 0.05 level

Table 1depicts the factors influencing the consumption of health food drinks. Male consumed health drinks higher than female, but preferably in the age group of young adults as observed from the higher percentage of consumption between 15 to 20 and 20 to 25 years of age and UG and PG pursing young adults ($p<0.05$). Consumption of health food drinks was also underlid in the monthly income group of Rs. 100000 to 15000 and 15000 to 20000 ($p<0.05$). This data revealed that the consumption of health food drinks was preferable choice by young adults.

Products characteristics were enquired for the choice among various health food drinks by young adults. Flavour of the product was the first choice followed by clinical effect, nourishment, packaging and quality with the minimum influencing effect by neighbours ($X^2 = 60.167$; $p=0.000 < 0.05$).

Hence the present trend of young adults prefers the consumption of health food drinks and choose the health food drink product based on flavour.

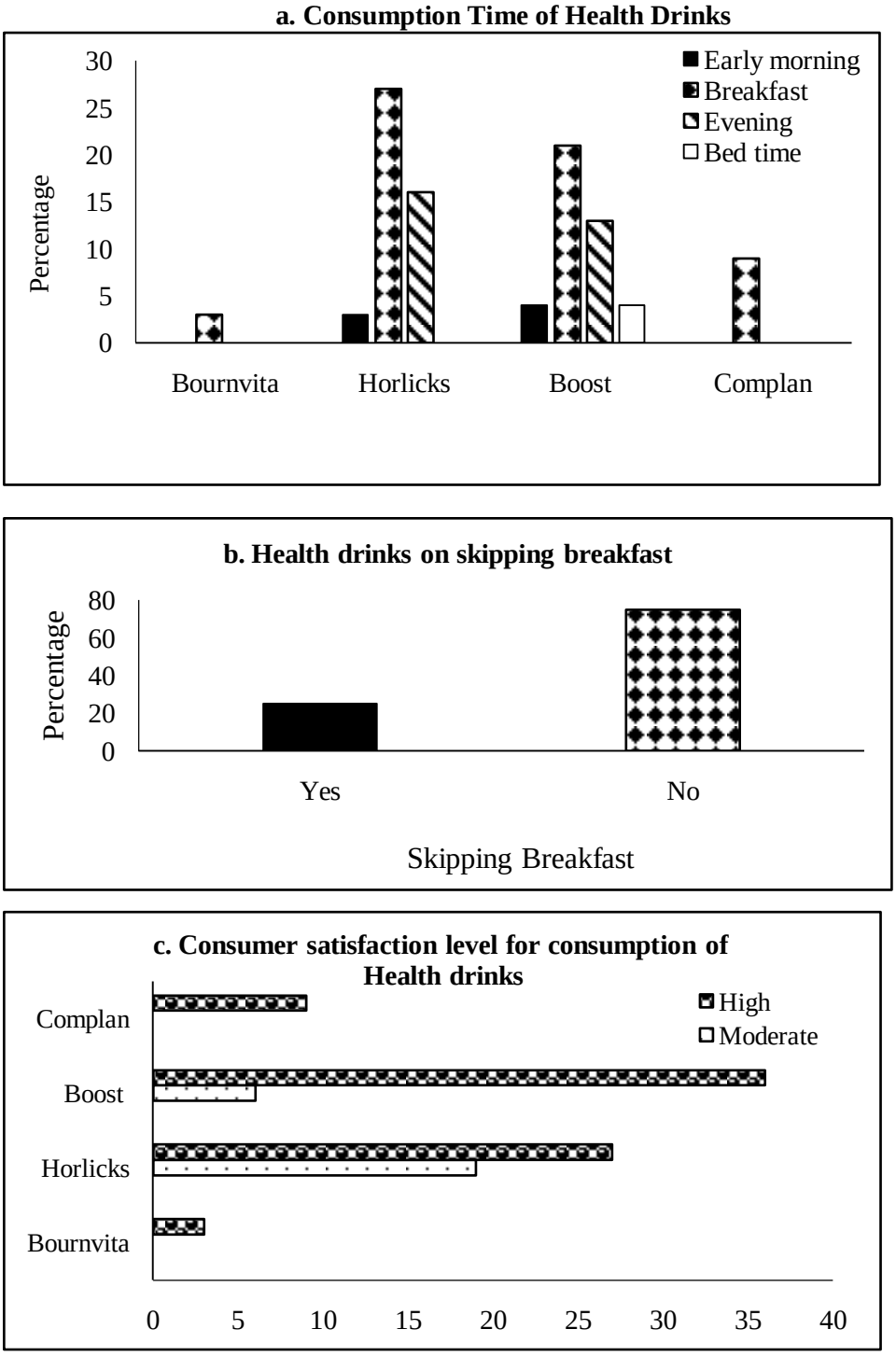

Figure 1

Consumption pattern of health food drinks

Consumption pattern of health food drinks was investigated with respect to the brand of products consumed among respondents as illustrated in Figure 1. As shown in Figure 1, Horlicks, Boost, Complan and Bournvita were in the sequence of the order of preference for consumption by

respondents. Consumption was most preferably at breakfast time by more than thirty per cent of respondents, but seventy percent of consumption was appreciably not on skipping of breakfast. This preference of consumption at breakfast time could be attributed to the prevailing dietetic principle of supplementing the breakfast with health drinks for avoiding the gain in body weight. Breakfast with liquid consistent health drinks restrict dietary intake with the supply of micronutrients so that the reduction in calorie value can help in maintenance or loss of body weight.

TABLE 2
NUTRITIONAL PERCEPTION BEHIND THE CONSUMPTION OF HEALTH FOOD DRINKS

Nutritional Perception	Strongly Disagree	Disagree	Normal	Agree	Strongly Agree	Chisquare
Feeling Energetic	0	0	4	73	23	20.592 P=0.002*
Feeling Active	0	28	34	35	3	39.937 P=0.000*
Increase in body growth	39	23	6	32	0	13.740 0.132*
Gaining Stamina	0	0	65	28	7	4.041 0.671*
Increasing memory and cognitive abilities	3	21	37	28	11	38.528 0.000*
Supplementing meal	8	3	13	74	2	32.624 0.001*
Preventing hunger pangs	0	7	22	71	0	11.758 0.068*
Feeling Digestibility	0	0	3	86	11	8.075 0.233*
Zero level cholesterol	0	22	72	1	5	13.262 0.151*
Zero added sugar	5	27	23	42	3	24.884 0.015*
Vitamins & Minerals	0	0	8	74	18	13.948 0.030*
Increasing bone strength	0	0	23	59	18	23.617 0.001*

*Significance at 0.05 level

In the analysis of consumer's satisfaction for consumption towards the brand of products, Boost, Horlicks, Complan and Bournvita were in the sequence of order of the highest satisfaction. Horlicks and Boost were reported for the moderate level of satisfaction whereas low level of satisfaction was reported for none of the brands of products in the study.

Table 2 explains the nutritional perception behind the consumption of health food drinks. Nutritionally health food drinks were perceived to provide health benefits such as keeping consumers energetic, active, increasing body growth, body stamina, memory and cognitive

abilities, supplementing meal, preventing hunger pangs, digestibility, zero level cholesterol and sugar, vitamins and minerals and increasing bone strength as observed from 75 per cent of responses at normal and agree level of rating scale. This scenario of data set might help to understand that nutritional and health benefits were widely considered in the consumption of health food drinks. This observation of data set confirms the need of functional and nutraceutical food products among young adults also and could shed the light on the development of products with specific nutraceutical properties to young adults of the present trend.

CONCLUSION

It could be concluded that health food drinks was fortunately a dietary choice among the present young adolescents and adults. Consumption pattern revealed that health food drinks was preferably consumed at breakfast time not on skipping of breakfast. Nutritionally health food drinks was perceived to feel energetic, active, increasing body growth, stamina, mental abilities, bone strength and vitamins and minerals. Hence the study confirmed the nutritional and health benefits preferable for health food drinks and this requirement could be exploited in the formulation of dietary and nutraceutical supplements for young adults.

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PHYTOCHEMICAL SCREENING OF ALLIUM CEPAVAR.CO5 (RED ONION) SEEDS

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ABSTRACT

Onion (Allium cepa L.) has been cultivated for thousands of years and used as an important part of human diet. The seeds of onion contains odorless, non-protein sulfur amino acids, namely, S-alk(en)yl cysteine sulfoxides which are the precursors of secondary metabolites present in onion plant. The main objective of the study is to identify the potentially beneficial components in aqueous, boiled aqueous and methanol mediums. Different types of phytochemicals have been identified from red onion seeds var.co5.The phytochemical assay was carried out for alkaloids, terpenoids, phenols, saponins, flavonoids, quinines, protein, sterol and tannins. The result of the phytochemical screening showed that the alkaloids, terpenoids, saponins, flavonoids, quinines, sterol and tannins were present in the onion seed extracts. The physiochemical analysis of the plant is very important and has a great interest for the production of new drugs for curing of various diseases. Hence these plants can be used for further phytochemical profiling for the invention of new therapeutically valuable compounds. These phytochemicals helps to detoxify and neutralize free radicals that prevent cancer and related degenerative diseases.

KEYWORDS: *Alkaloids, Terpenoids, Saponins, Flavonoids, Quinines, Sterol*

INTRODUCTION

Onion (*Allium cepa L.*) is one of the most important vegetable consumed all over the world. Onion seeds are included in dishes, especially in some Indian cusines but their commercial availability is currently limited(Dini *et al* .,2008).Red onion seeds are a rich source of phytonutrients which makes them inevitable for the treatment or prevention of a number of diseases, including cancer, coronary heart disease, obesity, hypercholesterolemia, type 2 diabetes, hypertension, cataracts, and disturbances of the gastrointestinal tract (e.g., colic pain, flatulent colic, and dyspepsia).

Materials and Methods

Collection of Plant Material

The seeds of Red Onion (*Allium cepa)*var.co5 were collected from the market and the specimens were identified .

Preparation of Plant Extract

The seeds of Red Onion (*Allium cepa)*var.co5 were air dried for a week. The dried seeds was then powdered using a mixer grinder , and subjected to extraction with aqueous , boiled aqueous and methanol for 24 hours. The filtered extracts were used for preliminary screening of phytochemicals.

Aqueous Extract

Aqueous extracts of the seed sample was prepared by soaking 1.5 gram of the red onion seed powder in 20 ml of distilled water. It was mixed well and covered tightly , and was placed in a shaker incubator for 24 hours at room temperature. The samples were then filtered with Whatman No.1 filter paper . The condensed extracts were used for preliminary screening of phytochemicals.

Boiled Aqueous Extract

Boiled Aqueous extracts of the seed sample was prepared by boiling 1.5 gram of the red onion seed powder in 20 ml of distilled water at 60°c for 30 minutes .The samples were then filtered with Whatman No.1 filter paper. The condensed extracts were used for preliminary screening of phytochemicals.

Methanol Extract

Methanol extracts of the seed sample was prepared by soaking 1.5 gram of the red onion seed powder in 20 ml of methanol. It was mixed well and covered tightly, and was placed in a shaker incubator for 24 hours at room temperature. The samples were then filtered with Whatman No.1

filter paper. The cond ensed extracts were used for preliminary screening of phytochemicals.

Phytochemical Analysis

Test for Alkaloid (Mayer's test): To 1ml of the red onion seed extract add one ml of the Mayer's reagent and one ml of the iodine solution. The samples were then observed for the presence of turbidity or yellow precipitation (Siddiqui and Ali, 1997).

Test for Terpenoids (Salkowski test): To 1ml of the red onion seed extract was taken in a test tube and was treated with 1 ml of concentrated solution of sulphuric acid and heated for 2 minutes. Formation of greyish colour indicated the presence of Terpenoids (Sheel and nisha,2014)

Test for phenol(Ferric chloride test): To 1 ml of the red onion seed extract add 1-2 drops of ferric chloride solution. Formation of blue green black indicates the presence of phenol(Iyengar.,1995).

Test for Saponins(Frothing Test): To 1 ml of the red onion seed extract add one or two ml of distilled water and was shaken well . The formation of 1 cm layer of foam showed presence of saponins(Ndam*et al .,2014).*

Test for Flavonoids(Shindo's Test): To1 ml of the red onion seed extract add a few fragments of magnesium ribbon to the solution , 5-6 drops of concentrated Hydrochloric acid was added. Appearance of scarlet pink indicates the presence of flavonoids(Siddiqui and Ali,1997).

Test for Quinines : To 1 ml of the red onion seed extract one ml of 1percent sodium hydroxide was added . Formation of blue green , red colour indicates the presence of quinines(Archana*et al.,2012).*

Test for protein(Xanthoproteic test): To 1 ml of the red onion seed extract , few drops of nitric acid was added . formation of yellow colour indicates the presence of protein (Tiwari*et al.,2012).*

Test for sterol (Salkowski's Test): To one ml of the red onion seed extract add a few drops of chloroform and a few drops of concentrated sulphuric acid .formation of red colour at the lower chloroform layer indicates the presence of sterol (Siddiqui and Ali,1997).

Test for Tannins(Gelatin Test): To 1 ml of the red onion seed extract, two ml of two percent gelatin solution containing sodium chloride was added. Formation of white precipitate indicates the presence of tannins(Tiwari*et al.,2012).*

Results and Discussion

The Red Onion Seeds were qualitatively analyzed. The extracts showed diverse phytochemical profiles with respect to the solvent medium used. Out of three extracts (aqueous ,boiled aqueous

and methanol), aqueous and boiled aqueous showed the maximum occurrence of phytochemicals, the preliminary phytochemical screening tests may help in the detection and identification of bioactive principles and subsequently may lead to the prevention of deadly diseases through drug discovery. Further,these tests facilitate their quantitative estimation of bioactive chemical compounds. These findings of phytochemicals were good enough to reflect its importance as medically efficient to prevent and cure diseases. Hence these plants can be used for further phytochemical profiling for the invention of new therapeutically valuable compounds. These phytochemicals helps to detoxify and neutralize free radicals that prevent cancer and related degenerative diseases.Increasing attention has been focused to identify the naturally occurring anticancer agents, especially plants and plant products used in daily diet which is an inevitable source of bioactive components (Sultan and Sherif.,2011).

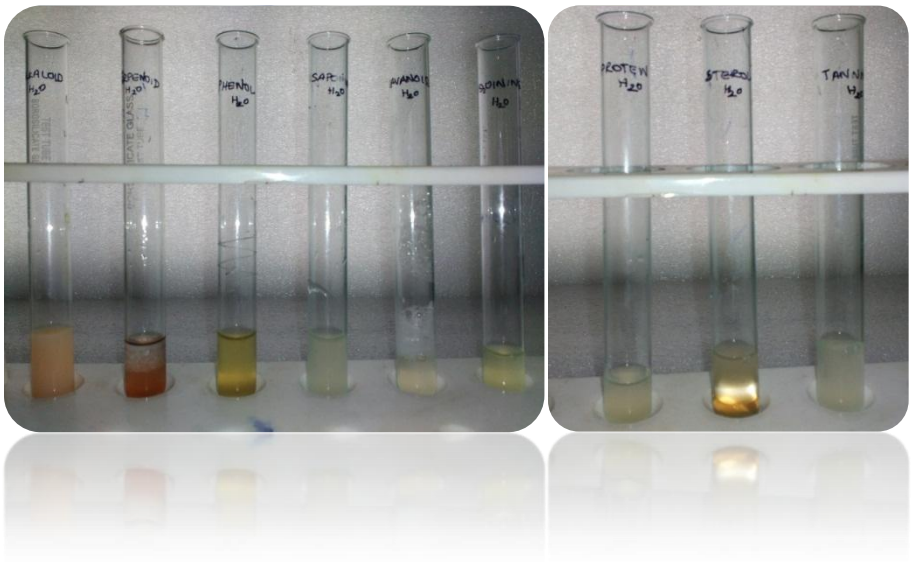
Qualitative Phytochemical Analysis of *Red Onion Seeds*

TABLE I
EXTRACTION WITH AQUEOUS SOLVENT

Chemical test	**Inference**	**Aqueous Medium**
Alkaloids	Formation of yellow colour	+
Terpenoids	Formation of greyish colour	+
Phenols	A blue green black colour	-
Saponins	Formation of 1cm layer of foam	+
Flavonoids	Appearance of pink scarlet colour	-
Quinines	Appearance of blue green or red colour	+
Protein	Appearance of yellow colour	-
Sterol	Formation of red colour at the lower chloroform layer	+
Tannins	Formation of curdy white precipitate	+

Key: +indicates presence,-indicates absence

From the above table it is observed that the red onion seed extract with aqueous solvent has phytochemical constituents such as Alkaloids, Terpenoids, Saponins, Quinines, Sterol, Tannins were present and absence of Phenols, Flavonoids, Protein were observed .the results obtained in the present study are in par with the study conducted by Yalcin*et al.*,2014 stating that onion seeds are rich in fatty acids namely phytosterols.



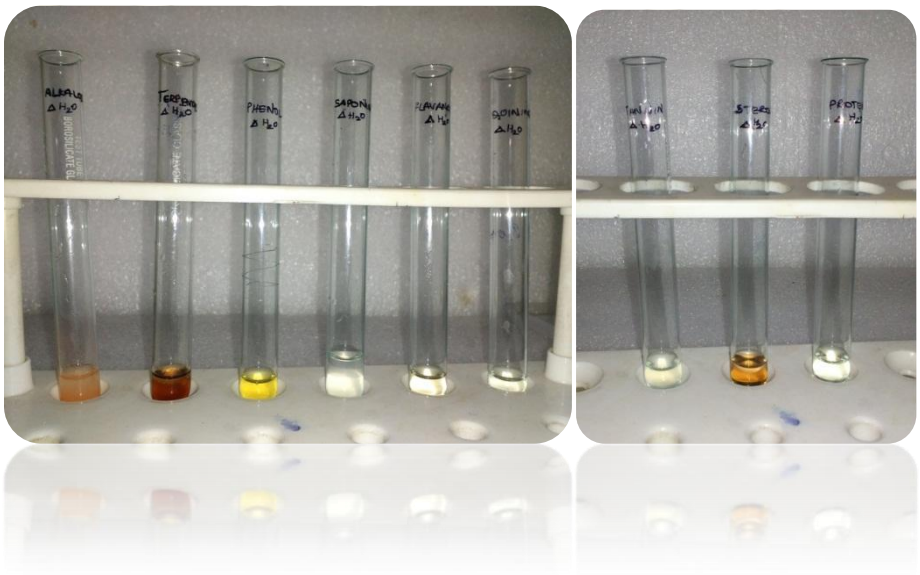
Phytochemical tests for Aqueous Extracts of red onion seeds

TABLE II
EXTRACTION WITH BOILED AQUEOUS SOLVENT

Chemical test	**Inference**	**Boiled Aqueous Medium**
Alkaloids	Formation of yellow colour	+
Terpenoids	Formation of greyish colour	+
Phenols	A blue green black colour	-
Saponins	Formation of 1cm layer of foam	-
Flavonoids	Appearance of pink scarlet colour	+
Quinines	Appearance of blue green or red colour	-
Protein	Appearance of yellow colour	-
Sterol	Formation of red colour at the lower chloroform layer	+
Tannins	Formation of curdy white precipitate	+

Key: +indicates presence,-indicates absence

From the above table it is observed that the red onion seed extract with boiled aqueous solvent has phytochemical constituents such as Alkaloids, Terpenoids, Flavonoid, Sterol, Tannins were present and absence of Phenols, Saponins,Quinines,Protein were observed .As reviewed by Dai *et al.,2010*tannins are one of the important secondary plant metabolite in terms of preventing cardiovascular, neurodegenerative diseases and cancer which is in par with the present study.



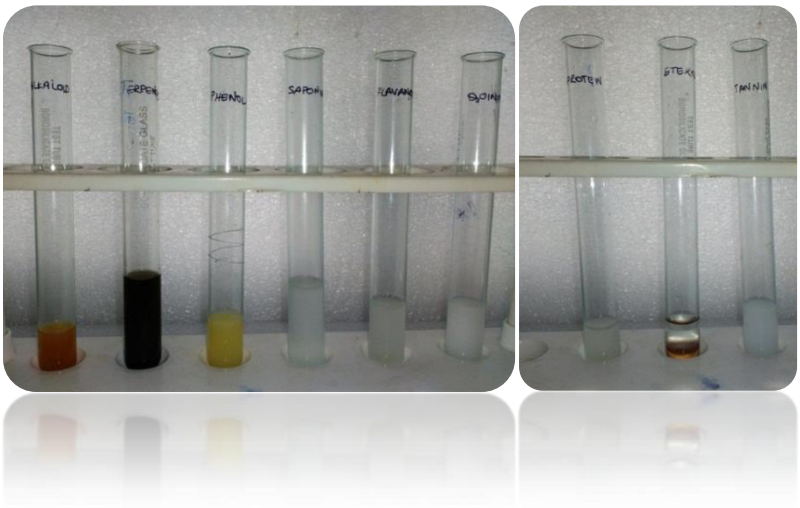
Phytochemical tests for Boiled Aqueous Extracts of red onion seeds

TABLE III
EXTRACTION WITH METHANOL SOLVENT

Chemical test	Inference	Methanol Medium
Alkaloids	Formation of yellow colour	+
Terpenoids	Formation of greyish colour	+
Phenols	A blue green black colour	-
Saponins	Formation of 1cm layer of foam	+
Flavonoids	Appearance of pink scarlet colour	-
Quinines	Appearance of blue green or red colour	-
Protein	Appearance of yellow colour	-
Sterol	Formation of red colour at the lower chloroform layer	+
Tannins	Formation of curdy white precipitate	+

Key: +indicates presence,-indicates absence

From the above table it is observed that the red onion seed extract with methanol solvent has phytochemical constituents such as Alkaloids, Terpenoids, Saponins, Sterol, Tannins were present and absence of Phenols, Flavonoids,Quinine, Protein were observed .Flavonoids are the abundant polyphenols in the daily diet, quercetin a flavonoid has been reported in onion (Azuma*et al.*, 2010 ,Ashwini*et al.*,2013).



Phytochemical tests for Methanol Extracts of red onion seeds

CONCLUSION

The presence of phytochemicals makes the seed useful for treating various health problems. In the present study, the most of the biologically active phytochemicals were present in the aqueous,boiled aqueous and methanol extracts of *Allium cepa*var.co5(red onion)seeds. Since the aqueous and boiled aqueous extracts containsmore constituents it can be considered for the further in-depth investigation. The medical properties of red onions extracts may be due to the presence of above mentioned phytochemicals precursors in the seed. Profiling of plants extracts in different solvent system confirms the presence of diverse group of phytochemicals. Hence, it is concluded that based on the work of interest , it is necessary to use the appropriate solvent mediums for the extraction and isolation of phytochemicals. Eventhough the usage of onion and onion seeds is quiet common among the community, the purpose of the study is to create awareness among the public regarding the phytonutrients & functional components which play a major role in disease prevention in the present scenario.

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PHYSICO CHEMICAL CHARACTERISTICS OF FUNCTIONAL NOODLES

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ABSTRACT

The aim of this study is to use Kodo millet (Paspalum scrobiculatum),green gram dhal (Vigna radiata), and modified cassava starch(retrograded resistant starch fraction, as functional food ingredient)with whole wheat flour to develop noodles as ready -to- cook functional food. Analysis of physico chemical characteristics on formulated noodles with different combinations compared with control (100% whole wheat flour) showed that the incorporation of greengramdhal flour and sodium alginate (as an additive) with modified starch and Kodo millet flour improved the expansion ratio. The breaking strength of the noodle decreased with an increase in the Kodomillet flour substitution. The bulk density increased as the level of millet incorporation (50%) increased and comparatively decreased as the level of millet flour decreased (25%) and also with the substitution of modified starch (25 and 15%) and pulse flour (10%).The millet flour and the modified starch based noodles showed reduction in L,a*and b* color values. The chemical qualities of functional noodles reported as the moisture and protein content was low when compared to control and high in fiber content with an increase in the level of incorporation of Kodo millet flour (50 and 25%). Incorporation of Kodo millet flour and modified starch, imparts low digestible starch content, thus products with indigestible compounds leads to slow; the minimum period for the action of digestive enzymes on carbohydrates.*

KEYWORDS: *Modified Cassava Starch, Functional Ingredient, Physicochemical Characteristics*

INTRODUCTION

In the management of *diabetes mellitus*, more than half of the patients have poor glycemic control; there is a need to develop functional food containing complex carbohydrates with higher levels of dietary fiber. The physiological health benefits of resistant starch due to its incomplete digestion and undergoes fermentation to act as a substrate for colonic microflora led to consider it as a functional food ingredient and also could be classified as dietary fiber (Xie and Liu, 2004). Starch modification results in the production of resistant starch. Kodo millet, (*Paspalum scrobiculatum L.)* is of interest due to its high fiber, lecithin and low in fat contentand is an excellent for strengthening nervous system.

Extrusion technology with its intense mechanical shea, able to break the covalent bonds in biopolymers, and its structural disruption and mixing facilitate the modification of functional properties of food ingredients (Carvalho and Mitchelle, 2000).The structure of noodles results from the extrusion process can lead to a dense protein network reducing the availability of starch granules to attack by alpha-amylase.When pasta is prepared with combination of low gluten flour, the product results in rigid pasta texture when dried and too soft and sticky texture after cooking. Over cooking of pasta often result in sticky product where the starch leaches into the cooking water. These disadvantages could be minimized with the addition of food additives. Food additives play an important role in imparting desired functional property in foods.Hence, an endeavourwas made to formulate functional noodles incorporated with modified starch to have the nutritional benefits of cereal; millet based modified functional foods for human health.

METHODOLOGY

Perishable and non perishable items for the product formulation were procured fromthe local departmental storeand stored till use. Commercially available sodium alginate (Food grade - NDL) was purchased from S. Square and Company, Gwalior (India) and used as a stabilizer in noodle extrusion.

Noodle preparation

The basic ingredients for the preparation of control noodle are whole wheat flour, salt and water. Cereal, millet and pulse based cassava modified starch incorporated noodles were processed as per the standard procedures. The functional flour blends as Kodo millet flour (50 and 25%), modified cassava starch (25 and 15%),green gram dhal flour (10%) and sodium alginate (2%) with the appropriate combination of whole wheat flour weighed followed by addition of salt and was mixed well. The functional flours were then sifted thrice to ensure thorough blending. For pre moistening, the functional flour blend with hot water (70 ºC) was added and mixed well, followed by pre steaming in an idly steamer for 5 min. The pre moistened and pre-steamed functional flour blend was fed in the barrel ofextruder. Then, the blend was post moistened with of hot water (70 ºC) and was mixed thoroughly in the extruder by the shaft in the extruder. The mass was kneaded for 15 min to ensure thorough distribution of moisture. The appropriate brass dies for respective product was fixed and then extruded. After extrusion, the pasta products were post steamed for 20 min using idly steamer. The post steamed noodles were cooled and dried in a cabinet drier for four hours at 60°C. The same procedure was also followed for the preparation of control (100% whole wheat flour) noodles.

Physical characteristics of functional noodles

The expansion ratios (average of 6 measurements)of uncooked and **c**ooked noodlewere determined using the method explained by Nwabueze *et al.*, 2006. The simple technique developed by Anbazhagi (1993) was followed to analyze breaking strength of functional noodles. A noodle strip of 6 cm length was taken and its ends were tied horizontally to the supporting strands about 15 cm above the ground level. Known weights (1g) were dropped on the tied strip at different heights. When the strip breaks, the breaking strength of the noodles were recorded as Y cm.The unit bulk density for all the pasta products were determined from the weight and volume of 1cm long pieces of product. Bulk density was measured in (gcm^{-3}) by weighing the quantity of extrudates required to fill a marked volume of glass cylinder (1000 cm^{-3}) according to Samahy *et al*., 2007.Color (L^*, a^*, b^* values) of the noodles were determined by Hunter lab colour meter

Chemical characteristics of functional noodles

The noodle samples were analyzed for moisture (AOAC, 1995 by hot air oven method), protein (AOAC, 1998), starch (AOAC, 2005) andcrude fiber by acid and alkali digestion (Maynard,1970).

Statistical analysis

Data for chemical characteristics were analyzed using Data Entry Module for Agres Statistical Software (Version 3.01) developed by Tamil Nadu Agricultural University, Coimbatore. The data obtained from the various experiments on chemical characteristics were subjected to statistical analysis to find out the impact of different treatments of noodles by using Factorial Completely Randomized Design (FCRD) method as describedbyCochranand Cox (1957)

RESULTS AND DISCUSSION

The results of physico chemical characteristics are presented in Table 1 and Table 2. The expansion ratio of raw and cooked noodles;ranged from 1.13 to1.19 and 2.51 to 2.59 respectively. A decrease in the expansion ratio of noodles was noticed as the substitution level of Kodo millet flour and modified starchincreased because these are rich in dietary fiber. The incorporation of green gram dhal flour (rich in protein) increases the expansion ratio of the products along with the addition of food additive (sodium alginate).The decrease in expansion ratio with an increase in the level of millet flour was presented by Vijayakumar *et al*. (2010) as for branded noodle as 1.43±0.10 for 10 per cent millet flour blended noodle as 0.75±0.09 and 0.71± 0.07 for 20 per cent millet flour blended noodle. . The breaking strength of the noodle decreased with the increase in the Kodomillet flour substitution. Hemalatha (2004) reported similar results as the breaking strength of the noodles decreased with increase in the level of incorporation of little millet flour and Kodo millet flour.Data regarding bulk densityrevealed that the noodles had a value of 0.746-0.749 g/cm^3. The bulk density increased as the level of millet incorporation (50%) increased and comparatively decreased as the level of millet flour decreased (25%) and also with the substitution of modified starch (25 and 15%) and pulse flour (10%).The bulk density of millet flour substituted noodles (0.490±0.08 g/ml) was significantly high as compared to the bulk density of branded noodles (0.395±0.03 g/ml) (Vijayakumar *et al*., 2010).Similar observations were seen in the present study also. The samples of noodles with millet flour incorporation had the lowest L* values, becomes darker from light brown to brown (higher brownness), which can be explained by the higher content of ash and fibre content.The

incorporation of modified starch to the samples did not affect any predominant changes in the color of noodles.

The initial moisture of the noodles varied between 8.09 to 8.16 per cent and was noted to be less when compared to control (whole wheat flour) and this might be due to the lower moisture of millets and pulses, as pulses were roasted prior to grinding. Incorporation of modified starch also reduced the moisture content .Sozer *et al.* (2007) estimated moisture content for resistant starch enriched spaghetti as 8.97± 0.04 per cent which was lower than that of the moisture content of durum wheat spaghetti as 9.40±0.03 per cent.These reports are in line with the present investigation.The protein content of noodles was found to be 9.26 - 11.20 g/100gfor kodo millet flour based samples while control samples contained 11.14g/100g respectively.The substitution with millet flour (50% and 25% kodo millet flour) and cassava modified starch for the formulation of low glycemic functional noodles reduced the protein content. With respect to incorporation of 10 per cent pulse flour (green gram dhal) not only improves the protein content (quantity) and strength, the level of protein quality was increased by cereal - leguminous amino acid complementation. Sozer *et al.* (2007) presented that the protein content of resistant starch enriched spaghetti (12.21 ± 0.08 %) was lower than that of the control (14.05± 0.09%). Significant increase in fiber content of noodleswas observed with increase in the level of incorporation (50 and 25 per cent) of kodo millet flour compared to the control (2.00 g/100g). A significant higher increase was also observed in the 25 per cent modified starch substituted samples than in the 15 per cent incorporated samples this might be due to the fact that the resistant starch may be defined as a "functional fiber," which can boost the level of total fiber in foods.

CONCLUSION

It was inferred that to develop low glycemic millet based functional noodles, the proportions of functional flour blend as whole wheat flour(50%) ,Kodo millet flour (50% and 25%) with cassava modified starch (25% and 15%) and green gram dhal flour(10%) was found to be acceptable with an improvement in nutritional quality.

TABLE 1 PHYSICAL CHARACTERISTICS OF FUNCTIONAL NOODLES

Treatments	Physical Characteristics						
	Expansion ratio		Breaking strength Point of breakage (wt in g)	Bulk density (g/cm^3)	Colour		
	Raw	Cooked	1		L*	a*	b*
WWF (100% - Control)	1.18	2.56	10.7	0.749	78.93	-1.95	25.18
WWF:KMF(50:50)	1.13	2.51	10.1	0.754	76.60	-1.95	24.40
WWF:KMF:CMS(50:25:25)	1.15	2.53	10.4	0.752	69.70	-1.40	22.10
WWF:KMF:CMS:GGF(50:25:15:10)	1.19	2.59	10.5	0.746	71.80	-2.40	23.50

WWF: Whole wheat flour, KMF: Kodo millet flour, CMS: Cassava modified starch GGF: Green gramdhal flour

TABLE 2 CHEMICAL CHARACTERISTICS OF FUNCTIONAL NOODLES

Treatments	Chemical Characteristics			
	Moisture (%)	Protein(g/100 g)	Fiber(g/100g)	Starch(g/100g)
WWF (100% - Control)	8.16	11.14	2.00	54.60
WWF:KMF(50:50)	8.14	10.82	5.21	43.92
WWF:KMF:CMS(50:25:25)	8.10	9.26	5.83	51.58
WWF:KMF:CMS:GGF(50:25:15:10)	8.09	11.20	5.60	45.28
SED	0.05837	0.06209	0.06462	0.28636
CD (0.05)	0.11511**	0.12244**	0.12946**	0.56474**

WWF: Whole wheat flour, KMF: Kodo millet flour, CMS: Cassava modified starch GGF: Green gramdhal flour

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STANTARDISATION AND NUTRIENT EVALUATION OF JACKFRUIT PUDDING MIX

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ABSTRACT

With the changing perceptions in food concepts, jackfruit products have now entered in the list of most cherished dishes. This valuable fruit has got great attention nowadays owing to its nutritional and antioxidant properties. Value added products like chips, jam, pickle and canned pieces are some of the very common value added products from jackfruit. Raw jackfruit flour has got great potential for value addition. However, scanty information are available about a good pudding mix with jackfruit flour. Hence, an attempt has been made to develop an instant pudding mix with jackfruit. Raw jackfruit flour and corn flour at various proportions were incorporated to get an acceptable pudding mix, where pudding mix with 100 percent corn flour was taken as control. Based on the organoleptic scores obtained, the treatment with 60 per cent corn flour and 40 per cent jackfruit flour (T3) was found to be the best pudding mix with a mean score of 8.97 for overall acceptability followed by 50 per cent jackfruit flour (8.82). All other treatments had a mean score above the acceptable levels. The nutrient analysis of the selected pudding mix revealed that it contain 82.68g carbohydrate, 11.3g protein, 2.32g fat, 0.06g fibre, 7.61mg calcium, 2.85mg phosphorus, 0.27mg iron and 0.16mg zinc per 100g. It could be concluded that the development of such novel products will help in main streaming raw jackfruit.

KEYWORDS: *Jackfruit Bulb Flour, Corn Flour, Pudding Mix, Organoleptic Evaluation*

INTRODUCTION

Jackfruit botanically known as *Artocarpusheterophyllus*, grows in tropical and subtropical regions throughout the world.The fruity flavor of its sweet arils (bulbs) can be appreciated from a distance. The fruit deteriorates rapidly upon ripening like other climacteric fruits. The edible portion in the form of bulbs after pitting is approximately 30–35% of the whole fruit. Therefore, the high transportation and packaging costs in case of whole fruits warrants marketing of the fruit in pitted and pre-cut form after the bulbs are separated from the pericarp. The market potential of jackfruit can be promoted if the fruits are made available to the consumer in a ready to eat or ready to cook form throughout the year. It has become necessary to open new avenues for its better utilization like nontraditional uses of jackfruit in the form of convenience foods like pudding mix. The ready to mix formulations are currently getting lot of emphasis owing to increase in their demands in markets due to ease of preparation at homes. Hence, the present study aims to develop jackfruit flour incorporated instant puddingmix with improved nutritional and organoleptic qualities.

METHODOLOGY

Collection of raw materials

Raw jackfruit (*varikka* type) is collected from the households and the flour was prepared as per the procedure suggested by Pandey and Ukkuru (2004). Other ingredients namely corn flour, skimmed milk powder, sugar and china grass was procured from the local market.

Preparation of pudding mixes

Pudding mixes were prepared using varying proportions of raw jackfruit flour (RJF) and corn flour (CF)as detailed in table 2. For preparing pudding, 25 gm of raw jack fruit flour and corn flour with varying proportions was taken to which 75g ofskimmed milk powder, 75 g of sugar and 2.5g of china grass were added.

TABLE 1. TREATMENTS FOR JACKFRUIT INCORPORATED INSTANT PUDDING MIX

Treatments	Combinations
T_0	Control (100CF)
T_1	80% CF + 20% RJF
T_2	70% CF + 30% RJF
T_3	60% CF+ 40% RJF
T_4	50% CF+ 50% RJF
T_5	40% CF+ 60% RJF
T_6	30% CF+ 70% RJF
T_7	20% CF+ 80% RJF

CF-Corn flour, RJF-Raw jack fruit flour

Organoleptic evaluation

A series of acceptability trails were carried outusing simple triangle test at the laboratory level and selected a panel of fifteen judges between the age group of 18- 35 years as suggested by Jellineck (1985). The organoleptic evaluation of the pudding mixes were carried out by preparing pudding with these mixes. The reconstituted pudding was evaluated organoleptically by the judgesusing a 9 point hedonic scale**.**

Nutrient composition of the pudding mix

The moisture, carbohydrate, crude protein,crude fibre and total ash were determined according to the standard methods of AOAC (1980). Analyses were carried out in triplicate.

Statistical analysis

The scores obtained for organoleptic evaluation were evaluated by Kendall's Coefficient of Concordance (W).The data on quality evaluation of jackfruit incorporated pudding mix and control was analysed statistically using T test.

RESULTS AND DISCUSSION

Organoleptic evaluation

Pudding prepared from jackfruit based pudding mix was subjected to sensory evaluation and the results are detailed in Table 2.

TABLE 2. MEAN SCORE FOR ORGANOLEPTIC EVALUATION OF JACKFRUIT BASED PUDDING

Treatments	Sensory Attributes					
	Appearance	Colour	Flavour	Texture	Taste	Overall acceptability
T_0	8.82 (5.90)	8.57 (5.47)	8.55 (5.03)	8.6 (5.03)	8.62 (5.33)	8.62 (5.03)
T_1	8.91 (6.37)	8.64 (5.70)	8.75 (6.20)	8.6 (6.20)	8.62 (5.03)	8.64 (6.20)
T_2	8.64 (4.87)	8.75 (6.27)	8.8 (6.20)	8.75 (6.27)	8.75 (5.97)	8.82 (6.20)
T_3	9.00 (6.97)	8.91 (7.13)	8.93 (7.00)	9 (7.23)	8.93 (7.27)	8.97 (7.00)
T_4	8.40 (4.20)	8.22 (4.07)	8.35 (4.30)	8.24 (4.57)	8.48 (4.97)	8.46 (4.30)
T_5	8.11 (2.90)	8.11 (3.27)	8.04 (3.17)	7.97 (3.47)	8.08 (2.97)	8.2 (3.17)
T_6	8.00 (2.60)	7.68 (2.50)	7.84 (2.47)	7.77 (1.93)	7.8 (2.23)	7.68 (2.47)
T_7	7.77 (2.20)	7.31 (1.60)	7.51 (1.63)	7.46 (1.64)	7.33 (1.64)	7.82 (1.63)
Kendall's W value	0.617**	0.604**	0.663**	0.670**	0.623**	0.684**

Values in parentheses is mean rank score based on Kendall's W ** Significant at 1% level

The result of the organoleptic evaluation shows that, mean scores and mean rank scores for sensory parameters (appearance, colour, flavour, texture, taste and overall acceptability) of jackfruit based pudding mix was highest for treatment T_3(60% corn flour+ 40% raw jack fruit flour) than the other treatments. The mean score for taste and overall acceptability was 8.93 and

8.97 respectively.Kendall's value shows that there was significant agreement between the judges at 1% level.

Nutrient analysis of the pudding mix

Based on sensory evaluation, jackfruit pudding mix with 60 % corn flour and 40 %raw jackfruit flour was selected as best treatment and it was subjected to nutritional analysisand the result was tabulated and presented in table 3.

TABLE 3. NUTRIENT COMPOSITION OF THE JACKFRUIT BASED PUDDING MIX

Nutrients (%)	Treatments		t value
	Control (T_0)	Pudding mix (T_3)	
Moisture content (%)	6.54	5.41	7.369**
Carbohydrate (g/100gm)	79.22	82.68	12.820*
Crude protein (g/100gm)	10.97	11.36	0.652 ^{NS}
Fat(g/100gm)	1.51	2.32	3.044 ^{NS}
Crude fibre (g/100gm)	0.034	0.061	4.182*
Calcium (mg/100gm)	7.14	7.61	53.7^{NS}
Phosphorus (mg/100gm)	3.91	2.85	6.187**
Iron (mg/100gm)	0.283	0.272	1.692^{NS}
Zinc (mg/100gm)	0.183	0.168	5.62^{NS}

*Significant at 0.05% level ** Significant at 0.01% level NS-Non significant

The table 3 reveals the moisture content of jackfruit based pudding mix was less (5.41 %) compared to control (6.54%). The products with low moisture content have enhanced shelf life quality by lowering the microbial load (Abraham and Jayamuthunagai, 2014).

The carbohydrate content of control was significantly higher (82.68 %) than the jackfruit based pudding mix (79.22%). The carbohydrate content of corn flour is 77g /100 g (Anon., 2017a) and that of jackfruit bulb flour is 74.12g/ 100g (Kumari and Divakar, 2016).This difference might have contributed to the significant difference in the carbohydrate content in the control and jack fruit based pudding mix.

The crude protein content of jackfruit based pudding mix was11.366% and 10.979% in control. However, the treatments did not differ significantly. Satter *et al.* (2014) developed weaning food by incorporating 41 per cent of jackfruit bulbs with wheat flour, soy flour and milk powder. The 100g of the product provides 16.55g of protein.

The fat content of the jackfruit based pudding mix was significantly higher (2.32%) than the control (1.51%). The fat content in corn flour is 3.9% (Anon.,2017 a) and 7.20% in jack fruit bulb flour (Swami *et al*.,2012).The difference in fat content may be attributed to addition of jack fruit flour with different levels of total solids as compared to the corn flour alone.

A significantly higher (0.06 %) crude fiber content was recorded in the pudding mix compared to 0.03 % in control. Kumari and Divakar (2016) reported the crude fibre content of jackfruit bulb flour is 4.04g 100^{-1}. This may be the reason for the more fibre content of jack fruit based instant pudding mix.

Mineral analysis showed that phosphorus and zinc content of pudding mix (2.85mg and 0.18mg/100gm) were less than that of control (3.19mg and0.16mg/100gm) however, the difference in zinc content was not significant. The lower values in pudding mix may be attributed to the lower phosphorus(36mg/100gm) and zinc (0.42mg/100gm)content in jackfruit flour (Swami *et al*.,2012) as compared to phosphorus(75.6mg/100gm) and zinc (0.5mg/100gm) content in corn flour(Anon.,2017 b).The iron content of pudding mix (0.27mg/100gm) was on par with control (0.28mg/100gm).A non-significant increase in the calcium content was recorded in the pudding mix (7.61 mg/100gm) compared to control (7.14mg/100gm).

CONCLUSION

In recent years, emphasis is focused on product diversification, by products utilization and development of value added jackfruit products to improve the jackfruit industry**.**Hence, the current study was carried out to exploit the properties of raw jack fruit flour as an ingredient of instant pudding mix.The study concluded that 40 per cent incorporation of jackfruit flour for the preparation of instant pudding mix was acceptable in all the sensory qualities and had high nutritional profile

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ASSESSING PREVALENCE OF PRE-LACTEAL FEEDINGAMONG LACTATING WOMENIN KARAIKAL DISTRICT OF PUDUCHERRY

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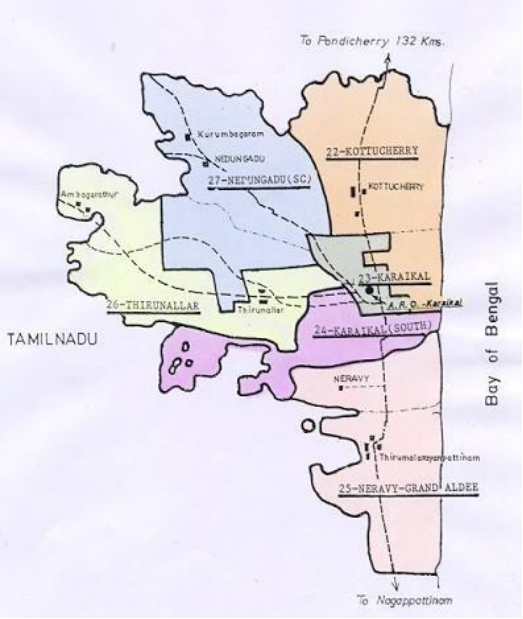
ABSTRACT

Various studies have emphasized the role of breast feeding in the prevention of wide range of infancy infections including diarrhoea which may in turn ensure child survival. But initiation of breast feeding is hindered by the cultural practice of pre-lacteal feeding. In India this practice of giving prelacteal feeds cut across all the communities irrespective of the religion and caste as it is considered to have positive effect on child's gastrointestinal health and intellectual growth. In Karaikal, practice of pre-lacteal feeding is very common cutting across all religions. Hence it becomes imperative to assess the prevalence of prelacteal feedings. The study group chosen is lactating women .The prime objective of the present study was the assessment of prelacteal feeding practices, types and delineate the factors associated with same among the lactating mothers in karaikal. A purposive non probable sample of 50lactating women was chosen. Both primary as well as secondary data collected through a semi-structured interviewer administered questionnaire .Results were statistically analysed and showed prevalence of prelacteal feeding to be 46%.39.1% mothers gave sugar water to the newborns. Other prelacteal feeds included omam water [carom seeds], cow's milk, plain water, religious water, jaggery with honey and castor oil and mashed dates. 65.2% mothers cited traditional cultural practice running through generations as the reason behind giving prelacteal feedings. Educating mothers regarding ill effects of pre lacteal feeding along with breastfeeding can reduce the chances of morbidity and mortality in Infants.

KEYWORDS: *gastrointestinal, mortality, prelacteal*

INTRODUCTION

Karaikal region is the second important region in Union Territory of Puducherry. Karaikal region lays 130km south of Puducherry. It is located between 10'49' l lo North latitude and 79943' and 79 " 52' cast longitude. It is surrounded by Nagapatnam district of Tamil Nadu state.



The boundaries of this district are the Bay of Bengal on the East and Nagapatnam district on the other North and south whereas Thiruvarur on the west. Karaikal region is spread over an area of 160.00 sq.km. Karaikal had population of 200,222 of which male and female were 97,809 and 102,413 respectively [Census] 2011.

Fig.1.Map of karaikal district.

The child population is 22,263[11.12%] of which 11.56% are males and 10.7% are females. However the Infant Mortality Rate in karaikal is still 22/1000 live births. Further the Neonatal Mortality rate is 7.28/1000 live births and Infant deaths within 24hrs of birth is 9.7%. The causes of infant deaths vary from Pneumonia to sepsis to Acute respiratory infections and diarrhoea constitutes about 4% of the total causes. Only 68.1% Children under age 1 years are breastfed within one hour of birth[NHSRC, 2013].

Table: 1[Census, 2011]

Population	Numbers
Total	200,222
Male	97809
Female	102413
Child	22263

Various studies have however emphasized the role of breast feeding in the prevention of wide range of infancy infections including diarrhoea which may in turn ensure child survival. In this regard time of initiation of breast feeding is very important in determining the health of the child. In many countries before starting breast feeding there are various cultural practices of giving certain food items to newborn babies by grand-parents or aunts with silver spoon or bare fingers

and many other such practices prevail. This practice of giving any food except colostrum or breast milk to a newborn before initiating breastfeeding is referred as pre-lacteal feeding.

In India this practice of giving prelacteal feeds cut across all the communities irrespective of the religion and caste as it is considered to have positive effect on child's gastrointestinal health and intellectual growth.

Studies have shown that the effects of prelacteal feeding in babies range from lactation failure , diarrhoea and recurrent infections[Punia et al, 1997]. In a study in Ethiopia on 'Prelacteal feeding practices and associated factors among mothers attending immunization clinic in Harari region, eastern Ethiopia, 2014 it was found that 45.4% mothers gave prelacteal feeds[open journal of preventive medicine,2014,4,529-534].

In another study by Jimoh et al [2011] in Northen Nigerian rural setting, 85.2% women practiced pre-lacteal feeds.

As far as India is concerned in a study by kanagasabapathy et al [2015]on Pre-lacteal feeding practices among rural mothers in Tamil Nadu, it was found that 52 mothers gave prelacteal feeds to their babies irrespective of their literacy status and this led to delay in letdown reflex and contributed to lactation failure.In another study in northern India titled Determinants of Prelacteal feeding in rural northern India by Roy et al [2014] it was observed that 54.5 % of the mothers gave prelacteal feeds and education in the Recently delivered women[RDW] did effect the behavior with regard to prelacteal feeding.

Hence it becomes imperative to assess the practice of prelacteal feedings and the factors associated with it.The study group chosen is lactating women who seldomly step out of home during the initial phase of lactation . Hence the prime objective of the present study was the assessment of prelacteal feeding practices and the factors associated with same among the lactating mothers in karaikal.

Rationale

The problem of prelacteal feeding is still widely prevalent in India, though exclusive breast feeding might have taken a boost. However traditional and cultural practices of prelacteal feeding before initiating breastfeeding expose the newborn to various infections and pose health risks. The predominance of prelacteal feeding practices underscores the need for innovative strategies to create awareness among mothers emphasizing risks of prelacteal feeding and benefits of early initiation of breast feeding.

Objectives and Specific Objectives

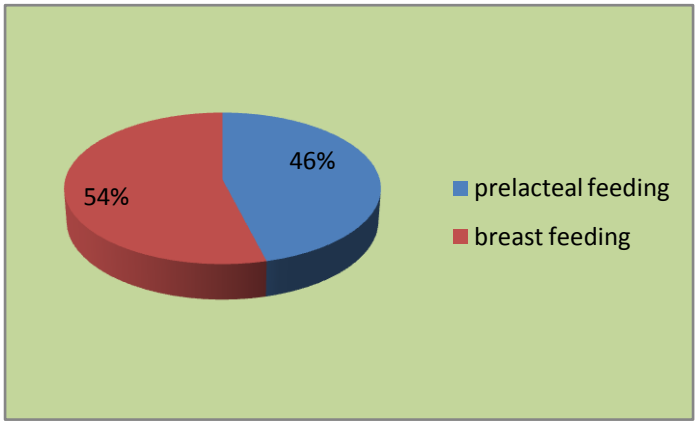
- The prime objective of the present study was to assess prelacteal feeding practices prevalent in karaikal.
- Enlistingthe associatedfactors with giving pre lacteal feeding.
- Enlist the types of pre lacteal feeds given to newborn babies.

METHODOLOGY

A purposive non probable sample of 50 lactating women was chosen. Both primary as well as secondary data was collected from Govt. hospital & private maternity clinic and hospitals, door to door visit through a pre-tested semi-structured interviewer administered questionnaire to lactating women.

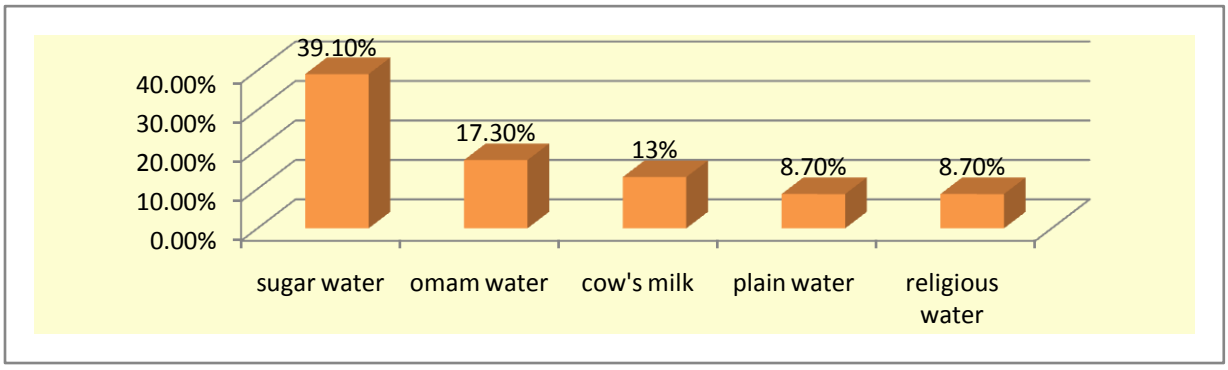
RESULTSAND DISCUSSION

Prevalence of prelacteal feeding was found to be 46% as 23 mothers out of the total 50 mothers had given some form of pre lacteal feeding.



Graph1: Prevalence of Prelacteal feeding.

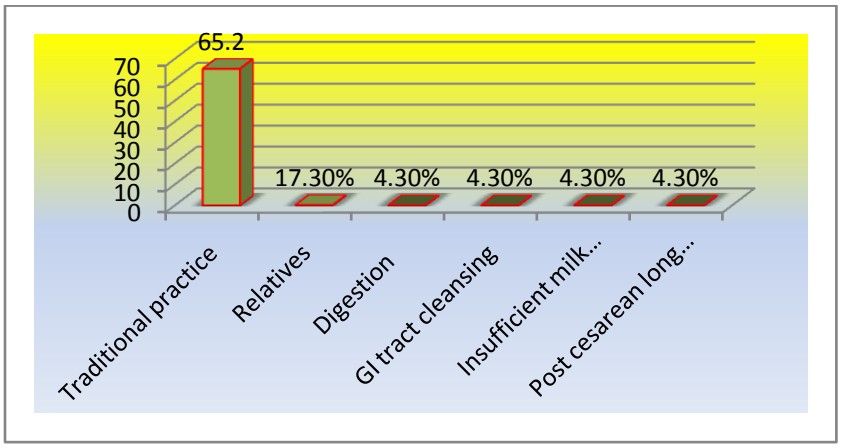
As far as types of prelacteal feeding is concerned majority of the mothers 39.1%[9] gave sugar water to the newborns. 17.3%[4] had given *omam* water [carom seeds]followed by cow's milk 13%[3]. Plain water was given to 8.7%[2] babies and another 8.7% [2] newborns were given some religious water.



Graph 2: Types of prelacteal feeding.

The other prelacteal feeds included jaggery with honey[4.3%], jaggery with castor oil[4.3%] and mashed dates[4.3%].

65.2%[15]mothers cited traditional cultural practice running through generations as the reason behind giving prelacteal feedings. Another 17.3% [4] cited compulsion by relatives to give prelacteal feeding. Other factors associated with prelacteal feeding included better digestion[4.3%], cleansing of GI tract specially with honey and ghee/castor oil[4.3%], insufficient milk production immediately after delivery[4.3%] and long gap after cesarean for breast feeding[4.3%].



Graph:3 Factors associated with prelacteal feedings.

CONCLUSION

Traditional and cultural practices of prelacteal feeding before initiating breastfeeding expose the newborn to various infections and pose health risks. However educating mothers regarding ill effects of pre lacteal feeding alongwith breastfeeding can reduce the chances of morbidity and mortality in Infants.

The predominance of prelacteal feeding practices underscores the need for innovative strategiesto create awareness among mothers emphasizing risks of prelacteal feeding and benefits of early initiation of breast feeding.

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EMERGING NEEDS OF NUTRITION EDUCATION TO MOTHERS AND CARE GIVERS TO ENSURE BETTER NUTRITIONAL STATUS OF CHILDREN

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ABSTRACT

Worldwide, the role of nutrition education specially to mothers and care givers in addressing under nutrition has been recognised and all national and international programmes on child under nutrition include nutrition education as a niche area of focus. Critical review of earlier published papers. Nutritional status of children is a development indicator of a nation. Inadequate emphasis on Nutrition and Health Education (NHE) activities for behaviour change has been identified as a major lacuna in the National programmes on improving child nutrition. Towards ensuring quality nutritional education, the role played by Anganwadi workers need to be augmented by the participation of the entire community in general and increased involvement of Academic institutions like Medical and Home Science Colleges can curb this situation. Several studies have showed the vicious cycle of under nutrition and infection and the effect of infection on the nutritional status of the child (1,2). Family as a whole takes care of the child's nutritional status and hence a targeted nutrition education of the family on the need to seek medical advice during infection and ensure prompt dietary care post convalescence has a key role in improving the nutritional status of the child. Worldwide, the role of nutrition education specially to mothers and care givers in addressing under nutrition has been recognised and all national and international programmes on child under nutrition include nutrition education as a niche area of focus. ICDS programme of Indian Government also emphasises the dire need of nutrition education to combat malnutrition and infection. The paper attempts to highlight successful studies conducted globally in improving nutritional status of children with specific focus on nutritional education. The paper also reviews the actions to be taken with regard Indian context to further improvise and restructure the current national programmes on Infant and child nutrition.

KEYWORDS: *Nutritional, Augmented, Restructure*

INTRODUCTION

Nutrition education is an important tool in improving the nutritional status of the child. Various studies have clearly brought out the important reason for undernutrition in children to beinfection (1,2). Studies reported earlier highlightedthe interrelationship of infection and undernutrition and the toll of infections on nutritional status of the child.(1,2). In developing countries like India, poverty and access to health care serviceshas a major role in determining the nutritional status of the children. Equally important is the lack of awareness to seek medical advice at the earliest appropriate time of illness. Among urban low income groups, though accessibility is not a problem,lack of awareness to seek medical advice at earliest opportunity results in deterioration of health and nutritional status. The recent spurt in the practice of using over-the-counter drugs with the previous prescription or a suggestion by the neighbours forsimilar symptoms of illness without due consultationwith the medical practionerhasled to infections progressing rapidly, leading to a further deterioration in health and eventually affecting nutritional status.

Factors affecting Nutritional status and growth amongst children

Studieson various risk factors affecting stunting amongst under two children found in 137 developing countries reinstated the fact that the leading risk for stunting worldwide to be "term, and small for gestational age" (that is, being born at or after 37 weeks of pregnancy, but being too small). This was followed by poor sanitation (7.2 million cases) and risk factors related to child nutrition and infection. The results of the study suggest that a large proportion of childhood stunting in developing countries could be prevented if exposure to a few key risk factors are eliminated. (4)

It is universally accepted that children have the right to a caring, protective environment;safe and nutritious food; basic health care to protect them from illness and promote growth and development. A number of financial and non-financial barriers may delay or prevent poor households from seeking health care for their sick infants and children. Such barriers include geographical access or distance; financial barriers; sociocultural, language and ethnicity‐related barriers; and lack of knowledge and awareness, which can together lead to low demand for and use of services, particularly by the poor (5).The generally lower levels of health-related knowledge and awareness among poor and marginalized groups result in low demand for health care services. To realize the benefits of seeking care for sick children, caregivers must know where and when to seek appropriate health care and assistance. Delays in seeking medical attentionat appropriate time have been estimated to contribute up to 70% of child deaths. (6)

Global Studies on the Role and Impact of Nutrition Education

Studies in Bangladesh on the effect of educational intervention on prevention of malnutrition revealed that before the intervention period, mothers neither had sound knowledge of appropriate infant and young child feeding nor recognized the need for giving adequate food during rapid growth of their children. They had taboos on foods and little knowledge about the nutritional status of their children and the nutrient density of foods. They had faith in traditional or spiritual healers rather than in medical treatment by a health-care provider. After the intervention, superstitions and food taboos were reported to have been removed from the mothers in the intervention groups as they changed their practices. The mothers' ability to identify malnutrition

improved extensively. They realized that disease could be prevented with proper care, and they wanted to seek care from local government health-service providers instead of going to traditional healers (7).

Guided by formative research, the intervention studies at Peru, aimed to enhance the quality and coverage of existing nutrition education as a means of government health facilities to address malnutrition. The studyrevealed that improvement of nutrition education delivered through health care services can decrease the incidence of stunted growth among children in areas where access to food is not a limiting factor(8).

Similarly, an experiment conducted in Indonesia for five months in the form of providing nutrition education once in two weeks and analysed based on General Linear Model analysis showed that intervention in terms of nutrition education had a significant effect on nutritional knowledge, attitude and practices among mothers and nutritional status of children less than five years based on the Z-score of body weight for age. (9)

Findings from FAO in Vietnam emphasised the successful health outcome of a nutrition project based on household food production and nutrition education and the value of evaluating nutrition projects with reference to measurable health outcomes. A nutrition program based on home garden food production and nutrition education for mothers of young children was associated with significant reductions in morbidity from acute respiratory infection and diarrheal disease in preschool children.(10)

Studies conducted in Pakistan reported that the intervention was successful in reducing undernutrition in two areas of Pakistan. Nearly 36% and 32% children in poor households progressed to a normal nutritional status within their given resources without any food provision if nutrition education based on personal dietary assessment is provided to them. (11) These findings support the evidence that there is scope for improving feeding behaviour and growth through counselling, nutrition education, and behaviour change communication.

Indian Context

A study on Primary health care and nutrition in New Delhi, projected on the importance of nutrition as an essential component of primaryhealth care (PHC) stated that Integrated child development services (ICDS) through close coordination with PHC can improve health and nutritional status of mothers and children. There has been a progressive improvement in access to health and nutritional services in urban and rural areas, though the pace of improvement is slow.(12)

A study conducted on nutritional status of school-age children in urban slums suggested that nutrition education should address family as a whole and not just the women. Nutrition education should focus on communication for behavioural change. (13)

Another studyon the“Effect of Nutrition Education of mothers on Infant Feeding Practices”, showed that nutrition education played a significant role in improving the nutritional status of the infants when weight for age is considered as a parameter for assessing nutritional status. (14)

Study by Nutritional Foundation of India, revealed that increased awareness about PHC and ICDS services and their access can result in improvement of health and nutritional status especially in women and children. The relatively steep decline in severe grades of undernutrition in childhood and halving of mortality rates among under-five children over the last five decades

are mainly attributed to improvement in access to PHC. A more rapid improvement in nutritional and health status can be achieved through improvement in content, coverage and quality, convergence and synergy between PHC and ICDS programmes. (12)

World bank report on enhancing the impact of ICDS envisages that although the design of ICDS recognizes the multidimensional determinants of undernutrition, too much emphasis is currently given to providing food security through the supplementary nutrition program. It underlines that not enough attention is given to the most effective interventions for child nutritional outcomes like disease control and prevention activities, education to improve domestic child-care and feeding practices, and micronutrient supplementation(15).

Designing Probabilistic Model of Nutritional Education

WHO in its Source for health professionals (16) states that health information may not reach poor and marginalized populations alike for varied reasons, including proximity to health centres and limited outreach in many areas. It feels that low levels of education and linguistic or cultural barriers may likewise make health information or other health-related information, education and communication (IEC) inaccessible especially for ethnic minorities. Poor literacy of Women may likewise place many forms of health information, such as print media, beyond their reach, while restrictions on their mobility may limit their exposure and access to new health-related ideas and practices. Therefore the design of nutritional education should be planned and aimed towards the target population for successful implementation and outreach.

Empowering nutrition education encompasses political, social, and economic factors whichaffect nutrition; it encourages local people to participate in the interpretation and analysis of their own situations. Local people need to reflect together on issues such as their malnutrition. In that dialogue process they can learn from each other, and produce knowledge that none of them had previously gained as individuals. (17)

Studies conducted earlier have emphasised on the importance of appropriate home prepared foods, hygiene and high energy foods together with the importance of recalling messages by mothers after the messages are delivered. The studystates that though variations in delivery of educational interventions exist, most of the studies are of reasonably good quality with appropriate use of charts, posters and booklets. (18)

WCD report clearlyreiterates that whatever success ICDS programme has been able to achieve so far, it has been because of strong community support and cooperation. It was observed that nutritional education programmes were conductedby Anganwadi workers at least once a month in 69% of the Anganwadis, on topics related to mothers and children. The review report recommended that to ensure good health and nutrition of children below two years, priority should be to reachtheir mothers first with health education and counselling (19).

Improvement in Nutritional education with regard to Indian context is not feasible without adequately preparation of Angawadi Workers (AWW). While structured training programmes are to be conducted through 400 Anganwadi training centres spread over the country, many a times it has beennoticed that many AWW are sent to their workplace with little or no prior and adequate training, and were made to learn by themselves in their actual filed setting. Refresher training and the degree of supervision that might help AWWs to acquire the skills to perform their duties is also scarce as ICDS support services at state level have limited man power which halt their progress. As a result, the AWW has very little technical or other support staff in

providing ICDS services – a job that requires considerable understanding of nutrition, maternal and child health issues.(20). Academic institutions like Medical and Home Science Colleges should be assigned important roles in improving the program quality and performance.

CONCLUSION

Nutritional status of children is a development indicator of a nation. Inadequate emphasis on Nutrition and Health Education (NHE) activities for behaviour change has been identified as a major lacuna in the National programmes on improving child nutrition. Prompt medical care during illness and providing good nutrition during and post infection might reduce the effect of infection on nutritional status. It is important to educate the parents about the dual care that has to be taken during and post infection period as well as seeking medical advice in care of illness. If the nutritional status and infections are addressed together, the effect of infection on nutritional status can be considerably reduced. Educating the parents to seek medical advice during illness and giving them right nutrition education to take prompt care during post convalescence might play a major role in improving the overall nutritional status of children.Towards ensuring quality nutritional education, the role played by Anganwadi workers need to be augmented by the participation of the entire community in general and increased involvement of Academic institutions like Medical and Home Science Colleges can curb this situation.

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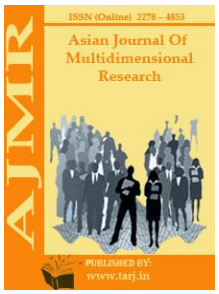

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

IDENTIFICATION OF PHYTOCHEMICALS BY CHROMATOGRAPHIC TECHNIQUE IN POMEGRANATE SEEDS

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ABSTRACT

The study was carried out to identify the compounds by chromatographic techniques in pomegranate seeds. Chromatography is usually introduced as a technique for separating and identifying the components in a mixture. The basic principle is that components in a mixture have different tendencies to adsorb onto a surface or dissolve in a solvent. It is a powerful method in industry, where it is used on a large scale to separate and purify the intermediates and products in various syntheses. Techniques such as Column Chromatography, Paper Chromatography, Thin Layer Chromatography and Gas Chromatography-Mass Spectrometry were carried out in the study which gives different results accordingly. As each solute distributes itself (equilibrates) between the stationary and the mobile phase, the distance a solute moves is always the same fraction of the distance moved by the solvent. This fraction is variously called the retardation factor or the retention ratio, and is given the symbol R or Rf.

KEYWORDS: *Chromatography, Industry, Tendencies*

INTRODUCTION

Plant constituents may be isolated and used directly as therapeutic agents or as starting materials for drug synthesis or they may serve as models for pharmacologically active compounds in drug synthesis. The general research methods include proper selection of medicinal plants, preparation of crude extracts, biological screening, detailed chemo pharmacological investigations, toxicological and clinical studies, standardization and use of active moiety as the lead molecule for drug design (Wink *et al.*, 2005).

Isolation and purification of the active principles from an exceptionally complex matrix which are the major bottlenecks affecting drug discovery from natural sources, and this reductionist approach may lead to inconclusive findings in clinical trials (Williamson, 2001; Raskin& Ripoll, 2004). Other reasons for not always isolating or fractioning a plant extract are the possible presence of unstable or unknown active constituents and the presence of a range of active compounds, rather than only one.

METHODOLOGY

Column chromatography:

Column chromatography is frequently used by organic chemistry to purify liquids and solids. An impure sample is loaded onto a column of adsorbent, such as silica gel or alumina. An organic solvent or a mixture of solvents (the eluent) flows down through the column. Components of the sample separate from each other by partitioning between the stationary packing material (silica or alumina) and the mobile elutant. In column chromatography, the stationary phase is packed into a glass tube to form a cylinder or column of granules. Solvent or buffer can flow freely between the granules.

Paper chromatography:

Paper chromatography is the simplest, type of chromatography that people meet. A drop of a solution of a mixture of dyes or inks is placed on a piece of chromatography paper and allowed to dry. The mixture separates as the solvent front advances past the mixture. Filter paper and blotting paper are frequently substituted for chromatography paper if precision is not required. Mixtures of solvents are also used, including aqueous solutions, and solvent systems with a range of polarities can be made. A mixture useful for separating the dyes on Smarties is a 3:1:1 mixture (by volume) of butan-1-ol:ethanol:0.880 ammonia solution. As each solute distributes itself (equilibrates) between the stationary and the mobile phase, the distance a solute moves is always the same fraction of the distance moved by the solvent. This fraction is variously called the retardation factor or the retention ratio, and is given the symbol R or Rf.

Thin Layer Chromatography (TLC):

Thin Layer Chromatography is similar to paper chromatography, but the stationary phase is a thin layer of a solid such as alumina or silica supported on an inert base such as glass, aluminium foil or insoluble plastic. The mixture is ‘spotted’ at the bottom of the TLC plate and allowed to dry. The plate is placed in a closed vessel containing solvent (the mobile phase) so that the liquid level is below the spot. TLC has advantages over paper chromatography in that its results are more reproducible, and that separations are very efficient because of the much smaller particle size of the stationary phase. The solvent ascends the plate by capillary action, the liquid filling the spaces between the solid particles. This technique is usually done in a closed vessel to ensure

that the atmosphere is saturated with solvent vapour and that evaporation from the plate is minimised before the run is complete. The plate is removed when the solvent front approaches the top of the plate and the position of the solvent front recorded before it is dried (this allows the Rf value to be calculated).

Gas Chromatography – Mass Spectroscopy (GC-MS):

Gas Chromatography – Mass Spectroscopyanalysis was carried out on a Perkin Elmer Turbo Mass Spectrophotometer (Norwalk, CTO6859, and USA) which includes a Perkin Elmer Auto sampler XLGC. The sample was taken from the purified methanol extract from column chromatography. The column used was Perkin E lmer Elite -5 capillary column measuring 30m × 0.25mm with a film thickness of 0.25mm composed of 95% Dimethyl polysiloxane. The carrier gas used was Helium at a flow rate of 0.5ml/min. 1µl sample injection volume was utilized. The inlet temperature was maintained as 250°C. The oven temperature was programmed initially at 110°C for 4 min, then an increase to 240°C. And then programmed to increase to 280°C at a rate of 20°C ending with a 5 min. Total run time was 90 min. The Mass Spectroscopy transfer line was maintained at a temperature of 200°c. The source temperature was maintained at 180°C. GC-MS was analyzed using electron impact ionization at 70eV and data was evaluated using Total Ion Count (TIC) for compound identification and quantification (Bilia, A.R *et.al*, 2011).

RESULTS AND DISCUSSION

Column Chromatography

Extracts of methanol and aqueous are used for the separation of compounds. The extracts obtained from the column are being collected into eppendorf tubes. The main advantage of column chromatography is the relatively low cost and disposability of the stationary phase used in the process. The latter prevents cross-contamination and stationary phase degradation due to recycling.

The classical preparative column chromatography is a glass tube with a diameter from 5 mm to 50 mm and a height of 5 cm to 1 m with a tap and some kind of a filter at the bottom. Methods used to prepare a column are the wet method. The extracts are retained by the stationary phase and separate from each other while they are running at different speeds through the column with the eluent. At the end of the column they elute one at a time. During the entire chromatography process the eluent is collected in a series of fractions. Fractions can be collected automatically by means of fraction collectors. The productivity of chromatography can be increased by running several columns at a time. In this case multi stream collectors are used. The composition of the eluent flow can be monitored and each fraction is analyzed for dissolved compounds.

Column Chromatography

Paper Chromatography:

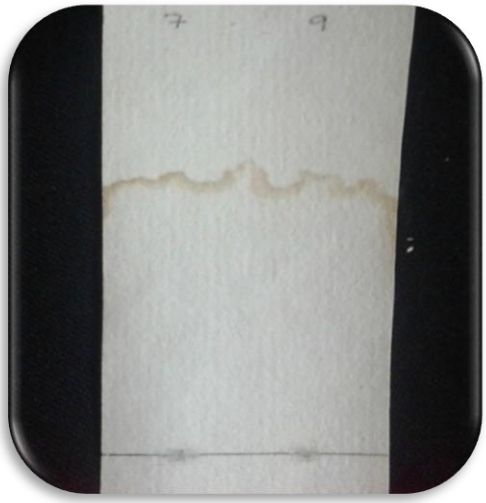
Results of the pigments used by paper chromatography for the two extracts of Pomegranate seed is presented in Table I.

TABLE I
PIGMENTS USED BY PAPER CHROMATOGRAPHY

Extracts	Solvent used	Colour obtained	Rf value	Reagent sprayed
Methanol	Methanol: Acetic acid: Chloroform: Water (5:4::2:1)	Brown	0.69	Ninhydrin
Aqueous	Methanol: Acetic acid: Chloroform: Water (5:4::2:1)	Pale yellow	0.72	Ninhydrin

Key: R*f* - *Retention factor*

Paper Chromatography analysis of the extracts, used different solvents that reveals the presence of spots as shown in Table I. Different solvents mixtures were used as mentioned with variable polarity and ratio for separation of the compound from the seed extract. The selection of the solvent system was used by analyzing the Rf value of the compounds. Ninhydrin was used to spray the paper in order to make the spots more visible . The solvent system consists of Methanol: Acetic acid: Chloroform: Water (5:4::2:1), revealed the presence of compounds and showed the Rf value of 0.69 and 0.72 between the methanol and the aqueous extract. However TLC was done in identifying single specific compound.



Paper Chromatography for aqueous and methanol extract of pomegranate seed

Paper Chromatography

Thin Layer Chromatography (TLC)

The results of the pigments fractioned by Thin Layer Chromatography is depicted below in Table II.

TABLE II
PIGMENTS USED BY THIN LAYER CHROMATOGRAPHY (TLC)

Extracts	**Solvent used**	**Colour obtained**	**R*f* value**	**Reagent sprayed**	**Compound identified**
Aqueous	Methanol: Acetic acid: Chloroform: Water (5:4::2:1)	Pale yellow	0.72	Ninhydrin	Alkaline, Glycosides
Galic acid	Methanol: Acetic acid: Chloroform: Water (5:4::2:1)	Brown	0.79	Ninhydrin	Alkaline, Glycosides
Ascorbic acid	Methanol: Acetic acid: Chloroform: Water (5:4::2:1)	Light brown	0.68	Ninhydrin	Alkaline, Glycoside

Key: R*f* - *Retention factor*

The solvent Methanol: Acetic acid: Chloroform: Water (5:4::2:1) was used for Thin Layer Chromatography. Aqueous extract of pomegranate seed was used for TLC method as the R*f* value was high in paper chromatography. Along with the aqueous extract two more extracts are used in identifying the solvent which is the Galic acid and Ascorbic acid. The solvent was run through the TLC Plate, it was dried and then sprayed with ninhydrin in order to make the spots more visible. The colour of the spots for aqueous was appeared to be pale yellow and the R*f* was 0.72,

whereas the spots for Galic acid and ascorbic acid was brown and light brown in colour and the R*f* value of both the extracts was 0.79 and 0.68 which corresponds to the compound Alkaline and Glycosides.

Glycosides act as the condensation products of sugars with a host of different varieties of organic hydroxyl compounds. Glycosides are colorless, crystalline carbon, hydrogen and oxygen-containing water-soluble phytoconstituents, found in the cell sap. Glycosides contain a carbohydrate and a non-carbohydrate part (Kar, 2007; Firn, 2010). Glycosides are neutral in reaction and can be readily hydrolyzed into its components with ferments or mineral acids. Glycosides are classified on the basis of type of sugar component, chemical nature of aglycone or pharmacological action.

TLC Profile of Galic acid, Ascorbic acid and Aqueous extract

Gas Chromatography- Mass Spectrometry (GC-MS)

The purified and separated fragment of methanolic extract of pomegranate seed extract from column chromatography was submitted to Gas Chromatography- Mass Spectrometry (GC-MS) in order to determine the chemical composition and significance of those compounds (Proestos*et al*., 2006 and Markham *et al*., 1996). The identified compounds are presented in Table III

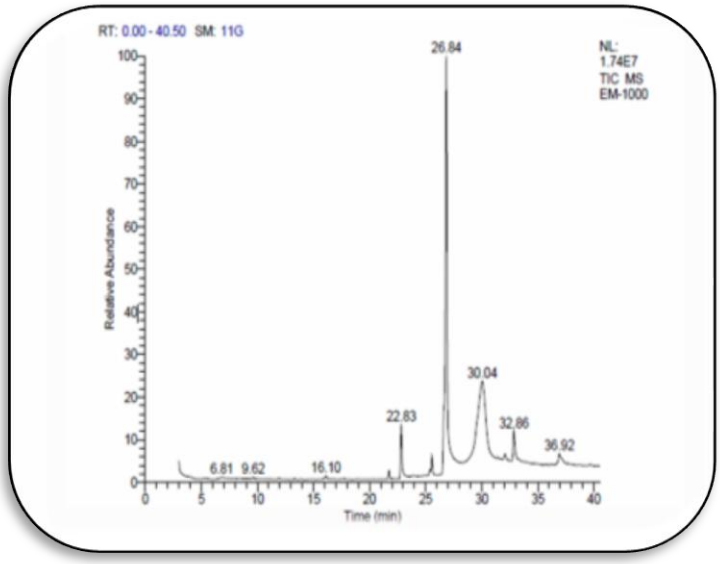
TABLE III
PHYTOCHEMICALS IDENTIFIED IN METHANOLIC EXTRACT OF POMEGRANATE SEED EXTRACT BY GC-MS

Sl. No	Compound Name	Molecular formula	Molecular weight	Area %
1	7-Methoxy-2,2-Dimethylchromone	C12H14O3	206	0.04
2	Hexadecanoic Acid	C16H32O2	256	5.99
3	3-(4-hydroxy-3,5-dialkylphenyl)propanol	C28H34O8	526	0.18

4	4 -n-Propylresorcinol	C9H12O2	152	1.17
5	2Hydroxycyclopentadec anone	C15H28O2	240	0.19

From the table, several compounds were identified and the biological significance of these compounds is discussed. Chromones and their derivatives 7- Methoxy-2,2Dimethylchromone are well known naturally occurring oxygencontaining heterocyclic compounds which perform important biological functions in nature. It is known that certain natural and synthetic chromone derivatives possess 81 important biological activities, such as antitumor, antihepatotoxic, antioxidant, antiinflammatory, antispasmolytic, estrogenic and antibacterial activities (Magdy A. Ibrahim *et.al*, 2010). n-Hexadecanoic acid may have the role in antioxidant and antiinflammatory effects (Kalpana Devi V *et.al*, 2012).

In a study conducted by David I. B. Kerr *et.al*, in 2008, it was concluded that 3-(4-hydroxy-3,5-dialkylphenyl) propanols represent a new distinct classes of GABAB (Gamma-Aminobutyric Acid(B)receptor modulators. These GABAB modulators may still represent a novel therapeutic strategy for the treatment of various neurological and pathological diseases.



GC-MS Chromatogram of methanol extract of pomegranate seed

CONCLUSION

From the present study it can be concluded that pomegranate seed extract was separated and identified by chromatographic techniques. Chromatography is defined as a process by which solutes are separated by a dynamic differential migration in a system consisting of two or more phases. As a first step column chromatography was done to methanol and aqueous extracts followed by paper chromatography for both the methanol and aqueous extracts to find out the best extract. From the R*f*value obtained in paper chromatography TLC was done. The purified extract was subjected to GC-MS analysis for identification of phytochemical compounds.

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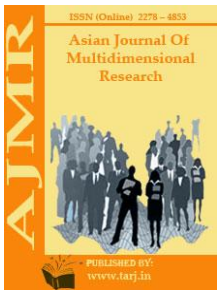

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

DEVELOPMENT OF A CLOUD BASED SOLUTION FOR EFFECTIVE NUTRITION INTERVENTION IN THE MANAGEMENT OF LIFESTYLE DISEASES

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ABSTRACT

A web based tool is being planned for therapeutic nutrition prescriptions in clinical settings. The cloud based system would have the ability to calculate the nutritional requirements and to guide first line nutritional management to patients and clients automatically. Also, it serves as an electronic medical and dietetic record, and personalised nutrition consultation approach can be planned even in the client's busy schedule. One to one approach is much more simplified and the client can converse to his/ her personal dietitian at their own convenient setting. The implementation once done would invite more and more queries for personalised nutrition support rather than depending on the set menu plans as in the case of current online approaches. Authenticity of the consultant dietitian would also be ensured by the responsible team providing nutrition support.

KEYWORDS: *Web Based Tool, Cloud Based System, Electronic And Medical Dietetic Record, Nutrition Support.*

INTRODUCTION

Nutritional support is the provision of adequate nutrients to maintain a healthy body weight and avoid malnutrition. The continuous delivery of high-quality and cost-effective nutritional care to patients has been shown to be an increasingly difficult task. It is observed that dieticians are requested to carry out the nutritional assessment, to manually calculate the nutritional needs and to design the everyday meal plan for each patient. In most cases, these time-consuming tasks are not completed due to lack of time or inadequate number of personnel [1]. Development of a computer assisted information tool with cloud-based on-line diet consultation module and comparison of its efficacy with one- to-one counselling would be efficiently utilized for client education intervention programs. The nutrient content calculation was planned to undertake with commonly consumed traditional as well as junk foods in Kerala; and the Indian Food Composition Table [2] was the authenticated support tool, followed by nutrition education software for patient education in hospitals and clinics.

METHODOLOGY

Role of ICTs (Information and communication technologies) in nutrition

With the popularity of nutrition and wellness education in today's world, also comes the opportunity for misinformation, half-truths and deception. Whether motivated by financial profit or driven by our 24/7 news cycle and need to 'get it on to the air first', recommendation on how to eat well and live right are ubiquitous [3]. In our 'over-communicated' world, who is providing the information is as important as to what information is being provided [4].

Diet consultation tool development

Development of authenticated Clinical nutrition research involves the study of effects of dietary intervention on one or more biological or health-related end points in human participants. Such research is foundational to providing evidence for dietary guidance and public health messaging. Clinical nutrition research is an essential endeavour that provides the evidence based underling dietary requirements and public health messages [5].

Nutritional support is the provision of adequate nutrients to maintain a healthy body weight and avoid under nutrition. Early nutritional support in hospitals has resulted in a positive correlation with the patient's outcome [6]. An accurate dietary intake measurement is important to clarify relationships between dietary intakes and chronic diseases [5]. In most of the therapeutic settings, dietitians are requested to carry out the nutritional assessment, to manually calculate the nutritional needs and to design the everyday meal plan for each patient. In most cases, these time-consuming tasks are not completed due to lack of time or inadequate number of personnel. Thus, the everyday menus are not individualized and nutritional assessment is performed only for patients with visible signs of malnutrition. Therefore, the nutritional support is not always adequate and efficient. Nutrition care managers have recently realized that the use of information technology improves the quality and effectiveness of the nutritional support services in clinical settings compared with the traditional manual methods. Most of the software that has been developed for hospital Dietetic Departments, concern nutritional screening and assessment, assignment of tasks, distribution of workload among dietitians and data recording [1].

Development of nutrition education software

Nutrition education software enables the dietitian to effectively conduct awareness campaigns (individual as well as community) as visual media has a powerful impact on people [7]. With this in mind, it is planned to develop a CAI tool for lifestyle diseases prevalent in the society.

The proposed tool can be designed & developed as a mobile app for Mobile devices or a web based application for computers. As per latest studies on market, the total users of Android application/Mobile phones across the world has crossed 190 million & one of the fastest growing market for the same is ASIA with 34 million users & growing. This is going to be our target audience. The proposed solution helps a user to make use of on line counselling in a personalized chat room with data recording facility for references. He can plan his diet & modify nutritional inputs as per the nutritional assessments. He can plan the diet with various applications modules integrated in the solution. In the case of mobile app, the users can avail these services as a dedicated app to be used in a mobile phone/ Tablet PC's that is downloadable from app stores. Live Chat rooms, FAQ's for quick appraisals as well as inferences from case studies can be made available in the CAI. Provision of chat rooms for live chat can be used with schedule request. Details of appointments & confirmation/ cancellation will happen online.

Cloud based consultation model for personalised nutrition care

Automatic and nutrition requirement generally employed with tools such as computerised systems, mobile based systems and other such technologies which are more personalised and handy to the users. The wireless infrastructure based devices can collect data for long period of time. In cloud computing with its immense computation power for easily deployment of healthcare monitoring algorithms and helps to process sensed data. Cloud computing is one of the new approaches in distributed systems that can handle some of the challenges of smart healthcare in terms of security, sharing, integration and management [8].

The major types of nutrition computer programs pertain to nutrient analysis, food service and recipe management, menu planning [9], clinical nutrition, drug-nutrient interactions, health risk assessment and lifestyle prescription, food and nutrition education and games [10]. In addition to programs specific to their field, nutrition educators are also assisted by general production tools such as graphics packages, computer photo and clip art collections and presentation software. Programs to educate patients provide dietary information and teach about causes of disease, symptoms, complications, dietary management and menu planning. It is expected that the nutrition counselling management system can improve the national health with animated nutrition counselling [11].

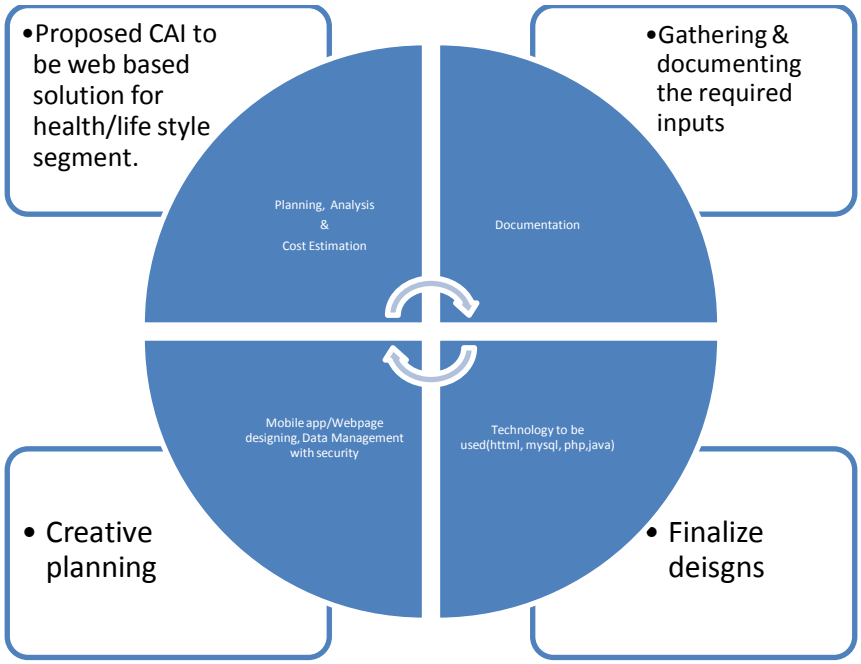
1. **Proposed Outcome for the cloud based solution in Mobile platform**

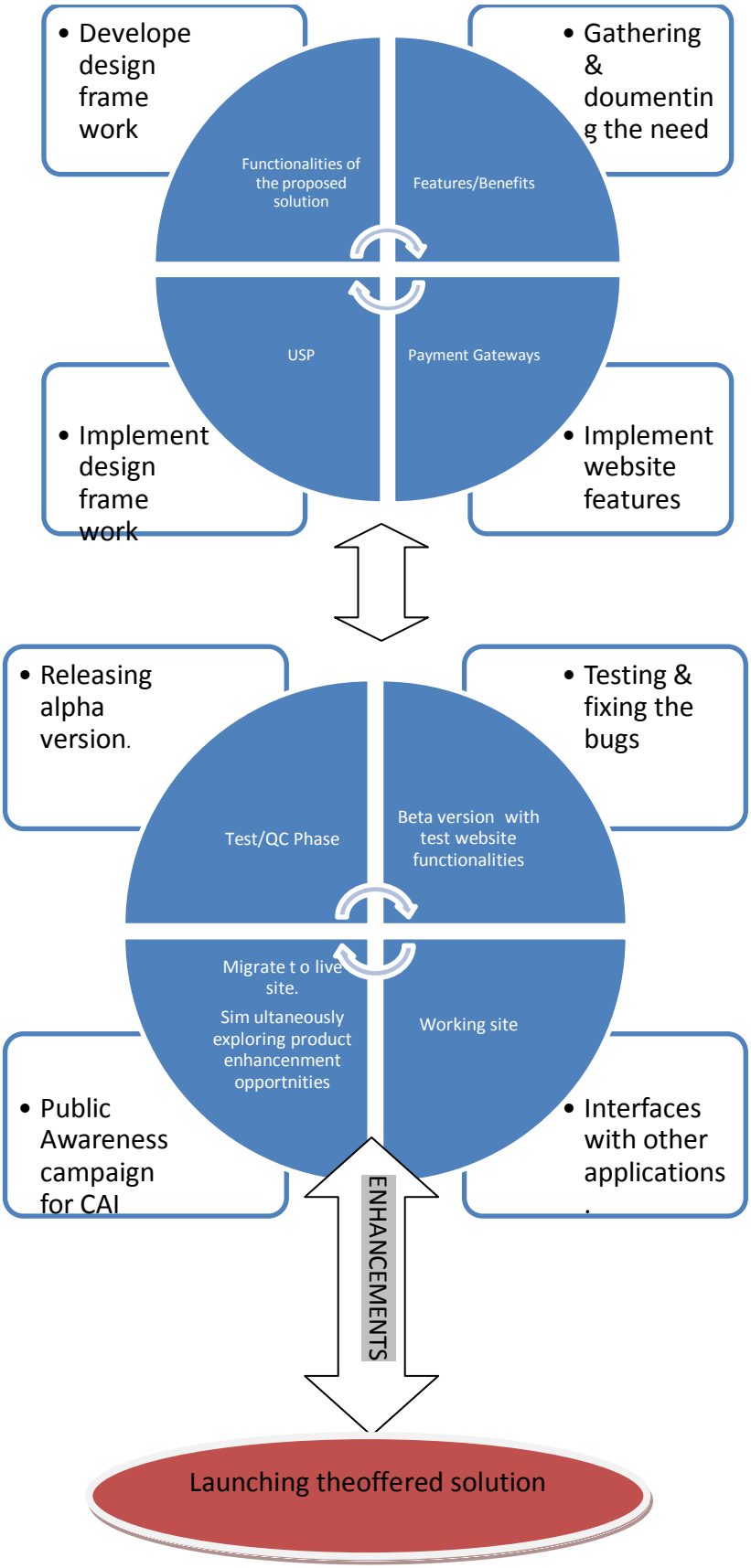
- **Customized and easy to access user Interface.**
- **Can create profile with Setting goals & keeping check points with alarms.**
- **Individual Chat rooms with options of fixing appointments for counseling.**
- **Offers multiple options available as per the Nutritional assessment**
- **Options of capturing data from counseling session for future references**
- **Counseling for disease oriented diet plans like Ketogenic diet etc.**

- **Suggest diet plans as per available raw materials.**
- **Calorie counter for selected food item**
- **Alternative dish with required calories**
- **Recorded health history.**
- **Calorie values of more than 3000+ International & Indian cuisines**
- **Interesting foot notes on selected food items**

2. Outlook of the results anticipated

The working model plan of the solution as well as the outlook of the model has been discussed in the diagram given below. A CAI (computer assisted instruction tool) may be modified to desired platform in the given proposal.




• Develope design frame work
• Gathering & doumentin g the need
Functionalities of the proposed solution
Features/Benefits
USP
Payment Gateways
• Implement design frame work
• Implement website features
• Releasing alpha version.
• Testing & fixing the bugs
Test/QC Phase
Beta version with test website functionalities
Migrate t o live site.
Sim ultaneously exploring product enhancenment opportnities
Working site
• Public Awareness campaign for CAI
• Interfaces with other applications .
ENHANCEMENTS
Launching theoffered solution

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UGC APPROVED JOURNAL

ROLE OF MORINGA OLEIFERA IN REGULATION OF LIFESTYLE DISEASES – INDUCED OXIDATIVE STRESS

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ABSTRACT

Drumstick (Moringa oleifera), Family: Moringaceae is an angiosperm plant, native of the Indian subcontinent. M.oleifera commonly known as murungai or mulakkay, is a medium-sized tree growing in Asia, Africa and tropical areas of the world as a valuable food source. The nutritional, prophylactic, and therapeutic virtues of this plant are scientifically recognized and included in our daily dietaries. Dietary consumption of its dried leaf powder is promoted as a strategy for personal health to combat micronutrient deficiencies and various life style related diseases. Various parts of M.oleifera tree have been studied for several pharmacological actions. Many reports have described its leaves as anti-fungal, anti-microbial, anti-atherosclerotic, anti-fertility, anti-depressant, anti-inflammatory, anti-diuretic and regulating hyperthyroidism. Several carbamate and thiocarbamate glycosides have been isolated from its leaves. Methanolic extract of drumstick leaves have been reported to contain saponin and phythate and also a good source of proteins. Methanolic extract of the leaves have been reported for its high antioxidant activity in both linoleic acid and peroxidation system and have been found to contain high poly unsaturated fatty acids[PUFA]. Leaves are rich in minerals such as Ca, P, Mg, K, S and Cl. Vitamins such as vitamin C and total carotene is abundantly found in the leaves of the plant. In the present study, the leaves of M. oleifera have been analyzed for their effect on oxidative free radical scavenging enzymes. In vitro study included estimation of total phenolic, total alkoloids, total flavonoids and antioxidant power (FRAP assay).

KEYWORDS: *Moringa Oleifera, Prophylactic, Therapeutic, Anti Oxidants, Oxidative Stress.*

INTRODUCTION

Anti oxidants are micronutrients that have gained importance in recent years due to their ability to neutralize free radicals and reactive oxygen species (ROS) or their actions. Under normal circumstances, the ROS are detoxified by the antioxidants present in the body and there is equilibrium between the generation of ROS and the antioxidants present. Sometimes, due to ROS overproduction or inadequate antioxidant defense, this equilibrium is hampered favoring the ROS upsurge that culminates in oxidative stress. ROS possess a strong oxidizing effect and induce damage to biological molecules, including proteins. Oxidative stress produced under hyperlipidemic condition is likely to be involved during progression of excess fat accumulation and metabolic dysfunction. Because of the relatively low expression of antioxidant enzymes such as catalase and super oxide dimutase (SOD) in hyperlipidemics, vulnerable to ROS attack when the system is under oxidative stress situation. Similarly, elevated levels of free radicals, due to inefficiency of the antioxidant defense system, may lead to disruption of cellular function by enhancing the susceptibility of membranes to lipid peroxidation. Hyperlipidemia usually exhibit high oxidative stress due to persistent and chronic metabolic dysfunctioning, which thereby depletes the activity of antioxidative defense system and thus promotes free radicals generation. These free radicals damage the pancreas and induce diabetes related insulin resistance. Oxygen free radicals could react with polyunsaturated fatty acids which lead to lipid peroxidation (LPO).

Hyperlipidemia, diabetes and hypertension are diversified metabolic disorders particularly associated with life style and dietary pattern of the individuals. The disorders separately or in a combination are the leading cause for morbidity and mortality of the society. Chronic diseases such as hypertension, hyperlipidemia, diabetes, coronary artery disease are representing 60 percent of all deaths in the world (AHA, 2013). According to recent scientific reports, more than 300 million people were hyperlipidemic Worldwide. Urbanization and globalization, sedentary life, consumption of fast, fried and junk foods along with their lifestyle pattern also contributed to metabolic syndrome, especially hyperlipidemia, Known as lifestyle disorders (Biswajit, 2007).

Plants contain substantial amount of antioxidants, including Zeatin, Kampeferin, tocopherols, carotenoids, ascorbic acid, flavonoids and tannins and it is suggested that, antioxidant action is important to overcome oxidative stress. Available synthetic antioxidants like butylated hydroxy anisole and butylated hydroxy toluene are associated with low margin of safety due to their toxicity. In recent years, natural antioxidants being safe and non-toxic are gaining much attention and therefore, the research is directed towards identification of plant foods with antioxidant ability that may be used for human consumption.

The major objectives of the study are –

1. To evaluate the phyto chemical properties of *Moringa oleifera.*
2. To evaluate the antioxidant properties of *Moringa oleifera.*

METHODOLOGY

Moringa Oleifera (Methanol Extract)

16g of samples and 150 ml of Methanol taken in a 250 ml glass beaker and kept for 24 hours at dark room. The extract was filtered and collected and kept for concentration and gravimetrically measured to determine the quantity of extract obtained (Sazada et.al, 2009). After gravimetric quantification all the extracts were re-suspended in respected solvents (10ml each, respectively) and further used for phyto chemical screening.

Phytochemical Analysis of *Moringa oleifera*

Phyto chemicals are produced by plants that consist of unique compounds as proteins, vitamins, beta-carotene, amino acids and various phenolics. Phytochemical constituents of Moringa oleifera were analyzed from dried leaf powder as well as from Methanol Extract.

Evaluation of Antioxidant Properties of *Moringa oleifera*

Natural antioxidants are recommended over their synthetic counterparts. BHA (butylated hydroxyanisole) and BHT butylated hydroxytoluene) because they are viewed as less toxic and more potent than synthetic antioxidants. Natural antioxidants such as vitamin C, tocopherols, flavonoids and phenolic compounds are known to be present in certain plants like Moringa oleifera (Pakadeetal et. al, 2012). DPPH and FRAP were used for antioxidant analysis. The collected sample was analyzed.

RESULTS and DISCUSSION

Phyto chemical constituents of *Moringa oleifera* were analyzed from leaf powder as well as from Methanol Extract. Phytochemical constituents that are present in powder sample include Alkaloid, Tannin and Phenol, Flavonoids, Terpenoids, Saponin, Glycosides, Lactone, resin. The methanol extract showed positive for Alkaloid Flavonoids, Terpenoids, Glycosides, resin. The phenolic compounds may be attributed to Quercetin. The flavonoids constitute kaempferol. The glycosides constitute nitrile glycosides of Niazirin and niazirinin.

Test	**Methods**	**COLD EXTRACTION**	
		M.Oleifera* *(Methanol Extract)	***M. Oleifera* *(Powder Sample)***
Alkaloid	Wagner's Test	+	+
Tannin and Phenol	Ferric chloride Test	+	+
Flavanoids	ShinodaTest	+	+
Terpenoids	Salkowski Test	-	+
Saponin	Foam Test	+	+

The present study is in accordance with the study of Okechukwu P C et.al. 2013 conducted on the Extraction of Phyto chemicals and its toxicity effects from the leaves of *Moringa Oleifera* showed the presence of above discussed phyto chemicals.

Evaluation of Antioxidant Properties of *Moringa oleifera*

Ferric Ion Reducing -Antioxidant Power Assay (FRAP)

In FRAP, Ascorbic acid is used as a standard solution for absorbance. This method indicates the absorbance concentration of Fe2+ in solution. so the higher this absorbance, the higher the concentration of Fe2+ and the higher the ability of that particular extract to donate electrons, that

is, the higher the reducing power of the extract. The higher the reducing power, the greater the antioxidant activity.

Sl. No.	Standard Absorbance (Ascorbic Acid)					Sample Absorbance
	S1	S2	S3	S4	S5	***Moringa Oleifera (Powder Sample)***
1.	**0.362**	**0.748**	**1.089**	**1.280**	**1.600**	**0.890**
$R^{2=}$ = 0.9797						
Results (µg/20 µL)	**266.0**					
(µg/ml)	**13300.0**					
(mg/ml)	**13.3**					

The present study is in accordance with the study conducted by Pakade et al., 2013 on the Comparison of antioxidant activity of *Moringa oleifera* and selected vegetables in South Africa.

VARIABLES	**CONTROL GROUP(n=10)**	**EXPERIMENTAL GROUP(n=10)**	**OVERALL (n=20)**
Age (years)	54.5±4.2	54.7±4.5	55.1±4.3
Height (cm) **Weight**(kg	159.2±6.9 79.3±8.6	161.1±8.9 83.3±9.6	159.6±7.9 81.3±9.1
BMI (kg/m^2) Normal <25 Grade I (25 - 29.9) Grade II (30 – 40) Grade III >40	 - 1(5%) 4(40%) 5(50%)	 - - 3(30%) 7(70%)	 - 1(5%) 7(35%) 12(60%)
WHR (men/women) **Average** **At Risk** Men 0.90 - 0.95 >/=0.95 Women0.80 - 0.86 >/=0.86	 7 (70%) 3(30%)	 8(80%) 2(20%)	 15(75%) 5 (25%)
Disease symptoms Severe headache	 5(50%)	 6(60%)	 11(55%)
Anxiety with stress	8(80%)	7(70%)	15(75%)
Shortness of breath and	4(40%)	3(30%)	7(35%)
Decreased appetite	2(20%)	1(10%)	3(15%)
Abdominal pain	2(20%)	3(30%)	5(25%)

Dry mouth	4(40%)	4(40%)	8(40%)
Weakness	5(50%)	6(60%)	11(55%)
Inflammation	6(60%)	7(70%)	13(65%)

Medicinal herbal supplements find a place due to their effectiveness in managing hyperlipidemia. They are cost effective, and exert less to no toxic side-effects in comparison with many chemically synthesized drugs (Busani et al. 2011). In a research conducted by Kumari (2010) it was found that Moringa leaf powder showed efficacy to reduce total cholesterol, triglycerides, LDL and VLDL.

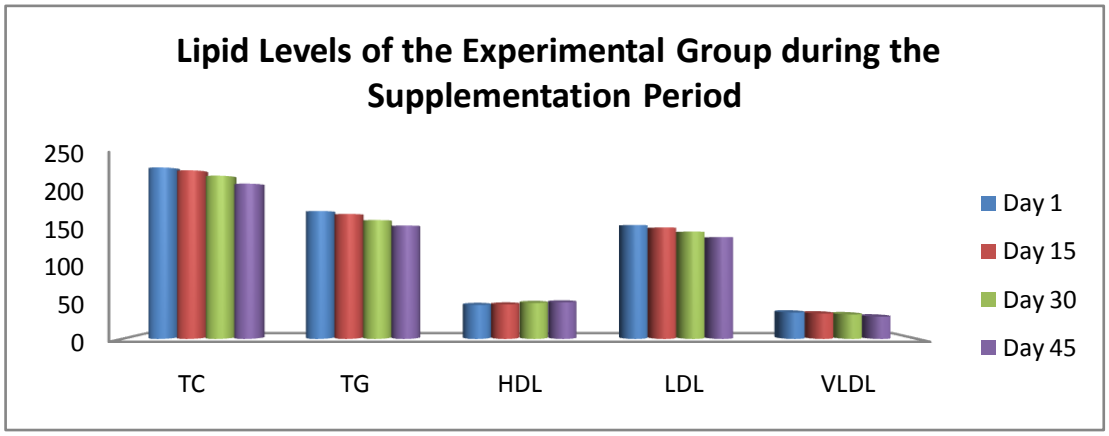
This part of the study highlights the efficacy of drumstick leaf powder *(Moringaoleifera*) in improving the HDL and decreasing the LDL and oxidative stress.

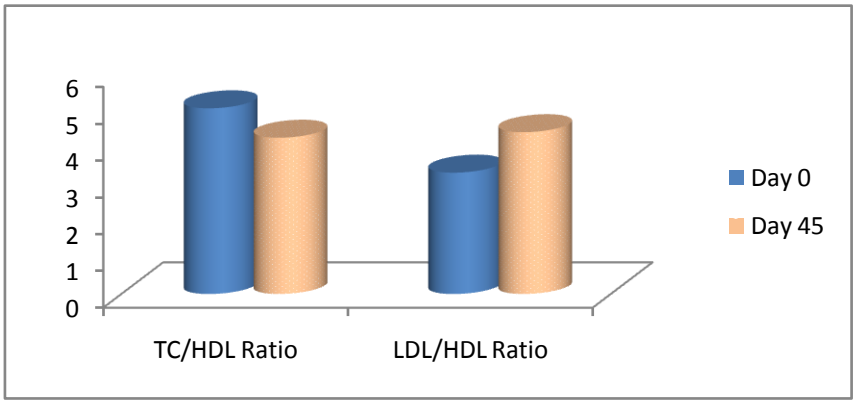
Lipid Levels of the Experimental Group during the Supplementation Period

An analysis of the lipid profile of the Experimental Group during the supplementation period was carried out. The lipid levels were analysed on Day 0, Day 15, Day 30 and Day 45.

MEAN LIPID VALUES OF THE EXPERIMENTAL GROUP DURING THE SUPPLEMENTATION PERIOD

Supplementation Days	**TC** mg /dl	**TG** mg /dl	**HDL** mg /dl	**LDL** mg /dl	**VLDL** mg /dl
	Mean ±SD	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**	**Mean ± SD**
Day 0	233.0± 11.7	173.8±44.0	46.2±5.9	154.8±23.9	35.90±8.6
Day 15	229.1± 11.8	169.8±45.4	46.9±6.1	151.4±23.2	34.50±8.9
Day 30	221.8±11.6	161.5±41.1	49.0±6.2	145.8±23.3	33.30±8.1
Day 45	211.0±10.0	154.0±41.2	49.8±6.2	138.3±22.7	30.20±8.3





The Table depicts a clear picture of the gradual reduction of the mean lipid levels of the experimental group with the progression of supplementation.

The mean Total Cholesterol value for Day 0 was 233±11 mg/dl. There was a reduction to 229±11 and 221±11mg/dl on Day 15 and Day 30.On the final day of supplementation, it was 211±10 mg/dl which showed a marked reduction. The t value was significant at $p<0.05$ from initial to final day of the supplementation period.

Triglycerides are particularly associated with the formation of short chain fatty acids associated with hyperlipidemia. The Triglyceride levels showed significant decrease during the supplementation period .The mean triglyceride value on Day 0 was 173±44mg/dl and lowered to 154±41mg/dl on Day 45. The gradual decrease can be attributed to the supplementation of moringa leaf powder that is rich in Phytochemicals.

HDL is the **"Good Cholesterol"** which is associated with decreased risk of Hyperlipidemia and oxidative stress. The bio availability of HDL in the human body is attributed with the consumption of fiber and antioxidants. On Day 0 the mean HDL value of the experimental group was 46± 5 mg/dl .On day 30 the mean HDL was 49±6mg/dl and showed slight increase to 49.8 ±6mg/dl on Day45respectively. This significant increase of Lipid HDL may be attributed to the consumption of drumstick leafe powder. Studies conducted by Biscoff 2008 showed the significant effect of Moringa on HDL. Hence the theme applies to our present study also.

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NUTRIENT CONTENT OF RECIPES PREPARED IN COLDPRESSED AND PROCESSED OILS

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ABSTRACT

Cold pressed oils are oils that have been expeller extracted in a controlled temperature setting. Cold pressed oil retains nutrient and flavour otherwise destroyed by heat in refined oil extraction, making them good for heart and overall wellbeing. Hence the present study was initiated within the aim to assess the nutrient content of the products prepared in cold pressed and processed oils such as coconut and groundnut oils. The selected products are chilli soya, ragi pakoda, vegetable cutlet, banana filters and masala paniyaram. The products were prepared with cold pressed and processed oils and evaluated with nine points Hedonic scale by the 10 semi trained panel members, thrice on sensory attributes. The comparison was done between the oils and processing methods. Products prepared using cold pressed oils both coconut and groundnut was highly accepted when compared with processed oils. Recipes like vegetable cutlet and banana fritters prepared in coconut oil was highly accepted when compared to ground nut oil and preparation like chilli soya, ragi pakoda and masala paniyaram cooked in groundnut oil scored better when compared with coconut oil. The highly acceptable recipes were evaluated in the nutrient analysis. Recipes like chilli soya, ragi pakoda and masala paniyaram prepared in cold pressed groundnut oil had a high amount of nutrients than the processed groundnut oil. Vegetable cutlet and banana fritters prepared using cold pressed coconut oil have a higher quantity of nutrients compared than the processed coconut oil. The peroxide value is high in cold pressed groundnut oil.

KEYWORDS: *Extraction, Groundnut, Vegetable Cutlet,*

INTRODUCTION

The words “oils”, “fats” are all used to refer to fats, “oils” is usually used to refer to fats that are liquids at normal room temperature, while “fats” is usually used to refer to fats that are solids at normal room temperature. The word “oil” is also used for any substance that does not mix with water and has a greasy feel. (Joshi., 2002). Coconut oil is available in three major forms: refined coconut oil, copra oil and Virgin Coconut Oil (VCO). The fatty acid profile in all three forms is the same, but some forms, in particular VCO, contain a higher amount of monoglycerides and diglycerides and other beneficial constituents, such as antioxidants (Nevin and Rajamohan. 2006, Dayrit et al., 2008). Groundnut oil is a very important oil seed and food crop around the globe for its nutritional and trade values. Mainly native to warmer climates, groundnuts frequently provide food for humans or livestock, and in the absence of meat, form a valuable dietary protein component. (Ajimotokan and Olaomi., 2009). Cold-pressed oils free from chemical activities characteristic of refining processing can be valuable edible oils providing that they do not contain harmful to humans chemical and microbiological contamination including mytotoxins and metals (Fe, Cu) accelerating the oxidation of oils and chlorophylls usually removed during the refining process. Cold-pressed oils have distinct aroma and taste. (Makała., 2015). Today cold-pressed methods of extraction are the same as the expeller-pressed method, albeit in a temperature-controlled setting. (Balasubramanyam., 2015).

METHODOLOGY

Methodology pertaining to the present study is presented below:

Selection of oils:

In the present study, cold pressed and processed cooking oils were selected for the preparation of the recipes. The selected oils are coconut and groundnut oils. These oils are easily available in the market. Cold pressed oils selected because it retains the nutrients and flavour of the recipes.

Formulation of the recipes:

The selected five recipes are ragi pakoda, chilli soya, masala paniyaram, vegetable cutlet and banana fritters. These five products were prepared using cold pressed and processed cooking oils both coconut and groundnut oils.

Conduct organoleptic evaluation:

A score card is one which reflects the sensory aspects of the food products such as appearance, color, taste, texture, and flavor. (Geeravani., 2004).

The panel members were selected based on their physical conditions, psychological factors and environment factors. The members of the panel should be carefully selected and trained to find out differences in sensory quality. The panelist should be of sound health and average sensitivity and conscientious individual. (Joshipur et al.,2000).

Formulation of score card:

The score card was identified as the best tool for conducting organoleptic evaluation, a nine point hedonic rating scale were formulated, presented and used for the conduction of organoleptic evaluation. The acceptability of the recipes was tested through organoleptic evaluation. The semi trained panelists of about 10 students were selected as taste panelist for organoleptic evaluation.

The overall acceptability scores obtained through the organoleptic evaluation were analyzed statistically (Anitha and Hemavathy, 2015).

Preparation and the sensory evaluation of the selected recipes were done in the foods laboratory of the Food Science and Nutrition department in Avinashilingam Institute for Home science and Higher education for Women University, Coimbatore.

The products were prepared in cold pressed and processed oils both coconut and groundnut oils and the products were evaluated by the 10 semi trained panel members for three consecutive days.

Sensory analysis was carried out for the following attributes:

- Appearance
- Colour
- Flavour
- Texture
- Taste
- Overall Acceptability

Nutrient content of the recipes

The nutrient content of the recipes were analyzed in the Nutrition laboratory, Department of Food Science and Nutrition, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore. After evaluating the recipes, 100g of the samples were taken dried and used for the nutrient analysis with the following principles. And the results were tabulated for the variations.

Energy

Energy was calculated using bomb calorimeter. The food was weighed and taken in a capsule. The bomb was assembled and oxygen was filled with 15 atmospheres. From the taken readings the energy value of the food was calculated.

Protein

Protein was estimated by kjeldahl nitrogen distillation method. The food sample is digested with concentrated sulphuric acid in a macro kjeldahl flask. From nitrogen value of the food substance, protein content was calculated.

Protein content of the food substance = Nitrogen value X 6.25

Fat

Fat estimation was done by ether extraction in a soxhlet apparatus.

Using the above principles of nutrients, 10 samples which are highly acceptable by the semi trained panel members were analyzed.

Peroxide value

Peroxide value is a measure of the peroxide in oil. The peroxide is determined by titration against thiosulphate in presence of KI. Starch is used as indicator. From the titre value the peroxide value of oil was estimated.Using this principle, peroxide value of the 4 oils was estimated.

Mineral Estimation

The food sample was dried and charred. Then the charred sample was placed in a muffle furnace for ashing. From the ash, solution was prepared. Using the ash solution mineral like iron, phosphorous and calcium were estimated.

A. Calcium

The ash solution was taken for the precipitation. After the precipitation formed, the solution was filtered using Whatman No. 40. It was heated and titrated against N/100 potassium permanganate. From the obtained volume of potassium permanganate, the amount of calcium present in food substance was calculated.

B. Iron

The iron was estimated by using wong's method.

C. Phosphorus

Ash solution was treated with ammonium molybdate solution and 1,2,4–amino naptholsulphonic acid reagent which gives blue color. The intensity of the color developed is the measure of phosphorus present in the sample.

RESULT AND DISCUSSION

Organoleptic evaluation of the recipes

➢ **CHILLI SOYA:**

For comparison purpose the average score obtained for the each oil processed and cold pressed (coconut and groundnut oil) is depicted in Figure-1

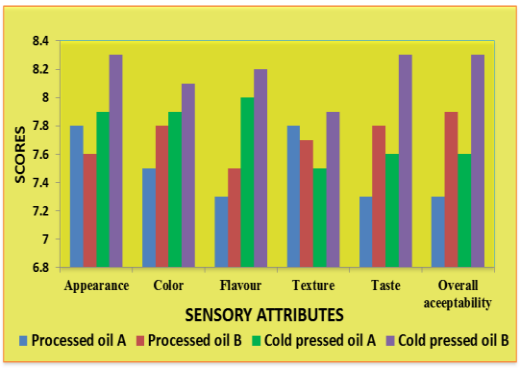

Figure – 1

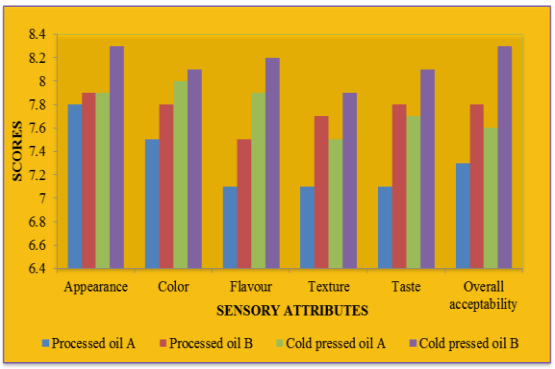

Figure – 2

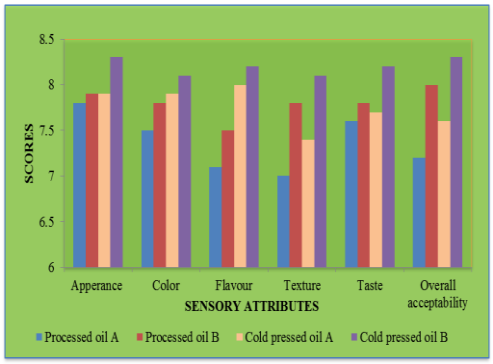

Figure – 3

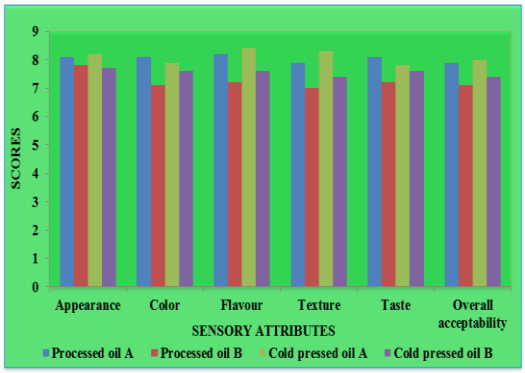

Figure - 4

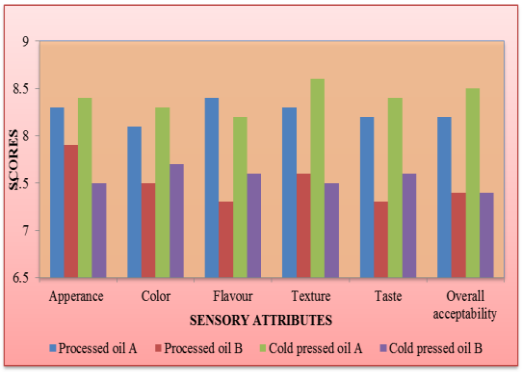

Figure – 5

From the figure it was clear that form the preparation of Chilli soya cold pressed groundnut oil was highly acceptable with maximum scores for all the attributes (Appearance 8.3±0.62, colour 8.1±0.56, flavour 8.2±0.64, texture 7.9±0.66, taste 8.3±0.48 and overall acceptability 8.3±0.6).

- **RAGI PAKODA:**

For comparison purpose the average score obtained for the each oil processed and cold pressed (coconut and groundnut oil) is given in Figure -2

From the above Figure it was clear that the preparation of ragi pakoda in cold pressed groundnut oil was highly acceptable with maximum score for all the sensory attributes (Appearance 8.3±0.62, color 8.1±0.56, flavour 8.2±0.64, texture 7.9±0.66, taste 8.1±0.55 and overall acceptability 8.3±0.62).

- **MASALA PANIYARAM:**

For comparison purpose the average score obtained for the each oil processed and cold pressed (coconut and groundnut oil) is depicted infigure -3

From the aboveFigure it was clear that the preparation of masala paniyaram in cold pressed groundnut oil was highly acceptable with maximum score for all the sensory attributes like appearance 8.3±0.62, color 8.1±0.56, flavor 8.2±0.64, texture 8.1±0.66, taste 8.2±0.48 and overall acceptability 8.3±0.60.

- **VEGETABLE CUTLET:**

For the comparison purpose the average score obtained for the each oil processed and cold pressed (coconut and groundnut oil) is depicted in figure -4

From the above Figure it was clear that the preparation of vegetable cutlet in cold pressed coconut oil was highly acceptable with maximum score for all the sensory attributes. The overall acceptability for the vegetable cutlet in cold pressed oil was recorded as 8.0±0.42.

- **BANANA FRITTERS:**

For the comparison purpose the average score obtained for the each oil processed and cold pressed (coconut and groundnut oil) is depicted in figure -5

For all the sensory attributes coconut oil was highly suitable for the preparation of banana fritters was recorded. From the above Figure it was clear that the preparation of banana fritters in cold pressed coconut oil was highly acceptable with maximum score for all the sensory attributes like appearance 8.4±0.41, colour 8.3±0.35, flavour 8.2±0.47, texture 8.6±0.38, taste 8.4±0.43 and overall acceptability 8.5±0.33.

Analysis of Nutrient Content of the Recipes

Nutrients like energy, protein, fat, carbohydrate, iron, calcium, phosphorus were analysed using the standard procedure. After the analysis the values for the nutrient content per 100g were computed and presented in the following tables for the various recipes.

Nutrient Content of Chilli Soya

The nutrient content of Chilli soya prepared using processed and cold pressed oil which was highly acceptable is depicted in Table-1

With regard to above mentioned nutrients cold pressed groundnut oil is showing higher quantity when compared with the processed groundnut oil. This is may be due to the different processing method of oils.

Nutrient Content of Ragi Pakoda

The nutrient content of Ragi pakoda prepared using processed and cold pressed oil which was highly acceptable is depicted in Table-2

From the Table, Ragi pakoda prepared in cold pressed groundnut oil showed for energy (183 Kcal), protein (3.4g), fat (13.4g), carbohydrates (12.2g), iron (12.3mg), calcium (340mg) and phosphorous (68mg) when compared with the processed groundnut oil.The increase of nutrient content in ragi pakoda prepared in cold pressed groundnut oil may be due to the quality of the oil and the product.

Nutrient Content of Masala Paniyaram

The nutrient content of Masala paniyaram prepared using processed and cold pressed oil which was highly acceptable is depicted in Table-3

From the above mentioned Table, masala paniyaram prepared using processed groundnut oil revealed that lower level of nutrients like energy (141.7Kcal), protein (1.25g), fat (11.2g), carbohydrates (9.0g), iron (5.7mg), calcium (136mg) and phosphorous (53.6mg) when compared with the cold pressed groundnut oil. The difference in the nutrient content of masala paniyaram

prepared in both processed and cold pressed groundnut oil was may be due to the changes in the method of processing of oil.

Nutrient Content of Vegetable Cutlet

The nutrient content of Vegetable cutlet prepared using processed and cold pressed oil which was highly acceptable is depicted in Table -4

Vegetable cutlet prepared in coconut oil (cold pressed) has showed little higher amount of nutrients compared with the processed coconut oil. The amount of nutrients present in vegetable cutlet prepared in cold pressed coconut oil was 135.5Kcal of energy, 1.85g of protein, 10.8g of fat, 7.7g of carbohydrates, 29.3mg of iron, 116mg of calcium and 71.6mg of phosphorous. This may be due to the quality of the product.

Table - 1- Nutrient content of Chilli soya

Nutrients	Processed Groundnut Oil	Cold Pressed Groundnut Oil
Energy (Kcal)	280	296
Protein (g)	3.4	3.7
Fat (g)	26.2	27.4
Carbohydrates (g)	7.6	8.6
Iron (mg)	18.3	24.3
Calcium (mg)	120	128
Phosphorous (mg)	34.0	41.6

Table -2- Nutrient content of Ragi pakoda

Nutrients	Processed Groundnut Oil	Cold Pressed Groundnut Oil
Energy (Kcal)	171	183
Protein (g)	3.2	3.4
Fat (g)	12.4	13.4
Carbohydrates (g)	11.7	12.2
Iron (mg)	11.6	12.3
Calcium (mg)	328	340
Phosphorous (mg)	62.4	68

Table -3 Nutrient content of Masala paniyaram

Nutrients	Processed Groundnut Oil	Cold Pressed Groundnut Oil
Energy (Kcal)	141.7	147.1
Protein (g)	1.25	1.44
Fat (g)	11.2	11.6
Carbohydrates (g)	9.0	9.2
Iron (mg)	5.7	11.7
Calcium (mg)	136	144
Phosphorous (mg)	53.6	65.6

Table -4 Nutrient content of Vegetable cutlet

Nutrients	Processed Groundnut Oil	Cold Pressed Groundnut Oil
Energy (Kcal)	127.6	135.5
Protein (g)	1.56	1.85
Fat (g)	10.2	10.8
Carbohydrates (g)	7.4	7.7
Iron (mg)	26.0	29.3
Calcium (mg)	100	116
Phosphorous (mg)	68.0	71.6

Nutrient Content of Banana Fritters

The nutrient content of Banana fritters prepared using processed and cold pressed oil which was highly acceptable is depicted in Table - 5

Table -5- Nutrient content of Banana fritters

Nutrients	Processed Groundnut Oil	Cold Pressed Groundnut Oil
Energy (Kcal)	174.2	183.3
Protein (g)	2.7	2.9
Fat (g)	14.0	14.8
Carbohydrates (g)	9.4	9.6
Iron (mg)	24.3	39.4
Calcium (mg)	136	148
Phosphorous (mg)	65.6	71.6

Peroxide Value of the oils

Peroxide value of oils such as coconut and groundnut oil (cold pressed and processed method) is given in table- 6.

Banana fritters prepared with cold pressed coconut oil has 183.3Kcal of energy, 2.9g of protein, 14.8g of fat, 9.6g of carbohydrates, 39.4mg of iron, 148mg of calcium and 71.6mg of phosphorous per 100g of the product whereas banana fritters prepared in processed oil has 174.2Kcal of energy, 2.7g of protein, 14.0g of fat, 9.4g of carbohydrates, 24.3mg of iron, 136mg of calcium and 65.6mg of phosphorous per 100g. This may be due to the different in processing method of the same oil.

Table – 6- peroxide value of the oils

	Processed		Cold pressed	
	Coconut Oil	Groundnut Oil	Coconut Oil	Groundnut Oil
Peroxide value(mEq)	**0.4**	**0.8**	**0.8**	**1.2**

The peroxide value for processed coconut and groundnut oil, cold pressed coconut and groundnut oil was determined. The cold pressed groundnut oil had a high amount (1.2mEq /100g of oil) compared than the other three oils.

Evaluation of the product

Recipes like chilli soya, ragi pakoda and masala paniyaram were highly acceptable in groundnut oil both in cold pressed and processed methods. Vegetable cutlet and banana fritters were highly acceptable in coconut oil (processed and cold pressed methods).The highly acceptable oil in each products were taken for nutrient analysis and the nutrient content between cold pressed and processed oil in each recipes were compared. The peroxide value is high in cold pressed groundnut oil than the other oils.

CONCLUSION

From the present study, it was concluded that the groundnut oil in processing and cold pressed methods was highly acceptable for chilli soya, ragi pakoda and masala paniyaram. The coconut oil (processed and cold pressed) was highly acceptable for the products like vegetable cutlet and banana fritters. For the nutrient analysis, the cold pressed coconut oil (for vegetable cutlet and banana fritters) had high amount of nutrients compared with processed coconut oil. The cold pressed groundnut oil (for chilli soya, ragi pakoda and masala paniyaram) contains higher quantity of nutrients than the processed groundnut oil. Present study revealed that cold pressed oils are having high amount of nutrients and improves the sensory attributes and overall acceptability of the products with all health benefits. It is better to use the cold pressed oils for cooking especially for the deep fat fried products to enhance the acceptability and nutrient content. This may improve the health status of the community.

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FORMULATION AND EVALUATION OF VALUE ADDED HEALTH MIX FOR TYPE II DIABETIC SUBJECTS WITH LOWR LIMB INJURY

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ABSTRACT

*Injury and surgery leads to malnutrition and post operative complications often surgical site infection, due to hyper metabolism and higher incidence of hyperglycemia among the diabetics. Lack of attention to nutritional management among the surgical orthopaedic diabetic subjects contributes to uunfavorable changes in blood glucose with the coordination of appropriate insulin therapy,whereas nutritional support and energy production becomes dependent on protein (1.5g–2.0g/kg of body weight).Value addition of nutrients through the essential food groups are continued to be an important tool, not only to promote a general state of wellbeing in different populations, but also to prevent complications due to chronic lifestyle diseases and surgical intervention among the subjects with chronic illness and trauma.**I**n the present study high protein mixes were formulated in such a way that the ingredients complement each other to make a complete high biological value protein along with addition of protein isolates from whey and soyaThe best mix was selected based on the organoleptic evaluation((score 4.8±0.4) and PDCASS was used to evaluate protein quality with minimum microbial content and low cost ,hence used for the preparation of commonly used recipes by the diabetics, to study the efficacy on the glycemic response among post operative diabetic subjects with lower limb injury(n=40;Age-26-55yrs).The decline in post operative fasting and postprandial glucose values(p value < 0.05) in experimental group showed that high biological value protein supplied(one third of day's protein requirement from breakfast) from health mix has the significant control over the plasma glucose, reducing the post operative complications. From*

the study it is evident that incorporation of soya protein isolate in regular diet as health mix is one of the most significant approach as it is used widely in the medical nutrition therapy due to its high biological value and many preventive health benefits.

KEYWORDS: *Malnutrition, Ingredients, Intervention,*

INTRODUCTION

Non communicable diseases (NCD) becoming a major public health problem in the country due to changing life style pattern, increasing psychological problems -stress and tension, result in social and cultural systems in the society. Other factors like decline in mortality, control of infectious diseases, extensive use of antibiotics, improvement in nutritional standards and access to health services have also contributed to increase in life expectancy in the community. Around 36 million people die each year and nearly 80 percent of NCD deaths (29 million) occur in low and middle income countries (WHO, 2012)

Diet and life style behavior are the major factors that influence susceptibility to many diseases. Life style diseases include Type 2 diabetes, hypertension, obesity, arthrosclerosis, Alzheimer's disease, and osteoporosis and so on. These diseases are also the result of the fast paced lifestyle behavioral activities such as faulty dietary habits, , skipping meals, excessive calorie/fat consumption, decreased intake of complex carbohydrates and dietary fiber, smoking, alcoholism, lack of sleep lack of exercise psychological disturbances and so on.

Diabetes appears to dramatically increase the risk of lower extremity amputation because of infected, non-healing foot ulcers Rates of amputation in populations with diagnosed diabetes are typically 10 to 20 times those of non-diabetic populations, and over the past decade have ranged from 1.5 to 3.5 events per 1000 persons per year in populations with diagnosed diabetes. People with diabetes are more likely to have chronic muscle-skeletal co- morbidities. Pre and post operative malnutrition increases the morbidity rate and length of hospitalization for various types of surgical patients. The prevalence of malnutrition in patients on admission to hospital is elevated. Orthopaedic surgery patients with surgical bone fractures and hip surgeries presented a deteriorating nutritional status, and a higher incidence of pressure sores in a month(García Duque et al,2008)

The stress response to surgery and the resultant hyperglycemia, osmotic diuresis, and hypo insulinemia can lead to perioperative ketoacidosis or hyperosmolar syndrome. Hyperglycemia impairs leukocyte function and wound healing. The management goal is to optimize metabolic control through close monitoring, adequate fluid and caloric repletion, and judicious use of insulin. Diabetic patients are at increased risk for adverse outcomes of surgery and results in complications affecting multiple organ systems, potentially resulting in adverse outcomes such as Surgical site infections(SSI),impaired wound healing, pseudarthrosis, hardware and implant failure and medical complications after orthopaedic surgery. But at the same time well controlled diabetic patients without co-morbidities have similar outcomes to patients without diabetes.

Medical and Nutritional therapy (MNT) is an essential component of inpatient (hospitalized)in terms of glycemic and hyperglycemic management among the diabetic subjects and. Individualized MNT, during hospitalization focused on optimizing glycemic control before and after surgery and to provide adequate macro and micro nutrients to meet metabolic demands, to

prevent post operative complications such as surgical site infection. Hyperglycemia in hospitalized patients is common and represents an important marker of poor clinical outcome and mortality in both patients with or without diabetes. Optimizing glucose control in these patients is associated with better outcomes. An inter disciplinary team is needed to integrate MNT in to the overall management plan that has been shown to reduce HbA1c by an average of 1-2 percent in Type2 diabetes patients (Moghissi and Hirseh,2005).

Nutritious diet and a balanced lifestyle are important to maintain good health. Nutritional status becomes even more important in individuals undergoing small surgical procedures or major surgeries. In individuals undergoing surgeries, nutritional status is an essential determinant of bone health. Despite considerable evidence on significance of nutrition, there exists a substantial percentage of who are malnourished patients with orthopedic diseases and those undergoing orthopedic surgery.Ffortification of regular diet with protein rich foods is more satiating than carbohydrate or fat, and high-protein diets (25%-35% of energy) are commonly used for weight loss that replace carbohydrate with protein and may be low or high in saturated fat.Reduced hunger, improved satiety, increased thermo genesis, and minimum loss of lean muscle mass during weight reduction using a reduced calorie diet and increased physical activity have been obseserved with the intake of higher dietary protein of high biological value.

With this view the present study is carried out to formulate and evaluate the value added protein mix for type II diabetic.The investigator recognizes the significance of food based approach which is easily available and affordable to prevent the complications related to type II diabetic conditions and also maintain their health status.

OBJECTIVES

1. Formulation and evaluation of value added health mix with high quality protein isolates and
2. Dietary intervention to evaluate the effect of the Nutrition Intervention on Glycemic response among selected post operative type II diabetic subjects

METHODOLOGY

PHASE I-FORMULATION OF THE HIGH BIOLOGICAL PROTEIN MIXES

1. Formulation of value added health mix using selected ingrediets

Variety of cereals and pulses were selected (Table I) ,germinated as Germination enhances taste, texture and nutrient contents and converts the complex nutrients into simple nutrients, increases vitamin C and minerals. Availability of nutrients increases due to the action of cytases and pectinases, by breaking the walls of cells, reduces the phytic acid content and also decreases the cooking time adding variety to diet. Germinated cereals and pulses were used for the formulation of health mix with the addition of the high biological value protein isolates such as Whey protein powder, Soy protein isolates, Skimmed milk powder and Egg white powder due to its cost effectiveness and dense of nutrient content from minimum quantity and easy usage of these health mixes among the various age and sex, physical activities and income groups whoever having the problems of critical illness. With these nutritional significance, a total of twelve variations were prepared using the selected cereals and pulses which was allowed to have germination and dried for flour extraction.

2. Incorporation of the high biological value protein powders with the formulated health mix

Whey protein has been reported to possess anti- inflammatory or anti-cancer properties and provides an excellent source of essential branched chain amino acids (BCAAs).The major protein fractions in whey are beta-lacto globulin, alpha-lactalbumin, bovine serum albumin and immunoglobulin's (Haug et al., 2007).Soy protein isolate (SPI) is a commercial soy protein product having at least 90 percent protein (dry basis) which has been widely applied in the food and pharma industry as an important ingredient due to its nutritional value, desirable functional properties and low cost (Hao et al., 2013). Skimmed milk powder contains calcium present that promotes growth and maintenance of teeth and bones at every stage in life (Devine et al., 2007). The egg white powder is high in protein, a "source" of vitamin A, folate, choline, phosphorus and selenium and rich in vitamin D, riboflavin, vitamin B12, biotin and iodine. The lipid matrix within the egg yolk is believed to enhance the bio availability of nutrients, such as lutein and zeaxanthin (Heron and Fernandez, 2004).

Keeping the above factors in mind, the flour was mixed with four types of high biological value protein powders in different quantity of using 5g, 10g, and 15g in each variation like that, a total of twelve, the cereal and pulse based health mix was used for value addition with whey protein powder, soy protein isolates skimmed milk powder, egg white protein in different proportion

Table II highlights the incorporation of high biological protein isolates in different variation

TABLE I
FORMULATION AND INCORPORATION OF HIGH BIOLOGICAL VALUE PROTEIN POWDERS

S. No	Ingredients	Quantity (g)	Whey Protein Powder			Soy Protein Isolate powder			Egg White Powder			Skimmed Milk Powder (Standard)		
			Variation(g)			Variation(g)			Variation(g)			Variation(g)		
			I	II	III	I	II	III	I	II	III	I	II	III
1	Ragi	30	5	10	15	5	10	15	5	10	15	5	10	15
2	Wheat	10												
3	Maize	10												
4	Whole Bengal gram	10												
5	Whole horse gram	10												
6	Whole green gram	10												
7	Peas	10												
8	Cow peas	10												

PHASE II
EVALUATION OF THE FORMULATED HEALTH MIXES.

1. Sensory and nutritional evaluation of the value added cereal-pulse based health mixes.

Sensory evaluation is a method of subjective evaluation that evaluates food quality like color, taste, flavor and texture (Sethi and Rao,2011) and evaluation by a group of panel members. Nutrient content of the diet needs to be screened to improve the availability,palatability acceptability and adequacy of the dietary recommended allowances (Raghuramulu, 2012). The formulated health mix of high biological value is analyzed for its macro and micro nutrient content. The amount of protein in the value added health mix was estimated by Microkjeldhal's method. Fat, fibre and riboflavin estimation was carried out by AOAC (2000) procedure. Calcium, iron,phosphorus and ascorbic acid were estimated by the standard procedure suggested by the manual of laboratory techniques. (NIN-ICMR 2010)

Amino acid score

Protein digestibility-corrected amino acid score (PDCAAS) is a method of evaluating the protein quality based on both the amino acid requirements of humans and their ability to digest it. The formula for calculating the PDCAAS percentage is: mg of limiting amino acid in 1 g of test protein / mg of same amino acid in 1 g of reference protein x fecal true digestibility percentage (Schaafsma, 2000). The PDCAAS allows evaluation of food protein quality based on the needs of humans as it measures the quality of a protein based on the amino acid requirements((Hoffman et al 2004). Evaluation of amino acid score of the highly acceptable value added cereal and pulse based health mix was carried out and considered for evaluation of value added health mix on health status of the selected participants.

The shelf life of a product can be defined as the time phase in which the product is safe and has acceptable qualities to be purchased and consumed (Malshe et al., 2012).The formulated twelve variations were treated for shelf life study and were packed in different HDPE bags and stored at ambient temperature for the period of two months to find out the keeping quality (shelf life) and nutrient content. Microbial load estimation for the healthmix samples were carried out for fresh, 30 and 60 days old samples of health mix with low cost

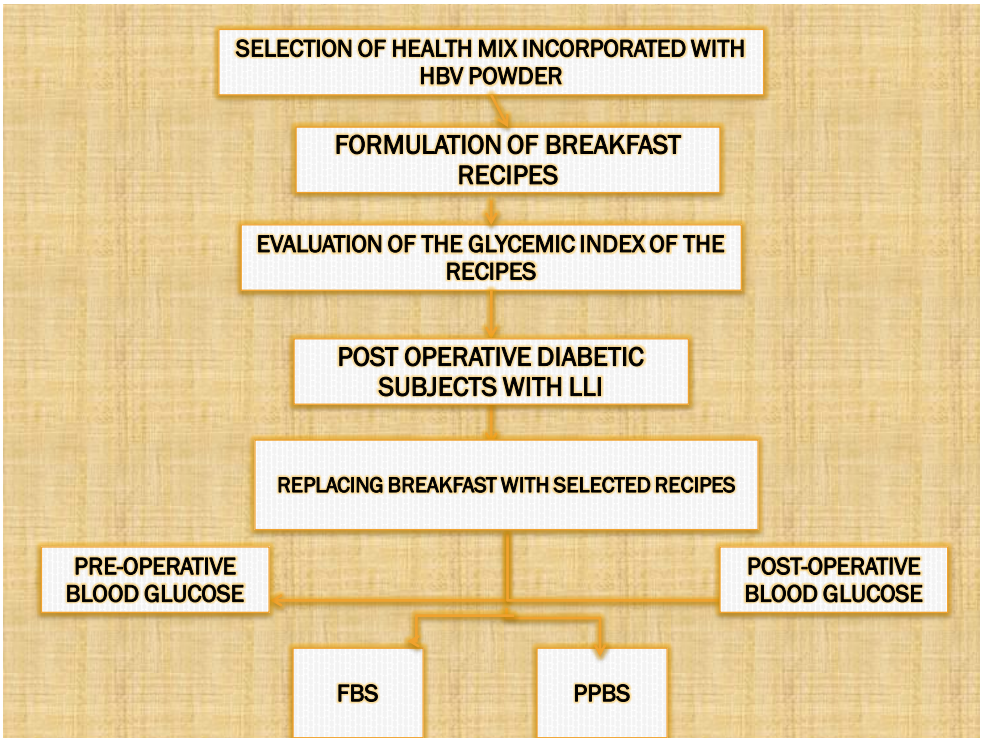
Acceptability of value added health mix incorporated recipes

The standard health mix and value added health mix were incorporated in selected recipes to assess the acceptability of the products for enhancing the nutrient content and to study the efficacy on the glycemic response among selected diabetic subjects. Preparation of recipe was tried thrice, to have correct scores. Some of the recipes selected for acceptability trail were Puttu, Pongal, Pancake, Momos (kolukkattai) and Chapathis The procedure adopted for the preparation is given in Annexure I. The factors considered for identification of these preparations were, the ease of preparation, taste familiarity, suitability to ones dietary pattern, economic viability and nutritional adequacy. Plate I highlight the chappathi prepared using the standard health mix and value added health mix

PHASE II

EVALUATION OF EFFICACY OF SELECTED VALUE ADDED HEALTH MIX ON GLYCEMIC RESPONSE AMONG THE SELECTED TYPE II DIABETIC SUBJECTS

The selected Type II Diabetic patients with lower limb injury undergone surgical intervention were considered on the basis of Ganga Hospital Injury Severity Score (GIHSS) for open injuries without critical illness for further nutrition invention (experimental group (N=40) and control group (N=40 namely dietary intervention and nutrition education. Limb-injury Severity Scores are designed to assess orthopaedic and vascular injuries by the orthopaedic rresearch ddepartment of Ganga medical center and hospital. The dietary intervention was assessed through the efficacy of value added health mix on glycemic response and wound healing among the selected Type II diabetic participants with lower limb injury by assessing the fasting and post prandial blood glucose after providing breakfast using selected value added health mix since postoperative hyperglycemia is the most important risk factor for any surgical site infection and aggressive early postoperative glycemic control reduce the incidence of any Surgical Site Infection (Ata et al,2010)



RESULTS AND DISCUSSION

Results are discussed under the following headings

1. Acceptability trial of recipes prepared using selected health mixes

Protein isolates are rich in Branched Chain Amino Acids (BCAA) which is must for protein synthesis, the process by which muscle fibers grow and contain less amount of fat which helps to reduce cardiovascular disease. It also has high Protein Digestibility Corrected Amino Acid Score (PDCAAS). Considering these benefits soy protein isolate incorporated health mix was used in the preparation of different recipes.Table II gives the mean acceptability scores of recipes prepared using health mixes incorporated with soy protein isolate powder

Table II-MEAN ACCEPTABILITY SCORE OF RECIPES PREPARED USING SELECTED HEALTH MIX

	Puttu	**Pan cake**	**Chappathi**	**Kozhukattai**
Appearance	4.7±0.4	4.7±0.4	4.6±0.5	4.7±0.4
Colour Texture	4.6±0.5	4.7±0.4	4.7±0.5	4.6±0.5
Flavour	4.6±0.5	4.8±0.7	4.9±0.7	3.8±0.4
Taste	4.7±0.4	4.8±0.4	4.8±0.5	4.0±0.0
Overall acceptability	**4.7±0.5**	**4.8±0.5**	**4.8±0.**4	**4.6±0.7**

After incorporating HBV soy protein isolate powders in the preparation of recipes, the appearance was as same as for all variations except for chappathi that had low value(4.6±0.5).The score for colour and texture of chappathi was higher (4.7±0.5)The score for flavour was high for the chappathi (4.9±0.4)and pancake (4.8±0.7) and the taste factor was also comparatively higher for both that was 4.8±0.5 and 4.8±0.4 respectively.Majority of panel members stated that the chappathi and pancake was highly acceptable with the overall acceptability score of 4.8±0.4 and 4.8±0.5 even though the puttu also had higer score of 4.7±0.5 for overall acceptability.Hence except kozhukattai other recipes used for the intervention among the selected type II diabetic subjects

***2.*Nutritive value of the formulated health mixes**

Nutrient analysis refers to the process of determining the nutritional content of foods and food products.

Table-III presents the nutrient content of health mix incorporated with different proportion high biological value protein powders.

TABLE III-NUTRIENT CONTENT OF VALUE ADDED HEALTH MIX INCORPORATED WITH HIGH BIOLOGICAL VALUE PROTEIN POWDER

Nutrients	Skimmed milk powder (Standard)			Whey protein powder			Soy protein isolate powder			Egg white powder		
	Variation1	Variation2	Variation3	Variation1	Variation2	Variation3	Variation1	Variation2	Variation3	Variation1	Variation2	Variation3
Energy (kcal)	418.6	436.5	454.3	419.1	437	455.7	416.6	434.5	450.6	403.4	406	408.6
Carbohydrate (g)	77.5	80.1	82.7	76.5	78.4	80.7	75.2	75.5	76	75.9	76	76.2
Protein (g)	15.1	16.8	18.5	15.5	17.8	20	17.3	21.3	25.4	14.2	14.6	15
Fat (g)	1.94	2.0	2.1	1.92	1.92	1.92	2	2.2	2.3	1.92	1.92	1.92
Calcium (mg)	222	264.8	307.6	163.2	147.3	131.3	170.8	162.5	154.2	162.1	144.9	127.7
Iron (mg)	4.2	4	3.82	4.3	4.1	4.1	4.9	5.4	6	4.2	4	3.82
Phosphorous(mg)	312	347	382	279	282	285	280.7	283.2	285.9	264.8	263	237.6
Riboflavin (mg)	0.28	0.36	0.43	0.20	0.19	0.18	0.20	0.19	0.18	0.20	0.19	0.18
Vitamin-C (mg)	2.10	2	1.98	2.10	2	1.98	2.10	2	1.98	2.10	2	1.98
Dietary fiber (g)	3.32	3.14	2.96	3.32	3.14	2.96	3.6	3.7	3.8	3.32	3.14	2.96

From the above Table III the nutrient analysis clearly shows that the health mix incorporated with soy protein isolate powder variation III had the higher amount of protein of 25.4g and energy(450.6 Kcal) and supplied less amount of carbohydrate of 76g among the other mixes.The Iron content of the same variation was comparatively higher among the all mixes that is 6 mg

3. Microbial content and cost effectiveness of the formulated health mix

The microbial count of the health mix incorporated with 15 percent soy protein isolate powder which was selected and used in the preparation of the breakfast recipes,was $107x10^3$, $118.6x10^3$, 221.5×10^3 for fresh sample, 30days and 60 days of shelf life respectively, and shows that the microbial content increases by the increasing storage days. The cost of health mix incorporated with soy protein isolate powder ranges from Rs.14 for 100g which was in the purchasing limit of the people of all socio economic status.

4. Evaluation of glycemic response among the selected type ii diabetic subjects

The selected breakfast recipe prepared from same quantity of health mix(100g) namely chappathi, puttu, ,pancake were given to the type II diabetic subjects with lower limb injury after the surgery i.e from post operative day by replacing hospital breakfast which supplied one third of day's protein requirement for an injured subjects after the nutrition education. The selected health mix was given to the subjects and follow up of the subjects was done by making them to visit on 15th and 30th post operative day and also instructed to follow the diet pattern given by the investigator for making sure of including value added protein mix for the breakfast at home and Their blood glucose values were measured pre and post operatively (both fasting and post prandial glucose values) from second day to fifth day of surgery and also on 15th and 30th post operative day and all subjects were observed whether they readmitted due to any post operative complications mainly surgical site infection which occurs also by higher level of blood glucose.Table IV gives the pre and post operative blood glucose values.

TABLE IV- PRE AND POST OPERATIVE BLOOD GLUCOSE VALUE OF SELECTED TYPE II DIABETIC SUBJECTS WITH LOWER LIMB INJURY

Parametres		N	Mean	Standard deviation
Pre Operative Glucose Values				
Fasting Blood Sugar		40	156.2	20.3
Post Prandial Blood Sugar		40	232.4	32.7
Post Operative Glucose Values				
Fasting Blood Sugar	POD 1	40	155.7	22.7
Post Prandial Blood Sugar		40	231.6	24.4
Fasting Blood Sugar	POD 2	40	149.4	12.5
Post Prandial Blood Sugar		40	210.1	18.6
Fasting Blood Sugar	POD 3	40	142.7	15.0
Post Prandial Blood Sugar		40	204.2	19.2
Fasting Blood Sugar	POD 4	40	138.4	17.7
Post Prandial Blood Sugar		40	193.8	16.9
Fasting Blood Sugar	POD 5	40	133.6	15.5
Post Prandial Blood Sugar		40	184.5	12.7
Fasting Blood Sugar	POD 15	40	132.2	13.3
Post Prandial Blood Sugar		40	178.7	9.4
Fasting Blood Sugar	POD 30	37	130.6	11.0
Post Prandial Blood Sugar		37	176.4	8.2

From the above table IV it is clear that there is a significant difference between pre and post operative glucose values (pod 2, pod 3, pod 4, pod 5, pod 15, and pod 30)i.e., when compared with post operative glucose vales (pod 2, 3, 4, 5, 15 and 30) of both fasting and post prandial blood glucose values are lesser than the pre operative glucose values

CONCLUSION

Health mix is one of the most significant products and with the incorporation soya protein isolates which is used widely in the Medical Nutrition therapy due to composition of amino acids and its biological value and many preventive health benefits.The results obtained from the study evident to review that the proportion of high quality protein isolates increases, the scores for overall acceptability also increases.Results also revealed that the incorporation of high biological value protein along with the regular diet of diabetics has control over the blood glucose especially on the post prandial value which is often raised and also affectsglycolysated haemoglobin (HBA1C) among diabetics.These results also evident to note that the high quality protein isolate can be blended easily in the health mixes and in common recipes.

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MEDICINAL PROPERTIES OF FUNCTIONAL PLANT FOODS USED BY THE SELECTED TRIBAL COMMUNITIES

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ABSTRACT

Tribes are the aboriginal inhabitants of our country who have been living in a life based on the natural environment and have cultural patterns congenial to their physical and social environment. They are the poorest; most marginalized, oppressed, and deprived people in the country. These tribes possess unique knowledge about the use of many wild flora and fauna in traditional medicine which has developed over generations of forest dwelling; most of which are either lesser known or hitherto unknown to the outside world. Many tribal groups have been using several plant or animal products for medicinal preparations, and these medicines are known as ethno medicine. As it is estimated that today nearly 64% of the total global population depends on medicinal plants to fulfill most of their health care needs, current dependence on traditional medical system remains high. The present paper aimed to document the knowledge among the tribals about the traditional herbals and the inclusion of these plants in their diet. The plants used for consumption as diet is distinct from one tribe to another of the same locality. The documentation of this information will be vital in future for sustainable utilization and conservation.

KEYWORDS: *Tribes, Traditional medicine, Health care, Diet*

INTRODUCTION

The tribal population predominantly depend on contribution from forestry and agriculture for their livelihood along with, and with minor contribution from diverse occupations. This has additional implications for finding sustainable community entrenched strategies to tackle malnutrition(Turner, Plotkin, and Kuhnlein 2013). According to a study conducted by FAO, among the known species of edible plants, 30 crops alone add 90 percent of world's calorie intake. This shows that several hundreds of species remain discarded or unnoticed at the hands of various human societies. Among the edible plant diversity, many are nutritionally or otherwise important. For instance, various wild species of Dioscorea, Colocasia, and Amaranthus, which are the source of vitamins and nutrients, supplement the food needs of a horde of families who live near to forests (Roy et al., 1998). Wild food also contributes to the household income security of millions of forest dependent communities.

Many tribal and rural families of Wayanad district in Kerala still conserve knowledge on a wide range of species for their food needs (Narayanan et al., 2011), medicine, uses related to religious and supernatural beliefs (Pramod and Sivadasan, 2003), and various other uses (Narayanan et al., 2011). The present study has been undertaken with the aim of recording the knowledge on the various edible plants, its medicinal property, and consumption frequency among the tribals of Wayanad district of Kerala. Among tribals, women are the gatherers of food for their family from the forestry. They are acquainted with far and wide of the forestry and edible flora also.

METHODOLOGY

The survey was conducted in the tribal locality of Pulppalli Panchayath of Wayanad district Kerala. The study areas, based on the total forest cover and tribal populations are ethno botanical hotspots of Wayanad. The study area Wayanad district is located in Kerala. It lies between north latitude 11º 27' and 11º 58'35" and the east longitudes 75º 47'50" and 76 º 26' 35". It has a salubrious climate. Since the Wayanad plateau lies at an average height of 900-1200 m above the mean sea level, it enjoys humid tropical climate, with almost uniform temperature throughout the year. The mean annual temperature is 23.8 ºC.

Tribal people in Wayanad district mostly inhabit in and around the deep forest area and depend on the forest resources for their livelihood. Some of them are resides in less accessible areas of the district and lead a primitive life. Each tribe has its ancient culture and traditional doctrine of utilization and conservation of plant resources. Only the medicine man (Vaidya), elder men and women have better knowledge about the traditional uses of their surrounding flora.Meetings and interviews with randomly selected (N=100) tribal adolescent girls (13-18yrs) and their parents were conducted to explain the purpose of the research. These interviews yielded medicinal properties of plants and identification method in depth. The key areas of discussion were detailed information on plants used againsthealth problems, and were recorded including local name, plant parts used, method of administration and inclusion of these plants and its part in their daily diet.

RESULTS AND DISCUSSIONS

Table I. Medicinal properties of the plant and the percentage of knowledge about the medicinal uses of plants among the selected participants and their parents.

S/N	Scientific Name of the Herb (Local name by tribals are given in the bracket)	Medicinal properties of the plant	Percentage of knowledge about the medicinal uses of plants* N=100	
			Tribal adolescent girls (13-18yrs)	Parents of participants
1.	Hygrophilaa uriculata (vayalchulli)	It used in many forms to cure inflammation, pain, urinary infection, edema, gout and used as a diuretic also.	15	90
2.	Erythrinastri ctaRoxb (murikkinch appu)	Bark juice is consumed for one week, daily in the morning to cure leucorrhoea and excessive thirst.	10	38
3.	Glycosmispe ntaphylla (pannal)	Crushed root piece mixed in water is administered in empty stomach, in the morning, for curing stomach pain	35	56
4.	Hemidesmus indicus (nannari)	Root bark powder boiled in milk is consumed early morning for one week to cure stomach disorders and also used as a blood purifier also.	50	80
5.	Dunaliellasa lina (thumba)	It has the richest source of commercial β-carotene. It has a pro-vitamin A activity, latent disease suppression, and used asleafy vegetable in food and it used in cosmetics too.	70	98
6.	Cassia tora (thakara)	It uses against various skin diseases such as ringworm, eczema, and scabies, and the leaves and seeds are acrid, laxative, antiperiodic, anthelmintic, ophthalmic, liver tonic, cardio-tonic and expectorant. The leaves and seeds are useful in leprosy, ringworm, flatulence, colic, dyspepsia, constipation, cough, bronchitis, cardiac disorders commonly.	30	75
7.	Diplaziumes culentum (churulichap pu)	It is popular because of its analgesic activity.	10	25

8.	Amaranthus caudatus (kaattucheera)	The plant is used as astringent, anthelmintic and diuretic. It is used in the treatment of strangury and similarly applied externally to scrofulous sores.	0	5
9.	Amaranthus viridis (Kuppacheera)	The plant is emollient and vermifuge, and usedas blood purifier. The root juice is used to treat inflammation during urination. The pounded root is applied against dysentery. The leaves are diuretic, febrifuge and purgative, and to relieve heart troubles and used in poultices, to treat inflammations, boils and abscesses, gonorrhoea, orchitis and haemorrhoids. The leaf sap is used as an eye wash to treat eye infections.	0	5
10.	Colocasiaesculenta (chembu)	This plant have antimicrobial, antioxidant activity and anticancer activity.	5	38
11.	Dioscorea. pentaphylla (noorakilangu)	They are used to cure stomach ache, constipation, indigestion, abdominal pain, dysentery, cough, cold, asthma, tuberculosis, skin wounds, boils, sunburn, cuts and injury.	0	20
12.	Dioscorea. hamiltonii (bennykilangu)	It is used to cure dysentery.	0	12

*multiple response

These are some common plants and tubers, which were used by the tribal population frequently in their diet. This table revealed that the medicinal properties of the plant and the percentage of knowledge about the medicinal uses among the selected participants and their parents.

Table II. Wild tubers consumed by different tribes.

S/N	Scientific name	Local name used by Tribal community
1.	Asparagus racemosus	Sathavarikilangu
2.	Costusspeciosus	Channakoova
3.	Hemidesmusindicus	Nannari
4.	Adeniahondala	Koombikilangu
5.	Dioscorea. hamiltonii	Bennykilangu
6.	D. oppositifolia	Kavalaikilangu
7.	D. pentaphylla	Noorakilangu

8.	D. pentaphylla var. rheedii	Koranakilangu
9.	D. wallichii	Narakilangu
10.	D. wightii	Mooyakilangu

The consumption of these tubers is not in regular manner. They depend on these tubers only occasionally or according to the availability or in famine. From this list S/N 1-3 are used only on medicinal base. The common preparation of the remaining tubers were washed, and boiled in water with little salt, removed the peel and consumed it hot with chilly.

Table IV. Frequency of usage of selected herbs in their diet

S/N	The herbs used in their diet	Percentage of frequency of usage * N=100			
		Four times in a week	Twice in a week	Weekly once	According to availability
1.	Vayalchulli	18	16	26	40
2.	Murikkinchappu	10	15	37	38
3.	Pannal	15	22	21	42
4.	Thumba	18	18	27	36
5.	Thakara	14	24	14	48
6.	Churulichappu	12	17	32	59
7.	Kaattucheera	22	14	22	42
8.	Kuppacheera	18	15	29	38

*multiple response

This table pointed out the frequency of herbs in their daily life. The herbs were selected on the basis of availability and occurrence of herbs among the selected area. Any of these herbs should be there in the diet of the selected participants daily. Even though they were not aware about the nutritive value or medicinal property of these herbs the free availability made them to consume these herb frequently.

CONCLUSION

Hundreds of indigenous foods were recognized; but an assessment of the patterns of their intake is not available. The consumption of wild food plants has been and still is being underestimated, and research, particularly concerning the socio-economic, cultural, traditional, and nutritional aspects of wild-food plants still lacks adequate attention. Further, there is little information on the distribution and the consumption pattern of the wild foods of tribal population. The present work has focused on the tribal adolescent girls they were dependent on wild foods and other forest resources for their existence. It is mandatory to increase an awareness of the value of such traditional knowledge, and an urgent need to document such knowledge to preserve the natural forest environment.

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UGC APPROVED JOURNAL

ANTIBACTERIAL FINISHING ON COTTON FABRICS USING ECO FRIENDLY HERBAL NANOCOMPOSITES

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ABSTRACT

Textiles are indispensable part of human life. Now a days; textile finishes not only enhance the feel and drape of fabrics but can also provide extraordinary hygienic properties like making it antimicrobial in nature. Nature has been a source of medicinal agents for thousands of years and an impressive number of modern drugs have been isolated from natural sources. To enhance the efficiency of biological and chemical properties of cotton fabrics by finishing with herbal extract nanocomposites. With an objective to increase efficiency of the functional properties, Memecylon malabaricum herbal extract nanocomposites were finished on to the cotton fabric (nanocomposite finishing). Various functional properties were analyzed and Antibacterial activity was carried out for before and after washed samples using standard EN ISO 20645 method and a standard AATCC - 147 test method respectively. Antibacterial activity of nanocomposite finished fabrics showed more inhibitory zones of 30.3 mm for Escherichia coli and 27.4 mm for Staphylococcus aureus. Nanocomposite finished fabrics showed good durable properties.

KEYWORDS: *Memecylon malabaricum, Herbal antimicrobial finish, cotton, nanocomposite.*

INTRODUCTION

The world of textile industry is going through revolutionary changes aimed at the unique needs of the modern customers. Textile substrates can be now modified to provide additional functional requirements apart from providing conversional properties [1] .Functional finishes represent the next generation of finishing industry, which, make textile materials act by themselves [2]. Microorganisms are part of our daily life. They join us in different forms mostly unnoticed [3]. As consumers have become more aware of hygiene and potentially harmful effects of microbes the demand for antimicrobial finished clothing is increasing [4].Though chemicals and heavy metal finished fabrics provide good antimicrobial activity, due to factors like toxicity, and non-biodegradability, they cannot be used for hygenic applications.Its derivatives as antimicrobial agents have received more attention to finish antimicrobial textiles. The herbal extracts like *Memecylon malabaricum* were also considered significant for the functional finishing of textile materials for antibacterial, antifungal and anti odour properties.

Even though reactive exhaust method and microencapsulation method have been used extensively in textile industries for functional finishing of fabrics, a novel technique called nanoencapsulation is rapidly emerging and widely used in pharmaceutical, chemical, cosmetics and food processing industries[5] . Nanoencapsulated drugs after finishing onto the textile materials provides a slow and controlled release of the active antimicrobial ingredient to achieve the desired delay until the right stimulus is obtained[6] .

Considering the significant characteristics of this technique, in our present research, herbal extract nanoparticles were prepared and were functionally finished on the cotton fabrics. To find out the efficiency of nanocomposite finished cotton fabrics, the parameters like antibacterial activity and wash durability were evaluated.

METHODOLOGY

FABRIC PARTICULARS AND SELECTION OF HERBS

Plain weave cotton Fabric is selected with 40s yarn count, 60 ends per inch (EPI) and 56 picks per inch (PPI).Medicinal plant, *Memecylon malabaricum* were collected from different region in and around Erode district, Tamil Nadu. Leaves of the plants were used in the study.

SELECTION OF BACTERIA CULTURE:

The following microbes were selected for this study according to the ENISO 20645 standard.

Test organisms - **Escherichia coli** ATCC 11229 and **Staphylococcus aureus** ATCC 6538

EXTRACTION OF HERBS

The separated herbal parts were shadow dried and powdered by using dry grinding machine. The herbal powders were stored in a dry container for further studies. The extraction process was done in three stages, such as drying, grinding and extraction.

PREPARATION OF ANTIBACTERIAL NANOPARTICLES

Herbal extract nanoparticles were prepared by coacervation process by cross-linking with glutaraldehyde. In this method, the herbal extract was incubated with bovine serum albumin (wall material – 2% w/v) for one hour at room temperature. Using 1M HCl pH was adjusted to 5.5. Ethanol was added to the solution in the ratio of 2:1 (v/v) at the rate of 1ml/min. Coacervate

thus formed was hardened with 25% glutaraldehyde for 2 hours to allow cross-linking of protein. Organic solvents were removed by rotary vacuum evaporator and resultant nanocapsules were purified by centrifugation at 4 °C at 10,000 rpm. Pellets were suspended in 0.1M PBS (pH 7.4) and lyophilized with mannitol (2% w/v).

NANOCOMPOSITE FINISHING OF COTTON FABRICS

Cotton fabric sample were treated with herbal nanoparticles (nanocomposite finishing). All the samples were padded with 8% citric acid in a padding mangle at a pressure of 3 psi with 100% wet pickup followed by drying and curing at 160°C for 5 min.

ANTIBACTERIAL ASSESSMENT OF THE FINISHED FABRIC

(EN ISO 20645 TEST METHOD)

The antibacterial activity of finished fabric was tested according to EN ISO 20645 against the test bacterial cultures, Escherichia coli and Staphylococcus aureus. The finished cotton fabric with the diameter of 20 ± 1 mm was placed on the surface of Nutrient agar medium which was swabbed with the bacterial cultures. The plates were incubated at 37 ºC for 24 hours to measure the zone of inhibition in millimeters formed around the fabric.

WASH DURABILITY OF FINISHED FABRIC (AATCC – 124 TEST METHOD)

Nancomposite finished cotton fabrics were analyzed for their wash durability by subjecting the sample to repeated washing and antibacterial testing using the standard AATCC-124 and AATCC – 147 test methods (Parallel streak method). All the samples were washed and its antibacterial activity was analyzed after 1st, 5th and 10th wash.

RESULTS AND DISCUSSION

In the present study, nanocomposite finished cotton fabrics were analyzed to determine their efficiency of biologicall properties. Antibacterial activity and the durable properties of the nanocomposite finished cotton fabrics were analyzed

ANTIBACTERIAL ASSESSMENT OF THE FINISHED FABRIC BY EN ISO 20645

Finished cotton fabric was assessed for their antibacterial activity by EN ISO 20645 against test bacterial cultures. The zone of inhibition of fabric treated with nanocomposites showed inhibitorier. Nanocomposite finished fabric inhibited the organisms with the zones of 30.3 mm for E. coli and 27.4 mm for S. aureus (Figure-1). The measured zone of inhibition thus indicated that nanocomposites not only prevented the growth under the fabric also it constantly leached out from the material by restricting the growth of organisms to a greater extent.

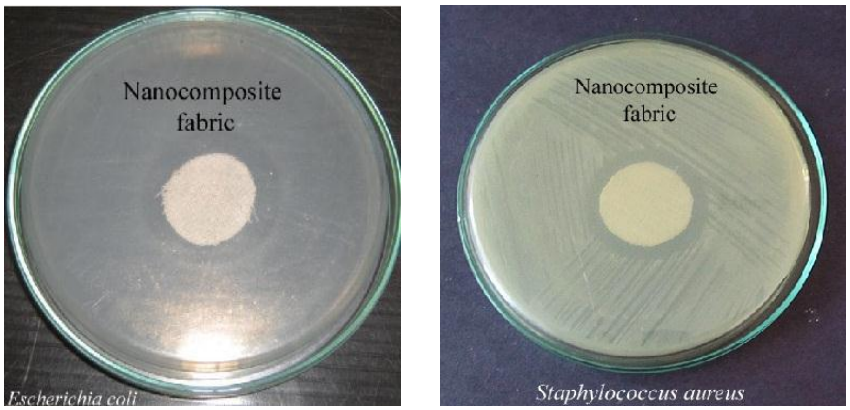

FIG 1. ANTIBACTERIAL ASSESSMENT OF THE NANOCOMPOSITE FINISHED FABRIC

WASH DURABILITY OF FINISHED FABRICS (AATCC – 124 TEST METHOD)

Durability was tested based on their antibacterial activity using standard Parallel streak method (AATCC – 147 test methods). The nanocomposite finished sample provided more inhibitory zones. After 10th wash, the inhibitory zone of 26.3 mm and 26.9 mm was reported for E. coli and S. Aureus (figures-2). This showed that the nanocomposite fabric was able to retain the antibacterial activity even after 5 to 10 industrial washes, thereby providing long term durability of the nanocomposite finished fabric.

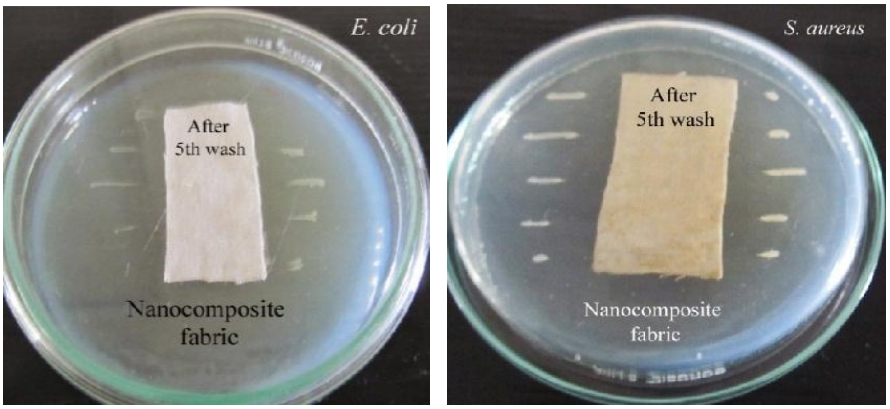

FIG 2. WASH DURABILITY OF NANOCOMPOSITE FABRIC

TABLE 1. ANTIBACTERIAL ASSESSMENT OF THE FINISHED FABRIC BY EN ISO 20645

Test Culture	**Zone of inhibition (mm)**	
	Escherichia coli#	Staphylococcus aureus#
Unfinished cotton	0	0
Nanocomposite finished cotton*	30.3	27.4

* Values in mm was measured including the diameter size of the fabric (20 mm)

Mean values were tabulated after performing three times for each test culture

TABLE 2. WASH DURABILITY OF FINISHED FABRIC BY AATCC – 124 TEST METHOD

Test Culture	Zone of inhibition (mm) after washes (in numbers)					
	Escherichia coli#			Staphylococcus aureus#		
	1st	5th	10th	1st	5th	10th
Unfinished cotton	25#	25#	25#	25#	25#	25#
Nanocomposite finished cotton*	29.9	28.7	27.9	26.8	25.9	25.1

No inhibitory zone was observed (value given is the actual diameter of the fabric)

CONCLUSION

The society move towards hygienic, less toxic, ecofriendly products which has increased the demand for anti-microbial textiles that is effective and safe for humans. In the present study, the advantages of functionally finished Ecofriendly herbal nanoparticles on cotton were well determined based on the biological and chemical properties. The nano size of extracts increases the durability and antibacterial activity of finished fabric to a greater extend. Also, no change in properties of nanoparticle finished cotton could also influence its wide applications in hygienic aspects in providing suitable comfort properties.

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Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

A STUDY ON OBSOLETE KANCHIPURAM SAREES UPCYCLING –A NEW PERSPECTIVE TO SUSTAINABLE HOME TEXTILE

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ABSTRACT

Kanchipuram silk belongs to kanchipuram region in Tamilnadu. Kanchipuram is known for its richness, elegance and sustainability. These expensive and heavy sarees are worn occasionally. Also people's taste and preference keeps changing thus making any fashion obsolete according to season. Home textiles refer to textiles used for home furnishing. Today home textiles are facing sustainable issues starting from raw material to finishing process. To produce a "high performance" and premium fabric, manufacturers either embed chemicals in material's yarn or apply finishes or coatings to materials after production. On the other hand fast fashion and disposal clothing is multiplying enormously. To sort these problems consumers should opt repurposing and reusing which is known as Upcycling method. Repurposing is the process by which an object with one use value is transformed as an object with an alternative use value. Reuse refers to using a method without treatment and reduces waste thus making it sustainable. The study was conducted to know use of obsolete kanchivaram saris and to upcycle it into home textile. Design thinking was done to accomplish upcycling process.awarness was given on how kanchipuram sarees could be upcycled.

KEYWORDS: *Home textiles, sustainable, upcycling, repurposing, reusing, design thinking*

INTRODUCTION

Kanchipuram silk belongs to kanchipuram region in Tamilnadu. It is woven from pure mulberry and zari thread. Kanchipuram is known for its richness, elegance and sustainability. These expensive and heavy sarees are worn occasionally. Also people's taste, comfort and preference keeps changing according to season thus making any fashion obsolete after a period of time.

Home textiles refer to textile used for home furnishing. Home textiles accentuate the interior of the home that divides between the home space and furnishings. Earlier, home textile was considered as functional purpose but now consumers give preference to functional as well as decorative aspect. Home furnishing fabric consists of natural and manmade fabrics. Often both are blend together to give durability and functionality. Home textiles include a wide range of products. Some of the most common home textile products are Home furnishing fabrics like Bed spreads, Blankets, Pillows and pillow covers, Cushion and cushion covers, Carpets and rugs, towels, Table cloth and mats, Kitchen linen and other fabric accessories.

Today home textiles are facing sustainable issues starting from raw material to finishing process. To produce a "high performance" and premium fabric, manufacturers either embed chemicals in material's yarn or apply finishes or coatings to materials after production.

On the other hand fast fashion and disposal clothing is multiplying enormously.Trashingtons of textiles are dumped every year. One of the biggest environmental issues is associated with fast fashion that comes from the use of synthetic fibres, which is also rapidly increasing. When consumers dispose of their unwanted clothes into the garbage, they almost always wind up in landfills or burning of waste clothes that emits toxic content that are hazardous.

To sort these problem consumers can preferupcycling method for sustainableobsoletefabrics. Themethod of repurposing and reusing is known as Upcycling. Repurposing is the process by which an object with one use value is transformed as an object with an alternative use value. Reuse refers to using a method without treatment and reduces waste thus making it sustainable. Upcycling is also known as Creative reuse which is not a new concept. It has been practised way back when there were economic crisis and scarcity.Example people upcycled the adults dresses into kids dress and old door into dining table. Similarly upcycling of old fabrics into home textile has to be considered and put into practice as part of sustainable future development.

OBJECTIVE

- To study on the use of obsolete Kanchivaram saris
- To upcycle an old sari for home textile
- To create a model of an innovative contemporary seater.
- To make Holder bag for yoga mat and chart
- To give awareness on design ideas

METHODOLOGY

Survey:

Questionnaire

A survey was conducted among a group of 50 urban women of age 40 and above who are having 20 years above obsolete Kanchivaram saris. A structured questionnaire was prepared and distributed among the women to get their response.

Design Thinking

A study on solution based thinking was done based on the survey

a. **Upcycling:** obsolete kanchivaram sarees, two old tyres of different size, a cushion
b. **Developing Design**:

Product I

❄ Acontemporary seater with cushion cover

Product II

❄ Yoga mat or chart holder

c. **Techniques used**: Braiding, Wrapping, pattern making and construction.

Awareness on Design Ideas

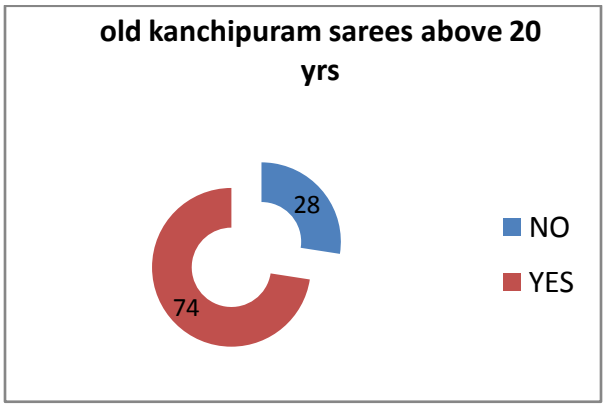
A class was conducted on the issues of sustainability, fast fashion and need for up cycling process.

RESULTS AND DISCUSSION

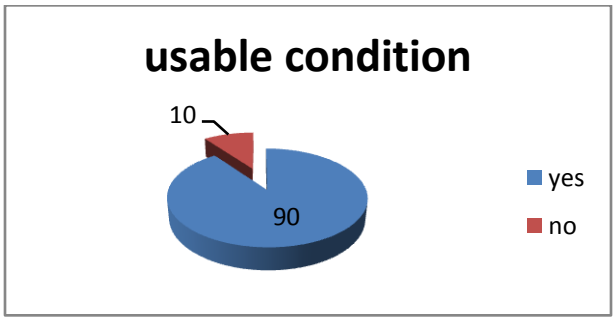
Survey:

Questionnaire

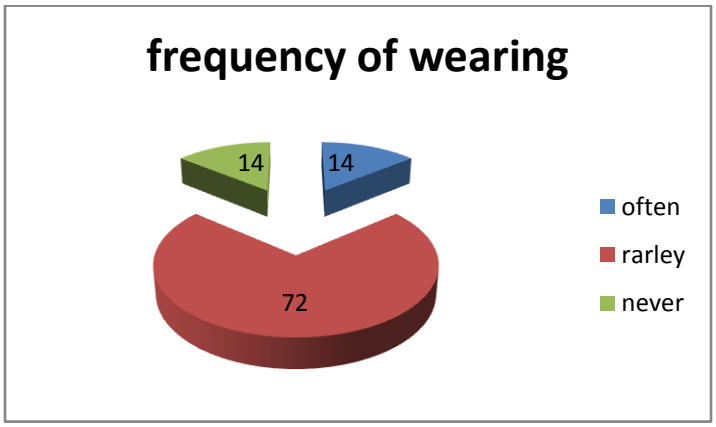
A group of 50 urban women of age 40 and above were questionedon the 20 years above obsolete Kanchivaram saris. A structured questionnaire was prepared and distributed among the women to get their response. The response was as follows



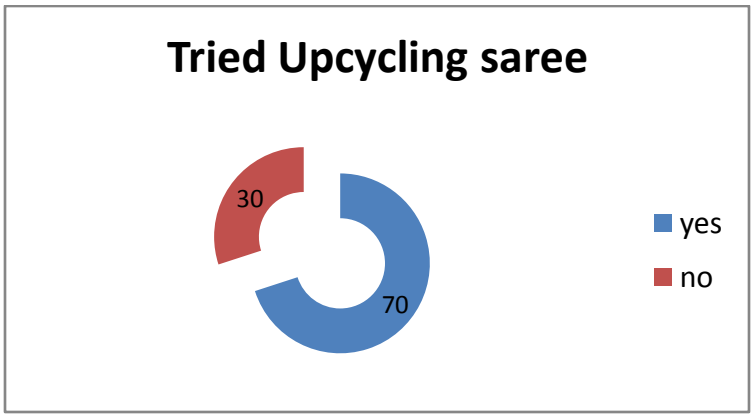
Of the 50 selected 74% of the women had kanchipuram sarees above 20 years old



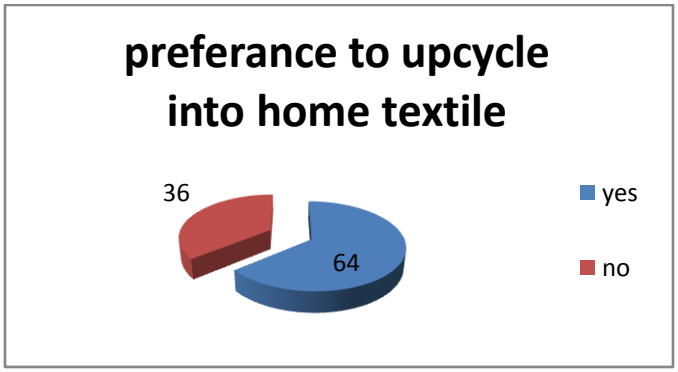
90% of the saris were in usable condition



14 % of them never used the saris and 72% of them rarely used it. The reason was because of changing trend in kanchivaram saris, few sarees were heavier to wear and older saris were in worn out condition.



70% respondedthat they have upcycled the saris into various other garments like kameez, dupattas and skirts. 30% responded that they never upcycled the saris since they haven't thought about it, few felt the saris was priceless to be converted into other items, Some of them were of the opinion that they had no time to modify it and few others felt the sentimental value towards it.



Of the 50% selected women 64% preferred to upcycle and repurpose the saris into home textile products.

Design Thinking

Solution and creative based thinking was done based on the survey.

Product I

a. Upcycling: Two old tyres of different sizes,few old kanchipuram saris and a silk saree were used for repurposing and reusing.

b. Developing Design: a contemporary seater was designed and developed using traditional kanchivaram saris.

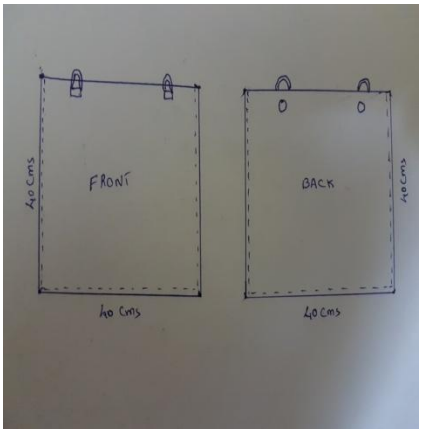
c. Techniques

Braiding and wrapping technique is used for the sarees that are on the verge of disintegration where stitching is impossible.

1. Braiding: the old saris were stripped into lengthy pieces and braided. Smaller tyre among two was chosen to wrap the braid.

2. Wrapping: Another kanchivaram sari was stripped into broader pieces and wrapped on the tyre. A combination stitching and adhesive was used to finish the product.


3. Construction of cushion cover: a square cushion cover was stitched according to the required measurements

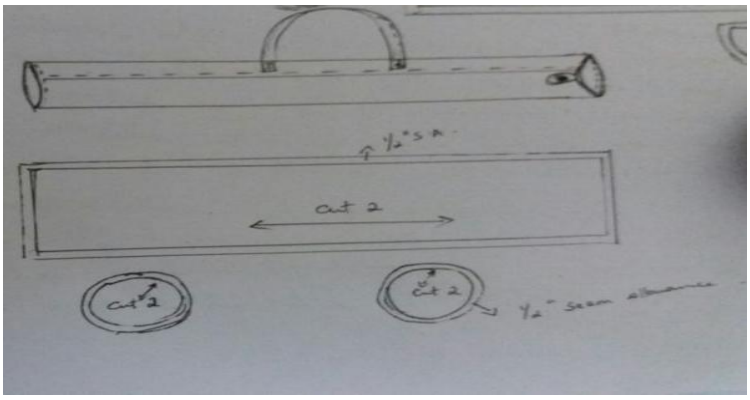



Final Product

Product II

Technique used for Yoga or Chart holder bagfor sarees that are in better condition.

Pattern making and Garment construction



Awareness on Design Ideas

A class was conducted to 50 urban women on the issues of sustainability, fast fashion and need for upcycling process. And design ideas on how obsolete kanchipuramsaress could be repurposed,reused and revived in home textiles into contemprory seater ,cushion covers, curtains, table mat and table covers in contemporary style.

CONCLUSION

Repurposing and Reusing is the need of hour.The sustainable fabrics have the added advantage for a healthier environment. Upcycling, up to an extent, can reduce the trashing in today's world. Kanchiparam saris are one among the sustainable saris which are famous for its luxury and elegance. The age old sarees could be revived using upcycling process as a measure to overcome the deteriorating quality over the period of time. Likewise there are various age old saris of cotton,silk and other natural material which can be creatively repurposed and reused in a contemporary style in the field home textile.

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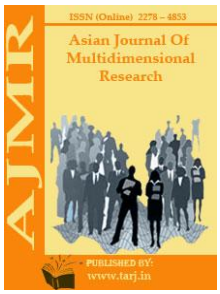

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

EVALUATING THE COLOURFASTNESS OF THESPESIAPOPULNEA ON JUTE – COTTON BLENDED FABRIC

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ABSTRACT

Increasing awareness on health and safety and important legislation on eco-toxicological considerations are gaining momentum. This drives us back to nature that is developing ecofriendly processes and finishes. Natural sources such as plants and animals , algae, bacteria and fungi not only provide us ecofriendly products for textile finishing but also possess bio-degradable properties.The alarming increase in pollution level demands us to immediately alter for ecofriendly products. People the world over are increasing consciousness about ecology and preference for natural dyes is ever increasing. Jute has gained a considerable place in substituting conventional fibres either as itself or as Jute-cotton blends. It is becoming an entirely new sector of textile furnishings and apparel industries. Jute-cotton blend is considered most appropriate because both are cellulose fibres and can be blended in a homogeneous manner. Biodegradability of natural dyes and its higher compatibility with environment makes it as preferred source for dyeing. Also lower toxicity, non-allergic and non-carcinogenic properties of these dyes increases its scope in newer research and identifying newer sources. This study attempts to evaluate the dye ability of jute-cotton with parts of Thespesiapopulnea.

KEYWORDS: *Natural Dyeing, Jute-Cotton fabric, Colourfastness, Mordants*

INTRODUCTION

Natural sources such as plants and animals , algae, bacteria and fungi not only provide us eco friendly products for textile finishing but also possess bio-degradable properties.

Jute can be substituted for conventional fibres either as by itself or as Jute-cotton blends. It is becoming an entirely new sector of textile furnishings and apparel industries. Jute-cotton blend is considered most appropriate because both are cellulose fibres and can be blended in a homogeneous manner.

METHODOLOGY

FABRIC SELECTION

Cotton fibres can be dyed with natural dyes to get the basic colours namely blue, green, red, black and yellow. It can be blended with many other fibers so that certain of the desirable properties of cotton that other fibers may lack will contribute to the general characteristics of the blended yarns and fabrics.

Jute is the second most widely used vegetable fibre after cotton.It is an annually renewable, biodegradable non toxic and environment friendly fibre. It is relatively cheap and possess number of suitable technical qualities like high tensile strength, good dyeability, anti - static property.It can also be blended with other natural fibres to produce various end products.The major objectives of blending of jute with other fibres natural as well as synthetic are to improve the functional properties of yarn as well as fabrics.

The drawbacks of jute can be suppressed or improved by chemical and finishing treatment or by blending with other natural or man madefibres, to get suitable products at a lower cost for different end uses.In recent times there has been a significant growth in the development and commercialization of diversified products using jute blended yarns and there by to widen the consumer base for jute products (Duraiswamy et al 2002).Hence Jute-cotton blended fabric was selected for the study.

Preparation of the Fabric

Weaving of Jute-cotton blended yarn was carried out in handloom. The blended yarns consisted of 30 percent jute and 70 percent cotton. Pure cotton yarn was used as warp and the blended yarn was used for the weft direction.

Processing of Fabric

The woven fabric was desized by soaking the material in boiling water for fifteen minutes. Later the fabric was washed in five percent detergent solution and thoroughly rinsed in soft water.

Some of the drawbacks of jute like stiffness and hariness of the fabric has to be improved, when it is intended to be used in value added products views Chattopadhyay et al (2001). Chemicals used at all stages of processing increase the pollution problem. With the prevailing high cost of commercial enzyme, biopolishing of ordinary jute fabric will not be economically viable .

As suggested by Amsamani and Ranganathan (2003) the desized material was soaked in cowdung solution for 48 hours to soften it. Shenai (2000) states that the traditional method of bleaching textiles had been by treating the fabric with butter milk and exposing it to sunlight.It

was then soaked in buttermilk for bleaching. The fabric was then rinsed thoroughly and dried in sunlight.

Selection of Dye Source

Dyes from vegetable sources are interesting for two main reasons. Firstly the colour of dye is very brilliant and secondly the toxicity is very low. Considering these facts natural dye was selected for the study. Different parts of the *Thespesiapopulnea* otherwise called as the Indian Tulip tree or Portia tree were used. Barks, leaves, flowers and fruits were collected dried in the shade and powdered.

Selection of Mordants

Considering the eco-friendly points natural mordants namely alum, pomegranate rind and myrobalon were selected for the pilot study.

Mordanting techniques used were pre, post and simultaneous mordanting. As suggested by Pan et al (2003) in pre mordanting, the material was boiled in the mordanting solution for half an hour prior to dyeing. Later it was taken out, squeezed well and immersed in the dye solution. In simultaneous mordanting,mordants were mixed with the already prepared dye solution. The fabric was then entered into this mixture and boiled for an hour. Later it was taken out and rinsed thoroughly in water and dried in the shade. Post mordanting was carried out after dyeing. The dyed sample, was squeezed well and immersed in the mordanting solution and boiled for half an hour. The above procedure was uniformly followed for all the three mordants selected.

Dyeing procedure

The weighted quantityof each dye powder was dissolved in 100ml soft water. Mordanting solutions were prepared with the selected mordants in 100ml soft water.Thus the pilot study with four dye sources, three mordants and three mordanting techniques resulted in the production of 36 samples.

The dyed samples were visually evaluated .based on the recommendation made, during visual inspection results the following dye sources, mordants and mordanting techniques were selected for optimization. The dye source selected was the fruit and mordant was alum and pomegranate with pre mordanting technique.

Nomenclature of Samples

Nomenclature	Samples
O	Original
A	Alum
P	Pomegranate rind
K	Fruit dye
1	Premordanting
2	Simultaneous Mordanting
3	Post Mordanting
W	Washed samples

Optimization

The main objective of optimization was to standardize the different variables involved in dyeing. This included optimization of dye concentration, extraction time, mordant concentration, mordanting technique, dyeing time and mordanting time. During optimization the value of the variable being optimized was varied keeping other variables constant.

The optimum concentration of dye source was found by varying dye concentration. One, two, three, four and five grams of dye powder/100ml of soft water were taken in five different beakers. The soaking time was kept constant for all concentration. Based on the results five percent was decided as the optimum dye concentration.

The optimum time for extraction of dye was found by varying the duration at 30, 60 and 90 minutes for the same concentration of the dye. The temperature was maintained as 100°c throughout. The dyed samples were visually inspected by a panel of 25 judges and the time corresponding to the dark shade was recorded as the optimum time for dye extraction. The same was found to be 60 minutes.

Duration of dyeing was varied as 30, 60 and 90 minutes. Later the samples were taken out, rinsed well, dried in the shade and evaluated visually using a proforma. Evenness of dyeing, colour, texture, general appearance were the major criteria taken into consideration for visual evaluation.It was found that 60 minutes was the optimum time for dyeing the material.

The concentration of the selected mordant was varied as one, two and three gms/100ml of water. The mordant solutions were taken in separate beakers. The mordanting time was also varied as 15, 30, 45, and 60 minutes. Premordanting and post mordanting were carried out for the various mordant concentration and mordanting time.

All the samples were soaked in soft water prior to dyeing. Later they were taken out, squeezed and shaken to avoid crease formation. The dye powder was dissolved in the required quantity of soft water and boiled for the specified temperature. The wet material was boiled at the chosen temperature for the specific duration with occasional stirring. The mordanting solution was prepared by dissolving the mordants in water. The material was mordanted following the suitable technique selected. Each dyed sample was rinsed thoroughly in soft water and dried in the shade.

Selection of washing Method

The samples were soaked in detergent solution for ten minutes and washed by kneading and squeezing. It was rinsed in three changes of soft water and dried in the shade. Soft water was used for washing.

Evaluation

The dyed and washed samples were visually evaluated for their eveness of dyeing, texture, luster and general appearance.The samples were also rated for their Fabric weight, Tear strength, Drape and Colour fastness.

RESULTS AND DISCUSSIONS

Visual inspection

Evenness of dyeing of the all the dyed samples was rated as even .

The lustre of all samples was rated as medium. Texture of all samples was rated to be coarse The general appearance of samples was rated to be fair .

Laboratory Tests

Fabric Weight

Dyeing has increased the weight of all samples. Sample P1K had gain of 6 percent and sample A1K with 33 percent gain in weight.

Washing reduced the weight of all dyed samples. Sample A1KW had a minimum loss of ten percent while sample A1KW had the maximum loss of 32 percent.

Statistical analysis reveals that dyeing both before and after washing has a significant impact on the fabric weight of samples.

Tear Strength.

Dyeing has reduced the tear strength of all samples in the warp direction. Washing reduced the tear strength further. Minimum loss of two percent was observed in the case of sample A1KW in the warp direction.

Statistical analysis shows that tear strength of samples A1K and A3K vary significantly due to dyeing. Washing reduced the tear strength of all dyed samples. Sample P1KW had a minimum loss of one percent.

Drape

The drape co-efficient decreased for all the dyed samples. The individual difference between the samples werelow.

Statistical analisyis indicate that dyeing has a significant effect on the drape of all samples expect sample P1K. Drape of sample P1KW alone varied significantly due to washing.

Test for colour strength

Colour difference of the dyed samples are presented in Table

Colour Strength

S.No.	Samples	Colour Difference			
		△L	△a	△b	△E
1.	PIK vs AIK	7.82	-2.5	4.86	9.59

The colourdifference between the dyed samples of different mordants were noted for different mordanting techniques. All the samples gave lighter shades. The ‘a’ values of the samples were negative indicating a greener shade. The ‘b’ value for the samples were positive values indicating more quantum of yellow. The pre mordanted samples indicate more yellow than the post mordanted samples.

In the colourfastness test against sunlight, samples A1K was rated as good against sunlight. The colourfastness of sample P1K was poor.

As regards washing, samples A1K and P1K had good colourfastness property while the colour of the rest of the samples were only fairly fast to washing. In staining test the fastness property of almost all samples were rated to be fair.

The staining test proved that samples A1K and P1K had fair fastness to wet pressing while the rest were poor in fastness properly.

Almost all samples had excellent colourfastness to dry pressing. Staining tests also proved very good fastness of the samples to dry pressing.

CONCLUSION

Jute cotton blended fabrics can be enhanced by the application of natural dye extraction from the selected source and their performance is satisfactory even after repeated washing. Similar study can be undertaken with other sources of natural dye.

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ECO-FRIENDLY DYEING OF COTTON FABRIC WITH NATURAL DYE AND MORDANTS

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ABSTRACT

This study is aimed at eco-friendly dyeing of cotton fabric using natural dye extracts from banana leaves. 100% cotton fabric was selected for the study and pre-treatments such as scouring and bleaching were done before dyeing. The natural dye was extracted from banana leaf by soxhlet extraction method using acetone as solvent. Two different mordants, onion skin and pomegranate rind, were extracted by decoction method and used for dyeing. Three mordanting techniques were employed for dyeing process i.e., pre-mordanting, meta-mordanting, and post-mordanting. The dyed samples were tested and evaluated for colour fastness (laundering, rubbing and perspiration) and physical properties (areal density/GSM, thickness and tensile strength).

KEYWORDS: *Banana leaf dye, natural dye, natural mordant, onion skin, pomegranate rind.*

INTRODUCTION

Plants are potential sources of natural dyes owing to their easy and abundant availability. After harvest, the banana plant is disposed off on the land and it takes quite longer time to decompose. Sometimes, the dry plants are burnt to ashes which accounts to the environmental pollution. Hence the discarded leaves may be collected and used to extract natural dyes for colouring textiles. Natural dye from banana leaves is both eco-friendly and inexpensive [1]. Also, banana leaf extract shows very good antifungal activity and acetone is the best solvent for extraction followed by ethanol and petroleum ether [2].Most of the natural dyes are non-substantive in nature and hence require a mordant to fix them to the fibre. Usually, metallic salts such as copper sulphate, ferrous sulphate, alum, chrome, etc. are used as mordants[3]. Though these chemicals are good mordants they pose problems like skin allergy, especially the chrome and copper mordants. Hence, natural mordants such as tannins are preferable in place of metallic mordants. Pomegranate rind in rich in tannins and have been used in dyeing of silk and wool both in the presence and absence of mordants [4].

METHODOLOGY

Natural Dye

Banana leaf has been selected as the source for natural dye extraction. The banana variety chosen is Monthan (*Musa paradisiaca*). They were collected from a village in Erode district, Tamil Nadu, India. The collected leaves were washed thoroughly and dried under shade and then ground into powder form.One litre of Acetone (solvent) was taken in the Soxhlet extractor and 140 grams of banana leaf powder was packed and placed in the thimble and the mixture was refluxed at 10° to 50°C for 32 hours.The extract so obtained was filtered using filter paper and stored in an airtight container.

Natural Mordant

Two natural mordant sources namely Onion(*Allium cepa*) skin and Pomegranate(*Punicagranatum*) rind were selected for the study. Onion skin yields orange colour dye while pomegranate rind yields yellowish brown dye [5]. Since both these dye sources are rich in tannins, they could be used as mordants also. Onion skin (the dry outer skin) was collected from Bharathiar University Hostel and Pomegranate rind from Erode market. 200 grams of onion skin was taken in a bath and 3 litres of water was added and boiled at about 90°C for 40 minutes. Then it was allowed to cool, filtered and stored in airtight container. The pomegranate rind was dried under shade and broken into small pieces. 200 grams of pomegranate rind was taken in a bath and 3 litres of water was added and boiled at about 90°C for 40 minutes.Then it was allowed to cool, filtered and stored in airtight container.

Dyeing

100% Cotton woven fabric was bought from a weaver at Erode and pre-treatments such as desizing, scouring and bleaching were done and the fabric is made suitable for dyeing. Three mordanting techniques namely pre, meta and postmordanting were employed.Lower temperature is preferred for natural dyes, since higher temperature may degrade the dye and the fabric. Hence 60°C is chosen as the dyeing temperature. The procedure followed for mordanting and dyeing is tabulated as follows:

Table 1 Mordanting and Dyeing Proce

	Process
Pre-mordanting	Cotton fabric was treated with mordant for 10 minutes at 60°C with MLR of 1:5. Then the mordanted fabric was dyed at 60°C for 30 minutes and washed with cold water and dried.
Meta-mordanting	Cotton fabric was dyed in a bath containing mordant and dye for 60 minutes at 60°C with MLR of 1:5. The fabric was washed with cold water and dried.
Post-mordanting	Cotton fabric was first dyed with banana leaf dye at 60°C for 60 minutes and then treated with the mordant for 10 minutes at 60°C. The fabric was washed with cold water and dried.

RESULTS AND DISCUSSION

Banana leaves are good source of soluble phenolic compounds and acetone is the best solvent for extraction of these phenolic compounds. Since most of the natural dyes are non-substantive, they need a mordant to fix the dye molecule to the fibre (substrate). Mostly metallic salts are used as mordants to obtain brilliant colours. These salts pose serious effluent problem and hence the metallic mordants can be substituted with natural mordants that are biodegradable and non-hazardous in nature. Both onion skin and pomegranate rind extracts are rich in tannins. Hence they were used as mordants for dyeing.

The dyed and undyed fabrics were analysed for physical properties such as areal density (GSM: grams per square metre), thickness and tensile strength. Since fastness is the important criteria for coloured textiles, the dyed fabrics were tested for their colour fastness - rubbing, washing/laundering and perspiration. The results are tabulated as follows:

Table 2 Colour fastness to rubbing (ISO 105 X12: 2001

	Onion skin mordant		Pomegranate rind mordant	
	Dry	Wet	Dry	Wet
Pre-mordanted fabric	5	3	5	3
Meta-mordanted fabric	5	4/5	4/5	3
Post-mordanted fabric	4/5	3	5	2/3

It could be inferred from Table 2 that the colour fastness to dry rubbing is best with both the mordants and wet rubbing results are better for onion-skin mordant than pomegranate rind mordant.

Table 3 Colour Fastness to Washing (ISO 105 C06: 2010)

	Colour Change (grade)	
	Onion skin mordant	Pomegranate rind mordant
Pre-mordanted fabric	1	4
Meta-mordanted fabric	2	4
Post-mordanted fabric	1/2	3/4

Staining on multifibre fabric (Acetate, Cotton, Nylon, Polyester, Acrylic, and Wool) was found to be **4/5** for all samples.

Table 3 infers that very good colour fastness to washingis obtained with pomegranate rind mordant while onion skin mordant showed poor results. The staining on multifibre adjacent fabric is almost nil in both the cases.

Table 4 Colour Fastness to Perspiration (ISO 105 E04: 2013)

	Colour Change (grade)			
	Onion skin mordant		Pomegranate rind mordant	
	Acidic	Alkaline	Acidic	Alkaline
Pre-mordanted fabric	3/4	4	4	4/5
Meta-mordanted fabric	3/4	3/4	4	4
Post-mordanted fabric	3	2/3	4	4/5

Staining on multifibre fabric (Acetate, Cotton, Nylon, Polyester, Acrylic, and Wool) was found to be **4/5** for all samples.

Table 4 infers that very good colour fastness to perspiration, both acidic and alkaline, is obtained with pomegranate rind mordant while onion skin mordant showed average results. The staining on multifibre adjacent fabric is almost nil in both the cases.

Table 5Areal Density (GSM) (ASTM D3776: 2002)

	Areal Density (GSM)	
	Onion skin mordant	Pomegranate rind mordant
Pre-mordanted fabric	95.4	97.4
Meta-mordanted fabric	97.6	94.4
Post-mordanted fabric	95.4	95.4
Undyed (control)	102	

Table 5 shows the areal density of the undyed and dyed fabric samples. It is understood that there is slight reduction in the GSM of dyed fabrics compared to the undyed fabric.

Table 6 Fabric Thickness (ASTM D1777: 1996)

	Thickness (mm)	
	Onion skin mordant	Pomegranate rind mordant
Pre-mordanted fabric	0.21	0.21
Meta-mordanted fabric	0.20	0.20
Post-mordanted fabric	0.20	0.20
Undyed (control)	0.16	

Table 6 shows the thickness of the undyed and dyed fabric samples. It is understood that there is slight increase in the thickness of dyed fabrics compared to the undyed fabric. This is due to the fact thatswelling of fibre occurs during wet processing of textiles and the yarnsmove closer to each other.

Table 7 Tensile Strength of Fabric (ASTM D5035: 2011)

	Onion skin		Pomegranate rind	
	Warp	Weft	Warp	Weft
Pre-mordanted fabric	12.7	15.5	8.9	11.0
Meta-mordanted fabric	11.1	15.7	10.4	16.8
Post-mordanted fabric	11.0	18.3	10.7	15.5
Undyed (control)	Warp: 13.3, Weft: 19.3			

Table 7 shows the tensile strength of the undyed and dyed fabric samples. The onion skin mordant dyed fabric exhibits little loss in tensile strength along the warp and slightly more loss in tensile strength along the weft while the pomegranate rind mordant dyed fabric shows considerable loss in strength in both warp and weft directions.

CONCLUSION

The natural colorants are emerging globally due to the fact that they are safer and more environmentally friendly and thus the application of natural dyes should be considered as a better alternative. Natural dyes have many advantages over synthetic dyes such as higher bio-degradability and compatibility with the environment. The Natural dyes have a wide range of shades that can be obtained from various parts of plants including roots, leaves, flowers and fruits. There has been increasing interest in natural dyes, as the public is becoming more aware of the ecological and environmental problems related to the use of synthetic dyes. Mordants are needed to set the colour when using natural dyes. Different mordants will give different shade. They also improve colour and light fastness. Natural mordants like, tannic acid, onion skin, pomegranate, etc could be used in place of metallic mordants.

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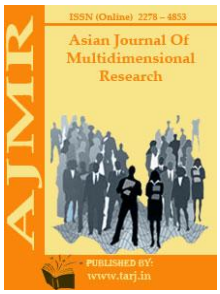

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ANALYSIS OF SPINNABILITY OF WRIGHTIA ARBOREA (DENNST.) MABB. FIBER

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ABSTRACT

The demand for renewable raw materials is steadily rising as the drive for a green economy and a sustainable future accelerates. This Paper reports study on the Wrightia Arborea (Dennst.) Mabb.fibre is used for design and development of fabric for primary healthcare textile. Wrightia Arborea (Dennst.) Mabb. is a natural cellulosic fibre obtained from dead seed of this plant. Wrightia Arborea (Dennst.) Mabb. is also known as Tambda kuda tree which is useful for various diseases especially in south India.Wrightia Arborea (Dennst.) Mabb. is a medicinally important plant belongs to the family Apocynaceae.The work consists of three different steps i.e. extraction of fiber, conversion of fiber into Yarn and conversion of yarn into fabric. Wrightia Arborea (Dennst.) Mabb. (WA) fibre have been blended with Viscose Rayon (V) fibres at three different proportions 70: 30 ; 60 : 40 & 50:50 and the ring spinning yarn and fabrics are produced using pilot machinery's like carding, Roving, Ring spinning and socks knitted machine. The properties of Wrightia Arborea (Dennst.) Mabb. fibre, method of yarn production, process parameters used in various processes involved in yarn production and testing of yarn characteristics and conversion of yarn into fabric were studied.

KEYWORDS: *Wrightia Arborea (Dennst.) Mabb.,Viscose Rayon, healthcare,Textilefibre, Blend, Knitted Fabric etc.,*

INTRODUCTION

The Wrightia arborea (Densst.) Mabb.belonging to the family Apocynaceae, is a small deciduous tree, distributed throughout the warmer parts of India. Different organs (root, bark and leaf) have been usedin traditional medicine for many years.

Name of the Species : Wrightia arborea (*Wrighta tomentosa*)

Scientific Name : (Dennst.) Mabb.

Family: Apocynaceae

Kingdom : Plantae

Common/Local Name: Tambada Kuda

English Name : Woolly dyeing rosebay

Hindi: daira, dharauli, dudhi

Sanskrit: kutaja

Tamil: வெட்பாலை vet-palai

Plants have been used as medicinal agents from the earliest days of man's existence. Wrightia arborea (Densst.) Mabb. (Syn. Wrightia tomentosa Roem and Schult) belongs to the family Apocynaceae.Wrightia arborea (Densst.) Mabb.is known as Tambda kuda. *Wrightia Arborea* (Dennst.) Mabb.,tree distributed throughout the warmer parts of India with small branches and densely velvety leaves. Bark is gray, thick and corky. Oppositely arranged eliptic or obovate leaves have fine tips, and are 3-5 X 1.5-2 inches. Flowers, 1 inch across, have an unpleasant smell, and are pale yellow or yellowish-brown, maturing into a dull purple. They are borne in many-flowered corymbose cymes at the end of branches. Flowers are pale yellow with a fleshy orange-coloured corona of scales at the center. Petals are oblong, overlapping to the left. Stamens do not prootrude out of the flowers. Fruit are pods joined together, cylindric, 14-21 X 3-4 cmFlowering and fruiting: April-December. Medicinal properties ofWrightia arborea (*Wrighta tomentosa*)leaves is a tradition herbal remedy has a long history of use, distributed in plains and slopes of the Shevaroy Hills which is commonly known as kudagupalai. It is well known for its medicinal effects and is being traditionally used for thetreatment of various element.

Treatment for-

- Chronic Diarrhoea
- Dysentery
- Haemorrhage
- Cardiac Diseases
- Fever
- Psoriasis
- Skin Diseases

PARTS USED IN TREATMENT:

- Bark of the Root
- Seeds
- Leaves

Bark: The dried bark of Wrightia arborea is employed as a substitute and an adulterant for the bark of Holarrhena antidysenterica. in Tamil nadu the powdered stem bark is mixed with curd and is taken orally to treat urinary stones.

The stem bark and root bark :are believed to be useful in snake bite and scorpion – strings.

Leaves : The leaves with salt are given forto relief from toothache. The dried leaf powderis believed to be useful as diaphoretic, expectorant and also used in dysentery

Root: The root is used to cure headache, while a root powder is taken with water to retrieve fever

Latex: The latex is applied on cuts, wounds and on skin allergy.

The present aim of the study about Wrightia arborea (*Wrighta tomentosa*) blended fabric best property and physical and chemical characteristic.

METHODOLOGY

This research work aims at developing knitted fabric for Technical Textile application by combining fibers in different proportions as 50:50, 60:40, 70:30 wt % of *Wrightia arborea* (Dennst.) Mabb. with Viscose Rayon and study the characteristics of the blend.

Fiber Selection

Wrightia arborea (Dennst.) Mabb and Viscose Rayonfibers are selected for developing fabric because these fibers with varying blend proportions this fibers have some special and unique properties which fulfill the research objectives.

Wrightia arborea (Dennst.) Mabb Fiber Extraction Method

The Matured pod of*Wrightia arborea* (Dennst.) Mabb floss were collected from Mettupalayam locality was used for the study. Different methods were adopted to extract the *Wrightia arborea* (Dennst.) Mabb fiber from seed pod but only one hand stripping method provides satisfactory results keeping the strength, lustre and the other desirable properties as good as possible.

Plate 1: *Wrightia arborea*fiber from seed pod

Yarn Production

The separated soft fibers were converted into yarn in PSG Tech, Coimbatore and it has undergone several process. From Lap to yarn formation Carding, to Ring Spinning. 100% of *Wrightia arborea* (WA) fiber cannot be processed on the machine due to its softness, lack of cohesiveness and low elongation – at – brake it is blended with viscose rayon (VR).

Plate 2: Ring Spinning Machine

Fabric Production

After Yarn production the yarn are converted into fabric using circular sock knitting machine at PSG Tech, Coimbatore.

Plate 3: Sock knitted machine and Sock knitted Fabric

***Wrightia arborea* fiber Testing**

The fiber characteristic testing such us DSC & TGA, SEM, XRD, FTIR were tested in PSG Techs COE INDUTECH, Coimbatore. The Tensile properties of single fiber were measured by using Tensile Strength- instron machine . The sample tested methods BISFA 2004, Chapter 6 & ASTM D 3822/D3822M-14 at relative humidity 65%+/-2% and temperature of 21°C+/-1 °C. The Chemical composition, Fiber density, fiber diameter were tested at SITRA Coimbatore.

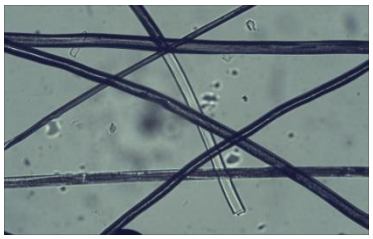

Plate 4: *Wrightia arborea* fiber Structure

Testing of Yarn Properties

The Yarn characteristic such us yarn count,Single yarn strength, elongation diameter were tested in SITRA Coimbatore.All the tests were carried out after condisioning the sample at thetemperature of 21°C+/-1 °C and relative humidity 65%+/-2%. The wrapper fibers on the yarn surface are shown blow pictures.

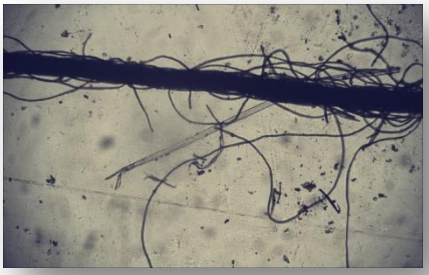

Plate 5: Wrapper fibers on the Yarn surface

Results and Discussion

The *Wrightia arborea* fiber and yarn Testing reports were studied and the results are reported below.

DSC & TGA

The Thermal stability of *Wrightia arborea* fibers assessed by DSC & TGA. The instrument used DSC NETZSCH STA 449F3 the baseline alumina 20kmin 30 to 1200 c .ngb-bs3 and the temperature range starts from 30°C/20.0(K/min)/1000°C. The DSC & TGA graph shown below in figure 1

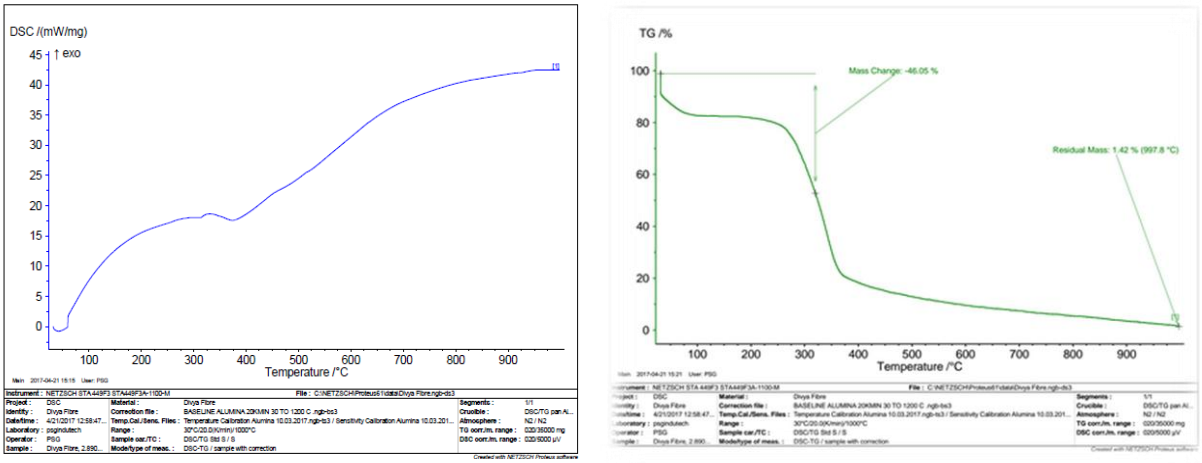

Fig 1: DSC &TGA

Morphological Study by FESEM Analysis

Morphological Study was done by using FESEM analysis of the*Wrightia arborea*fiber using Carl Zeiss microscopy ltd, UK & SIGM in PSG INDU tech, Coimbatore.

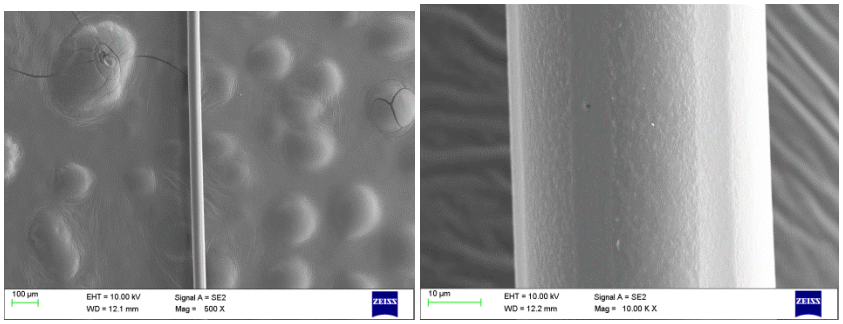

Plate 6: FESEM *Wrightia arborea* fiber 100µm and 10 µm

XRD Analysis Xray Diffraction are designed To determine the phase analysis and orientation of a single crystal or grain. XRD analysis was done by using panalytical, netherland & x'pert³ powder in PSG tech Coimbatore.Anode Material copper,K-Alpha1 (Å):1.5406,K-Alpha2 (Å):1.54443,K-A.2 / K-A.1 ratio is 0.5,K-Alpha (Å) is 1.541874 andK-Beta (Å) is1.39225 the XRD graph shown below figure 2.

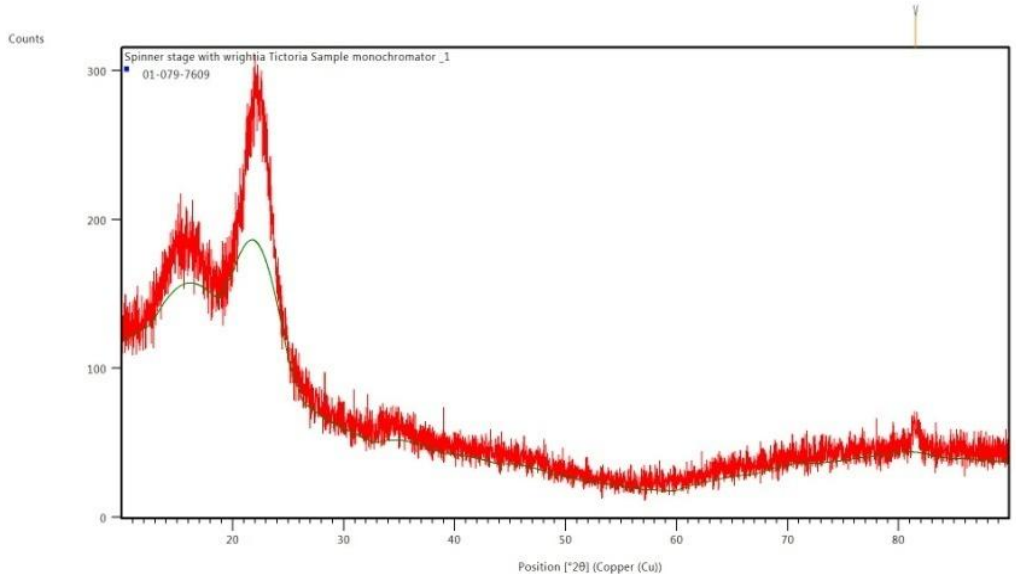

Fig 2: XRD Analysis

FTIR Analysis

FTIR was used to identify the products of paralysis. The chemical components in *Wrightia arborea* that contributed to the various organic volatile products were identified and listed below

S.No	Index	Match	Compound Name
1	127	94.93	Thyme
2	244	91.61	Oak
3	185	84.65	Newsprint (no ink)
4	187	83.88	Newsprint (black ink)
5	29	82.02	Burlap
6	243	80.05	Pine
7	274	78.94	Kayocel k-1000
8	6	78.40	18 Point coated carton newblack paper –back side
9	2101	78.31	Wood Flour
10	225	75.22	Cardboard,150 lb burst

Table 1: FTIR Analysis of *Wrightia arborea* fiber

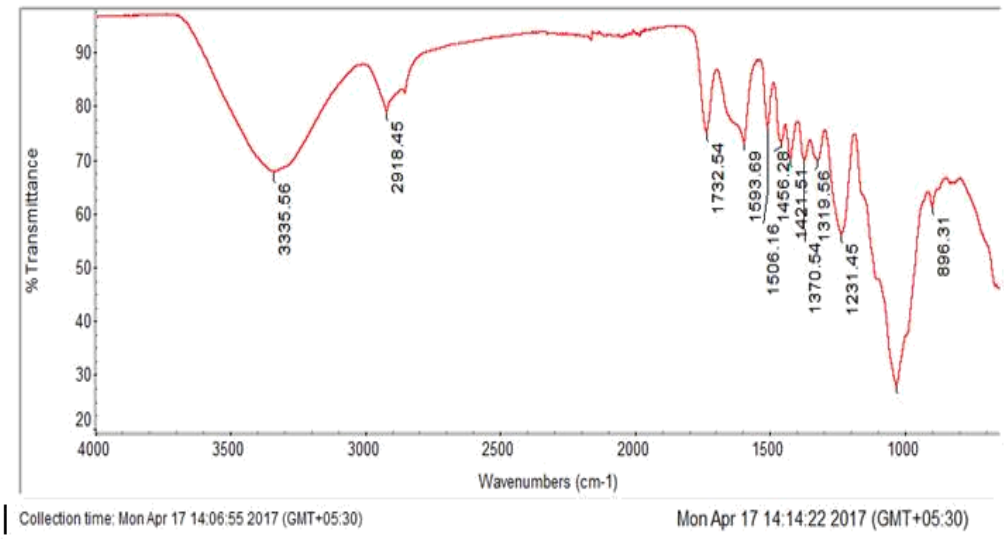

Fig 3: FTIR Analysis

Chemical Composition of *Wrightia arborea*fiber

Every fiber has a composition and it is important to know before processing. *Wrightia arborea* fiber is a cellulose and the cellulose is the principle element. Following are the chemical composition of *Wrightia arborea* fiber.

S.No	Chemical Composition	*Wrightia arborea* fiber
1	Cellulose content %	75.23
2	Lignin content %	13.77
3	Wax content %	0.55

4	Ash content (on dry basis) %	2.40
5	Moisture content %	7.77
6	Density g/cc	1.264

Table 1: Chemical Composition of *Wrightia arborea* fiber

Tensile properties of *Wrightia arborea* fiber

The Tensile properties of single fiber were measured by using Tensile Strength- instron machine. The sample tested methods BISFA 2004, Chapter 6 & ASTM D 3822/D3822M-14 at relative humidity 65%+/-2% and temperature of 21°C+/-1 °C.

S.No	Tensile properties	*Wrightia arborea* fiber
1	Mean Dinier	1.36
2	CV% of denier	16.14
3	Tenacity g/Denier	2.41
4	CV% of Tenacity	46.11
5	Elongation %	1.95
6	CV% of Elongation	26.28
7	Diameter mm	0.03701

Table 2: Chemical Composition of *Wrightia arborea* fiber

Yarn testing *Wrightia arborea with Viscose Rayon*

The Yarn characteristic such us yarn count, Single yarn strength, elongation diameter were tested and the results are tabulated below.

S.No	Yarn testing	*Wrightia arborea with Viscose Rayon*
1	Yarn Diameter (mm)	0.1184
2	Yarn Count (Ne)	60.86
3	Single Yarn TPI (Z)	27.62
4	Single Yarn Strength (g)	98
5	Average RKm	9.96
6	Single Yarn Strength CV%	13.65
	Average Elongation %	4.65
	Elongation CV %	29.19

Table 2: Yarn testing *Wrightia arborea* with Viscose Rayon

CONCLUSION

The Major objective of the present study is to investigate the spinnability of *Wrightia arborea* fibers. It reveals that the spinning of 100% of *Wrightia arborea* fibers are not possible because

of the softness low elongation properties so my research works pertained to the assessment of spinnability of *Wrightia arborea* fibers blended with viscose fiber.It produce good results in all the testing parameters. It is understood from the available literature the attempt has not been made in the direction of conversion of *Wrightia arborea* fibers into fabric. By considering the specific properties of *Wrightia arborea* fibers such as thermal insulation and low density light weight it can be utilizes for varies technical application towards the field of medical textile product development

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Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

EVALUATION OF ECO FRIENDLY ANTIBACTERIAL TEXTILE FINISH EXTRACTED FROM MEDICINAL PLANTS

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ABSTRACT

An important and growing part of the textile application need for human life is protection from various infections and other exterior incentive factors. The functional textiles with an ideal antibacterial finish can bring about effective, durable and compatible multidimensional bio textiles. The aim of the present work was to evaluate an eco friendly natural antibacterial textile finish extracted from Glycyrrhiza glabra and Syzygium cumini plants. The extracts were treated on bamboo/cotton woven fabric using pad-dry-cure method. The antibacterial activity using Agar Diffusion Method against Gram Positive organism (Staphylococcus aureus) and Gram Negative organism (Escherichia coli). The invitro antibacterial analysis was performed by AATCC 147 method. The sample was imparted with herbal extract and natural biopolymer process. Then the coated sample was analyzed for morphology using FESEM test and Physical textile properties of controlled and finished fabric bamboo/ cotton fabric like abrasion resistance and tearing strength were analyzed.

KEYWORDS: *Antibacterial finish, herbal extractions, pad-dry and cure method, AATCC147 test method.*

INTRODUCTION

Clothing is a feature of nearly all human societies and it protects one from various climates, toxic chemicals and gives good comfort and appearance. Clothes can reveal our priorities, aspirations, and liberalism or conservation. Clothes go a long way in satisfying simple or complex emotional needs and can be used consciously or unconsciously to convey subtle or overt messages [2].

Bamboo fibers are the newest thing to hit the textile arena. Bamboo is now being made into a fiber that has wonderful characteristics. It has a natural deodorizing property. It allows the body to breathe and absorb sweat in a split second[3].Cotton is the purest form of natural cellulose. Raw cotton contains about 0.5 per cent of the waxy substance which serves a protective coating on the surface of the fiber[1].

From the past, textiles were considered as low technology domain as their primary functions are protection of modesty, providing microclimate and good look. With the intensification of global competition, textile manufacturing companies from developed countries are competing for a significant share of the global market by developing new technologies or new products.

A number of antimicrobial agents have been used in textile applications. Among these, development of antimicrobial textile finish is highly indispensable and relevant since garments are in direct contact with the human body. Plant-based antimicrobials represent a vast untapped source[6].

Glycyrrhiza glabra, also known as liquorice and sweet wood, is native to the Mediterranean and certain areas of Asia. It is a perennial herb which possesses sweet taste. The main taproot, which is harvested for medicinal use, is soft, fibrous, and has a bright yellow interior [4].

Traditionally the *Syzygium cumini* (jambul fruits) leaves, seeds, and bark are all used in ayurvedic medicine. The bark contains tannins and carbohydrates, accounting for its long-term use as an astringent to combat ailments like dysentery [5].

METHODOLOGY

Fabric Selection

For this study,30's countbamboo/cotton with 50:50 ratio was selected with the plain weave structure. Then the grey sample is wet processes with cellulase enzyme.

Selection of medicinal plant extracts

The herbal extracts selected for the present study was *Glycyrrhiza glabra* and *Syzygium cumini* which was collected in and around Coimbatore city. The collected plants were shade dried at room temperature to reduce the moisture content present in the *Glycyrrhiza glabra* and *Syzygium cumini* plant extraction and then the dried extractions were then powdered and sieved for further study.

Preparation ofmedicinal plant's extract

For the finishing process, ten grams of dry powder was taken and mixed into 50ml of 80% ethanol. The container was closed and kept overnight. After overnight incubation, the extraction were filtered through filter paper and evaporated at room temperature to concentrate the extracts. This ethanolicextraction was then finished with bamboo/cotton fabric by pad dry cure method.

Application of selected herbs by Pad-Dry Cure Method

The extractions were finished on the bamboo/cotton fabric with 10% of the fabric weight with 1:10 material: liquor ratio using padding mangle. Padded the sample with the three roll padding machine for five minutes. After padding, the samples were dried and cured in room temperature.

Evaluation of the Antibacterial Herbal Extracts by (AATCC -147)

The herbal coated fabrics were tested as per AATCC (American Association of Textile Chemist and colourist) standards of qualitative methods. The herbal coated fabrics were ascertained by qualitative test method as recommended by AATCC method standards Agar Diffusion methods (SN19592). From the above assessment, herbal coated samples which showed the zone of inhibition were screened and selected. The extractions were tested for its antibacterial activity using Agar Diffusion Method against Gram Positive organism (*Staphylococcus aureus*) and Gram Negative organism (*Escherichia coli*).Swatches of the finished specimens and controlled samples were qualitatively tested for their antibacterial effect using the Agar Diffusion method.

Assessment of the effective antibacterial activity

The test dishes were removed from the incubator and were assessed for the zone of incubation. This assessment was made by visual examination as well as under the microscope with 40X enlargement. Analysis was made on the basis of presence or absence of bacterial growth which is termed as zone of inhibition after 18-24 hours. And among the two herbal extractions samples one of the best extraction was taken for the further study.

RESULTS AND DISCUSSION

In the present study, antibacterial activity was performed with ethanolic extractions of *Glycyrrhiza glabra* and *Syzygium cumini.* The study was made against two pathogenic bacteriae using the agar diffusion method.

Evaluation of antibacterial activity in herbal finished fabric samples

The antibacterial activity of the selected herbal extractions was studied individually and the results showed maximum antibacterial activity. These herbal treated samples showed good testing results.

TABLE-1

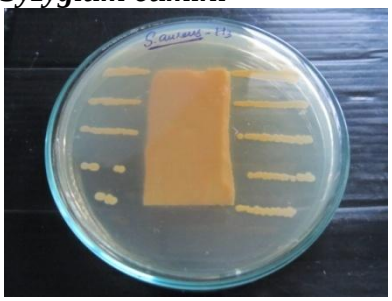
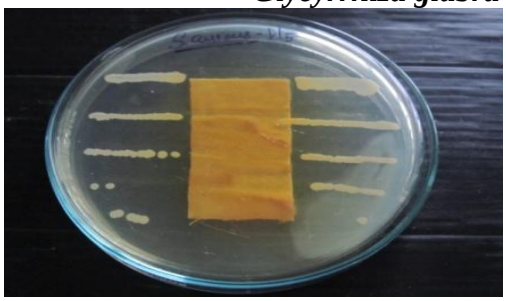
S. No.	**Herbal extract**	**Antibacterial activity - Zone of Bacteriostasis (mm)**	
		Staphylococcus aureus	***Escherichia coli***
1.	Controlled sample	0	0
2.	*Syzygium cumini*	31	29
3.	*Glycyrrhiza glabra*	28	29

Plate-1

Antibacterial activity of the finished fabric samples against *Staphylococcus aureus* and *Escherichia coli*

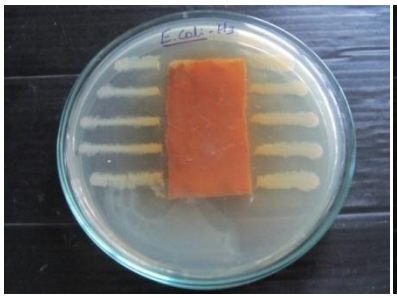
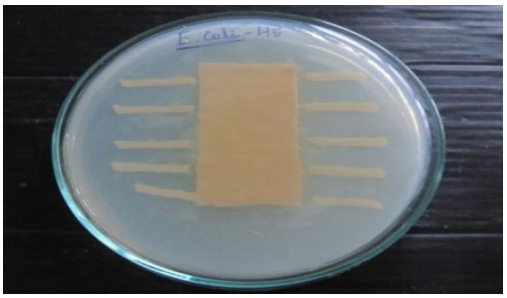
Staphylococcus aureus

Syzygium cumini ***Glycyrrhiza glabra***

Escherichia coli

Syzygium cumini ***Glycyrrhiza glabra***

From the abovetable-1, it was clearly seen that the controlled sample showed no inhibitory action against both the microorganisms *Staphylococcus aureus* and *Escherichia coli*. Among the finished samples, the finished samples with *Syzygium cumini* extract showed maximum inhibition of 31 mm and 29 mm against *Staphylococcus aureus* and *Escherichia coli* respectively. Whereas, the *Glycyrrhiza glabra* extract showed a maximum inhibition of 28 mm and 29 mm against *Staphylococcus aureus* and *Escherichia coli*. Hence the *Syzygium cumini* extract was used for further research work.

Evaluation of Abrasion resistance testing

TABLE-2

Sl.no	**Average weight loss %**			
	Controlled sample		**Herbal finished sample**	
	Before	**After**	**Before**	**After**
1.	0.155	0.124	0.240	0.235
2.	0.155	0.127	0.240	0.235
3.	0.155	0.130	0.235	0.230
4.	0.155	0.120	0.240	0.240
5.	0.155	0.128	0.230	0.230

From the above results, there was a slight difference in controlled and finished fabric samples before and after abrasion resistance.

Evaluation of tearing strength tester

Table-3

Sl.No	Tearing strength			
	Controlled sample		Herbal finished sample	
	Warp	Weft	Warp	Weft
1	30	19	45	40
2	30	20	42	38
3	30	21	40	35
4	30	21	44	36
5	30	20	45	32

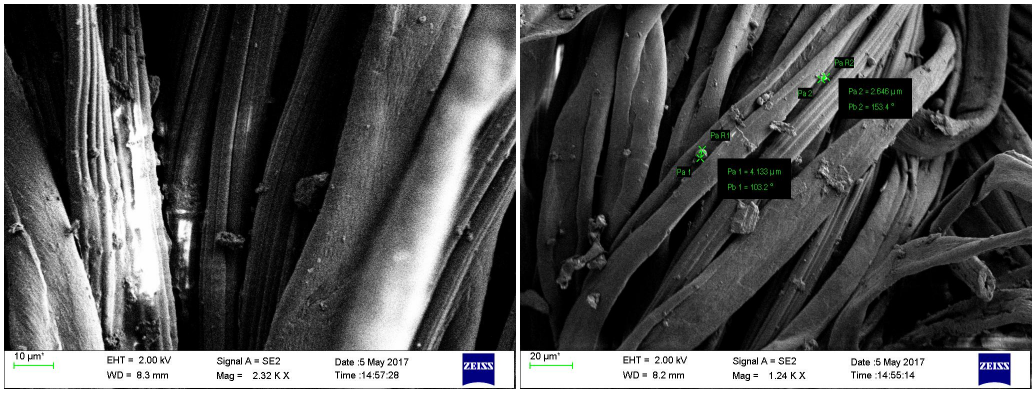
The above results showed the tearing strength tester for the controlled and herbal finished samples.

FESEM-Fourier Transmission Scanning Electron Microscopic Analysis

The surface topography of the antibacterial finished sample were observed using Fourier transmission scanning electron microscopic (FESEM). The characteristics of the finished samples by herbal extraction method were tested.

Plate-2

FESEM imaging of Antibacterial finished fabric samples



The above **plate-2** shows the Fourier transmission scanning electron microscopic image of antibacterial finish on bamboo/cotton woven fabrics. The deposition of the extracts was seen clearly on the surface of the yarn.

CONCLUSIONS

The application of herbal coated fabric samples were implemented in health care and hygienic products. It is possible to produce durable antibacterial effect using these types of herbal extract. The two herbal finished fabricsshow the maximum antibacterial activity against both *Staphylococcus aureus* and *Escherichia coli.*

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UGC APPROVED JOURNAL

DEVELOPMENT OF ANTIBACTRIAL FINISH IN BAMBOO FABRIC USING HERBAL OIL

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ABSTRACT

A textile or cloth is a flexible material consisting of a network of artificial fiber. In this the bamboo fiber is made from the starchy pulp of bamboo plants. This textile fiber is fabricated from natural bamboo and other additives. Bamboo fiber is naturally anti-bacterial, UV protective, green and bio degradable. Scouring and bleaching process is undergone on the grey knitted bamboo fabric using caustic soda and hydrogen peroxide for the removal of fiber paleness, impurities and natural waxes. After these treatment special finish like anti bacterial finish in applied on the fabric using herbal oils like buck thorn oil, thyme oil and grape seed oil. These oils are natural, with medicinal values, promotes skin health and are eco friendly in nature.

KEYWORDS: *Bamboo fiber, anti-bacterial, biodegradable, eco friendly*

INTRODUCTION

Bamboo fiber and starchy pulps are made from bamboo that grows widely through Asian countries. Bamboo fabric is very soft and can be worn directly next to the skin. This substance has particular functions of anti-bacteria and deodorization. The content of bamboo fiber in blended yarns decides the anti-bacterial behavior of the final product. The higher the bamboo content the better the anti-bacterial properties. It is suggested to keep 70% bamboo fiber in blended yarn in order to obtain satisfactory anti-bacterial effect. Anti-bacterial function of bamboo fabric continues even after fifty times of washing. Green and biodegradable bamboo fiber is produced out of bamboo stem which is cultivated in northern part of china. Bamboo is fast growing renewable resource, its growth is après 3 feet over a night thus considered environment friendly. Eco Textile gain utmost importance's as one of the most useful research that help promote new innovations, in an eco-friendly manner. This research work aims at developing a sustainable anti-bacterial coating of herbs extract on bamboo fabric for healthcare applications. An extensive study was conducted to assess the antibacterial effectiveness of the extracts by standard test methods and findings which are discussed.

OBJECTIVES

*To select bamboo fiber for the investigation.
* To spin the bamboo yarn for 40's count into combed effect.
*To knit the bamboo yarn into bamboo fabric.
*To give pre-treatment to the bamboo fabric to improve the absorbency by scouring with sodium hydroxide and bleaching with hydrogen per oxide.

*To evaluate the physical and functional properties of the fabric.
*To dye the selected bamboo fabric with cold brand reactive dye.
*To study the wash fastness of the anti-bacterial activity applied on the selected fabric.

METHODOLOGY

Selection of fabric

- To select bamboo fiber for the investigation. To spin the bamboo yarn for 40's count into combed effect. To knit the bamboo yarn into bamboo fabric with the count of 40's with the single jersey structure.

Selection of herbal oils

The sea buckthorn oil, thyme oil, grape seed oil were selected for the study.

SEA BUCKTHORN OIL

- Its botanical name, Hippophaerhamnoides, means "tree that makes the horse shine, "referring to its ability to improve horses' health and make their hair shiny and smooth.

THYME OIL

- Oil of thyme is derived from thyme, also known as Thymus vulgaris. The perennial herb, a member of the mint family, is used in aromatherepy, cooking, potpourri,mouthwashes and elixirs, as well as in ointments.Thyme also has a number of medicinal properties, which is due to the herb's essential oils.

GRAPE SEED OIL.

- Grape seed oil has been extensively used for its medicinal properties. Grape seed oil is an important ingredient in several skin and hair care products. It is processed from the tiny seeds of grapes.

Anti-bacterial finish

Antimicrobial finishing is one of the special typeof finishing given to the textiles where the chances of bacterial growth are high and the safety is paramount.Tulsi leaves neem, pomegranate fruits, sea buckthorn oil, thyme oil andgrape seed oil activity and are employed in medical devices like medical tools, instruments, devices and machines. It is also used in health care sector and devices.So this finish was selected for the study.

FLOW CHART

Selection of fiber

(Bamboo fiber)

↓

Converting fiber into yarn

↓

Converting yarn into fabric

↓

Fabric formation

(Knitting –single jersey structure)

↓

Wet processing

(Scouring, Bleaching)

↓

Dyeing

(Cold brand reactive dye)

↓

Functional finish

(anti bacterial finish using herbal oil)

↓

Evaluation of Functional fabric

Bamboo fiber was selected to spin into bamboo yarn which was knitted with single jersey structure using circular knitting machine ,then was scoured and bleached with sodium hydroxide and hydrogen peroxide respectively. There sea buckthorn oil,thyme oil and grape

seed oil were finished conventional with wet and dry stage dip and dry method for 5 minutes and squeezed of dried and wear study done.

NOMENCLATURE

The nomenclature of the 40's combed bamboo warp knitted fabric which were finished with selected herbal oil finish and after are given below.

TABLE.1

s.no	Sample details	Sample code
1	Controlled sample	C
2	Dyed bamboo fabric	DBF
3	Sea buckthorn oil	SBO
4	Thyme oil	TO
5	Grape seed oil	GSO
6	Dyed bamboo fabric sea buckthorn oil finished	DBFSBOF
7	Dyed bamboo fabric thyme oil finished	DBFTOF
8	Dyed bamboo fabric grape seed oil finished	DBFGOF

RESULT AND DISCUSSION

Anti-bacterial activity of the finished fabric were assessed by ENISO 20645.

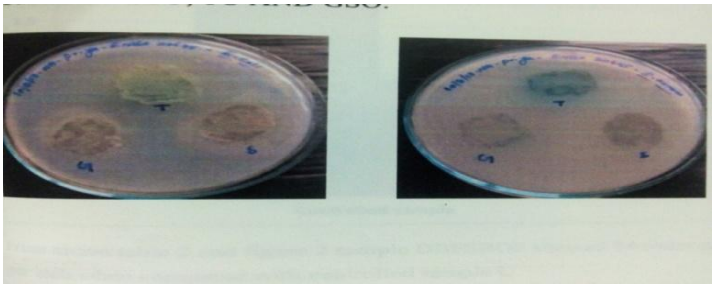
TABLE.2

s.no	Fabric sample	Zone of inhibition	
		Staphylococcus aureus (mm)	Echeriachia.coli(mm)
1	DBFSBOF	27	0
2	DBFTOF	0	0
3	DBFGSOF	20	0

Sample DBFSBOF andDBFGSOF had a zone of inhibition of 27mm and 20mm respectively against sample DBFGSOF where as sample DBFTOF had developednil zone of inhibition against Staphylococcus aureus and Echeriachia.coli.Also samples DBFSBOF and DBFGSOF had nil developed of zone of inhibition against .

Anti-bacterial acitivity of finished fabric ENISO 20645 Finished fabric

Anti-bacterial assessment-Against Staphylococcus aureus and Echeriachia coli bacteria-SBO,TO AND GSO



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Evaluation of geometrical properties

Evaluation of wales per inch and course per inch of selected finished fabric

TABLE.3

S.no	Fabric sample	Wales per inch of controlled sample	Course per inch of controlled sample
1	**C**	**34**	**32**

Controlled sample C had 34 and 32 inches of wales and courses per inch .

Evaluation of fabric weight

TABLE.4

s.no	Fabric sample	Grams per meter square
1	C	230
2	**DBFSBOF**	**237**
3	DBFTOF	235
4	DBFGSOF	234

Sample DBFSBOF had the biggest GSM of 237 against the lowest GSM of 230 of the controlled sample.

Evaluation of bursting strength

TABLE.5

s.no	Fabric sample	bursting strength	Co-efficient of variation %
1	C	6.1	1.03
2	**DBFSBOF**	**6.4**	
3	DBFTOF	6.3	
4	DBFGSOF	6.2	

Sample DBFSOBF showed highest bursting strength when compared to samples C,DBFTOF and DBFGSOF.

Evaluation of air permeability

TABLE.6

s.no	Fabric sample	bursting strength	Co-efficient of variation %
1	C	400	1.06
2	**DBFSBOF**	**420**	
3	DBFTOF	415	
4	DBFGSOF	410	

Sample DBFSOBF had the highestair permeability when compared to the controlled samples C,DBFTOF and DBFGSOF.

CONCLUSION

Thus the sample DBFSBOF was effective in antibacterial activity against staphylococcus aureus and in physical evaluation bursting strength,wales and course per inch,grams per square meter and air permeability.This research work has given a new idea in finishing of bamboo with herbs for anti-bacterial activity. The herbal oil finishes increases the durability and antibacterial activity of finished fabric to a greater extend. The finish is cost effective and user friendly because it is natural, easily available and ecofriendly, it can be repeatedly applied as a renewable finish.

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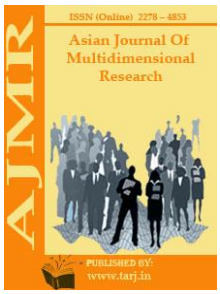

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

DYEING OF COTTON FABRIC WITH EUCALYPTUS AND BETEL LEAF DYE

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ABSTRACT

Natural dyeing is a technique to dye the textile fabrics with the colours extracted from natural sources like plant animals and minerals etc. Natural dyeing and printing have been used for centuries but the disadvantage of being limited in colours and inferior in colour fastness and durability properties. However, they are eco-friendly, biodegradable and non- carcinogenic in comparison to synthetic dyes. In this research work cotton fabrics were dyed using the powder extract obtained from eucalyptus and betel leaves; simultaneous mordanting by alum, catechu and malachite green ,essentially higher utilization of dyestuffs and shortening of the dyeing procedure was achieved as a result of the dip dyeing principle followed prior to drying shows green colour. The dye exploitation of cotton is higher in this case common exhaustion method is followed. The result revealed that the cotton fabric can successfully done natural dyeing.

KEYWORDS: *Natural Dye, Eucalyptus And Betel Leaves Extract, Mordant, Alum, Catechu, Malachite Green, Cotton.*

INTRODUCTION:

Dyeing is a process of applying coloring matter directly on fiber without any additives. Finishing is the final process to impart the required end use finishes to the fabric. Textile auxiliaries like chemicals are used for all steps in the textile manufacturing process that is from pre-treatment to dyeing and finishing. A dye is a colored substance which has an affinity to the substrate to which it is being applied. The dye is comely applied in an aqueous solution, and needs a mordant to improve the fastness of the dye on the fiber.

METHODOLOGY

Materials: Cotton fabrics**,** Eucalyptus leaf**,** Betel leaf.

Methods: The woven cotton fabric was selected for the following process- pre-treatment, extraction of dyes from leave's, mordanting and dyeing.

Plate 1: Eucalyptus leaf

Plate 2: Betel leaf

Preparation of fabric for dyeing

Scouring

Scouring process was done to remove natural impurities and waxes as well as added finishes that might interfere with the fixation of the dye. The natural method of scouring fabric was to boil it well for several hours with a soap seeds. When, scouring was completed remove the fabric and rinse in warm water and dried it in sun light, iron it before dying, for the evenness of dye.

Extraction of colorant:

The betel and eucalyptus leaves were shade dried and made into a coarse powder A weighed quantity of the powder was then subjected to continuous extraction in 50 percentage methanol with 50 percentage of water. The extraction was filtered through a cotton fabric for 2 to 5 times. The extraction was closed tightly and kept for 12 hours so that it will be marinated well. Then the marinated extraction was opened for 12 more hours for the evaporation processes at room temperature. It was filtered and then dye solution was kept for mordanting with malachite.

Mordanting

To study the effect of dye shade of the eucalyptus and betel leaf extraction, alum, catechu, and malachite mordant were chosen. In this research simultaneous mordanting method was used 60gms of mordents were added to each litter of dye solution. Mix the mordant well in the dye bath and filter it for more than 5 times. Now the wet fabric was immersed in the dye solution

according to the room temperature for 1 hour. At last the samples were washed in 1 Gms per liter of the soaping agent for 5min and then dried in shadow to avoid the reaction on sun light.

Dyeing

After scouring, the filtered extraction was divided in to 3 parts as per the 1 type of fabric and 3 types of mordant which gives three different color shades. The cotton fabric is also divided for the 3 separate dye bath. The fabric was dipped in the dye bath in wet condition so that the dye will be spread in the cloth evenly. The cloth should be Immerse well in the dye bath, to remove the air bubbles in order to avoid the patches on the fabric. Let it soak for 1 hour then take it out and squeeze it well. Repeated washing will be given to remove the excess dyes in the fabric then the fabric is dried in shade.

Color fastness test

Fastness test of the dyed material was undertaken to light fastness, rub fastness and wash fastness test. The colour fastness is commonly determined by loss of colour in original samples or it shown in grey scale. Wash fastness of dyed fabric show the rate of diffusion of dye and mode of dye inside the fabric. The wash fastness of the dyed fabric was washed thoroughly with non-ionic soap as 1g/L of water. Then the fabric is dried in direct sunlight for two days to determine the Light fastness of the dyed samples. The rub fastness of the dyed fabric was done by rubbing the fabric and determines the color fade.

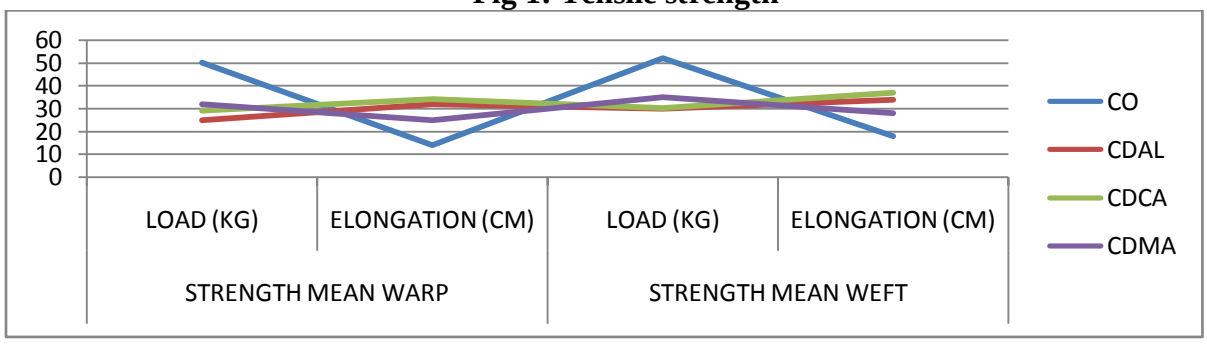
Evaluation through visual inspection by the faculty members and Fashion designing students:

The evaluation of the collection was done by visual inspection. Through college going students and adults. They are explained under the following headings. They rated the collection for color effect and selection of fabric.

RESULT AND DISCUSSION

Tensile strength:

Fig 1: Tensile strength



Warp direction

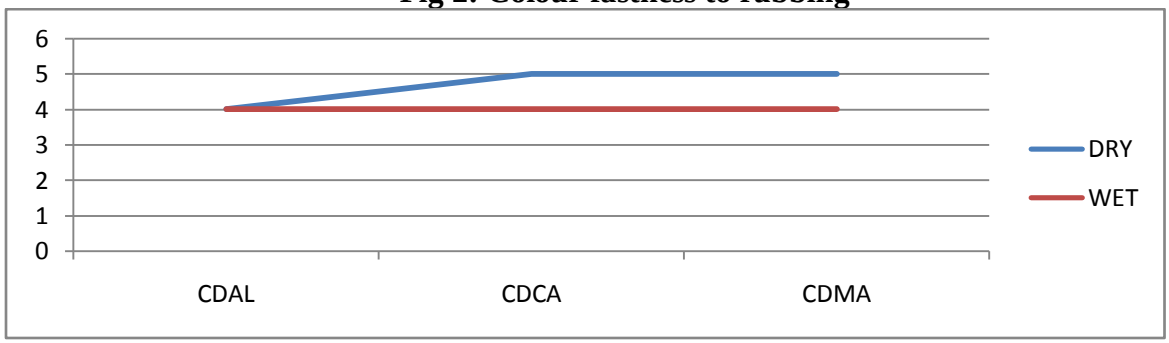
The Figure 1 shows that the undyed samples CO having load 50 kg and 14cm elongation in warp direction. The dyed cotton samples CDMA 32 kg having high load and CDCA 34cm having high elongation in warp direction and CDAL 25kg having low load and CDMA 25cm are having low elongation in warp direction when compared to dyed samples CDAL and CDCA.

Weft direction

The above Figure1 shows that the undyed samples CO having load 52 kg and 18 cm elongation in weft direction. The dyed cotton samples CDMA 35 kg having high load and CDCA 37cm having high elongation in weft direction and CDAL, CDCA 30 kg having low load and CDMA 28cm are having low elongation in weft direction when compared to dyed sample CDCA.

Colour fastness to rubbing (crocking)

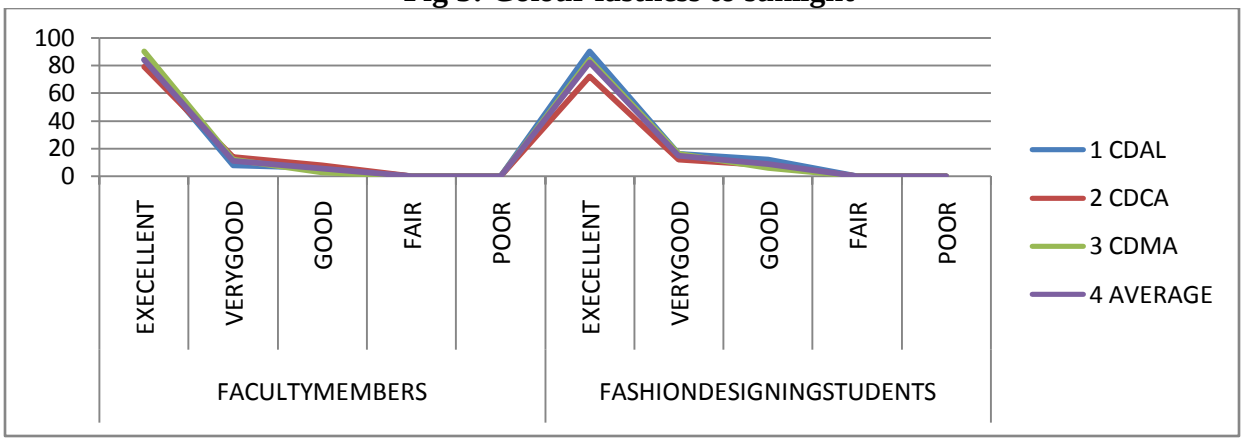
Fig 2: Colour fastness to rubbing



From the above Figure 2 it is observed that colour fastness to rubbing of CDAL, CDCA, CDMA, fabrics. Its clear shows that the all samples having excellent rubbing fastness property in both dry and wet condition.

Colour fastness to sunlight

Fig 3: Colour fastness to sunlight



From the above Figure 3 it is observed that colour fastness to sunlight of CDAL, CDCA, CDMA, fabrics. Its clear shows that the all samples having excellent rubbing fastness property in wet condition.

CONCLUSION

Thus the purpose of this study has to explore the natural resource and toidentify the plants which having dye content and then extract a dyes form selected plant to apply in cotton fabric. This task was accomplished by the use of mordants, on the other hand gives results in good fastness, exhibited by the cotton clothes and experiments to explore the dye yielding properties, possibilities in extracting dyes from the identified plants and their suitability for coloring textiles. This study is mainly concentrating on ecofriendly approach of the experiment. Therefore it

follows that much more research and developmental effort needs to be go in this area. The traditional practices always have to be substituted by the modern and more scientific practices in order to overcome some of the disadvantages of this dye. The cotton fabrics which are dyed by means of using natural dye extracted from the beetle and eucalyptus leaf can be used for apparel production.

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EXTRACTION AND CHARACTERIZATION OF CELLULOSIC FIBERS FROM ARECA CATECHU.L STEM: AN EXPLORATORY INVESTIGATION

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ABSTRACT:

Researchers and scientists are looking forward for the new fiber sources for the sustainable processing. The ultimate goal is to produce an organic fibrous material that can be utilized in textile industry and to manufacture eco-friendly products. In this circumstance here emerges a fiber from Areca catechu .L (sheath) which has been attracted worldwide as a threat to biodiversity. Hence this paper highlights the physical, chemical and structural characterization of the fiber extracted from Areca catechu. L sheath fiber. The fiber was examined for the physical properties such as fiber length, diameter, elongation, moisture absorbency and fineness as well as mechanical properties by analyzing its tensile strength test. The structural and functional characterization of the fiber is examined using the Scanning Electron Microscope (SEM) and IR spectroscopy (FTIR).The thermal behavior of the fiber is analyzed using the Differential Scanning Calorimetry (DSC).

KEYWORDS: *Areca catechu. L* Stem, fiber properties, SEM analysis, FTIR analysis, DSC.

INTRODUCTION

Now a days the textile market has the trend of manufacturing go green products. Ultimately the consumers are also aware of buying eco friendly fabrics [1]. Specifically the present textile market is available with plenty of eco friendly products made of emerging natural cellulosic fibers with top ranking fibers such as organic cotton, hemp and sisal. But in such cases there is a possible risk of getting a plenty of resources for bulk and continuous production. Keeping such factors in mind, the new fiber sources are identified by the researchers and scientists. But the goal is to produce an improved and sustainable products made of fibrous material which can be used in textile industry in various aspects such as garments, upholsteries and interior decorations. Natural fibers are the class of traditional fiber materials of renewable sources which experiencing a great revival now-a-days [2]. And especially the plant fiber has the characteristics such as resistance to water, thermal insulation and related characteristics. Thus the new plant fiber has been identified to decrease the pressure of handful number of species for the small scale industry [3, 4]. Today a vast resource from waste sources like agricultural, textile industries has given a generation to new fibrous materials called *Areca catechu.L* is a waste material from sustainable plate making industry which is belongs to the family Are caceae. It reproduces rapidly using vegetative means. Some research is also been carried out to destroy the waste completely [5].

METHODOLOGY

The fibers can be obtained in large number from the matured sheath than in the younger ones [8]. Hence the matured *Areca catechu. L* sheath were identified and collected from the Mettupalayam district, Tamilnadu, India. The matured sheath are about 50 inches long and 50-70 µm in diameter [9]. The sheath were separated from the plant, washed thoroughly in water and water retting process was carried out 2-3 weeks. The fibers are then extracted from the sheath manually using the needles [10].

Fig: 1Areca *catechu. L* Sheath Waste

Characterization analysis:

Structural Analysis of Areca catechu. L Sheath Fiber

The surface morphology of Areca catechu. L Sheath Fiber is analyzed using Scanning Electron Microscope (SEM). The surface of the fiber is coated with gold using Edward Sputter coater apparatus and then observed at an accelerating potential of 10 kV.

Single Fiber Tensile Strength and Elongation

The tensile strength of the *Areca catechu. L* Sheath Fiber is tested according to ASTM D 3822 using eureka single yarn strength tester. The principle of the machine is constant rate of traverse were the preconditioned fiber sample is mounted between the two jaws having the gauge length of 15 cm. The strength and elongation of the fiber is determined and noted at the point of rupture.

Chemical Analysis

The chemical composition is to analysis the cellulose, lignin, hemi cellulose, holo cellulose and ash content present in *Areca catechu. L* Sheath fiber. The standard test method was studied in terms of weight percentage (wt. %). The Kushner and Hoffer method is used to determine the cellulose content present in *Areca catechu. L* Sheath fiber. According to the Klason method the lignin content of CUSF were measured. As per ASTM F 1755-01 standard, *Areca catechu. L* Sheath fiber ash content were measured. The holo cellulose of CUS fibers was determined according to the method described by wise et.al. The cellulose content and holocellulose content difference is measured to identify the hemi cellulose content. The average of five samples with standard deviation value has been reported.

RESULT AND DISCUSSION:

Characterization analysis:

Structural Analysis of Areca catechu. L Sheath Fiber

The longitudinal section of NF_2 fiber shows the cellular structure and these cells together form fibrils with tissues connected with each other at several locations along the length to form fibers is shown in Fig: 2it can be seen traces of waxy materials and some damage in the fiber surface due to manual extraction process. The cross section view of NF_2 fiber shows that large empty spaces which are uniform in shape and it also have small empty spaces called voids or lumen which is clearly visible in Fig: 2. Mechanical interlocking of NF_2 fiber surface roughness can promote adhesion interaction, mainly of the van der Waals type, between fiber and polymeric matrix.

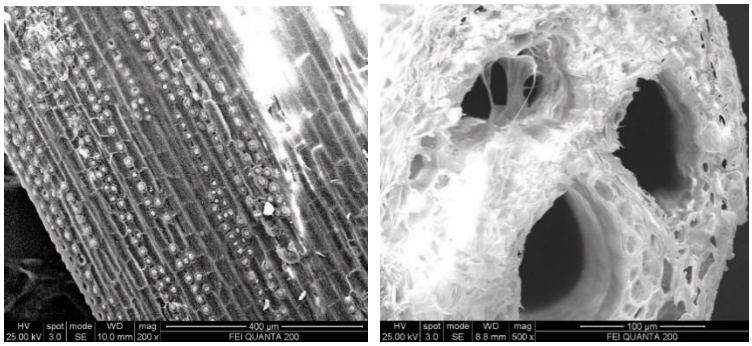

Fig 2: SEM Analysis of *Areca catechu. L* Sheath Fiber (a) 400 µm (b) 100 µm

Single Fiber Tensile Strength and Elongation

After that fiber length and fineness, the fiber strength is considered to be an importance amongst fiber properties. Fiber strength denotes the maximum tension, the fiber is able to with stand before breaking. It can be expressed as breaking strength and tenacity etc. The mechanical properties of *Areca catechu. L* Sheath Fiber depend largely on the chemical composition, especially the cellulose percentage and cell wall structure. The pre conditioned of fiber was at 21±1˚C and 65±2% relative humidity. The single fiber was mounted in the jaws of the clamps. All slacks was removed without really stretching the specimen and care was taken to keep the specimen straight within the jaws and ensured that the fiber sample lay on the line of action between the force and measuring device and the point where the fiber left from the moving jaw face. Twenty samples were randomly selected for test condition and a graph was plotted as load

as strain to test the fiber samples, the mechanical properties of the *Areca catechu. L* Sheath Fiber were determined. The maximum tensile force was found to be 3.87N, young's modulus of *Areca catechu. L* Sheath Fiber exhibit MPa and the percentage of elongation at break of *Areca catechu. L* Sheath Fiber 1.8% shown in Fig: 3.

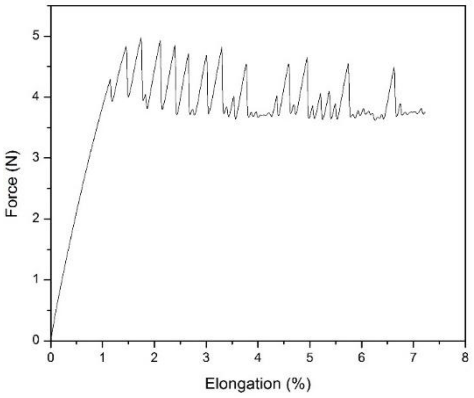

Fig 3: Tensile strength of Areca catechu. L Sheath Fiber

CHEMICAL ANALYSIS

Chemical composition of NF_2 showed low cellulose content of 41.8% which ensures moderate mechanical properties. The hemicellulose content is quite high (31.4%) when compared with other natural fibers. Higher levels of hemicellulose lead to disintegration of cellulose micro-fibrils so the fiber strength is decreased. Lignin founds 22.3% which is high, and it is well known for its harmful impact on fiber structure and its morphology. The ash content is low at 3.1% which is high compared to other natural fiber, as higher levels can lead to smooth fiber surface morphology and reduce the bonding capacity of the fiber with the matrix.

TABLE I: COMPARATIVE CHEMICAL ANALYSIS OF DIFFERENT AGRO WASTES.

Fiber Name	Cellulose	Hemicellulose	Lignin	Ash	Holocellulose
Areca catechu. L	**41.8**	**31.4**	**22.3**	**3.1**	**72.5**
Cotton stalk	45.5	19.3	18.2	2.52	75.6
Rice straw	70.9	30.7	17.2	16.6	70.9
Rya straw	74.1	16	15.4	3.2	74.9
Corn straw	39.0	42.0	7.30	24.9	82.1

CONCLUSION:

The investigation of *Areca catechu. L* Sheath Fiber proves that the fiber obtained from its wet sheath has good amount of cellulose, hemicellulose and lignin content which meets level of other available natural fibers. The fiber has good absorbency, medium strength and elongation. Less lignin content and high density of the fiber is more suitable for making non-woven and composites. SEM analysis of the fiber shows that the fiber has many hollow pores which can be able to hold moisture and thus suitable for high absorbency materials such as napkins and wipes. As a result it is concluded that the *Areca catechu. L* Sheath Fiber are the possible sources of fibers and a suitable alternate for presently available textile fibers.

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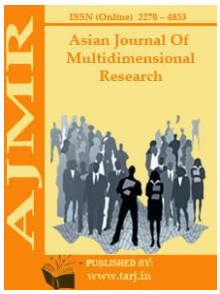

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

NATURAL DYED TEXTILES FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

A major emphasis is now given to producing eco-friendly textiles treated with natural herbal dyes. Herbal textiles are not only eco-friendly but they leave certain residues that can be further used for making other environmental friendly products. Sustainable methods and techniques are needed to be adopted by the textile world. With the discovery of synthetic dyes, the usage of natural dyes slowly declined. Recently there has been revival of growing interest on the application of natural dyes on natural fibres due to worldwide environmental consciousness. The focal point of the present study is on the use of natural dyes for the development of sustainable herbal textiles.

KEY WORDS: *Herbal Textiles, Sustainable, Eco friendly.*

INTRODUCTION

Sustainable textiles make renewable and biodegradable fabrics, making it an excellent choice as an environmentally-friendly fabric throughout its entire product life cycle. Sustainability is a complex multidimensional concept concerning the environment, economy, human health and social impact state Islam and Khan(2014). It aims to meet the needs of the present generation without compromising the ability of future generations to meet their needs. A valuable contribution towards environmental sustainability in the textile sector can be achieved by the use of natural dyes.

Eco friendly fabrics have now become very popular among the modern day apparel manufacturers. Apart from the manufacturing of the eco-friendly fabrics, the dyeing and finishing also plays a major factor in keeping the environment less polluted and more greener. Some of the finishing and dyeing techniques in the textile industry are harmful to people with sensitive skin. They may cause nausea, breathing problems and even seizures. The textile and apparel products impact the environment at every point along the product's lifecycle. In the last few years sustainable dyeing and value added finishing have been promoted using various plant or herbal extracts.

As the textile industry is one of the rapidly growing sectors in the modern world, textile materials both natural and synthetic were generally dyed for value addition for different market segments and for different customer requirements. In the primeval days the textile materials were dyed with natural dyes until the concept of synthetic dyes came forth. Owing to the durability, cost effectiveness and ready availability, textile dyers inclined towards synthetic colorants suggests Richa (2013). Since most of these synthetic dyes which are derived from the petrochemical sources through hazardous chemical processes, it poses a great threat to the human ecology.The industry has now become somewhat conscious in its negative contribution to the environment in the processing of textile products.

Herbal dyeing is one step ahead of the organic life style. Natural dyes are obtained from natural resources, mainly from different parts of the plants which unlike petroleum resources are renewable. Many dyes derived from flowers, fruits, seeds of trees such as myrobolon, tesu or the flame of the forest, annatto, etc also are renewed annually. Tree leaves are also a sustainable and renewable source, provided these are harvested in a scientific manner and quantity and frequency of leaves removed from each tree does not exceed its renewal potentialdescribe Saxena et.al. (2014). New ways and methods to explore and utilise these natural resources is very much required to promote a sustainable living .

The present study was undertaken by the researcher keeping in mind to use natural dyes for sustainable development of herbal textiles. The study was carried out as a primary pilot study which will lay seed for the researcher to carry forward the research.

METHODOLOGY

Selection of Fibres

Organic cotton is grown without pesticides or genetically- altered seeds and with the help of sustainable methods of crop rotation views Elsasser(2010). It is grown using methods and materials that have a low impact on the environment.

The history of human kind is intertwined with the history of wool.Itis one of the earliest fibres to be spun into yarn and woven into cloth. Kadolf (2006) confesses Merino sheep produces the most valuable wool.

So,natural eco-friendly fibres like organic cotton andwool have been selected for the study.

Selection of The Spinning Method

The selected organic cotton andwool fibres were spun into yarns. The fibres organic cotton and wool were taken in hundred per cent 100% C, 100% W pure forms.

Selection of Fabric Construction Method

The selected hundred per cent organic cotton 100% C and wool 100% W yarns were then constructed into fabric by handloom weaving. Hence hundred per cent handloom woven organic cotton (100% HC) material and hundred per cent handloom woven wool (100% HW) material were taken for the study.

Selection of Herbs

*Ricinus communis*or the castor-oil-plant is a species of perennialflowering plant in the Euphorbiaceae family. The castor plant (Ricinus communis L.) or Eranda is used for treating various ailments. The Sanskrit name 'erandah' describes the property of the drug to dispel diseases. For medicinal purpose the leaves and dried mature roots of plant are used from very early ages.R.Communishastherapeutic efficacy and known to possess antiinflammatory, analgesic, antioxidant, anti tumour,purgative activity states Morya (2016). Eranda (RicinuscommunisLinn) is one of the plant whichis still widely used as herbal medicine in Ayurveda.

Vitex negundo Linn. (Verbenaceae) commonly known as Nirgundi is a woody,aromatic shrub grown as a small tree.All parts of the plant, from root to fruit, possess a multitude of phyto-chemical secondary metabolites which impart an unprecedentedvariety of medicinal uses to the plant. It is interesting to note that a single plant species finds use for treatment of a wide spectrum of health disorders in traditional and folk medicine viewVishwanathan and Basavaraju (2010).The leaves and roots has anti -inflammatory, analgesic, anti-arthritic and antioxidant actions.

The herbs Castor Plant and Nirgundi wereselected for the study.

The leaf of Castor Plant (C) and Nirgundi (N) herb were taken to desired quantity, washed, dried in shade and powdered.

Selectionof Mordant

Indian Rhubarb is almost odourless or somewhat fragrant, with bitter astringent taste viewsSrivastava(2015). For the study Rhubarb (*Rheum* spp) was selected as a natural plant mordant. The leaves of rhubarb when boiled acts as a natural mordant which is good for all/most of the fibres. It gives a vivid colour ranging from reddish orange to brown shades.

The leaf of Rhubarb herb was collected freshly before the process.

Preparation of Herbal Solution

The required quantity of each powdered herb from Castor and Nirgundiwere taken separately and mixed with water in the ratio of 1:50. It was then boiled at 75 - 80 degree Celsius for one

hour until the herbal solution becomes a viscous consistency.Then the extracts of Castor Leaves and the extract of Nirgundi leaves were filtered and set aside separately. The filtered extracts of castor leaves and leaves of nirgundiherbs were thus kept ready for further application purposes .

Preparation of the mordant

The leaves of the rhubarb were finely chopped into small pieces and is mixed with water in the M:L ratio of 1:30. The solution was then boiled in low temperature for one hour. The herbal extract wasfiltered from the solution which became a thick viscous consistency. It was then cooled and kept ready for application. Care should be taken to boil the solution in a well ventilated area, as the fumes can cause problems.

Dyeing procedure of the selected handloom material

Pre-treatment Process

The hundred per cent handloom woven cotton 100% HC and hundred per cent handloom woven wool fabrics100% HW which wereselected for the study was immersed in water for about 10-15 minutes prior to the dyeing process for evenness in dyeing .

Dyeing of the selected handloom material

The herbal solution of castor leaves was taken and mixed with water in the ratio of M:L ratio of 1:20.The mordant solution of rhubarb leaves were also taken in the ratio of 1:0.5 and mixed along with the herbal solution The pre-treated cotton 100% HC and wool fabrics100% HW were immersed in the castor leaf herbal solution and was boiled for half an hour at 60 degree Celsiusfor cotton and 20-30 degree Celsius for wool material .The same process was thus repeated for thenirgundiherbal solution. Thus the following four herbal 100% - Handloom woven organic cotton +Castor leaf herb(HCC), Handloom woven organic cotton + nirgundi leaf herb (HCN), Handloom woven wool + castor leaf herb (HWC) and Handloom woven wool +nirgundi leafherb (HWN) dyed materialswere made ready for the study.

Selection of products

Since Castor leaves are good in treating knee pain, knee band (*K)* was selected and prepared for the study. Hence, Knee band was prepared from hundred per cent cotton HCC and wool HWC materials.

Nirgundi herb was found to relieve pain in the heel and foot. Hence heel socks (*S)*were prepared and selected for the study. So, a pair of socks was prepared from hundred per centcotton HCN and wool HWN fabrics.

Finally, products like HCC*K*, HWCK, HCNS, HWN*S*, were prepared from the herbal dyed 100% handloom materials. Thus four products were prepared for the final study.

Selection of evaluation / test methods

Performance study

A performance study from the selected prepared productsHCC*K*, HWCK, HCN*S* and HWN*S*was conducted by a clinical trial in a Nature Cure Centre. Five patients suffering from pain in knee and heel were selected. The patients suffering from knee pain were given HCC*K*, HWC*K*and patients suffering from heel pain were subjected to HCN*S*, HWN*S*.They were instructed to carry out the washing of the products with natural detergents and to dry them in shade

to retain the medicinal properties. They were also instructed to keep them in a cool and dry place prior to use like medicines. The patients were instructed to wear the knee band next to the skin from morning 9am to evening 4pm(7 hours) and the socks were used while sleeping from 10pm to 6am (8 hours) in the night time for a month.The performances of the selected products were evaluated once in every week and the clinical trials were conducted for 4 weeks duration.Detailed feedbacks from the patients and also from the doctors were collected every week regarding the performance of the product.They were asked about the comfort of wearing the product, whether it caused any problems while wearing the product like itching, swelling, colour bleeding/staining. They were also asked whether wearing the product made any significant changes in the area covered.The details of the performance study were consolidated and are given in the results and discussions.

Determination of colour fastness of the handloom dyed samples

Colour fastness is a term used for the degree to which dye holds fast to the fibre or fabrics. A good or high fastness means that they do not bleed or rush in washings, crock or rub off in wear.

COLOUR FASTNESS TO SUNLIGHT

The four herbal dyed hundred per cent handloom woven organic cotton and wool material dyed with castor leaf and nirgundi leaf extracts HCC, HCN, HWC and HWN were subjected to sunlight from morning 10am to evening 4pm (6 hours) for a week. Consecutive random samples were prepared and subjected to testing. Results for each day were recorded and consolidated results are recorded.

COLOUR FASTNESS TO CROCKING

This test is designed to determine the degree of colour which may be transferred from the surface of a coloured fabric to a specify test cloth for rubbing. Colour fastness to rubbing was done in dry as well as wet conditions in a crockmeterfor the four herbal dyed hundred per cent handloom woven organic cotton and wool material dyed castor leaf and nirgundi leaf extracts HCC, HCN, HWC and HWN.The hundred per cent handloom woven organic cotton material dyed with castor leaf extractHCC was taken and placed on the base of the crock meter so that it rested flat (on the abrasive cloth) with its long dimension in the direction of rubbing. The 5cmX 5cm of dry undyed test cloth (cotton) was mounted over the end of the finger which projects downward from the weighed sliding arm for Dry Crocking test and forWet Crocking test this undyed test cloth was thoroughly wetted in water, squeezed and mounted. A spherical spiral wire clip held the test cloth in place. The finger was covered onto the test specimen and it was crocked back and forth twenty times by making ten complete turns. The undyed test cloth was then removed and evaluated for colour change and staining. The same process was repeated for other handloom HCN, HWC and HWN woven herbal dyed samples. 10 consecutive samples were prepared and subjected to testing.Results for each tests were recorded in the results and discussion.

COLOUR FASTNESS TO WASHING

Colour fastness to washing test was designed to determine the effect of washing on the colour fastness of the textiles. The handloom woven castor leaf extract dyed organic cotton material- 100%HCC was taken and placed between two undyed test cloths (cotton).It was then stitched on all the four sides. Similarly,the process was repeated for all herbal dyed samples HCN, HWC and HWN.Ten consecutive test samples were placed separately in a container and

the necessary amount of soap solution was added to it .The samples were then agitated in the launderometer for 30 minutes after which the samples were taken out and rinsed in cool water.The stitches were ripped out. The test samples ware opened and dried in air at room temperature. The change in colour of the treated test cloth and the degree of staining of the two adjacent piece fabrics were evaluated. Results for each test were observed and the consolidated result is recordedin the results and discussion.

COLOUR FASTNESS TO PERSPIRATION

Continuous contact with the human perspiration also affects the fastness of some of the dyed fabrics. Hundred per cent handloom woven herbal dyed samples, HCC, HCN, HWC and HWN, were taken and stitched between two undyed dried test cloth(cotton).The test samples were then immersed in the prepared acidic and alkaline solution for 30 minutes. The samples were then placed on a resin plate and a stirring rod was used to remove any air bubbles present. It was then covered with another resin plate. The samples were then placed in a Prespirometer and the required pressure was applied to drain off any excess solution. It was then kept in an oven for 6 hours. The resin plates were separated from the samples and was then air dried.The change in colour of the treated test cloth and the degree of staining of the two adjacent piece fabrics were evaluated. Ten consecutive samples were prepared and subjected to testing. Results for each test taken down and consolidated results recorded in the results and discussion.

COLOUR FASTNESS TO HOT IRON

Pressing fastness test of dyed materials is performed to determine resistance of the textile materials to ironing and to processing on a cylinder.
The hundred per cent handloom woven castor leaf extract dyed organic cotton material HCCwas taken and placed between two undyed dried test cloth (cotton). A hot iron was rolled over the test sample for 15 seconds. The change in the colour and staining of the treated cloth was evaluated. Similarly the test was conducted for HCN, HWC and HWN.Ten consecutive samples were prepared in each and subjected to testing.Results were recorded in the results and discussion.

RESULTS AND DISCUSSON

EVALUATION OF THE PERFORMANCE STUDY

For the clinical study five patients suffering from knee pain and five patients suffering from heel pain were selected for the study based on their personal approval. Subjects suffering from knee pain were asked to wear the hundred per cent herbal dyed HCC*K* and HWC*K* knee bands. Similarly, subjects suffering from heel pain were given hundred per cent herbal dyed socks pair HCN*S* and HWN*S*.

The knee bands were given to five patients having knee pain due to prolonged sitting and also while driving vehicles. Each subject was given HCC*K* and HWC*K* knee bands.The prepared knee bands were used while they were in the above conditions. The knee bands were worn for 9am to evening 4pm (7 hours) for a month.The performances of the selected products were evaluated once in every week and the clinical trials were conducted for 4 weeks duration.

Heel socks were given to five patients having heel pain due to overweight and also stress placed on heels due to wearing improper sandals.Each subject was given HCN*S* and HWN*S*herbal heel socks. The socks were used while sleeping from 10pm to 6am (8 hours) in the night time for a

month.The performances of the selected products were evaluated once in every week and the clinical trials were conducted for 4 weeks duration. The results are given in a concise format in Table I

Table I: PERFORMANCE OF THE HERBAL DYED PRODCTS

Fabric	**Disease Selected**	**Product Developed**	**Performance of the product**					
100% Handloom Herbal Dyed			**Comfort**	**Itching**	**Swelling**	**Colour Bleeding**	**Colour Staining**	**Curative performance of the product**
HCC*K*	Knee Pain	Knee Band	Good	No	No	5	Nil	5
HWC*K*	Knee Pain	Knee Band	Good/ Excellent	No	No	5	Nil	5
HCN*S*	Heel Pain	Socks	Good	No	No	4/5	Nil	5
HWN*S*	Heel Pain	Socks	Good/ Excellent	No	No	4/5	Nil	5

Ratings: 5-Excellent, 4- Very good, 3- Good, 2- Fair, 1- Poor

The feedback collected along with the doctor from the subjects revealed that the patient felt comfortable while using the product. There was no discomfort from the product, for cotton and wool yarns, and the herbs gave them a smoothing effect after a prolonged usage which was a relief to the pain. They didn't have any itching, swelling or colour bleeding/staining from the product. Most of the patients also stressed their view that products made out of wool produced warmth effect which was smoothing at times of pain.

EVALUATION OF COLOUR FASTNESS OF THE HANDLOOM DYED SAMPLES

The hundred per cent handloom woven and herbal dyed HCC, HCN, HWC and HWN materials were subjected to sunlight, washing, wet and dry crocking, acid and alkaline perspiration and to hot iron and the result is shown in Table II

Table II: COLOUR FASTNESS OF THE HANDLOOM DYED MATERIAL

Fabric	**Colour Fastness tests**											
100% Handloom Herbal Dyed Material	**Sunlight**		**Rubbing**		**Washing**		**Hot Iron**		**Perspiration**			
	Cc	**Cs**	**Cc**	**Cs**	**Cc**	**Cs**	**Cc**	**Cs**	**Acid**		**Alkaline**	
									Cc	**Cs**	**Cc**	**Cs**
HCC	4	4	4	5	5	4	5	4	3	3	4	4
HWC	5	4	5	4	4	4	5	4	4	4	5	4
HCN	3	5	3	4	4	4	5	4	4	5	5	4
HWN	5	4	4	4	5	4	5	4	4	4	5	4

Ratings: 5-Excellent, 4- Very good, 3- Good, 2- Fair, 1- Poor

HCC, HCN, HWC and HWNhundred per cent handloom woven herbal dyed materials which were subjected to sunlight, washing, wet and dry crocking, acid and alkaline perspiration and to hot iron showed no colour change. Colour staining was also very good in all the four samples. This showed good to very good to excellent results.

CONCLUSION

Sustainability is one of the major concerns which the world focuses now. Environmental sustainability refers to the ability of something to continue without upsetting or damaging the earth's biological balance. Natural dyes can offer not only a rich and varied source of dyestuff, but also the possibility of an income through sustainable harvest and sale of the dye plants. In areas where synthetic dyes, mordants (fixatives) and other additives are imported and therefore relatively expensive, natural dyes can offer an attractive alternative..There is an essential need to identify the stages in various steps of textile production that are said to be the greatest cause for environmental degradation with a special focus on substances that are likely to cause harm to eco- balance.

Under such context this study was undertaken by the researcher with hundred per cent eco-friendly fibres and converting the same to handloom woven cotton and wool materials, treated with leaf extracts of Castor plant and Nirgundiherbs along with Rubharb, subjected it for colourfastness tests. The same herbal dyed hundred per cent handloom materials were made into products such as knee band and socks respectively. They were given to subjects selected and the results were optimum to satisfactory.At the level where scientific developments stand today, natural dyes are a sustainable option only for small-scale applications and they can complement synthetic dyes as an eco-friendly option for the environment conscious consumer and also as a means of providing livelihood to various stakeholders of the natural dye value chain.

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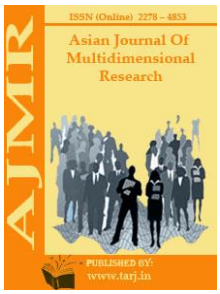

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

A STUDY ON ECOFRIENDLY DUAL FINISH USING MEDICINAL HERB

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ABSTRACT

Textile and clothing infused with medicinal herb is becoming popular now days. Textiles are an integral part of everyone's life. The selected herb has dual advantages. The present study focuses on the development of herbal antibacterial and UV resistance finishing for clothing. The medicinal plant (Gomphrena globasa) flower has been extracted. The application is done on 100% bamboo knitted fabric by Pad, Dry and Cure method. The finished fabric is assessed for the antibacterial activity against the selected Staphylococcus aureus and Escherichia coli. All the treatments shown good result and good washing durability upto 10 washes.

KEYWORDS: *100% Bamboo knitted fabric, antibacterial, UV resistance, Gomphrena globas herb.*

INTRODUCTION

Textiles have always played a central role in the evolution of human culture by being at the forefront of both technological and artistic development. The protective aspects of textiles have provided the ground for innovative developments recently; the medical textile industry has started paying attention to nature-based materials for developing premium healthcare products. The development of nature-based materials has led its limelight pave way to new field of textiles known as "herbal textile", which is slowly developing from the shadow of its ancient era.

In recent years new development allowed the production of functional textiles. But recently there are lots of attractions towards natural based herbs as an antimicrobial agent because of its eco-friendly and health hazardousness. Bamboo has much to offer in its raw form. Its geographical range is wide spread and its uses are numerous. As a grass, it has a diverse network of growth patterns and can flourish in harsh climates. Bamboo fibers are all cellulose fibre, Even though bamboo fabrics are often advertised as antibacterial, finished bamboo fabric only retains some of bamboo's original antibacterial property. Some studies have shown rayon-bamboo to possess a certain degree of anti-bacterial properties.Studies in China (2010) and India (2012) have investigated the antibacterial nature of bamboo-rayon fabric against even harsh levels of bacteria such as *Staphylococcus aureus* and *Escherichia coli*. While the Indian study found that "bamboo rayon showed excellent and durable antibacterial activities against both gram-positive and gram-negative bacteria", the Chinese study concluded "the bamboo pulp fabric just like cotton fabric has not possessed antimicrobial property".[(2)]

Gomphrena globasa, purple inflorescences have been used as a remedy for several respiratory inflammation conditions including bronchial asthma, acute and chronic bronchitis, and whooping cough.[(1)]

Development of antimicrobial textile finish is highly indispensable and relevant since garments are in direct contact with human body. The antimicrobial property plays a vital role, as they are directly in contact with the human skin. [(5,6)]In human body the skin color depends on the quantities of melanin, carotene and oxygenated or reduced hemoglobin combined in the skin, as well as the thickness, water content etc. Among other factors, the quantity of melanin that is distributed in the skin determines its fairness or darkness and greatly influences the human complexion, at the same time melanin plays an important role in minimizing the damage that UV rays cause in the skin. [(4)]

The importance to provide necessary protection to the wearer from the micro organisms, the fabric must have the bacterial resistant properties. There are several antimicrobial agents used to improve the functional ability of the clothing material. The present work is therefore aimed at studying the antibacterial and UV protection of 100% bamboo knitted fabric treated with selected medicinal plant and the result were analyzed.

METHODOLOGY

Selection of fabric

The 100 percent bamboo knitted fabric was selected for this study. The selected bamboo fabric were desized and bleached to remove impurities and natural coloring matters present in the fabric.

Selection of herb (*Gomphrena globasa*)

Gomphrena globasa flowers has been selected. *Gomphrena globosa*, commonly known as globe amaranth, makhmali, and vadamalli**,** is an edible plant from the family Amaranthaceae.it is also commonly referred as Bachelor's Button, Globe Amaranth. *G. globosa* is native to Central America including regions of Brazil, Panama, and Guatemala, but is now grown globally. In some countries the flower are boiled and made as tea. It is very heat tolerant and fairly drought resistant, but grows best in full sun and regular moisture. [(3)]*Gomphrena globasa*, has anti-oxidant, anti-cancer, Anti Fungal, Anti Bacterial, For Treating High Blood Pressure & Diabetes, Detoxifying & Purifying the human body. [(7)]

Plate- 1 *Gomphrena globasa*

Collection and Processing of *Gomphrena globasa*

The selected herb was collected all around Coimbatore. The collected flower were shade dried at room temperature to reduce the moisture content less than 14 % with proper drying. Then grinding process is done for dried flowers. In that the flower is grind into very small units ranging from larger course fragments to fine powder. The fine powder obtained after grinding was used for extraction and the fine powered was stored under good condition to reduce the risk of the contamination.

↓

Drying, garbling and grinding process

Herbs mixed with solvent (80% ethanol) at room temperature for 24 hours

Filtration using Whatman filter paper No.1

↓

Concentrated supernatant was collected

↓

Extract ready for application

Ethanolicextraction of collected *Gomphrena globasa* flower power

Extraction was carried out by dissolving six grams of *Gomphrena globosa* powder in 100ml of 80% ethanol, kept overnight under shaking condition in an air tight container without space. Then the extract was filtered using Whatmann no.1 filter paper (0.4µm), filtrate was collected and evaporated at room temperature. The concentrated extract was stored at 4 degree Celsius and used for further antibacterial and ultraviolet rays studies.

Finishing by Padding Mangle

The finishing of herbal extract (*Gomphrena globosa*) on to the 100% bamboo knitted fabric was done through padding mangle. The finished fabric samples immersed in the prepared extract was passed through a padding mangle run at a speed of 30 rpm/min and a mangle pressure of 15 kgf/cm^2. The padded fabric was air dried and then cured for 3 min at 140℃. The finished fabric sample was subjected to antibacterial and ultraviolet protection testing.

Plate- 2 padding mangle

RESULTS AND DISCUSSION

Antibacterial Activity by AATCC 147

The antibacterial activity of the finished fabric was evaluated by Antibacterial activity by AATCC147. Sterile nutrient plates were prepared. The plates were allowed to solidify for 5 minutes and sample were placed on it. 0.1% inoculum suspension of *Staphylococcus aureus* (ATCC 6538) and *Escherichia coli* (ATCC 8739) were swabbed uniformly over the surface of the agar. The sample were placed and kept in 37ºC for 24 hours. The antibacterial activity was evaluated in terms of zone of inhibition, measured and recorded in millimeters.

TABLE 1:- ANTIBACTERIAL ACTIVITY BY AATCC 147

S.no.	**Fabric samples**	**Zone of inhibition(mm)**	
		Staphylococcus aureus	***Escherichia coli***
1	Controlled sample	0	0
2	Treated sample	22	20

From the table 1, it shows that the treated sample has a high value than controlled sample.

Analysis of Ultraviolet Protection Factor

The ultraviolet protection of a fabric is expressed by the Ultraviolet Protection Factor (UPF). The UPF evaluates the reduction in the amount of the UV radiation that passes through the fabric to the skin. For example, when a fabric has an UPF of 20, only 1/20th of UV radiation reaches the skin. UV transmittance through the fabric samples was determined within a wave length range from of 280 to 400 nm using a Shimadzu UV/V is Spectrophotometer. The standard method used

for determining the UPF was AATCC 183 – 1999 (Transmittance or Blocking of Erythemally weighted Ultraviolet Radiation through fabrics).

The ultraviolet protection of a fabric is expressed by the Ultraviolet Protection Factor, (UPF). The UPF evaluates the reduction in the amount of the UV radiation that passes through the fabric to the skin. For example, when a fabric has an UPF of 20, only 1/20th of UV radiation reaches the skin. The AATCC (183-1999) Transmittance or Blocking of Erythemally weighted Ultraviolet Radiation through fabrics using Shimadzu UV/V is Spectrophotometer in 100 to 400 nm wavelength.

TABLE : 2 ULTRA VIOLET PRODUCTION FACTOR ANALYSIS

S.No	**Fabric Samples**	**UPF Range**	**%UV Radiation Blocked**	**Protection Category**
1	Controlled sample	0	0	Poor
2	Treated sample	30	81.2	Good

CONCLUSION

The *Gomphrena globosa* flower showed excellent characteristics in antibacterial and ultraviolet protection. Particularly finished with 100% bamboo fabric shows a good result. Due to ultraviolet ray many skin problems are raises, even it led to skin cancers. By using this study the skin problem caused by ultraviolet ray can be avoided. Finally the fabric testing and functional finish parameters are considered to define a perfect statistical analysis of the result. In future the study can be considered as hand gloves and garments.

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EFFECT OF ENZYME TREATMENT ON SPUN SILK- COTTON KNIT

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ABSTRACT

Knitting second only to weaving is a type of fabric forming method used world- wide. The knitted fabrics possess many comfort properties that has enormously increased its market demand. These knits were initially used only for making stockings but now it is used in hosiery industry, upholstery industry and technical textiles and more important of all medical textiles. Traditionally, wool was used for knitting stocking but now with the advancement of technology cotton and its blends and many other fibers is used. Here spun silk yarns, also known as Ahimsa silk obtained from pierced cocoons without harming the silk worm along with cotton to form knits. The presence of staple fibers in spun silk yarn is the reason for pilling on the surface of spun silk- cotton knits. Therefore an attempt was made to analyze the effect of enzyme in reducing the pills on spun silk- cotton knits. The enzyme treated knits were subjected to evaluations like visual inspection, fabric weight and bursting strength. The results revealed that the samples after enzymatic treatment showed good reduction of pills and moderate loss of weight. Also, the microscopic appearance of the enzyme treated knits exhibited good reduction of pills.

KEYWORDS: *knitting, spun silk, enzyme, pills*

INTRODUCTION

Clothing is the basic necessity of mankind, the art of which dates back to centuries. Evolutionarily his attempts to manipulate fibrous material into fabric in different methods resulted in the formation of fabric constructions like weaving, knitting, bonding, braiding, tatting and lace making. Among these, weaving and knitting are the commonly employed commercial methods of fabric construction. There are two forms of knitting technology, warp and weft knitting. Among them weft knitting is the more diverse, widely spread and accounts to maximum yardage of apparel fabrics compared to warp knitting. Circular knitting machines with needle beds arranged in circular cylinders including latch, bearded or compound needle machinery which can knit a wide range of fabric structures, garments, hosiery and other articles in a variety of diameters have developed(1).

Cotton possess more ideal properties than any other fiber like strength, softness, good drapability and air permeability; due to which the wearing quality and comfort of the fabric increases. Generally knits are more permeable to air which makes them comfortable to wear in summer. Silk most commonly referred to as the Queen of fibers is known for its unique qualities like ultra-soft touch, elasticity, flexibility, high volumetric feeling, deep color and scooping which also makes it more suitable for comfortable apparels. Silk knits are more preferred due to the combination of properties of silk and knits. Thus spun silk yarns possessing all the general characteristics of reeled silk but has less strength and elasticity and comparatively less costly than filament silk is being used for various studies based on knits(2)(3).

Due to the high friction experienced by the yarns during knitting and the presence of staple fibers on the surface of the knits. Pills were formed due to entangling of fibers. This gave fuzzy appearance to the fabric, which spoiled the appearance of the knitted fabric. Generally singeing, one of the major pretreatments to grey fabrics, is carried out in production units to remove the fuzz found on the surface of the fabrics. In this case, the fabric is passed over flame directly. This might damage the structure of the fibres. Therefore in the recent days with high scientific advancement, enzymatic treatments are applied. Enzymes are living protein derived from plants and animal matters. Apart from this enzymatic treatments are eco-friendly, safer to use, less time consuming, less energy consuming and bio-degradable causing no pollution hazards(4).

Thus the study has been undertaken with the intention of assessing the effect of enzyme on reducing the pills on the surface of spun silk- cotton knits. The objective of the study was to:

- Assess the effect of enzyme on spun silk and cotton knitted fabric.

METHODOLOGY

Selection of the yarn

A yarn is product of substantial length and relatively small cross-section consisting of fibers and/or filament(s) with or without twist, explains The Textile Institutes Textile Terms and Definitions Committee. Many authors justify filament silk yarns and finer counts of spun silk yarns are suitable for circular knitting. Cellulose fibers particularly cotton is used for knitting due to its versatile applications, moisture absorbency, good fiber strength, abrasion resistance and non- pilling, softness and pliability(5)(6) .

Considering the above factors, 1/60s spun silk yarns and 40s/1 cotton yarns were selected for the study.

Selection of knitting machines

The circular knitting machine is capable of processing a wide range of materials, blends and filaments on one and the same machine. So the circular knitting machine of 15 diameters and 24 guages (24 needles / inch) was selected for the study (7).

The selected yarns were wound on cones and inserted in the circular knitting machines, in two different manners. In case of 1:1 spun silk cotton jersey fabric, the spun silk and cotton cones were placed alternatively. For the silk 1:2 spun cotton jersey fabric, two cotton cones were placed after one silk cone. These passed through the old ones, casting them off. Following this procedure about three kilograms of fabric in the spun silk cotton 1:1 ratio jersey fabric was knitted. Later the cones were rearranged to knit spun silk cotton 1:2 ratio jersey fabric.

Need for Enzyme Treatment

The spun silk yarns used for the study had fuzzy protruding fibers on their surface. These protruding fibers were the cause of pilling on the knitted fabric surface. Pilling is a fabric surface fault characterized by little balls or pills of entangled fibers clinging on the fabric surface. Though they were removed to some extent while passing the yarns through the feeders, the knitted fabric contained many pill like protrusions which did not bring aesthetic value to the material. So the materials were subjected to enzymatic treatment to dissolve or remove the pills present on the material. Knitted fabrics undergo pilling more easily than woven because, in knitted fabrics, a great amount of yarn surface area is exposed. So, biopolishing of cotton and its blends would control pilling to an extent (8).

Selection of Enzymes

The Cellulase remove surface hairiness, thereby decreasing the fuzzy surface appearance of woven fabrics. Proteases catalyze the hydrolysis reaction of certain peptide bonds in protein molecules and modify the surface of silk fibers to provide new and unique finishes. The anti-pilling treatments on fabrics made of cellulosic fibers can be carried out with special enzymes (cellulase), which remove from the fibre surface all microfibrils, the potential cause of pilling formation. Similarly, protease is used to treat. Thus, the enzymes cellulases and proteases were selected for the treatment of spunsilk cotton mixed knitted fabrics. The enzyme was prepared from Microbial Source. It is named Cocktail enzyme, as it consists of cellulase, hemicellulase and protease. The enzyme is of alkaline base and can be stored at 4ºC or less for a month period. The activity of the enzyme is 1000 1U/ml (9).

Application of enzymes

Enzymes are active at atmospheric pressure in the temperature range of 30-60°C. For the knitted goods, enzymatic treatment is more effective along with agitation coupled with abrasion of the garment. Therefore the temperature was maintained at 45°C.

- Required amount of water was kept in three clean glass beakers [1:10 material liquor ratio]. The pH value was maintained at 5.5.
- The prepared enzyme was mixed in cold soft water in three different percentages namely 2%, 5% and 7%. This was then mixed to the water in three different glass beakers and stirred well.

- After wetting, the knitted samples were dropped into the enzyme solution. The solution was stirred constantly. After ten minutes the samples were removed and washed thoroughly in cold soft water.

The procedure was repeated for 20 and 30 minutes respectively. The samples treated with 2%, 5% and 7% for 20 minutes.

RESULT AND DISCUSSION

Fabric weight of Enzyme Treated Samples

Comparison of the weight of the samples before and after treatment is taken as the criteria of evaluation. Thus the enzyme treated samples were weighed in an electronic balance.

TABLE-I
FABRIC WEIGHT OF THE ENZYME TREATED SAMPLES

S.No.	Sample Name	Weight of Sample (gm)
1	1a	141.236
2	1b	134.147
3	2a	141.196
4	2b	134.08
5	3a	140.968
6	3b	133.89
7	4a	140.837
8	4b	133.76
9	5a	140.626
10	5b	133.656
11	6a	139.86
12	6b	133.43
13	7a	139.47
14	7b	133.16
15	8a	139.25
16	8b	133.02
17	9a	139.16
18	9b	132.98

From the above table it is clear that the samples treated for 20 minutes showed moderate weight loss and good texture.

Bursting Strength

Better fabric handle at the cause of poor strength is generally not acceptable. Hence the fabric strength of enzyme treated samples was tested, using Automatic Digital Bursting Strength tester. The bursting strength values of the samples are presented in the table below.

TABLE-II
BURSTING STRENGTH OF ENZYME TREATED SAMPLES

S. No	Sample Name	Bursting
1	2a	14.654
2	2b	16.069
3	5a	14.648
4	5b	16.056
5	8a	13.986
6	8b	15.312

From the table it is inferred that as the percentage of enzyme and time of treatment increased, the bursting strength of the samples decreased, that is the samples lost their strength as time and percentage of enzymes increased. Thus the samples 5a and 5b which showed moderate loss of strength when treated in 5% in enzyme solution for 20 minutes was taken for further study. Also the enzyme treated yarn and fabric samples were viewed under the microscope to observe the reduction in hairiness on the surface of the fabric (plate I a and I b).

PLATE I a
ENZYMES TREATED YARN SAMPLES

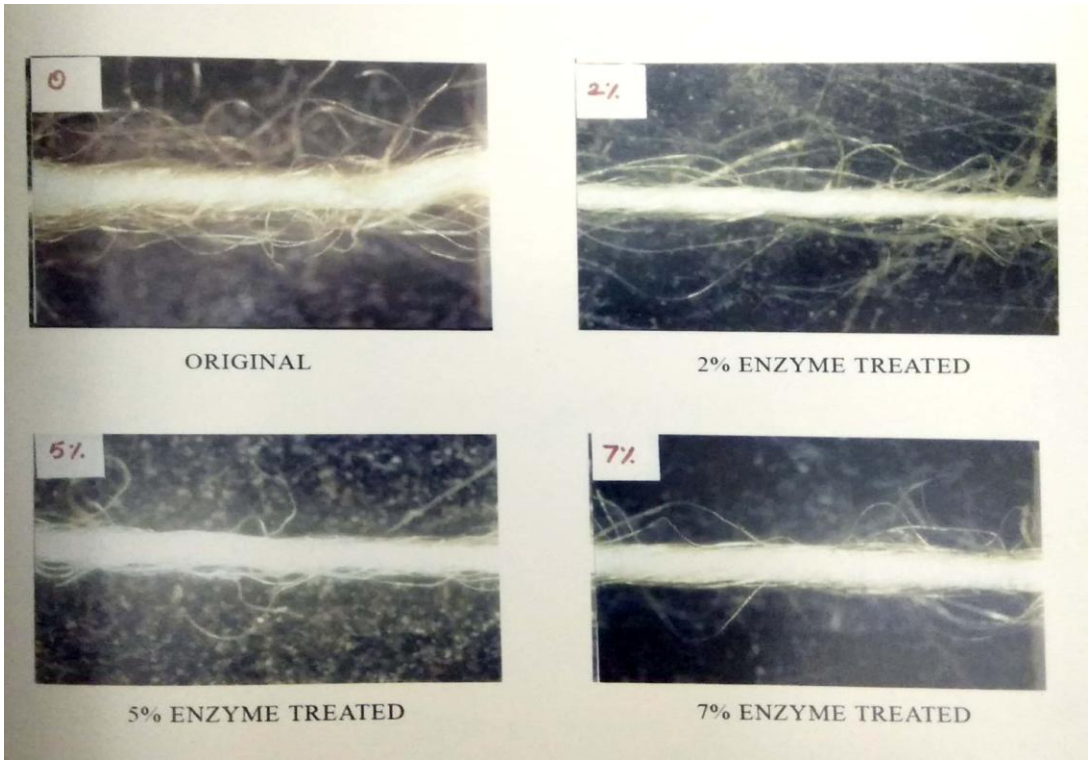

PLATE I b
ENZYMES TREATED KINTTED SAMPLES

CONCLUSION

This study clearly shows that Spun silk could be effectively knitted in the proportion of 1:1 and 1:2 along with cotton yarns. Enzyme treatment could decrease the pills produced by spun silk yarns. Thus, it could be concluded that spun silk combined with cotton yarns produce lustrous, rich knitted fabrics for apparels and the enzymes can be effectively used to enhance the appearance of the fabric. The results of the study paved a new road for the eco- friendly processing of silk- cotton knits using enzymes.

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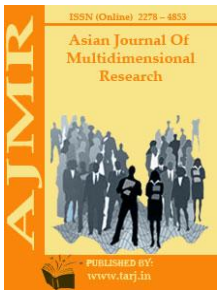

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UGC APPROVED JOURNAL

EFFECT OF SUNLIGHT PHOTO DEGRADATION ON DRAPING BEHAVIOR OF COTTON FABRICSUSING DRAPE ELEVATOR

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ABSTRACT

In this massive world almost everything is possible to be degraded through sunlight which is strongest and powerful source of light form ever found. Photo degradation is the alteration of materials by light, typically it refers to a combined effect of sunlight and air. It is usually oxidation and hydrolysis. It destroys painting, artifacts, and among all textiles are not exceptional cases here. End of the day, nothing cannot be compared to the power of Mother Nature. In this phenomenon how would it affect the textile properties when the fabric is photo degraded in sunlight for longer period of time? This experimental research deals with the impacts of the textile material after photo degraded, especially on drape behavior of a fabric. The essential property of a fabric "DRAPE BEHAVIOUR" will be evaluated using Drape Elevator which enables to evaluate the aforementioned property at various height and gravity.

KEYWORDS: *Photo degradation, Drape ability, Drape elevator.*

INTRODUCTION

Photo degradation is a chemical change resulting from the absorption of light that reduce the properties of materials, particularly polymer. All organic polymers can be degraded by light; the rate of degradation varies enormously from polymer to polymer

Exposure of cotton to sunlight produces an obvious photo-yellowing followed by photo-tendering. Cotton yellowing is due to photo-oxidation of cellulose. The action of light on cellulosic fibers results in degrading the properties. During the exposure, the fibers undergo photo-oxidation and photo-sensitized degradation. The source of radiation and the duration of exposure, the surrounding atmosphere, humidity, nature of the fibre chemicals present on the fibre during the exposure, temperature etc., and influence the degradation of the fibre taking place during the exposure.

Fabric drape is one of the most important properties of flexible material. It is also one of many factors that influence the aesthetic appearance of a fabric and has an outstanding effect on the formal beauty of the cloth. Drape is falling behavior under the influence of gravity when supported partially on a surface (**Y.J.Jeong (1998)**

Drape is important for the selection and development of textile material for apparel industries and it is calculated by the drapability of a fabric into dimensionless value called 'Drape co-efficient' which is defined as the percentage of the area from an angular ring of the fabric covered by a vertical projection of the draped fabric (**B.K.Behera (2006))**

ChiyomiMizutami (2005) suggests that, drape elevator can be developed to evaluate the drape formation of a fabric at different stages and different heights. The usual work on drape meter involves drape formation mechanism of fabric in fixed height and gravity. But through drape elevator, the drape formation mechanism of fabric enables to evaluate the drape behavior in different height and different gravity.

Although many studies related to the drape analysis, knowledge about the Drape elevator is very limited. This study analyses the drape ability of photo degraded cotton fabrics using drape elevator.

The main objectives of the study are,

- Selecting cotton fabric
- Exposing the selected samples to sunlight for zero , 30 , 60 and 90 days
- Determining the drape behavior of exposed fabrics using Drape elevator at various heights
- Comparing and analyzing the drape ability ofphotodegradedfabrics with drape elevation method and conventional method

It is hoped that the results of the study would highlight the drape behavior of photo degraded Cotton fabrics with drape elevator.

METHODOLOGY

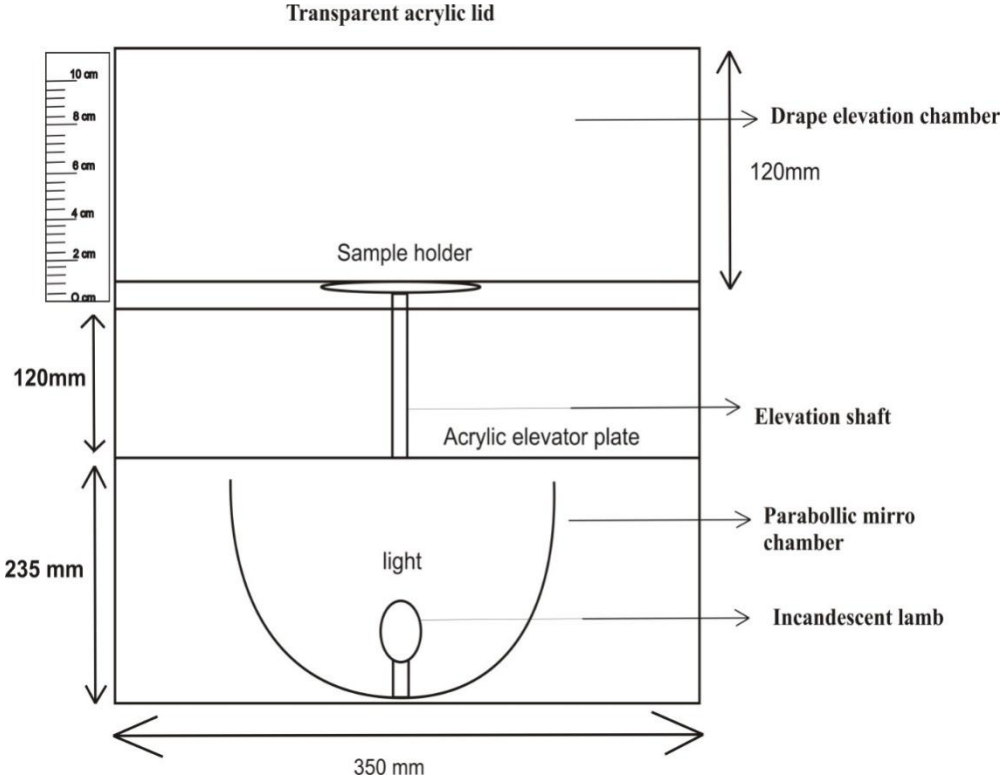
Cotton fabric is most widely used fabric in day to day life right from apparels to home furnishings. Hence Plain Woven Cotton fabrics were selected for the study. The selected fabric belonged to the category of 60's count with 160 GSM. Commercially available bleached cotton fabrics were selected. All fabrics were relaxed with two different relaxation procedures, dry

relaxation and wash and dry relaxation. For dry relaxation, fabrics were placed on a flat surface in a standard atmosphere (25º Celsius at 65 percent RH) for 1 week.Fabric is under severe strain and tension during weaving. To avoid bowing and skewing in fabric, it allows the interlacement to attain their favorite position **(www.farnatextiles.com) a**nd it has been conditioned to moisture equilibrium in standard atmosphere of 65±2 percent RH and 27±2º Celsius before testing.

The selected cotton fabrics were subjected to photo degradation through sunlight for 30 days (CFI), 60 days (CFII), and 90 days (CFIII) respectively. The samples were exposed to sunlight during the month of October to December from 11am to 3pm of the year 2017. The fabric was laid flat and exposed to direct sunlight and left for 30 days, 60 days, and 90 days respectively. Also an original sample (CF) without exposure is separated out for comparison.

The dimensions and the set-up of the instrument was taken exactly from the conventional eureka drape meter. The elevator table is attached to elevate the sample in different heights under different gravity. The sizes of the template and sample holder were taken from the Mag drape meter.

FIGURE I
SCHEMATIC DIAGRAM OF THE DRAPE ELEVATOR



ASSESSMENT OF FABRIC DRAPE

APPARATUS:DRAPE ELEVATOR

a. Drape tester is placed firmly and kept on the elevator table at 0cm level and the light switched on .

b. Sample fabric was cut with the template (25 cm diameter) and center hole is marked

c. Top box is removed and cut specimen was placed between the sample plates. It was ensured that the specimen is placed flat and touches the elevator table at 0cm.

d. The elevator table was moved from 2cm, 4cm, 6cm, 8cm and 10 cm respectively to evaluate the drape in various heights and gravity

e. Draped shadow was recorded with a white chart paper on top of the instrument by ensuring the pivot point matching the acrylic board on top

f. Traced shape was cut out with a pair of scissors and it's mass in gram determinedcorrect to two decimal places.

CALCULATION

Drape coefficient (DC %) = $\frac{W2-W1}{W1} \times 100$

W1 = initial weight of the chart sheet

W2 = final weight of the chart sheet (projected area)

The same procedure was repeated for six times on each sample.

RESULTS AND DISCUSSIONS

S.NO	SAMPLES	GSM	AVERAGE OF DRAPE CO-EFFICIENT (DC) %					
			0 cm	2 cms	4 cms	6 cms	8 cms	10 cms
1	CF	160	0	85	73.5	68.7	66.5	64
2	CFI	160	0	85	82	72	71.3	68
3	CFII	148	0	87.3	84	78.5	76	75.3
4	CFIII	147	0	87	85.3	81.5	80	79.5

Table: 1 Obtained results

From the above table it is evident thatthe sample CFII & CFIII has reduced its GSMmoderately as the exposure duration increases.

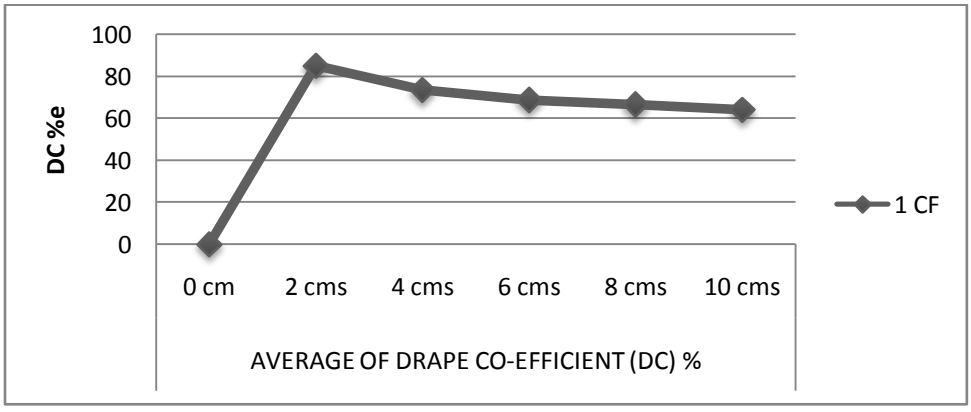


Fig: II Drape co-efficient % of Sample without exposure (CF)

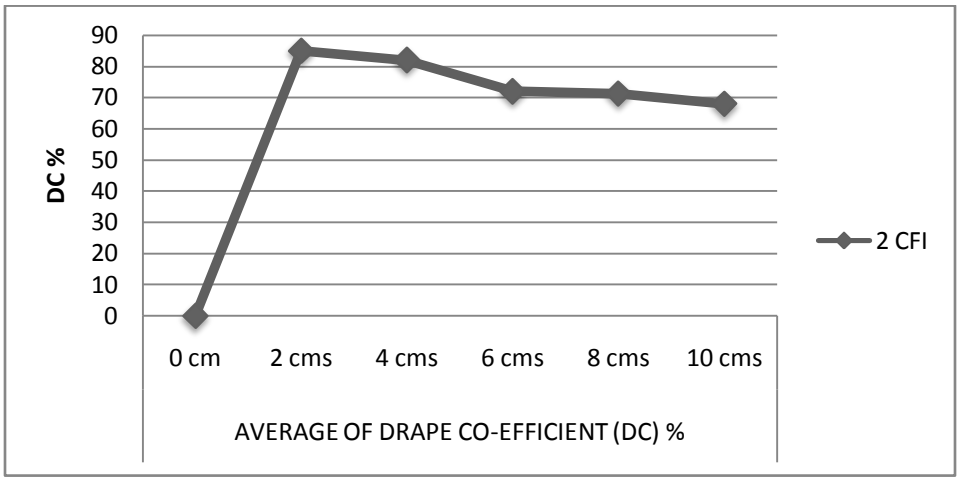


Fig: III Drape co-efficient % of Sample with 30 days exposure (CFI)

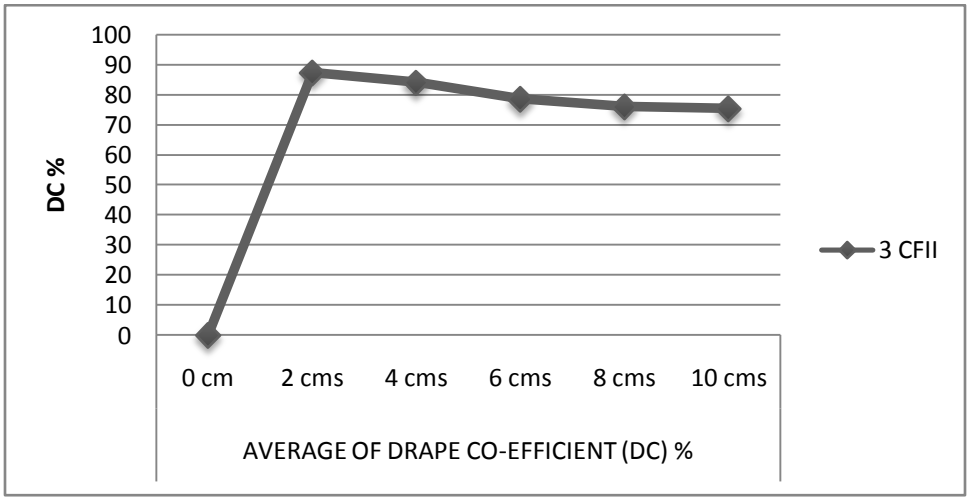


Fig: IV Drape co-efficient % of Sample with 60 days exposure (CFII)

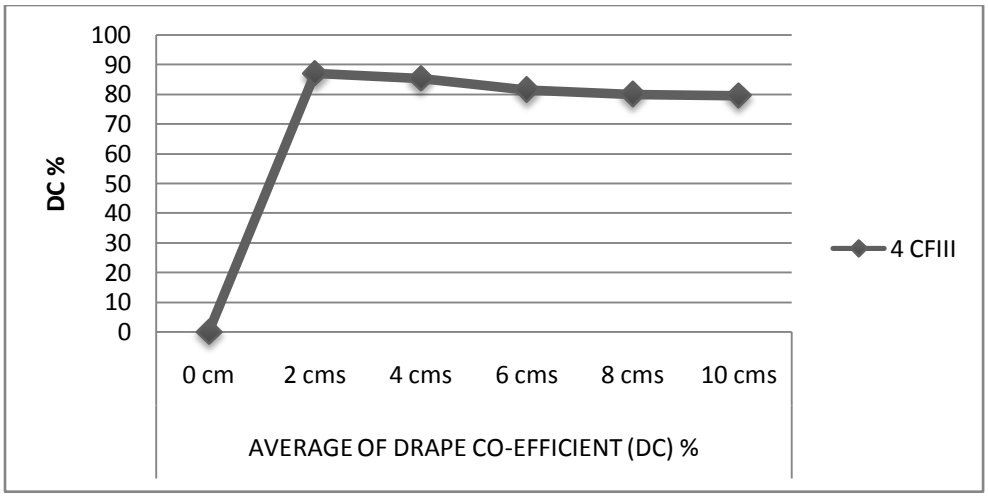


Fig: IV Drape co-efficient % of Sample with 90 days exposure (CFIII)

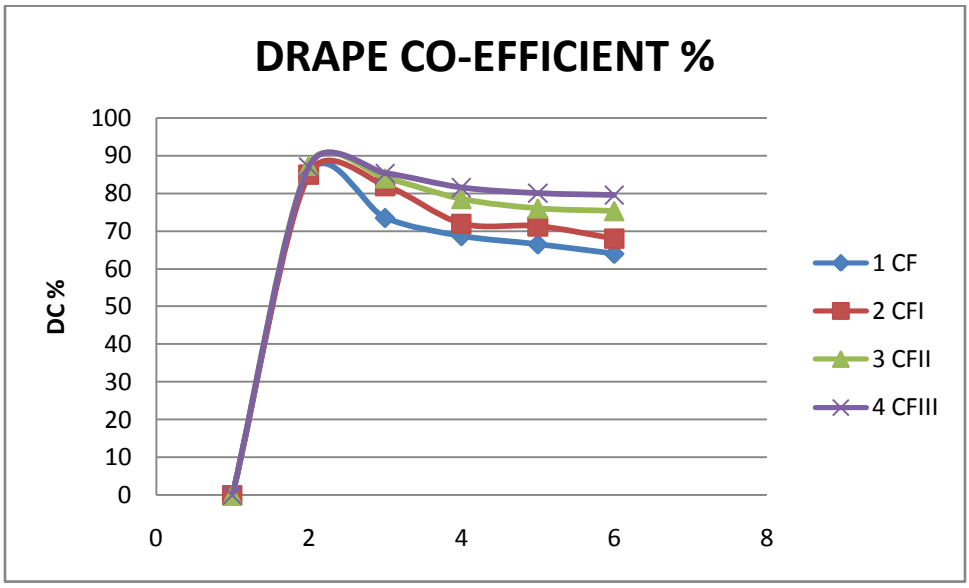


Fig: V Drape co-efficient % of all the samples

CONCLUSION

Fabric drape behavior is very important to fashion and textile industries where fabrics are used in apparel design and manufacturing. It is one of many factors that influence the aesthetic appearance of a fabric and has an outstanding effect on the formal beauty of the fabric. The methodology adopted for the study consisted of fabricating the drape elevator. Selecting the cotton fabrics and then the selected fabric has been photo degraded in sunlight for 30, 60 and 90 days respectively. The original samples, and exposed samples were subjected for drape analysis using conventional drapemeter and drape elevator at various heights and the results has been compared with the conventional method and elevator method.

It was found that the GSM of 60 and 90 days samples have reduced moderately after exposure. Sample exposed for 30 days faced no changes interms of GSM. Regarding the drape analysis of conventional drape meter, original sample have the lower drape efficiency, by which, it is evident that it has higher drape ability than the samples exposed. The more the samples are exposed the higher the drape efficiency. By this it could be concluded that the exposed samples CFI, CFII and CFIII has been affected by the photo degradation thus results in lower drape ability. The photo degradation through the sunlight has made the fabric stiffer and firmer compared with original samples. Also it's evident that samples become yellowishincolor (Yellowing) due to the oxidation process. With reference to the evaluation of drape ability using drape elevator, it has been found that drape elevator's drape ability is effective than conventional drapemeter. Consolidated Graph provides the evident of increase in drape behavior after 6 cms height which is standard in conventional drape meter. It can be concluded that original and exposed samples in drape elevator have better results than conventional drape meter.

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EXTRACTION AND CHARACTERIZATION OF NEW CELLULOSIC FIBERS FROM THE AGRO WASTE OF ALPINIA GALANGAL STEM

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ABSTRACT

Natural fiber is the plenty available renewable resources in globe. The fiber taken fromforest.Natural fibers seem to be a good alternative .The stem of this plant fibers and all the parts of this plant can be utilized in many applications. Use of the plant would enable its production and processing to be translated intoeco friendly technical textile industry. Alpinia galangal fibers are characterized by low density and high moisture absorbency in comparison with othe stem fibers. These fibers are long and biodegradable. Therefore, we can look this fiber as a sustainable resource for manufacturing and technical applications.

KEYWORDS: *Renewable resource, Technical Textiles, Alpinia galangal fibre.*

INTRODUCTION

Eco-friendly method needs to be used to extract the cellulose. Alpinia galanga fiber are chosen in this research work now a days global environmental issues, scientists all over the world have begun to show interest in natural ecofriendly product and their uses [1,2]. There are huge of reusable resources obtainable from the plant kingdom and a vast resource for different natural fibers like Jute, Banana, Coir, *etc*., which are huge available in many parts of world. These fibers are cellulosic in nature.

Fig .1

The ancient Vedic era, green plants are being used for their medicinal purpose .[3]Alpinia galanga (Linn.) of Zingiberaceae family is one amongst those medicinally important plants. Various parts of the plant are used for its anti-fungal, anti-tumour, antimicrobial, anti-inflammatory, anti-diabetic, antioxidant, anti-ulcer activities and other properties.The plant is a perennial herb. It grows up to a height about 5 feet. Leaves are *oblong-lanceolate*, tuberous root, slightly aromatic. The rhizome is from 3.5-7.5 cm in length, and seldom more than 2 cm thick. The leaves are long, *oblong-lanceolate*, acute, *glabrous*, ligules are short and rounded. Flowers are greenish white in colour, *bracteate*, bracts are ovate lanceolate.

METHODOLOGY

Raw material

The stems of Alpinia galangawere collected from Calicut, Kerla, ,India . The stems as shown in (Fig 1) are obtained by removing the leaves and are cut at required length by knife used hammer method for extraction .The extracted fibres were washed thoroughly to remove the unwanted materials, the bundles of fiber dried were collected .

Evaluation of Fibers

Characterization Methods

Tensile Strength

Tensile test were carried out using an INSTRON 5500R Universal testing machine to determine its tensile strength at 65^0 relative humidity and temperature 21 ± 1.5^0c with a cross head speed of 10mm/min.A1 kn load cell was used to measure. About 50 fibers were tested samples selected from *Alpinia galangal* fibers ,maximum strength according to the ASTM D 3822.[5]

The moisture regain and moisture content

The*Alpinia galanga*stem fiber is analyzed manually using BIS and ASTM D 629 methods. The predetermined amount of fiber (A) is conditioned in oven at 1050 °C and the constant mass of

the fiber is obtained (B). Thus moisture properties are calculated from the measured values using (1) for moisture regain and (2) for moisture content.[6]

Moisture regain = A – B / B X 100 (1)

Moisture content = A – B / A X 100 (2)

Chemical properties

The composition of *Alpinia galanga* fiber is shown in **Table 1**.Chemical composition such as Cellulose is the major component followed by lignin ,hemicellulose.

RESULTS AND DISCUSSION

Physical properties

Alpinia galanga was found mpa while the tensile strengths of other natural fibers such as *flax,jute,muntingia calabura* fiber are 500-900,690,370 mpa respectively.

Fiber Length

Alpinia galanga fibers are somehow longer than fibers. The bundles have a long effective length. If fiber is removed from the full length of stem by hand , the fiber strands as long as 1 to 1.5m.

Moisture Absorption Properties

Moisture Regain and Moisture Content

The fiber shows hydrophilic properties. This*Alpinia galanga* fiber absorbs more water than its own weight. Moisture content as well as moisture regain of fiber is found to be around which9.27% to 11.75 is comparable to other cellulosic fibers its similar to*Muntingia calabura* fibers .

Scanning electron microscopy

Fig.2

Analysis themorphological of*Alpinia galanga* fiber is shown in fig.2. The surface of characteristics explains that the fabrils are clean and smooth surface. Surface of cell is clearly visible perhaps due to low wax content.

Fiber Diameter

The *Alpinia galanga* fibers appear the thickness of the fiber when determined using projection microscope, it was in the range of 678 µm.

Chemical composition

The sample was analyzed for hemicelluloses, cellulose, lignin, ash. The sample was found to contain 5.67±0.02% (w/w) hemicellulose, 44.8±0.05% (w/w) cellulose, 33.33±0.03% (w/w) lignin, 1.62±0.001% (w/w) ash . **Table 1.** Comparison of the % composition of natural cellulose fibersfrom *Alpinia galanga* stems with *milkweed fibers,muntingia calabura* ,cotton and *linen*.[5]

Table.1

Material	Cellulose	Lignin	Ash
Alpinia Galanga	44.8	1.62	4.58
Milkweed stem fibers	74.5 4.1	2.2	
Muntingia calabura fibers	68.51	15.36 6.27	
Cotton	850.2	0.8	
Linen	722	-	

Table. I shows the chemical composition of the *Alpinia galanga* fibers found by means of using standard methods, is compared with natural fibers .Cellulose content in natural fiber is considered to be main component of strength, stiffness, structural stability .This fiber has low cellulose content lower than *other fibesr* .The lignin content in the fibers contributes to the rigidity and its low value .The fiber has low ash content compared *Muntingia calabura*.

CONCLUSIONS

Natural cellulose Alpinia galangal fibers were investigated in this paper for their suitability for textile applications*Alpinia galanga* fibers were extracted and then analysis the chemical composition and morphology and tensile properties of the fiber were studied.This result may development and increase the environment aspects of alpinia galangal plant can be used in technical applications such as reinforced composite materials, paper making, non-woven fabric,automotive textiles. Overall, using the alpinia galangal stems is more quality of natural cellulose fibers it will value added and more agro waste product.

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ANTIFUNGAL FINISHING OF TEXTILE PRODUCTS FROM NATURAL HERB EXTRACTION

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ABSTRACT

Natural dyes have better biodegradability and generally higher than compatibility with the environment. They are non-toxic, non-allergic and non-carcinogenic. Application of natural dyes has wide range of medicinal importance in textile industry. Natural dyes are not only used to impart colour to an infinite variety of materials but also for special properties. The fabric production rate is very tremendous and the market has limited scope which can be multiplied by value added finishing to textiles like fragrance finish which counts more value in the current scenario of market. The maintenance and improvement of current properties and the creation of new material properties are the most important reasons for the fictionalization of textiles. The natural dye was prepared from the mexican sunflower by grinding process. The cotton fabric was dyed using as prepared natural dye with mordant. The alum mordant gives good colour strength and also has antimicrobial property. The Rosa damascene fragrance finish is given to the Mexican sunflower dyed fabric. The types of material used, the method of extraction and application are dealt in detail in this project.

KEYWORDS: *Natural Dyes, Mexican Sunflower, Antimicrobial Property, Rosa Damascene, Extraction Methods*

INTRODUCTION:

Antifungal are used to kill or prevent further growth of fungi. In medicine, they are used as a treatment for infections ringworm and thrush and work by exploiting differences between mammalian and fungal cells. As well as their use in medicine, antifungal are frequently sought after to control moldgrowth in. Another antifungal serum applied after or without blasting by soda is a mix of hydrogen peroxide and a thin surface coating that neutralizes mold and encapsulates the surface to prevent damp or wet home materials.

METHODOLOGY

Selection of fabric

Based on market survey and consumer survey. Two Meter of 100% cotton fabric were purchased at the cost of Rs.90 from National textile corporation limited (A govt. of India undertaking), 35, Somasundaram mills Road, Coimbatore -641 009, India.

Selection of Herbs

There are three natural herbs and HIBISCUS was selected.

Extraction

Herbs extracted from the dried 120gm dry herb were boiled in 3 litter of water for about 20-30 minutes at 90ºC-100ºC.

SELECTION OF MORDANT

Alum is soluble in water react regular octahedral this is heated they liquefy and if the heating is continued, the water of crystallization is driven off, the salt froths and swells, and at last an amorphous powder remains.

PRE MORDANT

The fabric dipped into the mordant bath for 30 minutes after that the same fabric carried out to the required dye bath for 30 minutes.

POST MORDANT

In this process alternatively fabric treated with dyeing solution after that the same fabric finished with the mordant solution.

DIP METHOD

Fabric	-2 Meter
Marigold	-120gram
Water	-3 Liter
Duration	-20-30 Minute
Temperature	-90ºc - 100ºc

EXTRACTION PROCESS OF FLOWER

GRINDING PROCESS

The Mexican sunflower was grinding. The grinding paste was filtered by using of filter paper. The extract is boiled in 90°C at 30 minutes.

DYEING OF FABRIC

- For dyeing, 300ml of fresh flower was taken and 200ml of alum was taken as mordant and mixed into 500ml. Cotton fabric is dipped in aqueous solution.
- The dip method is done by immersing of fabric material (woven cotton) into the treatment bath containing extract solution for 30min at 90°c temperature. The fabric was removed from the bath and squeezed gently and air dried.

COLLECTION OF FLOWER (Rosa demascena**)**

A local flower of Rosa demascena is selected on the basis of their properties.

METHANOL EXTRACTION

The 50gm of Rosa demascena flower petals put in a clean beaker and the methanol solution of 500ml is mixed into the beaker. The flower petals should be immersed in the methanol solution. The container was closed and kept it for overnight in the incubation, the extract was filtered through filter paper.

ANTIFUNGAL ACTIVITY ASSESSMENT BY AATCC-30TEST METHOD

An incomes of 1.0 ml was evenly distributed over the surface of the agar. The fabric discs were pre wetted (not rubbed or squeezed) in water containing 0.05% of a non-ionic wetting agent (triton X-100) and placed on the agar surface. Treated fabric samples were placed in intimate contact with potato dextrose agar, which has been previously inoculated (mat culture) with broth suspension culture of test organisms (MUCOR and ASPERGILLUS NIGER). After incubation, a clear area of uninterrupted growth underneath and along the side of the test material indicates antifungal effectiveness of the fabric.

TEST MICROORGANISM:

The fungal strains used were **MUCOR** and **ASPERGILLUS NIGER.**

ANTIFUNGAL ASSAY:

The powder that showed better antifungal assessment. The activity of the short listed powder on various fungal strains was assayed by agar cut method. The fungicidal effect of the oil can be assessed by the inhibition near the agar plugs. This medium was prepared and poured on to the petriplate. A fungal plug was placed in the centre of the plate sterile discs immersed in the source respectively were placed above the gel in the plate.

EVALUATION

Objective assessment attempts to find the relationship between fabric hand and some physical, mechanical, comfort and colour fastness properties of a fabric objectively. It quantitatively describes fabric using translation result from some measured values of relevant attributes of a fabric. Techniques used for objective hand evaluation are by special instrument for measuring properties of fabric.

- Fabric weight:
- Fabric thickness
- Tensile strength
- Stiffness Test

- Abrasion Test
- Colour Fastness To Washing
- Colour Fastness to Perspiration
- Colour Fastness to Rubbing

RESULT AND DISCUSION

ASSESMENT OF ANTIBACTERIAL ACIVITY TEST- AATCC 147

The antibacterial activity of the finished cotton and ANOTHER COTTON fabric with maxican sunflower (dyed), Rosa demacena herbs was tested according to **AATCC-147** standard.

when compared with cotton and ANOTHER fabric maxican sunflower dyed and fabric in cotton sample shows good antibacterial activity using Escherichia coli (DCS-0.9), The maxican sunflower fabric was finished with Rosa damascena andit is compared that cotton fabric show best result with compared ANOTHER fabric(FCS -1.7).

ANTIFUNGAL ASSESSMENT BY AATCC 30 TEST METHOD:

The antifungal activity of the finished cotton and ANOTHER fabric with maxican sunflower (dyed), Rosa demacena herbs was tested according to **AATCC-30** standard. When compared with cotton and bamboo fabric maxican sunflower dyed and fabric in cotton sample shows good antifungal activity using Aspergillus flavus (DCS – 1.4), The maxican sunflower fabric was finished with Rosa damascena and it is compared that cotton fabric show best result with compared ANOTHER fabric(FCS – 1.5).

- Its finished sample marigold, hibiscus and henna. The marigold finished sample shows good antifungal activity using MUCOR the pre mordant (1.3) 10 and post mordant (2) 19, hibiscus MUCOR the post mordant (0.9) 14. Hibiscus post mordant, then henna pre and post mordant ASPERGILLUS NIGER is no zone found.
- It is observed that fabric weight (g/cm2) of the unfinished fabric is the (1.742), finished fabric is pre mordant (1.756) and post mordant is (1.756) found.
- It is observed that thickness(mm) of unfinished fabric 0.24, finished fabric is pre mordant and post mordant (0.25) is found.
- The tensile testing of the fabric finished with marigold pre mordant warp is highest tensile strength 28.44%kgf, post mordant 25.23% slightly lower tensile strength.
- Marigold post mordant weft is highest tensile strength 18.02%kgf, pre mordant 9.32% slightly lower tensile strength**.**
- The stiffness testing of the fabric treated with post mordant has highest stiffness strength 0.64gmcm and pre mordant has slightly lower stiffness 0.1gmcm**.**
- The abrasion testing of the fabric tested with pre and post mordant are both of 14.3%
- The colour fastness to dry rubbing samples pre and post mordant are showed very good (4/5) and the colour fastness to wet rubbing sample pre mordant showed good (4) and post mordant is very good (4/5).

- The washing fastness assessed with grey scale and the rating of finished cotton fabric are given.the washing fastness rating of cotton fabric finished with marigold was very good (4/5).
- The colour fastness to perspiration assessed with grey scale and the rating of finished cotton fabrics are the colour fastness to perspiration rating of cotton pre and post mordant was very good (4/5).

CONCLUSION

- When compared with cotton and ANOTHER fabric maxican sunflower dyed and fabric in cotton sample shows good antibacterial activity using Escherichia coli (DCS-0.9), The maxican sunflower fabric was finished with Rosa damascena and it iscompared that cotton fabric show best result with compared ANOTHER fabric (FCS - 1.7).
- When compared with cotton and ANOTHER fabric maxican sunflower dyed and fabric in cotton sample shows good antifungal activity using Aspergillus flavus (DCS – 1.4).
- The maxican sunflower fabric was finished with Rosa damascena and it is compared that cotton fabric show best result with compared ANOTHER fabric (FCS – 1.5).

The above study interprets that the natural ailing herb can be used in the recent trends to cure many Skin tissue and hence it is used in the healing of wounds such as burns, scrapes as well as irritated skin problems. The recent approaches that are dealing with English medicine are taking a backstep leaving the herbal medicine forward. Herbal medicine are the naturally produces product that are used in the treatment of many skin problem with no chemical thus no side effect.

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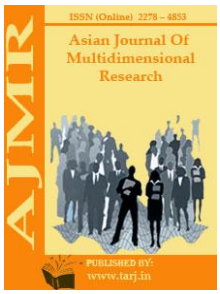

Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

DEVELOPMENT OF COIR MULCH MAT AND ITS APPLICATION FOR WEED CONTROL IN AGRO TEXTILES

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ABSTRACT

The demand for agricultural produce has grown aggressively due to the growing population worldwide. The expanding diameters of the cities, towns and villages have depleted cultivable lands in the outskirts and the compensation has been achieved by in turn depleting the forests for cultivable lands resulting ecological imbalance. The stress on productivity has lead to enormous dependence on the conventional way of using chemical herbicides. Further certain chemicals have been reported to be carcinogenic and a few do alter the gene composition of the produce and thereby make an adverse effect on the environment. This project is an attempt to substitute the unconventional synthetic materials with an eco friendly textile material. Non woven coir mulching has been adopted as a weed control technique. This technique was adopted in the curry leaf plantation and the results have been compared with chemical, manual and no weed control techniques. Economic feasibility of this technique has been analyzed and the payback period has been calculated. Further this technique has been used to develop a tailor made product called Pot Top which can be used to arrest weeds in potted plants. Comparison of vegetative growth has been made between the plants that have used pot tops and those which have been weeded manually and chemically. In this project, roof gardening technique with the help of Non woven coir felt material which can support vegetation even on concrete structures.

KEYWORDS: *Nonwoven, Coir, Weed control, Economic*

INTRODUCTION

In this globalized era of civilization the onus is on eco friendliness of the products and the wastes. The industries are facing a big problem in the disposing of their wastes without creating harm to the environment. For example chemical wastes and sludge from the textile.It processing industries are very hazardous and are treated biologically and disposed, but the sludge is now being treated accordingly and used as a building material. Cotton micro dust from spinning mills is another difficult waste to dispose off and also takes a long time to degrade. With the increase in the population worldwide, stress on the agricultural crops has increased. This situation is further aggravated by uncontrolled and varying ecological balance of water supply, air pollution, etc.

Agro-textiles like mulch mat, plant tops, sunscreen, bird net, wind shield, hail protection net, harvesting net, etc can be used for achieving the above goal. Further textile structures in various forms are used in shade house/ poly house and also in open fields to control environmental factors like temperature, water and humidity. It also avoids agro products damage from wind, rain and birds. Moreover textile materials like jute can be used in mulching, manufacturing Pot tops and in development of roof gardens which make buildings live.

METHODOLOGY

Collection of coir fibre

↓

Conditioning the coir fibre

↓

Washing the coir fibre

↓

Drying the coir fibre completely

↓

Screening

↓

Mixing of screened coir fibre

↓

Developing the Nonwoven using compression technique

RESULT AND DISCUSSION

Weed count measurement

Four pots were planted with same variety of croton. First pot was covered with pot top, the other was weeded manually, third was weeded chemically, and the fourth was left uncared. the frequency of chemical weed control was once in a month and that of manual weed control was also once in a month. All the four pots were under observation. Number of weeds in each pot was counted each month and the results are tabulated.

Weed Counts in different Pot Tops

S.no	Month no.	Number of weeds in each pot			
		No weed control	Manual weed control	Chemical weed control	Mulch weed control
1	1	3	0	0	0
2	2	3	1	0	0
3	3	7	1	0	0

Height Measurement

The vegetative growth of each plant is compared by measuring the height of each croton in each pot. The height was measured in centimeters and tabulated as follows.

Growth Measurement in Different Pot Tops

S.no	Height in cm			
	No weed control	Manual weed control	Chemical weed control	Mulch weed control
1	32	47	50	49

A plant top of15 cm diameter costs about 60 paisa but and the cost of weeding manually costs 30 paisa and chemically costs about 40 paisa. But the significance of this product is that when applied to a pot, the pot needs zero care and maintenance.

Economic Feasibility and Payback Analysis

The above-mentioned methodology was properly followed and good encouraging results were obtained. Firstly the objective of developing the nonwoven was achieved successfully by following the techniques mentioned in the methodology. The nonwoven was developed in duration of about 4 weeks. The developed composite is of the following specification:

Density – 370.37 kg/cu.m
Absorbing capacity – for 1 kg, 14 liters of water for 2 weeks approx.
Composition ratio: (75:20:5) i.e. (coir waste: cotton micro dust: nutrients)
pH of the composite – 6-6.5
Total dissolved salts – 2200 PPM.

Nutrient content of the composite:

Nitrogen (N) - 300 kg/hectare
Phosphorous (P) - 11 kg/hectare
Potassium (K) - 275 kg/hectare

These N P K values are almost equal to the normal types of soils that support plant growth. These N P K values are almost equal to the normal types of soils that support plant growth. For comparison the N P K values of the normal red soil is found to be

Nitrogen (N) - 340 kg/hectare
Phosphorous (P) - 14.5 kg/hectare
Potassium (K) - 338 kg/hectare

Two samples of each of the plants were tested and then compared with that of the soil. By noting these values it is found that these are found to be good and hence it is possible for us to grow more variety of plants in the future. Initially the rate of growth of the plants in both the composite and the soil was found to be same. There seems to be no difference found in the rate of growth of the plant in the initial week. But in the later stages the rate of growth of the plant started to vary slightly. During the course of the second week a slight difference in the rate of growth was found in ladies finger and tomato. But in the case of green even during the course of the second week the rate of growth was found almost to be same in comparison with the rate of growth in the soil. During the course of the next three weeks notable mild differences in the rate of growth of tomato, ladies finger and greens were observed. The greens showed very similar rate of growth during the entire duration of study.

COMPARISON OF THE RATE OF GROWTH

S.No	Name of the plant	Frequency of observation (days)	Root length/ plant(cm) Nonwoven	Root length/ plant(cm) SOIL
		4	2	1
1.	Tomato	12	7	5
		20	11	9
		4	1	1
2.	Ladies finger	12	5	4
		20	9	7
		4	3	3
3.	Greens	12	8	6
		20	11	9
		4	2	2
4.	Cury veg	12	8	5
		20	14	7

CONCLUSION

The result of this project is found to be encouraging and boasts a higher yield over the manual weed control method. This project is economically feasible as has a very short payback period. This can be practically implemented in large scale to any crop, with slight modification in the width of the non woven coir mat. Further this practice can be made more common by reducing

the cost of production of non woven material by producing in large scale. This practice can be made more profitable if the life time of this material is considerably increased through modern scientific techniques. Above all the yield obtained through this practice can boast of chemical free and toxic free natural product.The seeds that were irrigated began to germinate by 2 days. With proper care and further maintenance the plant growth took place without hindrance.

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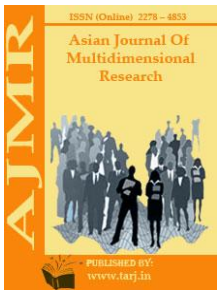

Asian Journal of Multidimensional Research (AJMR)
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A STUDY ON EXTRACTION OF FIBER FROMHELIANTHUS ANNUUS

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ABSTRACT

Natural fibers seem to be an effective solution for the production of fully biodegradable materials for replacing of some fibers. Among the natural fibers, plant fibers have many advantages: availability, recyclability, low cost, eco friendly, no toxicity, biodegradability, mechanical performance and easy extractability. Non renewable resources are becoming scarcer on the planet, and a generalized awareness exists regarding renewable resources and products. The stems of this plant yield fibers and all the parts of this plant can be utilized in many applications. Sunflower (botanical name, Helianthus annuus is fall remarkable, annually growing plant which grows up to a height of 3 feet to 10 feet(1m to 3m). The sunflower plant has a fleshy, coarse and hairy stem, while the leaves are blood and roughly textured. Sunflower stems have been used to make paper clothing, as fuel for fire. The stems are long and thick, hence extract fibers from these stems were planned. Helianthus annuus plant stems are harvested from the field for fiber extraction. The selected source was subjected to various treatments for extracted. The parameters for extraction like time, concentration were optimized. The extracted fibers were checked for its strength and length. The results of the study proved that Halianthusannuus stem could be effectively used for fiber extraction.

KEYWORDS: *Natural fiber, Fiber extraction, Retting process, Properties.*

INTRODUCTION

Mother Nature has extended her hands with tons of resources to satisfy the basic needs of mankind. Nature has provided us with nutrients, cereals, pulse, vegetables and fruits for good health, wood, sand, stone for protective shelter and fibers from plants, animals, and insects for good clothing. With regard to clothing the most dominant fiber are cotton, wool and silk. Some of the other fibers commonly used are jute, hemp, asbestos, flax, sisal and coir. But today the need of clothing haschanged from protection to specific finished end used clothing. Like bullet proof jackets for military man, antimicrobial finished clothing for medical personalities and heat proof garments for fireman and mine and workers. Apart from the challenge to production of special finished clothing today's researches are in need to tap the natural sources to extract fibers. This could be modified suitably for production of specially designed textile and garments.

Qualities of natural fiber are strongly influenced by growing environment, age of plant, species, temperature, humidity and quality soil. Various fields where natural fibers can be employed are; structural composites, automobile, non-structural composites, geo textiles, packaging, molded products, sorbents, filters and combinations with other materials.

Considering the above mention as need of the hour the investigator has planned a research extraction of fibers from *Helianthus annuus*using different retting methods. Under the research titles "**A STUDY ON EXTRACTION OF FIBER FROM*HELIANTHUS ANNUUS*".** The main objectives of the research work is to

- Identify unutilized natural sources for textile fiber extraction.
- select the high fiber yielding method
- Study the basic physical properties of the fiber extracted fiber.

METHODOLOGY

Collection of Source

The fully grown (height up to 3 feet to 8 feet) matured Helianthus annuus is decomposed in the land and become the manure for the next sowing of plants. There were collected from local harvested lands in Salem district, Tamil Nadu.

Extraction Methods

Helianthus annuus was selected as a source for extraction natural fiber in the present study. The *Helianthus annuus*stems were extracted by using water retting, chemical retting, enzyme retting and mechanical decortications method.

Water retting

Water retting was done by immersing the full length of *Helianthus annuus*about six feet and soaked into the open water tanks for six feet and soaked into the open water tanks for 4-5 weeks. The size of the water tank is seven feet in length and six feet in width and two feet in depth. After 4-5 weeks the stems were taken out and fibers were separated.

Water Retted Fiber

Chemical retting

Chemical retting was done by treating the stems with NaOH for 6-8 hours. Then the fibers were combed out and dried under the shade.

Chemical Retted Fiber

Enzyme retting

Enzyme retting was done by treating the stems with pectinase enzyme for 3-4 hours. Then the fibers were taken out and washed thoroughly with cleaned water. The fibers were separated from the stems and then it was dried under the shade.

Mechanical decortications

Mechanical decortication was done by using decorticator. The stems were fed into the machine through feed table and the stems were decorticated.

From the above four methods It is clear that only three methods yielded fibers. In mechanical decortications method the long stems were crushed and a semi juicy liquidwas obtained. Therefore this method was not considered for fiber extraction.

The fiber extracted from the above three methods evaluated for fiber length, Strength, Elongation, Fiber crimp and Fiber diameter.

RESULT AND DISCUSSION

Objective evaluation

Fiber Length

The average length of the fiber was measured using a measuring scale. The results shows that the water retted fiber measures 80cm-1m long whereas the length of the chemical retted fiber and enzymatic retted fiber was 50-90cm and 40-85cm respectively.

It is observed that the fiber length is maximum in water retted fiber.

Tensile strength of fibers

The results of the fiber strength of the water retted, chemical retted, enzyme retted are presented in the Table-I

TABLE-I
TENSILE STRENGTH OF EXTRACTED HELIANTHUS ANNUUS FIBER

S.No	Samples	Mean strength In(MPa)	Standard deviation	"F"ratio
1.	WRF	216.16	1.09	35.018**
2.	CRF	208.20	0.94	
3.	ERF	210.35	0.86	

** - Significant at 1% level ($p<0.01$)

From the above Table-II and Figure- 2 it is clear that the sample WRF shows the maximum strength by 216.16 followed by the sample CRF with its mean value as 208.20 and ERF as 210.35. The least value based on the tensile strength is seen in the sample CRF and highest in WRF. The reason for an increase in strength by the sample WRF may be absence of chemicals during fiber extraction. The WRF sample utilizes only immersion of the fibers, thereby maintaining the actual properties of the fiber whereas the CRF technique involves chemicals that detoriate the fiber properties during extraction. The reason for ERF sample decrease the strength when compared to WRF sample may be because of the immersion of the fibers in the water and enzymes. The "F" value proved the strength of WRF, CRF and ERF to be significant al 1% level.

Hence if could be concluded that the sample WRF has the maximum strength when compare to other fiber processing.

Elongation of fibers

The results of the fibers elongation of water retted, chemical retted and enzyme retted are presented in the Table-II

TABLE-II
ELONGATION OF EXTRACTED HELIANTHUS ANNUUSFIBERS

S. No	Samples	Mean elongation (%) of *Helianthus annuus*fibers	Standard deviation	"F"ratio
1	WRF	0.717	0.20	0.571^{NS}
2	CRF	0.710	0.17	
3	ERF	0.708	0.21	

NS – Not Significant

It is clear from the Table-III and Figure-3 that the sample WRF shows the maximum elongation percentage as 0.717 followed by the sample CRF with its mean perfect elongation as 0.710 whereas least value based on the fiber elongation is seen in sample ERF with 0.708. From the above listed sample, though CRF sample, it is low when compared to WRF.The "F" value proved the elongation of WRF, CRF and ERF to be not significant.

Hence it could be concluded that the sample WRF has the maximum elongation when compared to CRF and ERF.

Fiber Crimp

The water retted, chemical retted and Enzyme retted fibers have no crimp when visually observed.

Fiber Diameter

The *Helianthus annuus* fibers appear as in bundles. The thickness of the fiber when determined using projection microscope, it was in the range of 100-150µm. *Helianthus annuus* fibers are relative thick fiber as a result of the numerous cell ultimate's that form the fiber bundle.

CONCLUSION

The wide spread natural sources across the blue green globe can be use effectively to cater to the needs of mankind, especially textiles which has grown from personal grooming to high tech fashion and functional garments. The non availability of major natural fibers, which are known for is eco friendly and safe nature can be substituted with miner fibers. This can be extracted from different variants of various types of plant kingdom. In this view the result of this study proved that the *Helianthus annuus* could be used to extract the fibers. The water retted fibers have good strength, yield maximum amount of fibers. The physical properties proved the fiber to have newer awareness in the world of textiles.

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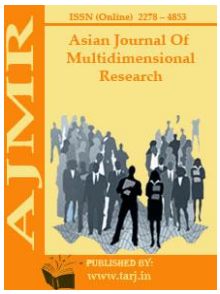

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

EFFECT OF NATURAL DYE ON SILK FABRIC FROM SELECTED SOURCES

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ABSTRACT

The Egyptians, Chinese and Indians were pioneer in natural dyeing and each civilization had a special method. The natural dyeing could be done with the use of mordants (mineral salts such as tin chloride to fix colour). Silk has been known as the "Queen of fibres" since discovery. Clothes made from silk are luxurious and have many excellent qualities including the luster, light weight, superior mechanical performance, fine, smooth texture, excellent moisture transportation, and draping quality. The aim of the study is to evaluate the performance of dyes extract from marigold, hibiscus, and rose petals on silk fabric. The dyed fabric was subjectively and objectively analyzed and tabulated.

KEYWORDS: *Calendula Officinal's, Tagetes, Hibiscus, Palmyra, Natural Dyeing, Mordant*.

INTRODUCTION:

Textiles are developing into inter disciplinary high-tech products. It has become an integrate part of everyone's life. Health hazards caused by the synthetic dyes in particular continue to be serious problem. There is a need to carrysout extensive research work for developing natural dyes which can be used as safer alternative.

Natural dyes are comprised of colourants that are obtained from natural sources without any chemical processing. Environment issues are becoming more crucial all over the world. Natural dyes, due to their eco-friendly nature serves a superior value to textiles material and apparel, because of their bio-degradable nature which are safe to flora, fauna, ecology and to our skin, (jayalakshmi, 2011).

METHODOLOGY

Selection of Fabric:

Silk referred to as queen of fibres is a luxurious fabric and has been admired for its versatility and delicacy. Silk the most tenacious, beautiful and continuous natural textile fabric given to mankind by nature is known for its draping quality, excellent wear, comfort, elegant appearance, brilliance of dyed colors and good covering power.

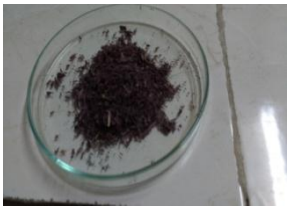
Selection of Sources:

Marigold

Marigold flower a major source of carotenoids and Lutin, is grown as a cut flower and in addition being grown for its medicinal values. Marigold leaves and flowers in particular have been used for various disorders. (Kannadasan, 2013).

Hibiscus rosa-sinensis

Hibiscus Rosa-Sinensis a well known member of the family Malvaceae, Hibiscus rosa-sinensis grows as an evergreen herbaceous plant.Grown in different regions of Asian continent, these beautiful flowers are denoted by several other names such as China rose (Anil kumar, 2012).



Rosa damascena:

Rosa damascena mill L, commonly known as Damask rose is known as Gole Mohammadi in Iran.Apart from the use of R. damascena are principally cultivated for using in perfume, medicine and food industry,(Boskabady et al. 2006,).

Palmyra Tree

Borassus flabellifer Linn. belongs to family Arecaceae, commonly known as palmyra palm. The palmyra tree was used for avoid the skin irritation of using the natural dyeing process,(Pramod HJ, 2013).

Mordant

Dyeing of fabrics with natural dyes often leads to problems such as narrow shade range, and lower color fastness of the dyed textiles. In addition to creating affinity between dye and fibre, the use of mordants also change the hue of certain dyes,(Manhita et al., 2011).

Mordanting Technique

Mordanting is the treatment of textile fabric with metallic salts or other complex forming agents which bind the natural mordant mordant able onto the textile fibres. Mordanting can be achieved by either pre-mordanting, post- mordanting and simultaneous mordanting.

PRE- TREATMENT OF FABRIC

The aim of the preparatory process is to improve the quality by removing impurities and foreign matters thoroughly and uniformly from the fabric and makes the fabric suitable for follow up process.

Degumming

True characteristic of the silk fabric like luster, brightness, whiteness etc. are hidden in raw silk. It is very essential to degum the raw silk properly. Otherwise a film of sericin will prevent the effective penetration of dyestuff, resulting improper dyeing. Degumming has to be carried out effectively and hence degumming is called the heart of processing.

Recipe

Weight of the Material - 284 gms
MLR - 1:10
Wetting agent - 0.5 g/l
Natural soap - 44 g/l
Soda ash - 2g/l
Temperature - 90oC
Time - 90 – 120 min

Procedure

The selected material was degummed in a bath containing 20gm of natural soap, 2g of soda ash and 0.5 g of wetting agent in 100 ml of water MLR 1:10 at 90oC for 1 ½ - 2 hours. Cool down to 70oC and then switch off the bath. After degummed the material is washed thoroughly with warm and cold water successively.

Bleaching

Bleaching is removal of yellow colour matter from the raw silk. Bleaching helps to add desired colour to the silk. The following recipe was followed for bleaching.

Recipe

Hydrogen peroxide - 2 per cent
Sodium silicate - 3 per cent
Wetting agent - few drops
Soda ash - 2 per cent
MLR - 1:20
Time - 30 min
Temperature - 90oC

Procedure

The selected material was bleached in a bath containing 2gm of hydrogen peroxide, 3gm of sodium silicate, 2 gm of soda ash and few drops wetting agent in a 100ml of water MLR 1:20 at 90oC for 30 min. After bleaching the material was taken out and rinsed thoroughly and dried.

PROCEDURE FOR DYEING THE FABRIC

The silk samples were dyed by the optimized parameters given below.

Recipe:

Material liquor ratio - 1:50
Dye soaking time - 1 hour
Dye extraction temperature - At boil

Dye temperature - At boil

pH for dyeing and mordanting – 7

Dye extraction medium - Aqueous medium

The dyed samples were taken out rinsed thoroughly and soaping was done by boiling the samples with 2g/lit of non-ionic detergent powder at 60oC for two minutes. Finally the sample was rinsed and dried at the shade.

Dye Solution

Dyed Sample

RESULTS AND DISCUSSION

Fabric Weight:

From the Figure 1 it is evident that fabric weight of dyed silk fabric increased by (16.07%) when compared to original fabric. The increase in weight is due to dyeing of the fabric.

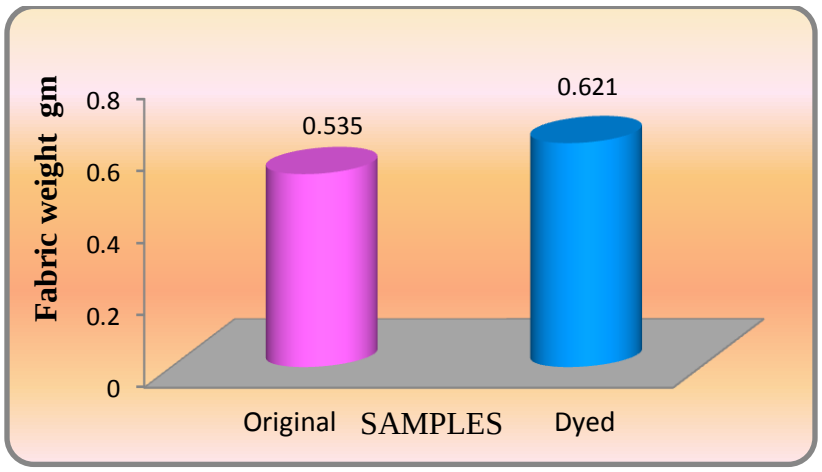


Figure 1 Fabric Weight

Fabric Strength:

From the Figure 2 it is evident that tensile strength of dyed silk fabric was increased by (20%) when compared to original fabric. After treatment of original fabric the tensile strength has increased.

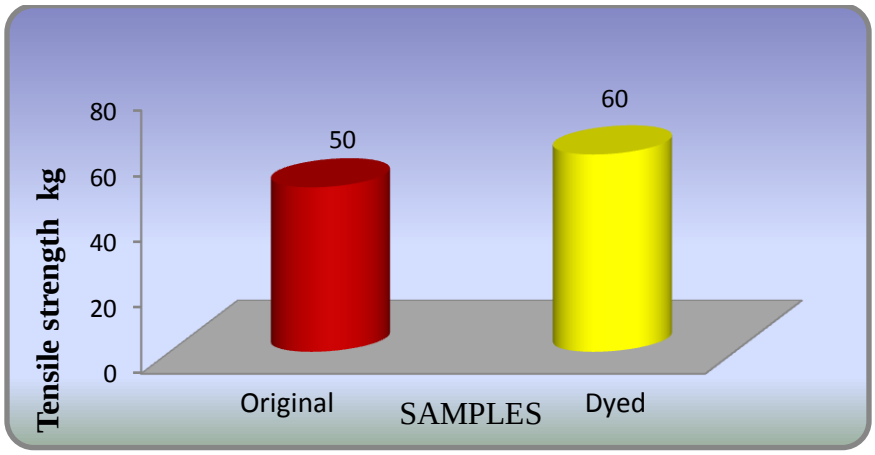


Figure 2 Fabric Strength

Abrasion Resistance:

From the Figure 3 it is evident that abrasion resistance of dyed fabric was increased by (33.3%) when compared to original fabric. The processing of silk shows improvement in abrasion.

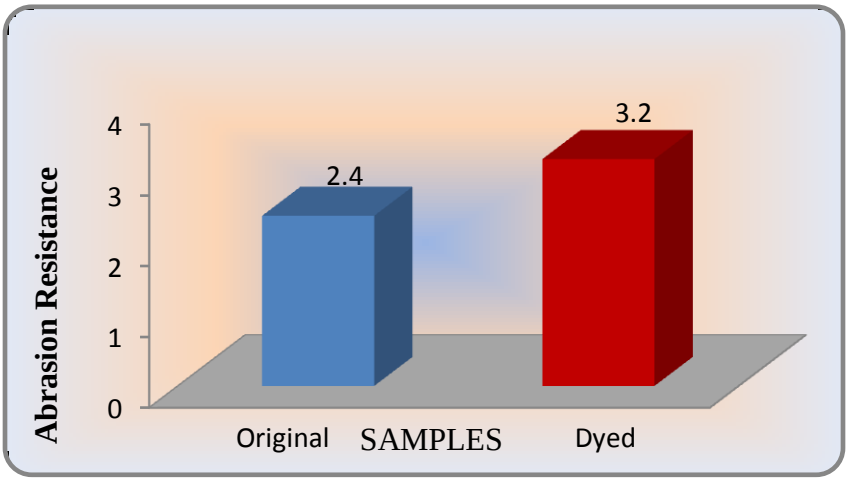


Figure 3 Abrasion Resistance

Drapability

From the Figure 4 it is evident that the drapability of dyed silk fabric was decreased by (12.20%) when compared to original fabric.

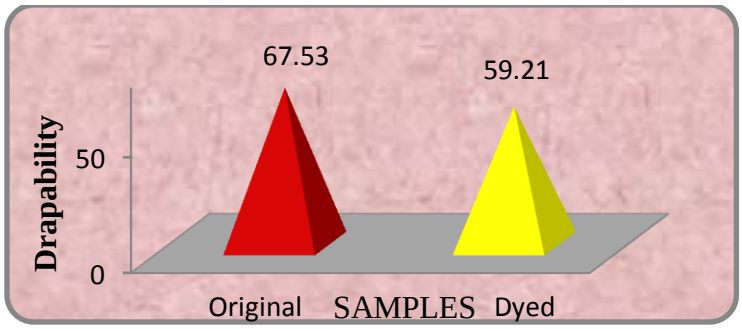


Figure 4 Drapability

Sinking Test

From the Figure 5 it is proved that the sinking level of dyed silk fabric was increased by (77.68%) when compared to original fabric.

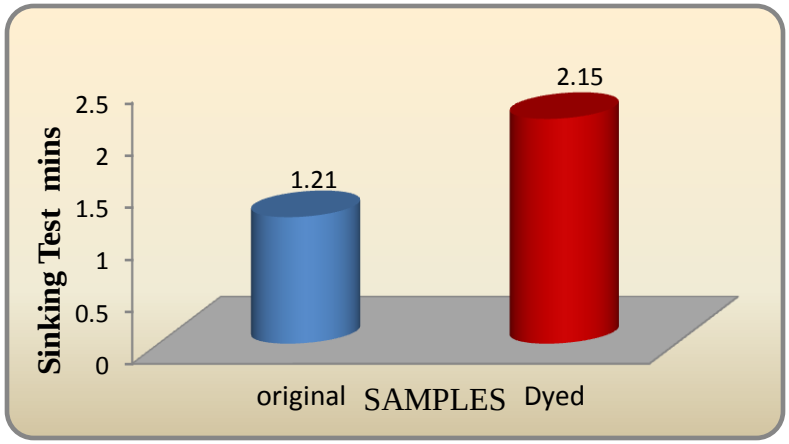


Figure 5 Sinking Test

Colour Fastness to Sunlight, Washing, Pressing and Crocking

Colour fastness to sunlight showed a excellent result. The colour fastness to washing is showed a result of very good. In the wet condition the result was very good and the dry condition of crocking test ranked a excellent, and there was no colour bleeding.

Colour fastness to pressing in both wet and dry conditions was done. In pressing the wet conditions result was excellent. But in dry condition of pressing there is slight difference of dyed fabric and showed a very good result.

CONCLUSION

As natural dye shows non-toxic, non allergic effects and results in less pollution as well as less side effects, it has become a thrust area in the field of textile dyeing research. Natural dyes are not only biodegradable, but also have medicinal properties like anti-bacterial, anti-inflammatory, and anti-allergic etc..Hence the silk fabric dyed with the selected flowers can find wide application in medicinal textiles and this can be commercialized.

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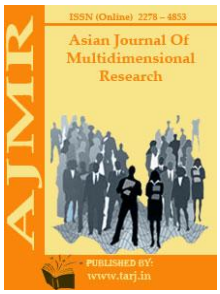

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EXTRACTION OF DYEFROM SHOREAROBUSTASAW DUST ANDITS APPLICATION ON COTTON FABRIC

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ABSTRACT

This study aimed at exploring the possibility of using the sawdust of Shorearobusta (Sal) wood as a natural colorant, which is abundantly available as a waste from saw mill. Natural dye was extracted using different solvents such as water, alkali and acid using conventional extraction method. The effect of different solvents on the yield of colorant was investigated. The selected cotton fabric was dyed with the extracted dye solutions. Alum was selected as mordant for dyeing. The dyeing was performed by exhaustion at 90 ^{0} C for 60 minutes. The dyed samples were analyzed for color yield and fastness properties. It can be concluded that extraction medium influences the dye yield and sawdust of Shorearobustacan be a potential source of natural dye.

KEYWORDS: *Shorearobusta, Natural Dye, Extraction, Saw Dust, Colourfastness*

INTRODUCTION

Natural dyestuff and dyeing has been used by humans for purposes varying from coloration of food substrate, cosmetics, leather as well as textile colorant from pre-historic period (Tamilselvi et al., 2013). Barks are typical sources of natural colorant which have the greatest natural source and produce a large variety of pigment compositions and when used will not be harmful to the atmosphere. The bark of Sal plant can be used as natural dye and widely available in the natural ecosystem of India and other countries. So the raw material is easily available and has good potentiality for dye extraction. The dye extracted from *ShorearobustaGaertn.f.* bark has been used in dyeing of silk(Sahoo et al. 2014). The main objective of the present study is to extract dye from saw dust using different solvents.

METHODOLOGY

Dye source

The *Shorearobusta* saw dust was collected from Bhavani Wood Works, Saibaba colony, Coimbatore, Tamilnadu.

Fabric

Desized, scoured and mercerized 100% cotton fabric was selected for the study. It was purchased from NTC, Coimbatore

Extraction of dye

The extraction methods of plant or vegetable dyes basically depend on the medium in which the dye is extracted. In the present study, three methods of extraction of natural dyes were carried out.

- **Aqueous extraction**

5g of the saw dust of *Shorearobusta*was soaked overnight in 100ml of distilled water and the mixture was placed in the water bath heating at constant temperature of 90ºC for 60 minutes. The mixture was filtered using a Whatman No.1 filter paper and the filtrate was kept at 4 ºC .

- **Alkaline extraction**

One percent alkaline solution with addition of 1g of sodium carbonate in 100ml of distilled water was prepared. Saw dust of *Shorearobusta*(5g)was soaked overnight in the alkaline medium and the mixture was placed in the water bath heating at constant temperature of 90ºC for 60 minutes. The mixture was filtered using a Whatman No.1 filter paper and the filtrate was kept at 4 ºC .

- **Acidic extraction**

One percent acidic solution with addition of 1ml of hydrochloric acid in 100ml of distilled water was prepared. Saw dust of *Shorearobusta*(5g)was soaked overnight in the acidic medium and the mixture was placed in the water bath heating at constant temperature of 90ºC for 60 minutes. The mixture was filtered using a Whatman No.1 filter paper and the filtrate was kept at 4 ºC .

Fabric Dyeing

The natural dye extracted from aqueous, acidic and alkali medium were used for dyeing the selected cotton fabric without mordant and with Alum as mordant by keeping M : L ratio 1:30. Dyeing was carried out at 90ºC for 60 minutes

Post Mordanting

The dyed cotton fabric samples were treated in 10% Alum solution for 1 hour in a water bath at 60 degree Celsius and then washed thoroughly in distilled water as part of post mordanting (Saravanan and Chandramohan, 2011).

Colorfastness Tests

The dyed cotton fabric samples were tested forColourfastness to washing, light, perspiration and rubbing.

Measurement of colour strength

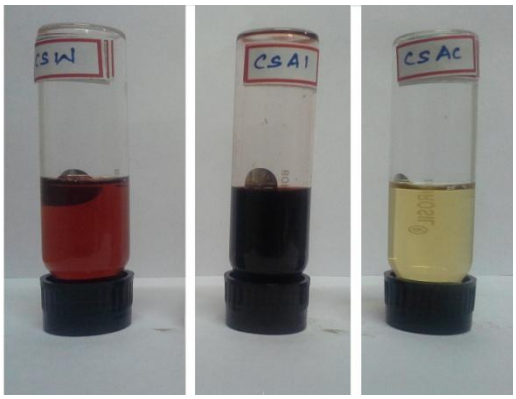
The spectral reflectance of the of the dyed cotton fabric was measured using SS 5100H dual beam spectrophotometer provided by Premier Colorscan Instruments Pvt. Ltd, Navi Mumbai, India. The K/S values were calculated by the Kubelka-Munkequation $\mathbf{K/S = (1-R)^2 / 2R}$, where R is the reflectance of dyed fabric at λmax. K is the absorption coefficient and S is the scattering coefficient. The CIELab values were determined for all the dyed samples.

Results and Discussion

Extraction of dye

The natural dye was extracted from *Shorearobusta*saw dust using different medium such as aqueous, alkaline and acidic. The color yield was found to be higher in alkaline extraction method when compared to other medium as shown in Figure 1.

Figure.1 Dye Extract of Shorearobustasaw dust in different medium



Water extract Alkali extract Acidic extract

Dyeing

The selected cotton fabric was dyed without mordant (UT) and with alum as mordant (MT). The colour obtained was presented in Table 1.It was observed that the dye uptake was good with alkaline dye extract mordanted with alum.

TABLE.1 COTTON FABRIC DYED WITH SHOREAROBUSTASAW DUST CRUDE EXTRACT

Extraction Medium	UT	MT
Aqueous		
Alkali		
Acidic		

Colour measurement

The fabric dyed using*Shodrearobusta*dye extracts were subjected to reflectance measurement.

TABLE 2. COLOUR MEASUREMENT VALUES OF VARIOUS COTTON FABRIC

Medium	Samples	L*	a*	b*	c*	H*	dE*	K/S
Aqueous	UT	74.290	3.160	10.127	10.609	72.641	--	6.392
	MT	79.316	0.961	22.290	22.311	87.496	13.343	19.066
Alkali	UT	70.150	5.633	9.217	10.823	58.849	--	8.685
	MT	**72.406**	**6.122**	**16.130**	**17.253**	**69.188**	**7.245**	**23.273**
Acidic	UT	75.478	2.366	10.049	10.324	76.720	--	5.766
	MT	79.677	-0.244	20.131	20.132	90.730	11.229	17.943

UT – without mordanted ; MT–with Alum mordanted

As shown in Table 2. K/S was measured for cotton fabrics and CIE lab values.

From the Table 1 & 2 shows the different shades of colour and colorimetric values of dyed cotton fabric with out mordanted and post mordanted with alum n different medium. dyeing with different medium imparted a shade change yellow and brown. It can be seen that thealkali medium of Alum postmordantedfabric showedlower value of lightness shows darker shade for cotton. Among the dyed fabric, maximum color value (K/S = 23.273) was obtained withalkaline extraction mordanted with alumand the lowest color value was shown by the fabric dyed with the Acid extract.

Fastness properties

The fastness properties of dyed cotton fabric are shown in Table 3. It was observed that, dyeing with *Shorearobusta*saw dust extracted using alkaline medium gave good washing, light and rubbing fastness properties as compared with aqueous and acid extraction. The alkaline extract also was found to be very effective in the Alum postmordanted cotton fabric.

TABLE 3. FASTNESS PROPERTIES FOR COTTON FABRIC DYED WITH SHOREAROBUSTASAW DUST

Samples			**UT**	**MT**
Washing	Aqueous		4	4
	Alkaline		4	4-4/5
	Acidic		3-4	4
Light	Aqueous		4	4
	Alkaline		4	4-5
	Acidic		3	4
Rubbing	Aqueous	Dry	3-4	3-4
		Wet	3	3
	Alkaline	Dry	3	3
		Wet	3-4	3-4
	Acidic	Dry	3-4	3-4
		Wet	3	4
Perspiration	Aqueous		3	4
	Alkaline		4	4/5
	Acidic		3	4

CONCLUSION

The present work shows that, saw dust of Shorea*robusta*can be used as dye source for textile coloration. These are available throughout world and at low cost, economical and easily availability. Different shades of color can be obtained using different medium of extraction. The alkaline medium yielded the most effective coloring properties. The washing, light and rubbing and perspiration fastness properties with alum mordanted fabric were quite good among all variations discussed. The dye has good scope in the industrial dyeing of cotton.

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ECO-FRIENDLY DYEING OF COTTON FABRIC WITH A NATURAL DYE EXTRACTED FROM LEAVES OF "MIMOSA PUDICA"

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ABSTRACT

Natural dyeing is a technique to dye the textile fabrics with the colours extracted from natural sources like plants, animals and minerals, microorganisms etc. they are eco-friendly, biodegradable and non-carcinogenic in comparison to synthetic dyes. Almost all synthetic dyes are being synthesized from petrochemical sources through hazardous chemical processes poses threat towards its eco-friendliness hence, worldwide growing consciousness about organic value of eco-friendly products has generated renewed interest of consumers towards use of textiles dyed with eco-friendly natural dyes .In this study the leaves of mimosa pudica a sensitive plant is taken as a natural source for dyeing. Conventional method is used for dyeing. Dyeing was carried out on cotton fabrics to impart the comfort and good absorbency properties. After dyeing the fabrics was tested for its physical properties such as thickness, GSM Weight, sinking and wicking.

KEYWORDS: *Natural Dyeing, Mimosa Pudica, Bio-Degradable, Physical And Absorbency Properties.*

INTRODUCTION

Eco friendly Cloth is a prehistoric technique of dyeing textiles in natural herbs. When exposed to skin, the herbs are absorbed into the body and may function as a means of providing ayurvedic treatment for a broad range of skin diseases. Herbal Cloth garments are 100 percent organic, completely free of synthetic chemicals and toxic irritants, and biodegradable.Natural dyes are dyes or colorants derived from plants, invertebrates or minerals. The majority of natural dyes are vegetable dyes from plant sources roots, berries bark leaves and wood &other organic sources such as fungi and lichens. The word natural dyes derived from the natural sources like plants, animals and minerals. Natural dyes are mostly non-substantive and must be applied on textiles by the help of mordants usually a metallic salt. For ready availability of pure synthetic dyes of different types/classes and its cost advantages most of the textile dyers/manufacturers shifted towards use of synthetic colorant Almost all synthetic dyes are being synthesized from petrochemical sources through hazardous chemical processes poses threat towards its eco-friendliness hence, worldwide growing consciousness about organic value of eco-friendly products has generated renewed interest of consumers towards use of textiles dyed with eco-friendly natural dyes .The purpose of colouring textile material was initiated using colours of natural source, until synthetic colours/dyes were invented and commercialised. Cotton is the" king of fibres "cotton is the natural vegetative fibre and it is the oldest and important textile fibre and has a great economic importance as a raw material for textile cloth [Moses 2005].It is a soft fluffy staple fibre that grows in a boil or protective capsule around the seeds of the cotton plants of the genus gossypium in the family of malvaceae. The fibre is almost pure cellulose.

Mimosa is known as a sensitive plant and it is a small short –lived shrub. Mimosa belongs to the taxonomic group magnoliopsida and family *mimosaseae*. In Latin it is called as *mimosa pudicaLinn*. Mimosapudica is native to South America and Central America. Mimosa pudica was first formally described by Carl Linnaeus in species plant arum in 1753. Mimosa is usually a short prickly plant with its branches growing close to ground. Environmental issues are becoming more crucial all over the world .natural dyes due to their eco-friendly naturally serves a superior value to the textile material and apparel because of their bio- degradable nature which are safe to our skin.Naturally dyed materials have good resistance to moth invasion. Most of the naturally dyed materials are non-toxic therefore non-hazardous to health [DR. A.A. ANSARI 2000].

OBJECTIVES:

- To select a suitable natural dye source and mordants.
- To optimization of extraction and dyeing parameters.
- To dye the sample using extracted dye solution.
- To study the dyed fabric properties.

METHODOLOGY

SELECTION OF NATURAL SOURCE:

The natural dye source is selected based on the easy application, affordable cost and colour. The leaves of mimosa pudica are selected for a study. The fresh leaves of ***mimosa pudica*** were collected from the botanical garden. Then the leaves of M.pudica washed with distilled water to remove dirt and soil, and were shade dried. Then the dried leaves were grind to make a powder,

the powdered source were extracted using *dip & dry method*. And the extract was used for dyeing the cotton fabrics. [Nilesh Kumar 2009]

SELECTION OF THE FABRIC:

Cotton is a soft, comfortable fibre and most widely used cellulosic material for apparel purposes. Cotton is the part of our daily life and it has hundreds of uses from blue jeans to shoe strings. Clothing and household items are the largest uses, but industrial products account from many thousands of bales. All the parts of the cotton plant are useful; the most important is the fibre or lint which is used in making cotton cloth. Cotton is widely used for apparels due to its high comfort.

Gossypium

PRE-TREATMENT OF THE FABRIC FOR DYEING:

The aim of preparatory processes is to improve the quality by removing the impurities and other foreign matters thoroughly and uniformly from the fabric and make the fabric more suitable for

the further processes. Desizing plays a major role in achieving a perfect fabric feel; it is a process of removing starch from the material.

DESIZING

Desizing is the first preparatory process to improve the quality of the fabrics. Desizing is the process of removal of size material applied on warp threads of a fabric to facilitate the process of weaving. Sizing is the necessary operation in which it provides sufficient strength to withstand the friction and abrasion during weaving process.Desizing is the process of removing the starch from the fabric .In Desizing the starch can be degraded into soluble substances using acids, oxidising agents and enzymes. ImproperDesizing results in improper dyeing [modak 2011].

SELECTION OF MORDANTS:

A mordant is a substance used to set dyes on fabrics by forming an insoluble compound with a dye [chinta 2008] .Mordant is metallic salt that facilitate the bonding of the dyestuff to the fibre. Natural dyes need to use the mordants for colour fixation.

Selection of mordant:

Pomegranate rind was used for mordanting, these were collected from the garden and both were dried under sunlight. Then grind them to make a powder and used as a mordant for this study.

Pomegranate rind used as mordant

Selection of mordanting technique:

There are three types of methods for application of mordants based on the time of usage they are as follows:

- Pre-mordant
- Simultaneous mordant
- Post-mordant

Pre-mordant:

In this method the fabric is first soaked in mordant and then boiled in the dyestuff.

Simultaneous mordant:

In this technique the mordant as well as the dye is mixed together and the fabric is soaked and boiled in its mixture.

Post mordant:

In this method the fabric is first boiled in the dyestuff and then soaked in mordant solution [gulrajani 1993].

Fabric dyed with mimosa pudica leaves.

SELECTION OF EXTRACTION METHOD:

Conventional or existing method of extraction:

The leaves of mimosa pudica were air dried in the shade and ground into a fine powder. The powder was gradually dissolved in distilled water at a ratio 1:20 at room temperature. (Suebkampet et al., 2012). Extraction process is carried out at a temperature range of 80-85°c for 1 hour. The extract was collected by initially filtering with gauzes. The Colouring materials from the leaves are extracted to dyeing the fabric. (Saha et al., 2003). Finally fabric was kept under the shade.

OPTIMIZATION PARAMETER:

The desized cotton fabric was taken and dyed them at three different concentrations of dye such as 3 Gms, 6Gms, and 9gms. These were mixed with 100 ml of water at 90c .for a period of 60 minutes.

S.no	Sample. No	Amount of source (g)	Time (minutes)	Temperature	M.L Ratio
1	A	3G	60 MIN	90 C	1: 20
2	B	6G	60 MIN	90 C	1: 20
3	C	9G	60 MIN	90 C	1: 20

Evaluation

Fabric weight:

Weight measurement of a fabric is often a prerequisite for subsequent tests of other fabric properties. If fabric weight or dimension is not kept constant or normalized then the test results will not be comparable. Fabric weight is the weight of yarn per square meter in a woven fabric, which is the sum of the weight of the warp and the weight of the weft. The fabric weight is expressed as grams per square meter (g/m^2). This information is useful to determine the

frequency with which new weft supplies and new beams will be required while weaving a fabric (Gordon, 2006).A sample of 10 × 25 cm was cut using a GSM cutter. It has sharp blades which penetrate onto the fabric when pressure is imparted with a slight twist. The weight of the cut samples was found using Electronic Weighting Balance.

GSM cutter & weighing balance

Fabric thickness

This is one of the basic properties of a fabric, giving information on its warmth, heaviness, and stiffness in use. Since fabric is sensitive to the pressure used in thickness measurement, it is difficult to measure fabric thickness with satisfactory accuracy. Usually, a thickness gauge, micro meter, FACT – 1[1] or KES – FB3[2] is used to obtain standard thickness or a thickness – pressure curve for a fabric.The standards ASTM D1777 and ISO 5084 describe several test methods for fabric thickness testing (Yan, 2006).Thickness Tester has a broad anvil, upon which a pressure foot is pressed by spring. The detail indicated the thickness of the material in thousands of an inch between the anvil and the pressure foot. Each division of the dial read 0.01 mm. The sample was placed on the anvil without tension or creases and the pressure foot was lowered onto the sample for two seconds at 2 kg pressure.

Thickness gauge

Sinking test

Sinking test is a simple test for the wettability of fabric. The time taken for the material to sink below the surface is observed. The shorter the time, the greater is the wettability (Paul, 2005). For the test, samples were cut in size of 5 × 5 centimetresquare. A 100 ml beaker was filled with distilled water. The original and natural dyed cotton fabrics were dropped from the surface of water from a standard height individually. The stop watch was started when fabric struck the surface of water and stopped when the last corner sank below the water surface and the time required for the sample to sink was noted. The same procedure was followed for all samples. The mean value was calculated.

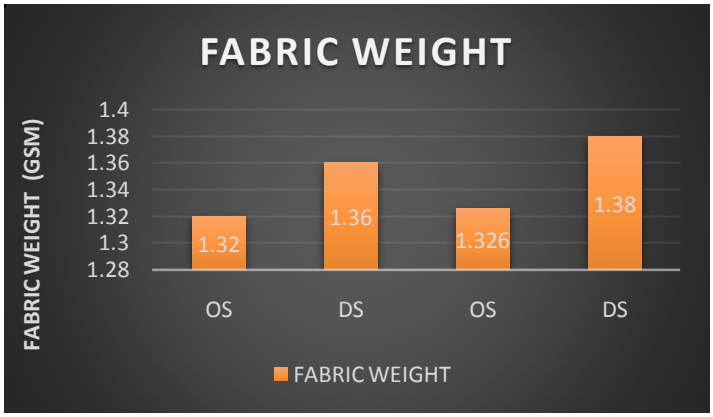
Wicking test

The test measures the rapid absorption. Three samples were cut into the size of 15 centimetre length and 2.5 centimetre breadth from the original, desized cotton fabric. One end of the sample is placed in a glass rod and other with a two gram weight attached to keep the sample straight. The sample placed in the glass rod was placed on heavy wooden blocks. The sample was allowed to immerse in the tray of distilled water. The rise of water level in the strip was measured. The same procedure was repeated for all the samples from the same materials. The mean value was calculated.

RESULT AND DISCUSSION:

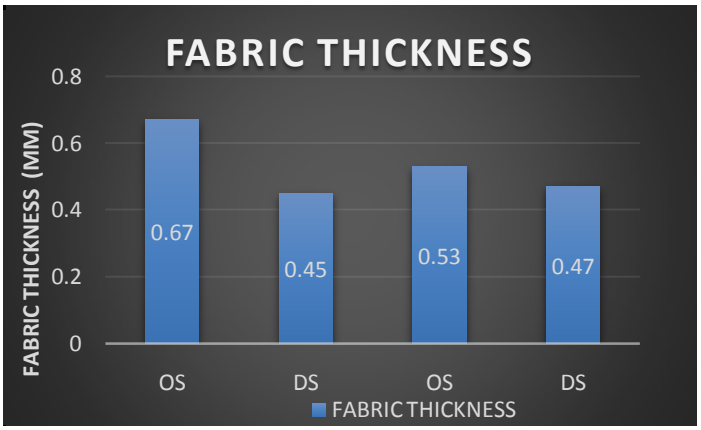
Fabric Weight:

The fabric weight of the original and dyed fabrics is given in the figure 1. From the above Figure 1, it is evident that the OS and DS were recorded. The weight is increased in DS than the OS; this is due to because of imparting Mimosa pudica leave powder as source.



Fabric Thickness

The fabric thickness of the original and dyed fabrics is given in the figure 2. From the above Figure 2, it is evident that the thickness of OS and DS was recorded. There was loss of thickness in DS than the OS. This is due to the process of dyeing with ***mimosa pudica***leaf powder as a source.



Sinking test

The fabric sinking characteristics of the original and dyes fabrics are evaluated and presented in the Table III

. **Table III.**

S.no	Time constant	Extended absorbency	
		Desized sample	**Dyed sample**
1	1 MIN	1.5 CM	4 CM
2	1 MIN	2.5 CM	3.9 CM

From the above Table III and Figure 3, it is evident that the sinking characteristics of the OS and DS. The wettability of DS was decreased when compared to OS. This may be due to the application of dye. Three samples of both desizedfabric and naturally dyed sample is taken and the time noted to sink completely Thus the naturally dyed sample takes less time to sink completely compared to desized sample.

Wicking test

The fabric wicking characteristics of the original and dyed fabrics were evaluated and presented in the Table IV.**TABLE IV**

S.No	Time	Original Sample	Dyed Sample
1	**1 min**	**1 cm**	**2.5 cm**
2	**1 min**	**1 cm**	**2 cm**

From the above Table IV and Figure 4, it is evident that the wicking characteristic of the OS and DS was recorded. DS absorbs more water than the OS. This may be due to application of dye.

CONCLUSION

Natural dyes are dyes or colorants derived from plants, invertebrates or minerals. The majority of natural dyes are vegetable dyes from plant sources roots, berries bark leaves and wood &other organic sources such as fungi and lichens. The word natural dyes derived from the natural sources like plants, animals and minerals. Natural dyes are mostly non-substantive and must be applied on textiles by the help of mordants usually a metallic salt. For ready availability of pure synthetic dyes of different types/classes and its cost advantages most of the textile dyers/manufacturers shifted towards use of synthetic colorant. Almost all synthetic dyes are being synthesized from petrochemical sources through hazardous chemical processes poses threat towards its eco-friendliness hence, worldwide growing consciousness about organic value of eco-friendly products has generated renewed interest of consumers towards use of textiles dyed with eco-friendly natural dyes .The present shows that the "***mimosa pudica"*** leave powder dyeing potential as a source for cotton dyeing. The dyed sample has good dye affinity in it. The synthetic dye has caused serious threat to the environment and hence nowadays synthetic dyes have been replaced by natural dyes .This natural dyeing process reduces the environmental impact and keeps the environmental clean.

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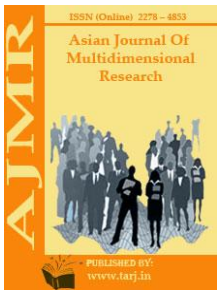

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UGC APPROVED JOURNAL

TREATMENT AND ANALYSES OF ABUTILON INDICUM FIBRES FOR FABRICATION

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ABSTRACT

Natural Fibres have shown substantial influence in range of applications which was previously dominated by synthetic fibres. Nowadays natural fibres are obtaining more attention due to its properties like economical, eco-friendly, bio compatibility, non-toxicity, bio degradation and abundant availability. The Abutilon Indicumis a natural bastfibre which is obtained from Malvaceae family. This paper deals with the treatment and analyses of essential properties of Abutilon Indicumfibres. The fibres were extracted from the bast portion of the plant, treated and analyzed for the properties of chemical constituents, micro structure and mechanical properties. The properties of Abutilon Indicumare compared with other natural fibres to innovate a product suitable for technical textiles. Natural fibres have come a long way during the last few years; these fibres have established a progressive and highly regarded name for themselves and numerous end uses. Recently more researches are carried on natural fibre composites. Natural fibre composites are very cost effective particularly in construction, packaging, automobile and geo textiles. These natural fibre composites are the replacement of synthetic materials. Natural fibres allow insulation properties higher than present materials. Natural fibre composites have a tendency to absorb water and moisture from the atmosphere which deforms the composite structure.This may be prevented by converting the thermal bonding structure into a composite structure instead of directly preparing composites from the natural fibres. By the acid and alkali treatments fibres have improved the moisture regain and moisture content.

KEYWORDS: *Natural fibres, Abutilon Indicum, Mechanical properties, Thermal bonding*

INTRODUCTION

Natural Fibre have shown significant contribution in variety of applications which was previously dominated by synthetic fibres. The advantages of using natural fibre are that they are economical, eco-friendly, bio compatibility, non-toxicity, bio degradation and abundance in availability[1,10]. Hence they are getting more attention for replacing synthetic fibres[2,8]. Natural fibres extracted from bast of trees, stem, leaves, and roots of plants[3]. Existing natural fibres are not sufficient to replace the synthetic fibres so new plants have to be finding to meet today's demand[4]. In this regard the abundant availability of the bast fibre*Abutilon Indicum*is utilized in effective means and it may be developed and used in the field of technical textiles.The *Abutilon Indicum*plants have two hundred species are available in this malvaceae family some are grown as ornamental plant[5]. The plants have medicinal properties where the stem, leaf and roots are used in siddha to cure diseases[6]. The plant is dried and powdered and used in siddha for various health issues. The plant has flowers which are in yellow, orange and purple color. Italso known by various names in different regions such as PerumTutti, PaniyaraHutti, thuthi in Tamil, Petari, Jhapi in Bengali, Vellula in Malayalam, Tutti in Kanada, Kanghi, Kakahi in Hindi and Common Name Abutilon, Indian mallow[7]. The length of the plant is about 3 – 5 feet. The stem is yellow in color, 0.3-0.9 cm in diameter with relative density of about 1.8 cm $^{-3}$, soft andflexible. It is commonly found in all places, shady waste lands which are adoptable for all climatic condition. The abutilon fibre was noted to have a diameter between 44.79 and 84.337, Cellulose content of 78.22 %, Lignin content of 6.14% and Wax of 0.47 % [3].

METHODOLOGY

Procurement of fibres

Abutilon Indicum is a plant fibre which obtained from Malvaceae family, which belongs to tropical and sub-tropical regions. General common name include Indian mallow and velvet leaf. Plant of the genus includes herbs, shrubs and trees. The height varies from 3 -5 feet. It grows naturally and also ornamental (Plate1a & b). The stalk of the plants is utilized for fibre extraction which was procured for the study.

Plate 1 a and bAbutilon Indicumplants

Treatment and Evaluation of fibres

Alkali treatment

It is reported that alkaline treatment has two effects on the fibre: it increases surface roughness resulting in better mechanical interlocking and it increases amount of cellulose exposed on the fibre surface, thus increasing the number of possible reaction sites. So the dry fibres were treated with 5% solution of NaOH for 2hours to remove the unwanted soluble cellulose, hemi cellulose, pectin, lignin, etc.from the fibre[9]. The fibre to solution weight ratio was maintained at 1:25. After 2hours the fibres washed thoroughly in distilled water to remove excess of NaOH and dried at 60^{o}C for 24h.

Acid treatment

The fibres of 25 grams weight were treated with normal Hcl which consists of 0.1ml Hcl mixed with 100 ml water. It was kept for 30 minutes at room temperature. Then it was washed with distilled water to remove the excess acid adherence. This was dried for 24 hours in shade.

These alkali and acid treated fibres were evaluated subjectively and objectively. Subjectively it was mounted on a board and kept for visual evaluation. Objectively it was evaluated for strength, elongation in Zwick/Roellequipment as per ASTM standards in SITRA, the moisture content and moisture regain as per IS 199:1989:RA-2016 and also microscopic appearance was observed. Based on the test results the fibres were then utilized for further study.

Fabrication and Evaluation

The *Abutilon Indicum*fibreswere converted into thermal bonded structure.For this low melt fibre namely PET was used. The quantity of 25 percent of PET fibres and 75 percent of *Abutilon Indicum*fibres were taken and mixed thoroughly manually. This was then fed into carding machine which comprised of liquerin opener, flat roller, doffer, guide roller, shell roller and synthetic roller. The speed of the feed roller was kept at 125 rpm. The cylinder speed was adjusted to 525 rpm. Thus the web was obtained from this machine.(Plate 2)

Thus formed web was fed into the thermal bonding machine. The web was wound in the Teflon sheet and sent into the bed of the thermal bonding machine. Then the temperature was adjusted to 200^{o}C. Thus the thermal bonded structure 30 cms width and 100 cms lengthwas obtained (Plate 3).This thermal bonded fabric was evaluated for basic properties namely weight, thickness and absorbency.

Plate 2 -Carding

Plate 3 -Thermalbonding

Nomenclature

The nomenclature used for the discussion is given in the Table I

TABLE I NOMENCLATURE

S.No	Nomenclature	Sample details
1	AB	Abutilon Indicumfibre samples
2	ABal	Alkali treated Abutilon Indicumfibre samples
3	ABac	Acid treated Abutilon Indicumfibre samples

RESULTS AND DISCUSSION

The results obtained from the evaluation carried for fibre and fabric are discussed under the following heads.

Visual Evaluation

The results obtained for the Visual Evaluation is expressed in Table II

TABLE II VISUAL EVALUATION

S. No.	Sample Code	Color			Luster			Texture			General appearance		
		Bright	Medium	Dull	Good	Fair	Poor	Soft	Coarse	V. Coarse	Good	Fair	Poor
1	AB	-	5	95	13	85	2	-	6	94	4	16	80
2	ABal	11	86	3	88	12	-	86	14	-	12	88	-
3	ABac	98	2	-	85	15	-	89	11	-	6	94	-

From the TableII it is obvious that the sample AB showed a dull color as per the opinion of 95 percent of judges followed by sample with 98 and 86 percentages for bright and medium in the samples ABac and ABal respectively. As far as luster is concerned 85 percent of the judges expressed as fair in sample AB. The sample ABal was judged by 88 percent of them to have good luster followed by sample ABac with 85 percent. The texture of the sample AB was noted to be very coarse(94 percent) followed by 89 and 86 percentages of judges in samples ABac and ABal respectively.The general appearance of the sample AB was poor as per the expression of 80 percent judges whereas the maximum of 94 percent of judges expressed a fair texture in sample ABac followed by sample ABal with 88 percent. Hence it could be concluded that the color, luster and texture have improved on alkali and acid treatments.

Fibre Moisture Content and Moisture Regain

The results obtained for the Moisture content and the Moisture regain are expressed in the Table III.

TABLE III
FIBRE MOISTURE CONTENT AND MOISTURE REGAIN (%)

Sample Code	Moisture content	Moisture regain
AB	10.2	11.2
ABal	10.4	11.4
ABac	10.2	10.5

From the Table III it is clear that the untreated fibres of *Abutilon Indicum*AB showed a moisture content of 10.2 and moisture regain was 11.2 percent. The treated fibresABal showed moisture content of 10.4 and regain of 11.4 depicting an increase over the original whereas the ABac showed no change in moisture content (10.2percent) and a slight change (10.5 percent) over the original sample.

Microscopic appearance

The microscopic observation exhibited irregular fibre bundles in the longitudinal view in both the treated and untreated samples. The cross sectional view was observed to have irregular polygons in both treated and untreated fibres.

Fibre strength

The fibre strength and elongation are expressed in Tables IV and V and Figures I, II and III

TABLE IV FIBRESTRENGTH

Sample code	Strength	Gain %
AB	402.04	-
ABal	601.04	49.49
ABac	470.07	16.92

From the Table IV it is clear that the sample ABal showed 49.49 percent gain in strength over the original sample. The sample ABacshowed an increase in strength of only 16.92 percent. The alkali treatment gave up to a 30% increase in tensile properties for flax fiber[11]. But as far as the *Abutilon fibre* is concerned more than 49 percent increase in the tensile properties was noted.

Fibre Elongation

TABLE V FIBRE ELONGATION

Sample code	Elongation	Loss or Gain %
AB	1.17	-
ABal	1.26	7.69
ABac	1.05	10.25

From the Table V it is obvious that the elongation of the fibre sample AB was 1.17. The sample ABac showed more increase of 10.25 percent than the sample ABal which was 7.69 increase over the original. Hence it could be concluded that the abutilon fibres exhibited more increase in strength and elongation in alkali treated and acid treated samples respectively.

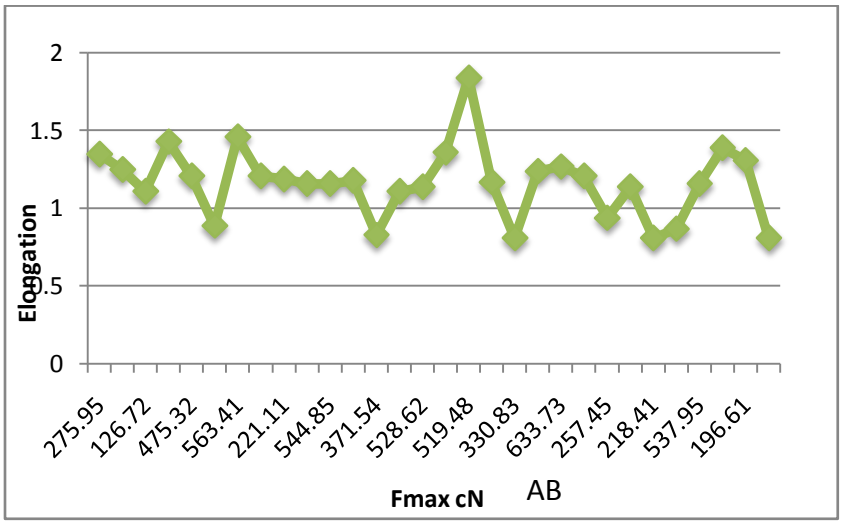

Fig. I Strength and Elongation of sample AB

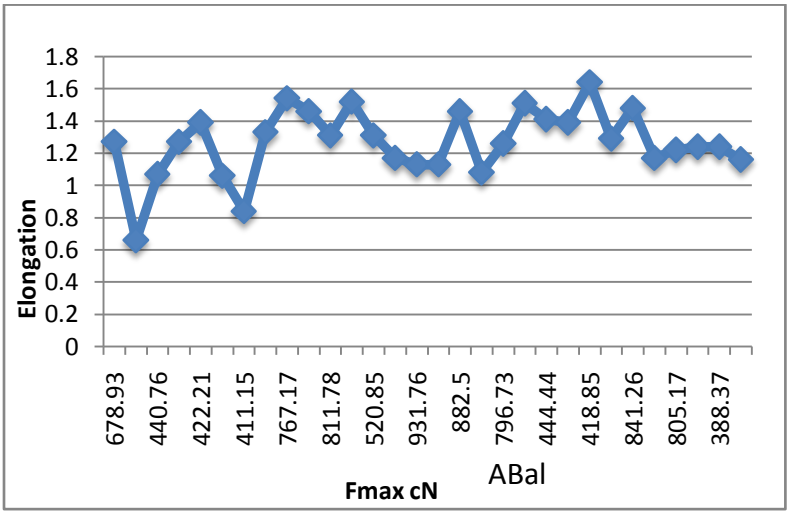

Fig. II Strength and Elongation of sample ABal

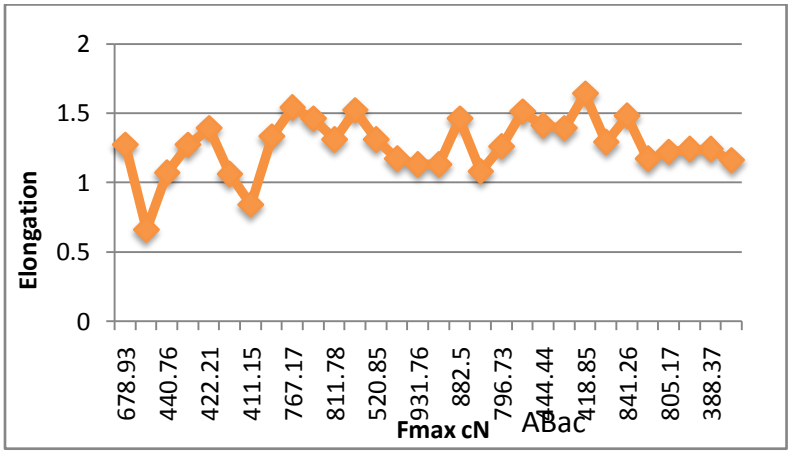

Fig. III Strength and Elongation of sample ABac

Fabric Thickness and Weight

The fibre thickness and weight are expressed in the Table VI.

TABLE VI FABRIC THICKNESS AND WEIGHT

Thickness (mm)		**Weight**
Without wt.	4.14 Kpa	**GSM**
3.5	3.3	290

From the Table VI is noted that the thickness of the thermal bonded structure was exhibited in average thickness of 3.5mm and when a load of 4.1kpa was imparted, the thickness was noted to be 3.3mm with slight decrease. This may be due to the compression of the thermal bonded structure.

Fabric absorbency

The fibreabsorbency is expressed in the Table VII.

TABLE VII FABRIC ABSORBENCY

Sinking (Min.)	**Wicking(mm)**	**Spray**
10.22	0.2	70*

***partial wetting of whole upper surface**

From the table VII it is clear that the absorbency was minimum in the thermal bonded structure from the readings shown for sinking, wicking and spray tests. The sample has taken 10.22 minutes for complete sinking, the liquid had travelled only 0.22mm in the fabric and spray test also proved that only the upper surface was wetted slightly. Hence it could be concluded that the thermal bonded structure had poor absorbency.

CONCLUSION

Alkali and Acid treatments improve the color, texture, luster and general appearance of the *Abutilon* Fibre. The alkali treatment had improved the moisture content and regainvalues slightly. The microscopic appearance did not show any alteration on treatments over the original. The fibre strength had drastic increase on alkali treatment over original. By giving acid and alkali treatment and improvising thefibre moisture content and moisture regain the absorbency may be improved in turn this may help in better composite structure preparation. The thermal bonded structure had very poor absorbency which may be utilized for such end uses.

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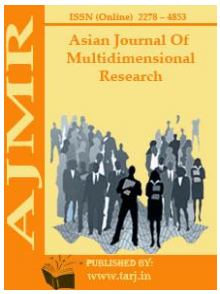

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ELICIT INFORMATION ON AWARENESS ABOUT UNDER UTILIZED PLANT FIBRES

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ABSTRACT

An appreciable utilization of plant fibres for the manufacture of industrial commodities with minimum environmental impact requires knowledge of the availability of plant fibres. A survey was conducted at Edappadi village in Salem district to elicit information on awareness about underutilized plant fibres. The information gathered were the details regarding employment of the respondents, annual income of their family, growth of under utilized crops, crops cultivated, problems faced by the respondents in agriculture, utilization of plant waste after harvest, method adopted for fibre extraction, utilization of extracted fibres, products made from extracted fibres and amount generated. The predominant problem faced by the respondents were water, labour, pest while growing crops. Though many fibre yielding food and nonfood crops grew in those areas, the people did not make the best use of the plant under utilized portions due to lack of knowledge. The aim of this paper is to review some of this basic knowledge about the requirement of natural fibres and to attempt for understanding the people's awareness about the fibre yielding under utilized plants and their prevailing usage.

KEYWORDS: *Appreciable, Underutilized, Prevailing*

INTRODUCTION

Natural fibres are excellent raw material for green products preparation. These are biodegradable, completely recyclable, and cheaper. These are also characterized by low specific weight, thermal and acoustic parameters with high hygroscopicity.[1]Apart from cotton and wool, many other known plant fibres, such as jute, banana, sisal, flax, ramie, coir have immense potentiality in sustainable product development. Due to scarcity of agricultural land and urbanization in limited areas, greater amounts of fibre are being produced[2]. Speaking at the Textiles India 2017 Conference in Gandhi Nagar, Gujarat, Union Minister for Agriculture and Farmers Welfare Minister, Mr Radha Mohan Singh said that the overall growth of natural fibre sector is important for the country's economy. They have economic importance and enormous impact on the development of the society[3].

METHODOLOGY

The methodology of the study comprised of the following steps.

a. Selection of Area and samples

The area was selected depending on the availability of the fibre yielding under utilized plants.A survey was conducted at Edappadi village in Salem district. A stratified random sample is a random samping technique in which members of the population are first divided into strata, then are randomly selected to be a part of the sample[4]. The areas were thus selected based on the availability of the plants. The sample size was 125 members belonging to different families.

b. Selection of Survey method

Interview schedule was the tool used for survey. Based on these objectives the questions were framed to obtain information. The demographic aspects were first asked by the interviewer. Then the survey was conducted at Edappadi village in Salem district to elicit information on awareness about under utilized plant fibres. The information gathered were the details regarding employment of the respondents, annual income of their family, growth of under utilized crops, crops cultivated, problems faced by the respondents in agriculture, utilization of plant waste after harvest, method adopted for fibre extraction, utilization of extracted fibres, products made from extracted fibres and amount generated.

RESULTS AND DISCUSSION

The data collected were recorded and tabulated .These are discussed under the following heads.

Employment Details of the Respondents

The employment details of the respondents are expressed in the Table- I.

TABLE I RESPONDENTS' EMPLOYMENT DETAILS

S.No	Employment Details	Respondents (%)
1	Agriculture	**48**
2	Private companies	20
3	Weavng	23
4	Driver	9
5	Government employee	6
6	Self employment	7
8	Civil job	4
9	Teacher	5
10	Others(Cable operator, Rtd. Military officer, Rtd., teacher, Software engineer, Bank employee)	5

From the Table I it is clear that the maximum of 48 percent of the respondents had agriculture as the main occupation. About 23 percent of them expressed that weaving was their main occupation followed by 20 percent of them who were employed in private concerns. About 9, 7 and 6 percentages of them expressed that they were driver, self employed and government employee. About 5 percent of them were teachers. They were also meson (4%) and cable ooperator, software engineer and bank employee. Few retired teachers and military persons were also noted.

Hence it could be concluded that the maximum of 48 percent of them were involved in agriculture.

Annual Income of Family

The annual income of the family of the respondents are tabulated and discussed below.

TABLE II ANNUAL INCOME OF THE RESPONDENTS

S.No	Income (Rs in lakhs per annum)	Rrespondents (%)
1	1-2	3
2	2-3	**49**
3	3-4	26
4	4-5	12
5	5-6	4
6	6-7	2
7	7-8	1
8	8-9	1
9	9-10	1
10	10-11	1

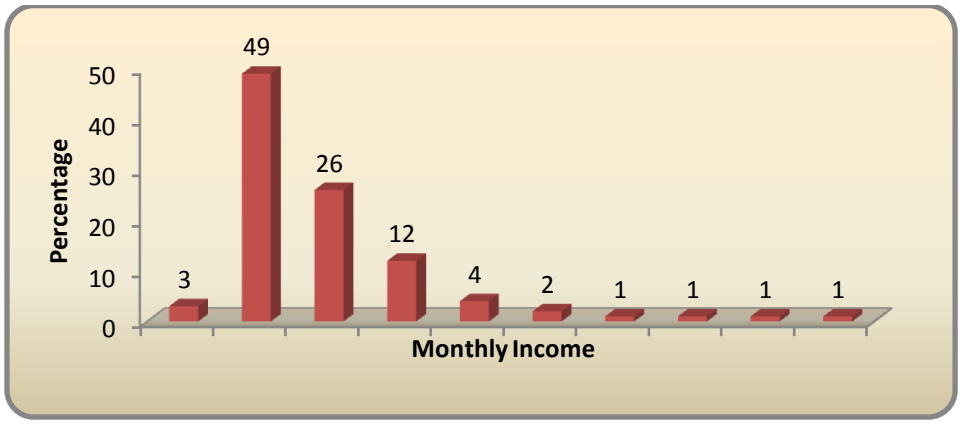

FIGURE – I Annual Income of Family

From the Table-II and Figure I, it is obvious that the annual family income of the maximum of 49 percent of respondents was between 2-3 lakhs followed by 26 percent of respondents whose income was between 3-4 lakhs, About 12%, 4% & 3% of the respondents expressed that their income was 4-5 l, 5-6 and 1-2 lakhs respectively .Only 1% of the respondents annual income was observed to be 7-8, 8-9, 9-10& 10-11 lakhs individually.

Thus from the survey it could be concluded that the maximum respondents of Edappadi village earned income between of Rs 2-3 lakhs per annum.

Growth of Under utilized and other plants

The growth of under utilized and othervplantsby the respondents is expressed in the Table –III.

TABLE –III GROWTH OF MAINTENANCE FREE CROPS

Sl No	Plants	Respondents (%)
1	Aloevera / Agave/Ablution	2
2	Aloevera/ Agave	**47**
3	Aloevera/ Water hyacinth	19
4	Aloevera/ Water hyacinth/ Agave/	24
5	Aloevera/ Water hyacinth/ Ablution/Korai	2
6	Aloevera	1
7	Aloevera/ Water hyacinth/ Korai/ Arecanut	5

From the Table III it is obvious that for the question asked about the names of the plant that grow by itself ,the maximum of 47% of respondents expressed that the plants namely Aloevera and Agave grow in their area followed by 24% and 19% of the respondents who expressed that Agave Aloevera and Water hyacinth, and Aloevera and Water Hyacinth plants grow by itself respectively.The plants namely Aloevera ,Water hyacinth ,Korai ,and Arecanut grow by itself as per the expression of 5% of the respondents Aloevera, Water hyacinth, Korai and Ablution(Thuthi) grow by itself as per the expression of 2% of the respondents .About 2% of the respondents express that Agave, Aloevera and Abutilongrow by itself, and another 2% express that Aloevera,Agave and Ablution (Thuthi) grow by itself.Only 1% of the respondents express their awareness about the growth of Aloevera plants.

Hence it could be concluded that the respondents had awareness about the growth of the under utilized plants for fibres and that the predominant plants were Aloevera and Agave

Farming crops

The farming plantsas per the expression of the respondents is presented in the Table IV. Ninety eight percent of them cultivated the plants in the available lands.

TABLE: IV FARMING CROPS

Sl No	Crops	Percentage (%)
1	Sunflower	16
2	Rice and Maize	**29**
3	Cotton	5
4	Groundnut	11
5	Hemp	10
6	Greens	9
7	Flowers	7
8	Vegetables	13

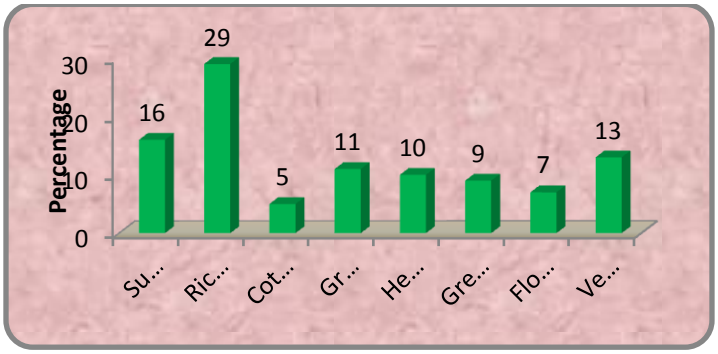

FIGURE – IIFarming Crops

From the TableIV and Figure II, it is clear that the maximum of 29 percent of them expressed that they cultivated rice and Maize (solam) followedby 16,13,11 and 10 percentages of the respondents who expressed that they cultivated sunflower, vegetables, groundnut and hemp. About 9 percent of them expressed that they cultivated greens and 5 percent of them expressed that they cultivated cotton crops.

Hence it could be concluded that most of the respondents cultivated crops of which the highest number of them cultivated rice and Maize (Solam). It is understood that they had interest in agriculture.

Problems Faced By The Respondents in Agriculture

The problems faced by the respondents in agriculture is presented in Table V. About 68% of the respondents faced problems in the agricultural field in growing plants.

TABLE –V
PROBLEMS FACED BY RESPONDENTS IN AGRICULTURE

Sl No	Problems	Percentage (%)
1	Water/Labour/Pest/Disease	**44**
2	Water/Labour/Pest	25
3	Water/Pest/Disease	2.9
4	Water/Labour/Disease	19
5	Water/Labour	7.35
6	Labour/Disease	1.4

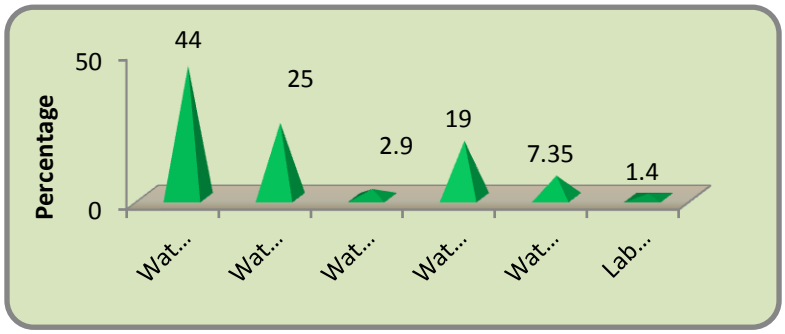

FIGURE –III Problems faced by respondents

From the Table Vand Figure III, it is obvious that of the 68% of them the maximum of 44% of the respondents expressed that they facedthe problems of Water, Labour,Pest and Disease while 25% of the faced the problems namely Water, Labour and Pest, followed by 19% of them who face problem of Water scarcity, Labour and Disease.About 7.35% of the respondents faced the problems related to Water and Labour, followed by 2.9 percentage of the respondents who faced problems related to Water,Pest and Disease: Water; Disease andLabour problems were faced by 1.4 percent of the respondents. Hence it could be concluded that the predominant problems faced by the respondents were Water, Labour,Pest and Plant Diseases while growing crops.

Utilization of non edible portion of the Plantafter Harvest

The respondents' utilization of the non edible portion of the plants is expressed in Table VI.

TABLE VI UTILIZATION OF NON EDIBLE PORTION OF PLANT

S.No	**Crops**	**Uses**				
		Fuel	**Fibre Ropes**	**Shelter**	**Animal feed**	**Product making**
1.	**Food Crops**					
	Respondent (%)	37	3	2	**58**	-
2.	**Non-Food Crops**					
	Respondent (%)	**58**	6	1	7	28

As far as the food crops were concerned the maximum of 58 percent of them used the non edible portion of food crops as animal feed followed by 37 percent who used it as fuel; whereas 3 and 2 percentages of them used it for rope making & shelter of respectively. In the case of nonfood crops, the maximum of 58 percent of them used it for fuel, 28 percent of them used it for product making and 7 percent used it for animal feed. Only 6 percent and 1 percent of them used the fibres for ropes and sheltering respectively.Hence it could be concluded that the maximum of respondents utilized the plant wastes for animal feed and fuel.

Method Adopted For Fibre Extraction

For the question asked if any attempt was made by the respondents for fibre extraction from the non edible portion of the plants, about 95 percent of the respondents expressed that they have not tried fibre extraction whereas the rest 5 per cent of them have tried fibre extraction.

TABLE VII METHOD ADOPTED FOR FIBRE EXTRACTION

S.no	Methods	Respondents(%)		Days required
1	Retting	2	40	More than 30 days
2	Decortication	3	60	Less than 10 days

Out of the respondentswho have tried the extraction process, 60 percent of them were tried decortication method and 40 % of them have tried retting method. The number of days utilized for fibre extraction was more than 30 days for retting process and 40 percent of the respondents expressed that they took less than 10 days as they followed decortication method.Hence it could be concluded that only very few of the respondents have attempted for fibre extraction and others did not have any awareness about the extraction methods.

Utilization of extracted fibres

The utilization of extracted fibres and the products made by the respondents are presented in the Figure IV. Only 6 percent of the respondents expressed that they utilized the fibres for various purposes and 94 percent of them did not use the fibres.

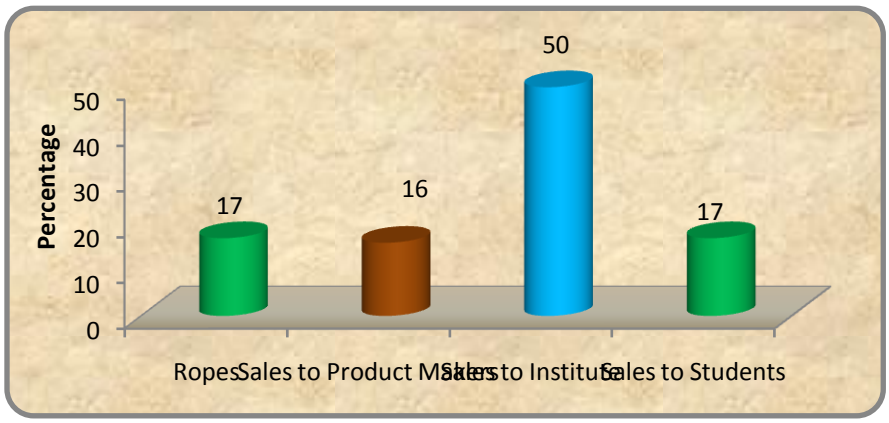

FIGURE – IV Products Made From Extracted Fibres

Out of the maximum of 50 percent of them sold the fibres to institutions and 17% of them sold the fibres to the students directly. About 17 & 16 percentages of the respondents expressed that

they utilized the fibres for rope making & sold it to product makers.Hence it could be concluded that the maximum respondents sold it to institutions which may be for research works.

Income Fetched From Fibres

The income fetched by the respondents is expressed in Figure V. About 6.25 percent of the respondents generated money from the extracted fibres.

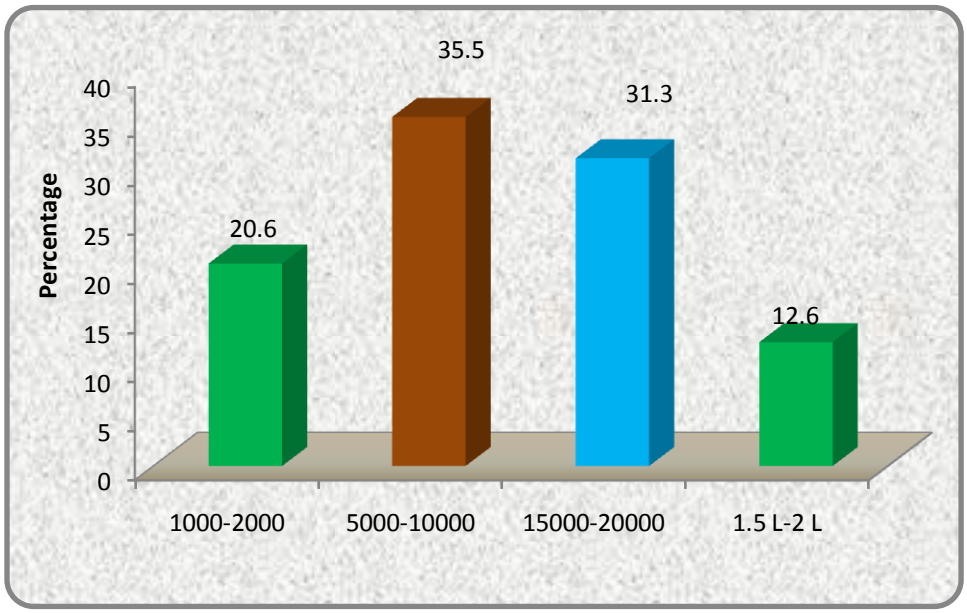

FIGURE – V Amount generated

Of them the maximum of 35.5 percent of them earned Rs 5000-10000: followed by 31.3 percent of them who earned Rs 15000-20000. About 20.6 & 12.6 percentages of the respondents earned Rs 1000-2000 and 15000-20000 respectively (Figure V).

Hence it could be concluded that only very few of them generated money from fibres and they earned money by doing the extraction process. Among them the maximum respondents earned only less than Rs 10000.

CONCLUSION

Thus from the survey conducted at Edappadi village in Salem district to elicit information on awareness about under utilized plant fibresthe findings derived were the maximum of 48 percent of them were involved in agriculture, the maximum respondents of Edappadi village earned income between of Rs 2-3 lakhs per annum, the respondents had awareness about the growth of the under utilized plants for fibres and that the predominant plants known were Aloevera and Agave and most of the respondents cultivated crops of which the highest number of them cultivated rice and Maize. It is also understood that they had interest in agriculture and the predominant problems faced by the respondents were Water scarcity, Labour, Pest and Plant Diseases in farming As far as the attempt for fibre extraction is concerned, most of them were not aware of the methods and very few of them generated money from fibre extraction among which the maximum respondents earned only less than Rs 10000.

Recommendations

Skill based training programmes may be organized to impart skills among the people of the Edappadi village.An entrepreneurial motivational programme may also be given to them to create successful entrepreneurs in the village.

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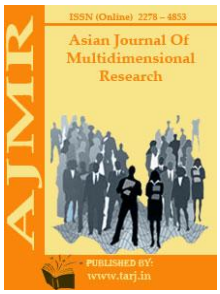

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

A STUDY ON THE EMERGING TRENDS ON BAMBOO FABRIC WITH NATURAL KUMKUM DYE AND INDIGO PRINT

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ABSTRACT

The textile area is one of the most available to main study. The main function of the textile industry is to supply the nation's requirements of clothing, either made out of natural fibers or man-made fibers. Today's pollution affects the ecology and environmental status nationally and internationally. There is a trend towards the use of natural dyes throughout the present world. It is due to eco-friendly nature of these colours, the production and application of natural dyes neither cause pollution nor disturb our eco-system. Hence the researcher has attempted to create woven bamboo fabric dyed with kum-kum dye and print the same with indigo print. Kum-kum dye, which is extracted from the turmeric powder. The fabrics were dyed with natural colouring matter extracted from Curcuma lenga (turmeric), using different environmentally friendly mordants. Natural dyes are classified into two groups, namely substantative dyes and adjective dyes. Substantative dyes require no pre-treatment to the fabric like Indigo, Orchil, turmeric etc., The fabric in different stages – Grey cloth, dyed cloth, printed cloth, been tested using various tests. Printing Technology is sparking a fundamental change in the textile and apparel industry. Traditionally, to create designs for fabric, colour separations and screens or rollers had to be used for the transfer of designs to the fabric. Printing is the second method of adding colour to the fabric. There are some subjective test in which a numerical result is difficult to produce usually a series of tests is made on a group of individual items and the results from each test recorded and subsequently analyzed by suitable methods.

KEYWORDS: *Bamboo Fabric, Natural Dye Kumkum, With Natural Print Indigo*

INTRODUCTION

The textile area is one of the most available to main study. The main function of the textile industry is to supply the nation's requirements of clothing, either made out of natural fibers or man-made fibers. Today's pollution affects the ecology and environmental status nationally and internationally. There is a trend towards the use of natural dyes throughout the present world. It is due to eco-friendly nature of these colours, the production and application of natural dyes neither cause pollution nor disturb our eco-system. Hence the researcher has attempted to create woven bamboo fabric dyed with kum-kum dye and print the same with indigo print.

Kum-kum dye, which is extracted from the turmeric powder. The fabrics were dyed with natural colouring matter extracted from Curcuma lenga (turmeric), using different environmentally friendly mordants. Natural dyes are classified into two groups, namely Substantative dyes and adjective dyes. Substantative dyes require no pre-treatment to the fabric like Indigo, Orchil, turmeric etc., The fabric in different stages – Grey cloth, dyed cloth, printed cloth, been tested using various tests. Printing Technology is sparking a fundamental change in the textile and apparel industry. Traditionally, to create designs for fabric, colour separations and screens or rollers had to be used for the transfer of designs to the fabric. Printing is the second method of adding colour to the fabric. There are some subjective test in which a numerical result is difficult to produce usually a series of tests is made on a group of individual items and the results from each test recorded and subsequently analyzed by suitable methods.

Aims and objectives of the study includes

- To weave 100% bamboo fabric with plain weave.
- To dye the bamboo fabric with natural kumkum.
- To print the dyed bamboo fabric using natural indigo.
- To evaluate the bamboo fabric in different stages – Grey cloth, dyed cloth, printed cloth, using various tests

METHODOLOGY

The study is systematically done under the following stages:

Selection of the raw material : The investigator has selected bamboo as raw material for the following reasons. Bamboo fibre is regenerated cellulosic fibre and so it has mechanical properties of superior tensile strength, excellent ultra-violet protection, anti-bacterial and biodegradable characteristics, high moisture absorption, softness, brightness and high flexible, highly water absorbent.

Selection of method for fabric construction: A major method of fabric construction is weaving. In the process of weaving, plain weave is the most important of all structures and forms the foundation for many combinations and techniques. It is undoubtedly one of the most used weaves.

Selection of Dyes: There is a trend now towards the use of natural dyes throughout the world. The eco-friendly nature of the dyes is a boon to the textile industry. Hence the researcher has selected the kumkum, a natural dye for colouring the bamboo fabric.

Extraction of Dyes: Turmeric is from the family curcuma tinctoria, a plant growing in underground. The tubers or roots are externally of a greenish – yellow colour , but internally the

colour is deep yellow or orange. It yield a small amount of the colouring in cold water; hot water extracts larger quantity of colouring. The colouring principles from turmeric is known as curcumin. The turmeric stem was soaked in the tank water and allowed ferment like indigo plant. After drying, turmeric stem was grained to make powder. The powdered turmeric was mixed with soda, lime and alum in the ratio of 1 : 10 and made it into a paste. This paste thus treated changes into red colour. It was put into a pot, and placed under the ground for six months and where the fermentation took place.

Dyeing Process: The dyeing process is explained under the following recipe :

Kumkum powder 2% of fabric weight

1 % of Ferrous Sulphate

PH Value 5

1: 100 (Material: Liquid Ratio)

Temperature 70^{o}c

The fabric was dipped into the dye solution for two times as the shade is 2%; if needed darker shades then it should be dipped for several times, in the same solution. The dipped cloth was removed from the dye solution and given thorough wash with soap solution followed by rinsingfor three or four times.

After treatment of dyed samples : After dyeing the fabric may undergo certain treatment for effective fixation of dye. Plantain juice is prepared by extracting juice from the plantain, it works as fixing agent. The fabric was rinsed in the soap water followed by the plain water. The dyed fabric was then squeezed and dried in the shade and pressed to remove wrinkles.

Selection of Natural Print Paste: Tradition of dyeing and printing with natural dyes in India dates back to prehistoric ages. The growing consciousness about environmental preservation and the control of pollution have all renewed interest for use of natural dyes for the colouration of textiles. For the above reasons the researcher selected the natural indigo dye as printing paste.

Selection of Printing Method: The screen printing is the most versatile of all printing processes, it is by far the dominant technology today. Here the researcher selection of printing method is "Screen Printing", the design as spiral design and floral design and the pigment is indigo natural pigment which is in dark indigo blue colour.

Printing Process: Pigment natural or synthetic have affinity for fibres that are attached to the fabrics, by means of adhesive, resin or bonding agent then the resultant colour is relatively permanent. The indigo powder made into solution with adding of little water and stirred thoroughly to mix well and then filtered with the help of lining cloth to be cleared without granules. The filtered solution was mixed with arabic gum in the ratio 1 :10 i.e. liquid : Gum. The kumkum dyed fabric was placed on a padded table on which the screen was placed where the design is required. The paste was smeared on the screen and with the help of squeegee it was pressed three times to and fro on it for a clear impression. The screen is removed from the fabric carefully without any shake. The printed fabric is left to dry and is ironed on the wrong side for effective fixation of colour. It should be treated within 24 hours of printing.

Evaluation: The dyed and the printed fabric has to be tested for its change in the properties, if any. The fabric was evaluated by the following methods:

Physical tests

The physical properties of the bamboo fabric like tensile strength etcwas done for the bambookumkum dyed fabric printed with indigo print.

RESULTS AND DISCUSSION:

Physical tests: The results of the study are discussed under the following - Bursting Strength, Tensile Strength, Drape Co-efficient, Shrinkage, Abrasion Resistance, Fabric Thickness, and Fabric Weight.

Physical Tests		Grey sample (GC)		Dyed sample (DK)	Printed sample (DKPI)
Tensile strength	Warp	Strength	58.09	58.18	57.22
		Elongation	26.15	34.55	33.53
	Weft	Strength	57.30	70.38	69.72
		Elongation	26.15	34.55	33.54
Shrinkage	Warp	1.8		1	1
	Weft	2		1.8	1.8
Bursting Strength	13.16			11.86	11.76
Drape Co-efficient	57.69			57.73	57.68
Abrasion Resistance	Warp	200		186	189
	Weft	218		118	120
Fabric thickness	0.56			0.54	0.62
Fabric weight	607.4			620.3	632.68

Tensile strength in Warp and Weft : The above table shows that the tensile strength and elongation of the dyed and printed samples, in which dyed kumkumsample has comparatively lesser tensile strength. In the weft direction the strength of the samples showed that grey cloth sample had the lowest strength and all the other samples were simliar.

Shrinkage of the Samples : As far as the shrinkage is concerned, the grey clothhas the highest shrinkage in the warp and the weft direction and the performance of the dyed kumkum sample is the best as it shows the lowest shrinkage percentage.

Bursting Strength : The bursting strength of the dyed and printed samples are less compared to the grey cloth.

Drape Co-efficient: It is evident that all the samples were similar in the drapability test.

Abrasion Resistance: From the above table, it is clear that the abrasion resistance of the grey cloth is comparatively good and the resistance for abrasion has lessened with the dyed and the printed samples.

Fabric thickness: The above table shows that the fabric thickness of the printed sample is high when compared to dyed fabric and grey cloth.

Fabric weight: The above table shows the fabric weight has increased in the dyed and printed sample.

Colour fastness tests: The colour fastness tests were conducted for the laundering, crocking and perspiration. The results of the same is presented below:

Colour Fastness test		GREY SCALE	
Fastness to perspiration	Alkaline	Dyed	Printed
		4-5	3-4
	Acidic	3-4	4
Fastness to rubbing	Dry	4	5
	Wet	4	4
Fastness to washing		5	4

Rating Scale: 5 – Excellent, 4 – Very Good, 3 – Good, 2 – Fair, 1 – Poor

The above table shows the colour fastness to perpiration of the all fabrics is rated as 'good' and 'very good'.As far as the dry rubbing is concerned it shows that all the samples are excellent and very good, wet rubbing shows that all the samples are rated as good and very good. The colour fastness for washing was rated as good and very good.

CONCLUSION:

The bursting strength of the dyed and printed samples are less compared to the bamboo grey cloth. The tensile strength and elongation of the dyed and printed samples, in which dyed indigo sample has comparatively lesser tensile strength and Kum kum dye has the highest tensile strength. All the samples were similar in the drapability. The grey cloth has the highest shrinkage in the warp and the weft direction. The abrasion resistance of the grey cloth is comparitively good and lessened with the dyed and the printed samples. The fabric thickness of the printed samples is high when compared to dyed fabric and grey cloth. The fabric weight has increased in the dyed and printed samples.

The colour fastness to laundering quality of the kumkum dyed fabric is rated 'excellent' and the printed fabric is rated as 'very good'. The colour fastness to perspiration of the all fabrics are rated as 'good' and 'very good'. The crocking in dry method kumkum dyed fabric and kumkum dyed fabric with indigo print has been rated 'excellent'. It is evident that the samples are rated as 'very good' for colour fastness to sunlight.

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APPLICATION OF ANTIBACTERIAL FINISH ON COTTON KNITTED FABRIC USING MADHUCA LONGIFOLIA EXTRACT

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ABSTRACT

Our environment is surrounded with wide range of medicinal herbs which helps in curing skin diseases. According to the report 50% of modern drugs are the origin of natural herbs. Textiles in the field of medicinal purpose has a wide range of future. As of that the scope of medical textiles was considered and implemented more on medical aspects in the form of anti- bacterial finish. The herb Madhuca Longifolia was used for the study which is been done on cotton knitted fabric. This plant contains anti-bacterial property which is treated on fabric which enhance the quality of human life through protection against various pathogens. The aim of the study is to prolong the life of human using textiles. Finally the evaluation of antibacterial finish against E-coli, S.aureus Pathogens were done.

KEYWORDS: *Madhuca Longifolia, Cotton Knitted Fabric, Anti- Bacterial finish*

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INTRODUCTION

Textile plays an important role in human history by keeping human body away from pathogens. It has been used for decades. Skin is in direct contact with cloths. Skin bacteria creates bad odours and allergies. So there is necessary to give additional prevention against various pathogens.Herbs are rich in medicinal agents which can be used as an alternate to synthetic drugs. Madhuca Longifolia is a tree. The leaf contains anti-bacterial property. Anti-bacterial finishes on textiles slow downs the growth of bacteria. Clothing provides additional protection against various pathogens.

METHODOLOGY

Pilot study (screening against pathogens)

⇩

Selection of Herb & Solvent

(Herb – Madhuca Longifolia / Solvent – Ethanol)

⇩

Herb extraction (Madhuca longifolia)

⇩

Application of herb extract on fabric (Dip dry method)

⇩

Antibacterial testing (AATCC 147)

⇩

Evaluation of treated sample

SELECTION OF MATERIAL

Cotton knitted fabric were selected was selected to apply anti-bacterial finish. The nature of this fabric is soft texture and breathability.

PARTICULARS OF THE FABRIC

FABRIC	YARN COUNT	GSM	THICKNESS
Cotton knitted fabric(single jersey)	**40's**	**180g/m^2**	**46**

PRE-TREATMENT

Scouring and Bleaching was done to remove various foreign matters. Cotton knitted fabric is soaked in soap oil for 30mins.Pre-treatment makes fabric more flexible and absorbable. The fabric is sterilized for further process.

SELECTION OF HERBS

Madhuca longifolia is an Indian tropical tree found largely in the central and north Indian plains and forests. The anti-bacterial property in Madhuca Longifolia leaf was used to create herbal textiles.

PREPARATION OF EXTRACT

The fresh leaves of Madhuca Longifolia were washed under running water and later dry shaded for 15 days and it was grinded into powder. Then the powdered sample were dissolved in the Ethanol solvents and taken in conical flask at the M:L ratio of 1:5ml and kept in shaker for 48hrs. After 48 hrs the solution was filtered using ordinary filter paper and Whatmann No – 1 filter paper. Then the extract was stored in the vessel for further study. The sample was concentrated in petric plate.After the concentration, the extract was subjected to antibacterial activity.It was performed by agar well diffusion method.

DIP & DRY METHOD

Madhuca Longifolia extract is taken in a vessel and the sterilized cotton knitted fabric is immersed in the solution for 20mins . After 20mins the sample is taken out and dried at room temperature. Then finished sample is subjected to Anti - Bacterial test (AATCC 147) by Agar well Diffusion method.

ANTI – BACTERIAL ACTIVITY BY AGAR WELL DIFFUSION METHOD

To determine the Antibacterial activities with ethanol extracts of Madhuca longifolia. Agar media was prepared, sterilized and used as the growth medium for bacterial culture. 1 ml of DMSO was poured into each sterilized Petri dish. The plates were then seeded with organism (bacterial culture) by sterilized cotton knitted strips. The plates were then incubated for bacterial culture for 24 hours and the zone of inhibition were measured.

ANTIBACTERIAL ACTIVITY OF MADHUCA LONGIFOLIA

HERBS	**PATHOGENS**	**Ethanol**
MADHUCA LONGIFOLIA	E.Coli	9
	S.aereus	10

In *Ethanol* solvent, *Madhuca longifolia* performed more activity against E.coli & S.aureus pathogens.

VISUAL PRESENTATION

ZONE OF INHIBITION FOR TREATED SAMPLE

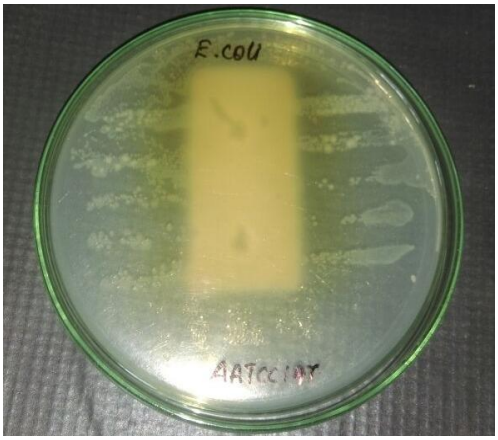


Plate:1

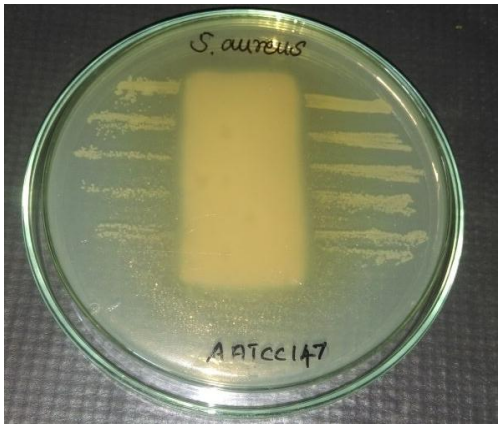


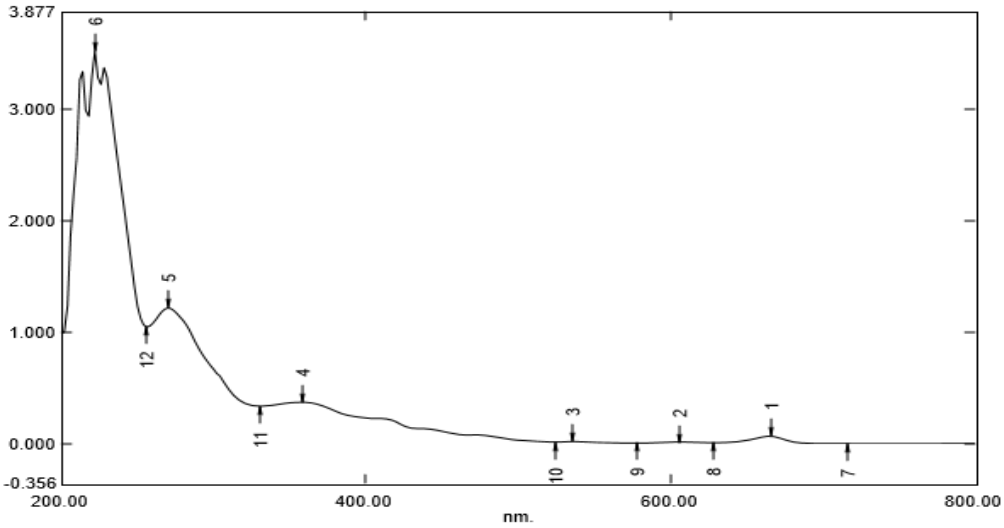
Plate:2

ANTI – BACTERIAL STUDY

Madhuca longifolia extract is subjected to Anti – Bacterial study by performing UV,GCMS & FTIR test.

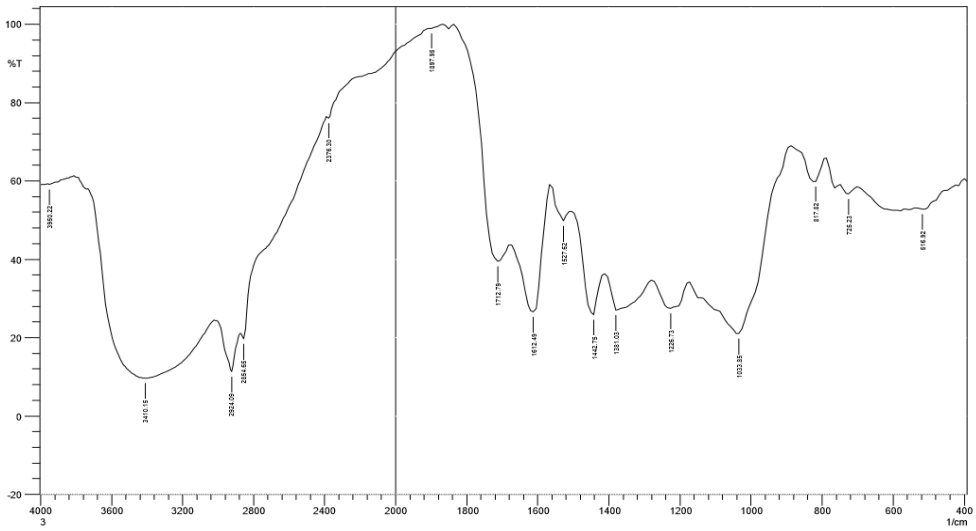
UV SPECTROMETER TEST

UV test is done to measure the exposure of UV rays which are reflected by sunlight.Our skin is directly affected by UV rays.So this test was done to detect the UV protection.



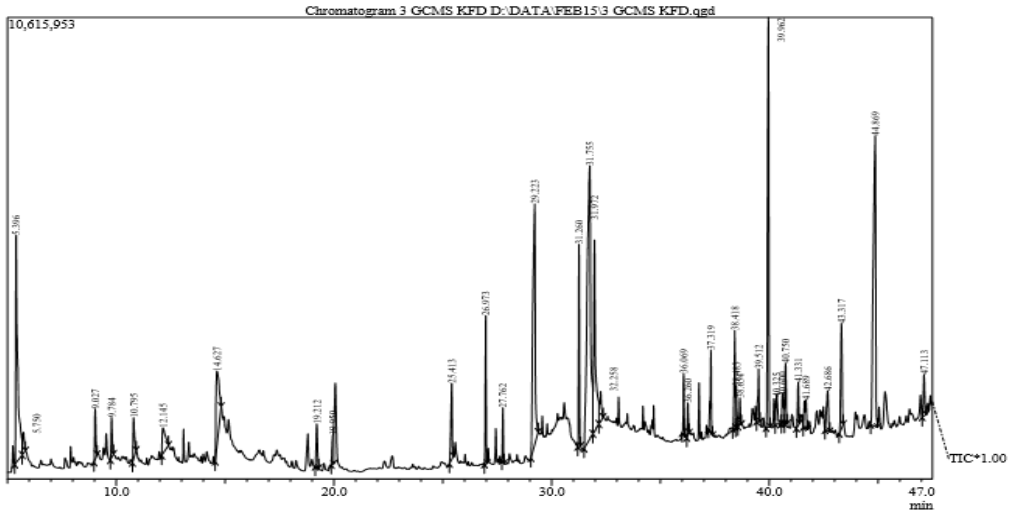
FTIR TEST

FTIR offers the quantitative and qualitative analysis for organic & inorganic samples.This test was done to measure the wavelength in the infrared region that are absorbed by the sample.



GCMS TEST

Gas chromatography-mass spectrometry is used to identify the chemical compounds in the sample.



CONCLUSION

The Antibacterial activity on cotton knitted fabric has been performed using the **Ethanolic exract of *Madhuca Longifolia***. The Antibacterial activity has been tested against Gram-negative and Gram-positive bacterium namely *E.Coli* and *S.Aureus* respectively.It is found that there were no bacterial growth in case of treated fabric.This indicates that the herb extract shows good Antibacterial activity.Extracts can be applied on the fabric directly by means of Dip dry method.the only limitation is that the direct method has less wash durability.The above study concluded that ***Madhuca Longifolia*** possess excellent antibacterial activity on cotton knitted .

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Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

CHARACTERIZATION OF THE RAW HEMP FIBRES FOR VARIOUS PROPERTIES

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ABSTRACT

This paper deals with the characterization of hemp fibres. Two types of hemp fibres were procured – Raw hemp fibre and Degummed, bleached, cleaned and opened fibres. The fibres are tested for its properties like chemical composition, density, chemical composition, moisture content and regain tensile strength and microscopic view of the fibre. The raw hemp and the processed hemp fibres are compared for its tensile strength and elongation and the results are inferred.

KEYWORDS: *Hemp Fibres, Moisture Content, Elongation*

INTRODUCTION

It was observed that the initially the hemp fibre was not considered for the production of soft and easy care textiles. Then, initial tests in the textile industry showed that certain processes allowed improvement in the everyday-wear characteristics of hemp textile. A study on the effects of agronomy and fibre extraction processing on fibre properties for textile processing was carried out. To relate the crop growing conditions with the fibre quality and productivity it required the hemp bast formation details. At various stages of the plant development the fibre development has been monitored by microscopic techniques. Two distinct bast fibre types occurred in hemp – primary and secondary fibres which showed different and independent development. The primary fibres were thicker and longer whereas the secondary fibres were thinner and shorter with high lignin content than the primary fibres. Secondary fibres only occur at the bottom of the stem. Based upon the observations, a selection of condition was made for growing and harvesting of hemp to obtain the best quality fibre for textile processing. To produce a crop with maximum amount of primary fibres free from secondary fibres, the recommended practice was to grow hemp at high seed density to avoid thickness growth and to harvest the hemp stems around flowering of the plants [6].

The water foot print of cotton textile is more than three times larger than the water footprint of industrial hemp textile was observed. Products of Hemp fibre have many advantages over products of cotton textile: industrial hemp is four times softer, industrial hemp is three to eight times stronger, industrial hemp is much more durable, industrial hemp is flame retardant, industrial hemp is not affected by UV rays, industrial hemp is very breathable but also very moisture absorbent and also the production areas of cotton textile are for a greater part in water scarce regions in the world. Industrial hemp is mainly grown in parts of the world were a little or no water scarcity is, so production of industrial hemp is less stressful for the environment [15].

Hemp is generally considered insect, pest and disease tolerant: neither is likely to cause economic damage, particularly in fibre crops. There is some of concern in seed crops. Minimum Use Permits exist for the most destructive pests. A healthy fibre crop generally resists all diseases and pest impact. However, many of the insects and diseases that are common in irrigated and broad acre cropping systems can cause some damage to hemp fibre crops. Hemp crops should therefore be monitored carefully throughout the season. Any abnormalities should be investigated and reported. A well planned healthy crop rotation will go a long way to reducing the risk of pest and disease outbreaks [20].

METHODOLOGY

Hemp fibres were procured form an industry in Karur and were proceeded for the property analysis. The fibres procured were raw hemp fibres (H1) and degummed, bleached, opened and cleaned hemp fibres (H2).

The Chemical composition for the Raw Hemp fibres were carried out by the FTIR test which uses an infrared light to scan the fibre and observe the chemical properties. The chemical composition of the raw hemp fibre is tabulated in table 1.

The moisture content and regain values of the fibre were assessed by the Oven dry method in which the fibres are placed in a hot air oven and a controlled continual flow of air where the relative humidity is maintained. The moisture content and regain value of the raw hemp fibre is given in table 2.

The density of the fibre is measured by immersing the fibres in water in a beaker or tube, whose density is known. The density of the hemp fibre is calculated by using the mass per volume method and by the level of water displacement. The results of the moisture content and regain and the density of the hemp fibres are tabulated in table 2.

The tensile strength and elongation of the fibres were measured by the INSTRON. The fibre strength is tested by clamping the fibre in between the jaws of the machine and the parameters are calibrated in the computer. The jaws are pulled against each other and the force required to break the fibre is recorded in the computer. The tensile strength and elongation comparison between the raw hemp (H1) and processed hemp fibres (H2) are given below in table 3.

The microscopic images of the raw hemp fibre were captured using the CETI image analyser by the Mascot Enterprises. Here the fibres are mounted on the sample plate and observed through the microscope which is simulated in the computer. The images of the fibre are captured then. The microscopic image of the raw fibre is given in fig. 1.

RESULTS AND DISCUSSION

TABLE 1: PHYSICAL PROPERTIES OF RAW HEMP FIBRE (H1)

Cellulose content (%)	**85.30**
Lignin Content (%)	**6.83**
Wax content (%)	**0.38**
Ash content (%)	**0.13**

TABLE 2: MOISTURE CONTENT, MOISTURE REGAIN AND DENSITY OF THE HEMP FIBRE

Moisture content (%)	**7.23**
Moisture regain (%)	**7.57**
Density (g/cc)	**1.171**

TABLE 3: COMPARISON OF THE TENSILE STRENGTH AND ELONGATION OF RAW HEMP FIBRE (H1) AND DEGUMMED, BLEACHED, OPENED AND CLEANED HEMPFIBRES (H2)

PARAMETERS	**HI**	**H2**
Maximum load (kgf)	**0.372**	**0.284**
Extension at maximum load (mm)	**2.538**	**2.629**
Tenacity at maximum load (mm)	**38.873**	**28.612**
Tensile strain at maximum load (mm/mm)	**0.138**	**0.085**
Maximum time (sec)	**10**	**9.745**
Tenacity at break (gf/tex)	**0.368**	**0.352**

Fig. 1 Microscopic Image of raw Hemp fibre

CONCLUSION

From the above results and discussion, it is inferred that the strength of the hemp fibres are affected due to the degumming and bleaching process where the tensile strength of the processed hemp fibres are lower than that of the raw hemp fibres.

ACKNOWLEDGEMENT

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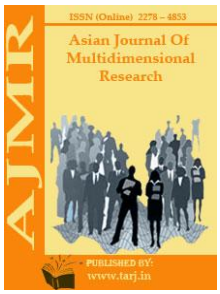

Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

TRANS Asian Research Journals

EFFECT OF ARABIC FLORAL DESIGNS ON DIFFERENT FABRICS USING MACHINE EMBROIDERY

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ABSTRACT

The importance of style and fashion in today's society is much under rated. Arabic designs are produced by Arabic culture. It is expressed in the architecture, organizations and structures of the Arab society. Arabic designs as being based on floral constructions. Arab artists reproduced nature with a great deal of accuracy. The world of machine embroidery always looks something new to conquer the market. Islamic architecture is highly influenced by geometric patterns, which has developed over the centuries. Arabic floral designs are used only for architecture, and tiles. The above details are subjected to "Arabic floral designs" are created by machine embroidery on different fabrics like art silk, crepe silk, crepe .All embroidered fabrics have been converted in to different sarees for better appeal and the garments itself will speak about success story of Arabic floral designs. The wonderful fashion where produced speaks volumes at success.

KEYWORDS: *Arabic Designs, Geometric Patterns, Crepe, Art Silk.*

INTRODUCTION

Fashion plays an important part in everyone's life. Embroidery is an art of working ornamental designs on cloth, leather, and other materials with decorative stitches. Arabic designs are produced by Arabic culture. Floral designs are used for various aspects. The use of floral design is reflected society's interest in nature and flowers in particular. Arabic designs are formed with flora patterns. Arab artists reproduced nature with a great deal of accuracy. Flowers and trees might be used as the motifs for the decoration of textiles, objects and buildings. A Highly ornate as well as the basis for "infinite pattern" type decoration, using arabesques and covering on entire surface. The infinite rhythms conveyed by the repition of curved lines, producing a relaxing, calming effect, which can be modified an enhanced by variations of line colour and texture

METHODOLOGY

The main aim is to,

- To select Arabic floral designs.
- To apply the designs on saris and Salwarkameeze using machine embroidery in crepe, crepe silk, and art silk materials.
- To evaluate the appearance of the embroidery in garments.

PROCESS OF FLOW CHART

1. Selection process

↓

2. Placement of designs

↓

3. Embroidering the design on fabrics

↓

4. Measurements

↓

5. Drafting and constructions

↓

6. Finishing

SELECTION PROCESS

Selection of Designs

An Arabic floral design has been selected for making embroidery.

Selection of Fabric

Three types of fabrics have been selected for using embroidery. They are:

Art silk
Crepe

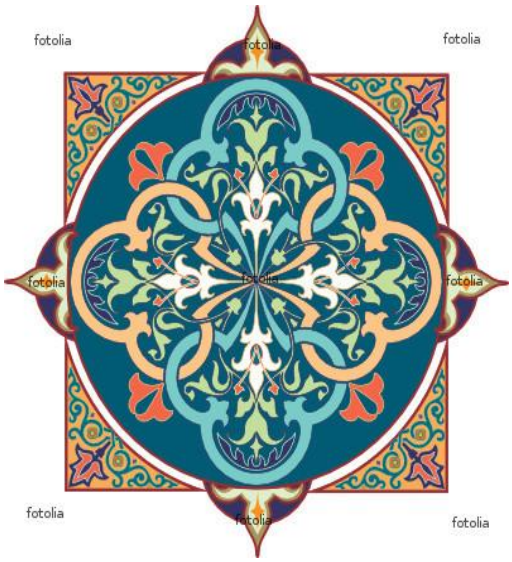
Crepe silk.

Selection of Garments

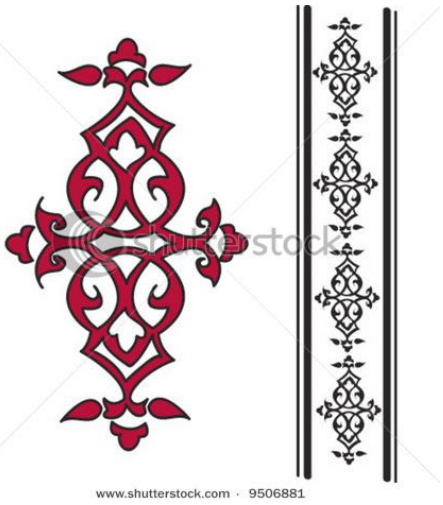
To the application of embroidery, two styles of garments are selected. They are saris andSalwarkameeze.

SELECTION OF DESIGNS

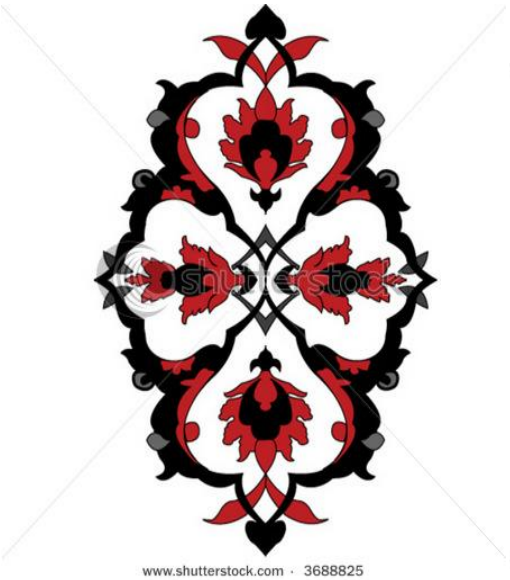
Design for Garment - 1



Design for Garment- 2



Design for Garment - 3



PLACEMENT OF DESIGNS

GARMENT- 1

Selected floral design is placed on the pallu of the saree, and another design is placed on the top and bottom borders of the saree.

GARMENT - 2

Selected floral design is placed on the pallu of the saree. And smallparts of the designs are placed on the full body of the saree.

GARMENT - 3

Selected floral design is placed on the top of the hem line of the kameeze.

APPLICATION OF EMBROIDERY

Procedure

- Embroidery hoop or frame can be used to stretch the material and ensure even stitching tension that prevents pattern distortion.
- To placed the hooped fabric on machine.
- To create the design and use sewing machine and fill in the design.
- Every color change requires, cutting the thread and changing the color manually.
- To change the stitch length and speed is controlled using stitch regulator.
- To finish the design using various stitches to the help of embroidery machine.

MEASUREMENTS

The measurements of the adolescent girls, age group between 18-22 have been standardized and taken.

DRAFTING AND CONSTRUCTION DETAILS

Drafting pattern is prepared according tothe measurements.

CONSTRUCTION DETAILS

Blouse

- Take front and back pieces and joined two shoulders.
- Then finished all darts. Finished the yoke piece and join it to the front bodice.
- Then finished the open. Finished sleeves and join the sleeves to the armholes.
- Then finished the back hem line and side seams.
- Finally finished the neckline

Salwar

- Take the two pieces and joined it.
- Finished the waist band.
- Then joined the waistband with the pieces.
- Then finished the side seams. And then finished the hem lines.

Kameeze

- Take front and back pieces and join the shoulders of two pieces.
- Finished the neckline. Then finished the sleeves and join the sleeves to the armholes.
- Then finished the side seams. Finished side slits.
- Then finished the front and back hemlines.

FINISHING

- After finishing the garments are placed on the ironing table.
- Back side of the garment should be ironed.
- Garments are ironed properly to remove all creases. Then fold it neatly.

FINISHED APPERANCE

Garment-1

Garment-2

Garment-3

EVALUATION

A set of questionnaires was prepared. They were distributed among the college going girls, working women and house wives. The rating was done excellent, very good,good,fair, poor. The cost study was done cheaper, reasonable, expensive. The opinion was regarding the Arabic designs,Visual appearance of the garment, creation of Arabic floral design to machine embroidery on garments,Colour combination of embroidery threads,Fabric selection for garments,Placement of designs on garments,Clarity of embroidery, Effect of design in garment, opinion about the cost of the garment, overall rating of the garments, was recorded and they were represented in tables and charts.

RESULTS AND DISCUSSION

VISUAL INSPECTION

For visual inspection a set of questionnaires was prepared. They were distributed among the college going girls, working women and house wives. The rating was doneand recorded and they were represented in tables and charts.

OVER ALL RATING OF THE GARMENTS

From the table below the results of the garments can be interpreted as follows:

95% of college going girls approved the design of the garments is excellent, 5% is very good, 0 % is good, 0% is neutral, and 0% is poor.

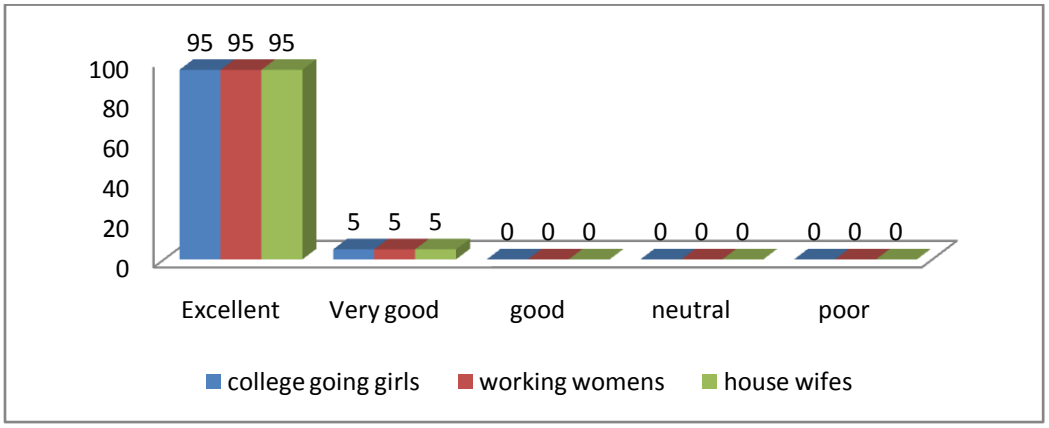
95% of working women's approved the design of the garments is excellent, 5% is very good, 0% is good, 0% is neutral, and 0% is poor.

95% of house wives approved the design of the garments is excellent, 5% is very good, 0% is good, 0% is neutral, and 0% is poor.

TABLE

Category	Excellent	Very good	Good	Neutral	Poor
College going girls	95	5	0	0	0
Working women's	95	5	0	0	0
Housewife's	95	5	0	0	0

CHART



CONCLUSION

Arabic floral design is a new techniques and attempt has been made to produce special effects produced in saris and Salwars. To produced Arabic floral designs on machine embroidery has been used. Arabic floral designs are produced by machine embroidery on art silk, crepe silk,and crepe fabrics. Multi color threads are used to produce embroidery. Free motion machine has been used to made embroidery. All embroidered fabrics have been converted in to different garments for better appeal and the garments itself will speak about success story of Arabic floraldesigns. The importance of style and fashion in today's society is much underrated. The world of machine embroidery always looks something new to conquer the market. Free motion machines are popular for making embroidery products easily. Saree is our traditional dress and Salwar is the common dress and it was used for all age women's. Arabic floral designs are used only for architecture, and tiles. The above details are subjected to "Arabicfloral designs" are created by machine embroidery on saris and Salwars in different fabrics.

The evaluation was done among three categories of people such as college going girls, working women and house wives. The results of the evaluation were as follows:

95% of college going girls approved the size of the designs in garments is excellent, 5% is very good,0 % is good , 0% is neutral , and 0% is poor.95% of working women's approved the size of the designs in garments is excellent, 5% is very good ,0% is good , 0% is neutral , and 0% is poor.95% of house wife's approved the size of the designs in garments is excellent, 5% is very good,0% is good , 0% is neutral , and 0% is poor.

Among all the design is considered as the best collection the attempt was successfully considering the positive response s from the categories such as college going girls, working women's , house wife's.

The wonderful fashion where produced speaks volumes at success.

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- "ARTS AND ACTIVITIES "TWO VIEWS OF ISLAM (JANUARY 2008).
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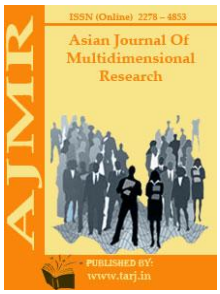

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UGC APPROVED JOURNAL

STUDY OF WICKING BEHAVIOUR OF POLYESTER/LYCRA KNITTEDFABRICS

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ABSTRACT

For a particular end-use, it is necessary to design fabrics with required moisture transmission properties. The chosen experimental procedure is the most important consideration to be followed during the evaluation of the moisture transmission properties of the fabric and clothing system. Wear comfort is influenced by the ability of the clothing material to transport moisture vapour and to dry quickly, especially when sweating conditions are considered. The movement or wicking of water in fabrics is of current interest because of the recent introduction of fibres, yarns and fabrics which manufacturer claim impart great personal comfort to the wearer. This paper is concerned with wicking which plays a vital role in determining comfort and moisture transport behaviour of fabric and also into find out the effect of four parameters of the various knitted fabrics on the wick ability. Parameters taken for the study were polyester cross-section, lycra denier used, plated structure and loop length.

KEYWORDS: *Wicking, Wick Ability, Fabric Parameters*

INTRODUCTION

Moisture produced in liquid and vapour form has significant effect on thermo physiological comfort of human body. The process of wetting and wicking provide thermo physiological comfort to the wearer. When any liquid movement happens through a textile material, wetting is expected to happen in the first step. The other mechanism takes place is wicking where the capillary suction force is responsible for the liquid to get transfer into the medium. Moisture movement across porous and permeable materials can interact with the fabric structure especially for sportswear knitted structures. The liquid wetting properties of fibrous materials are fundamentally important to their chemical processing and functional performance. The wick ability of fibre surfaces can be modified by changing the chemistry of the constituent polymers or by applying topical finishes.

Many researchers have done work on wicking and drying rate properties of knitted fabrics especially when it comes for the sportswear as an end use. Polyester trilobal flat, polypropylene, polyamide, elastane, polyester CoolmaxR, PBT, Dryrelease R and viscose Outlast R are the functional fibers used in fabric samples. They observed that back yarn fabric shows the best horizontal and vertical wicking wicking ability. Masoodi's study on the spontaneous imbibitions of liquid into a porous medium where the driving force that pulls the liquid into the medium is the capillary suction force was well observed by the researchers. The wicking and drying rate properties of functional knitted fabrics produced by using functional fibers in the backside and polyester or polypropylene in the fabric face was studied by Fanguiero et al.

Most of the researchers focused on the factors that affect the results of liquid quantity transferred and the time taked for the process. The cross section of the fibre plays a vital role in liquid transporting through the substrate.

METHODOLOGY

Materials

The materials used for the study is cotton/ lycra and polyester/lycra weft knitted fabrics. The sample details are given in the table below

Sample details

Sl.No.	Commercial samples	Laboratory Samples					
		Polyester cross section	Lycra deneir	Single jersey	Rib	Pique	Interlock
1	100 % Cotton - 16	Full plated , Half plated ,Circular	20 D	6	6	6	_
			40 D	6	6	6	_
2	100 % Polyester – 6	Full plated, Half plated , Trilobal	20 D	6	6	6	_
			40 D	6	6	6	_
3		Full plated, Half plated	20 D, 40 D	4	_	_	_
4		Enzyme wash, No Enzyme wash	_	_	_	_	4

Various knitted fabrics produced were treated for sinking and wicking behavior. Tests were carried out in a standard atmosphere of 22± 2º c and 65± 2 % relative humidity, and the samples were conditioned in a standard atmosphere for 24 hours before the wicking performance was determined.

Measurement of wickability in knitted fabrics

Vertical wicking can be measured by several techniques. In the visual observation method, the movement of the liquid along the sample is observed. Vertical strip wicking tests were performed on the custom based apparatus shown in Figure 3.1

The movement of the liquid, in terms of height wicked by the water is measured as a function of time. The wicking heights, measured for 10 minutes were recorded along the walewise and coursewise directions for a direct evaluation of the fabric wicking ability. A load should be hung at the lower end of the sample so as to keep it straight.

Five specimens of 200 mm x 25 mm were cut along the wale wise and course wise directions. The sample is hung vertically with its bottom end dipped in a reservoir of distilled water at a depth of 30 mm into the water. This was done by clipping the sample with a 1.2 g clip. The fabric's wicking ability was done by measuring the wicking heights every minute for 10 min.

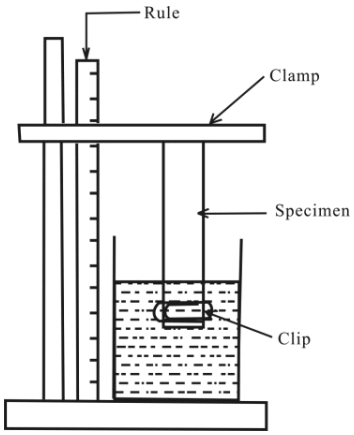

Figure 3.1 Schematic diagram of a typical vertical wicking apparatus

Design of Experiment

In this study, four independent factors and two levels of each factors were chosen to conduct the experiments. The parameters selected as independent factors were (i) polyester cross-section, (ii) lycra denier, (iii) plated structure and (iv) loop length.

RESULTS AND DISCUSSION

Influence of Polyester cross-section on vertical wicking behaviour of polyester/lycra knitted fabrics

In order to study the effect of polyester cross-section on fabric wickability, two different cross-section of polyester filament namely circular and trilobal were used.

From the Table 4.1, samples produced from trilobal cross-section show higher intercept values both in wale direction and course directions in comparison with those produced from circular

cross section. This is in agreement with the findings of Wang et al (2008) and Mukesh Kumar Singh (2009).

TABLE 4.1 COMPARISON OF REGRESSION OF SAMPLES WITH CIRCULAR AND TRILOBAL CROSS-SECTION

Sample Code	Polyester cross section	Wale				Course			
		Slope	Constant	R^2	Co.effi. of Regression	Slope	Constant	R^2	Co.effi. of Regression
SJ 1	Circular	0.8296	-0.5889	0.9879	0.9939	0.5665	0.609	0.9961	0.9980
SJ 4	Trilobal	0.5946	0.5701	0.9947	0.9973	0.494	0.998	0.98	0.9899
R 1	Circular	0.4179	1.2147	0.9978	0.9989	0.3714	1.0943	0.9935	0.9967
R 4	Trilobal	0.3721	1.4893	0.9985	0.9992	0.3379	1.495	0.9923	0.9961
P 10	Circular	0.5471	0.6917	0.9951	0.9975	0.3023	1.4293	0.9631	0.9814
P 7	Trilobal	0.3638	1.4417	0.9795	0.9897	0.4057	1.4117	0.9975	0.9987

Influence of Lycra denier on vertical wicking behaviour of polyester/lycra knitted fabric

The influence of lycra denier on the wickability is not so pronounced. There is no evidence to show that fibre denier affects wickability.

TABLE 4.2 COMPARISON OF REGRESSION OF SAMPLES WITH 20DENIER LYCRA AND 40 DENIER LYCRA

Sample Code	Lycra denier	Wale				Course			
		Slope	Constant	R^2	Co.effi. of Regression	Slope	Constant	R^2	Co.effi. of Regression
SJ 1	40 D	0.8296	-0.5889	0.9879	0.9939	0.5665	0.609	0.9961	0.9980
SJ 13	20 D	0.8286	-0.3473	0.9803	0.9901	0.6017	0.2572	0.9875	0.9937
R 1	40 D	0.4179	1.2147	0.9978	0.9989	0.3714	1.0943	0.9935	0.9967
R 19	20 D	0.3677	1.0326	0.9828	0.9914	0.2961	1.3863	0.9963	0.9981
P 10	40 D	0.5471	0.6917	0.9951	0.9975	0.3023	1.4293	0.9631	0.9814
P 4	20 D	0.5854	0.6007	0.9856	0.9928	0.5205	0.8541	0.9881	0.9940

Influence of Plated structure on vertical wicking behaviour of polyester/lycra knitted fabric

To study the effect of plating on wickablity of the fabrics, samples were produced with lycra in every courses and lycra in alternating courses. Single jersey fabrics with full plated structure shows the greater slope than that of the rib and pique fabrics irrespective of full/half plated structures.

From the Table 4.3 the effect of plated structure on wickability of the knitted fabric has significant effect in single jersey knitted fabrics.

TABLE 4.3 COMPARISON OF REGRESSION OF SAMPLES WITH FULL PLATED AND HALF PLATED STRUCTURES

Sample Code	Plated Structure	Wale				Course			
		Slope	Constant	R^2	Co.effi. of Regression	Slope	Constant	R^2	Co.effi. of Regression
SJ 1	Full plated	0.8296	-0.5889	0.9879	0.9939	0.5665	0.609	0.9961	0.9980
SJ 7	Half plated	0.55	0.406	0.995	0.9975	0.447	0.916	0.994	0.9970
R 1	Full plated	0.4179	1.2147	0.9978	0.9989	0.3714	1.0943	0.9935	0.9967
R 7	Half plated	0.488	1.212	0.994	0.9970	0.381	1.206	0.997	0.9985
P 10	Full plated	0.5471	0.6917	0.9951	0.9975	0.3023	1.4293	0.9631	0.9814
P 19	Half plated	0.36	1.497	0.993	0.9965	0.333	1.665	0.997	0.9985

Influence of Loop length on vertical wicking behaviour of polyester / lycra knitted fabric

The effects of loop length on wickability of the knitted fabrics were analyzed by varying the loop length as 2.9 mm, 3.1 mm and 3.3 mm According to the values indicated irrespective of the constructed structure, as the loop length increases the slope gets decreased to a significant level. We can come to a conclusion that loop length increases the wickability of the fabrics gets increased.

TABLE 4.4 COMPARISON OF REGRESSION OF SAMPLES WITH DIFFERENT LOOP LENGTH

Sample Code	Loop length	Wale				Course			
		Slope	Constant	R^2	Co.effi. of Regression	Slope	Constant	R^2	Co.effi. of Regression
SJ 1	2.9	0.8296	-0.5889	0.9879	0.9939	0.5665	0.609	0.9961	0.9980
SJ 2	3.1	0.7636	-0.3551	0.9788	0.9893	0.6535	0.4535	0.9949	0.9974
SJ 3	3.3	0.8182	-0.365	0.9815	0.9907	0.6395	0.4402	0.9931	0.9965
R 1	2.9	0.4179	1.2147	0.9978	0.9989	0.3714	1.0943	0.9935	0.9967

R 2	3.1	0.3567	1.2981	0.9938	0.9969	0.3279	1.2387	0.9896	0.9948
R 3	3.3	0.314	1.419	0.95	0.9747	0.328	1.341	0.981	0.9905
P 10	2.9	0.5471	0.6917	0.9951	0.9975	0.3023	1.4293	0.9631	0.9814
P 11	3.1	0.4756	0.9684	0.9929	0.9964	0.3594	1.2319	0.9923	0.9961
P 12	3.3	0.398	1.2481	0.9961	0.9980	0.3435	1.3643	0.9941	0.9970

CONCLUSION

The following conclusions emerge out of this study.

1. Wickability is found to be higher in knitted fabrics produced with trilobal polyester fibre.
2. Use of 40 denier lycra is found to improve wickability in a few cases.
3. Half plating with lycra has led to better wickability.
4. As the loop length increases, there is an improvement in wickability.

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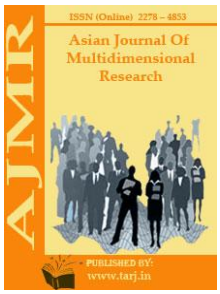

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

NATURAL DYED KNITTED FABRIC FOR SPORTSWEAR

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ABSTRACT

For eco-friendly dyeing, Bixa orellana (Annatto seed) was selected based on the literature survey to finish 50:50 bamboo/cotton single jersey knitted fabrics for sportswear. Using the fine powder the dye extracts were prepared at 4%, 6% and 8% concentration, in aqueous medium and direct dyeing procedure was carried out for the selected material. Evaluation was done using visual inspection and quantitative assessment of antibacterial activity by AATCC 100-2004 test method. Among all samples 6% concentrated dye extract shows higher percentage of bacterial reduction and acceptable colour shade. Hence, 6% dye solution was selected for dyeing 50:50 bamboo/cotton single jersey knitted fabrics.

KEYWORDS: *Natural Dyeing, 50:50 Bamboo/Cotton Single Jersey Knitted Fabric, Bixa Orellana (Annatto Seed), Antibacterial Activity By AATCC 100-2004 Test Method.*

INTRODUCTION

The textile industry is going through revolutionary changes aiming to meet unique needs of modern consumers. Textile products are more essential for human beings and now their development towards value added functions is on the rise. The science of clothing has evolved drastically. Innovations in the field of textiles are developing day by day .Bamboo plant is an essential bio-mass resource. It is biodegradable [6]. Recently, there is a lot of interest towards natural based herbs as an antimicrobial agent because of its eco-friendly and health hazard free nature [5]. Natural dyes are obtained from renewable sources, causes no health hazards, practically no or mild chemical reactions involved in their preparation, no disposable problem and eco-friendly [2].

METHODOLOGY

Selection of Natural dye source

Annatto is a colourant obtained fron the outer layer of the seed of *Bixa orellana.* Annatto colourants are a series of yellow to red carotenoid compounds. Cis-bixin is the major colouring compound [3].Based on the literature survey, the Natural dye sources such as *Bixa orellana* (Annatto seed) was selected. The selected Natural dye source was ground into fine powder. Using the fine powder the dye extracts were prepared at 4%, 6% and 8% concentration, in aqueous medium as the details provided in table 1.

		Table 1
	Recipe for extraction of Natural dye	
S.No.	**Recipe for extraction of Natural dye**	
1	Dye powder	*Bixa orellana* (Annatto seed)
2	Medium	Aqueous, 100ml
3	Temperature	100^0C
4	Time	60 minutes
5.	pH	7

Application of Natural dye sources at different concentrations

The dye extracts were applied on the selected knitted material, 50:50 bamboo/cotton using winch. The recipe for Natural dyeing was given in the following table 2.

Table 2

Recipe for Natural dyeing

S.No.	**Recipe for Natural dyeing**	
1	Material	50:50 bamboo / cotton knitted single jersey fabric.
2	Natural dye source	*Bixa orellana* (Annatto seed) extract.

3	Concentration	4%, 6% and 8%
4	M:L	1:20
5	Temperature	100^0C
6	Time	60 minutes
7	pH	7

The dyed fabric was evaluated using quantitative assessment of antibacterial activity by AATCC 100-2004 test method.

RESULT AND DISCUSSION

Quantitative assessment of antibacterial activity of Natural dyed fabric

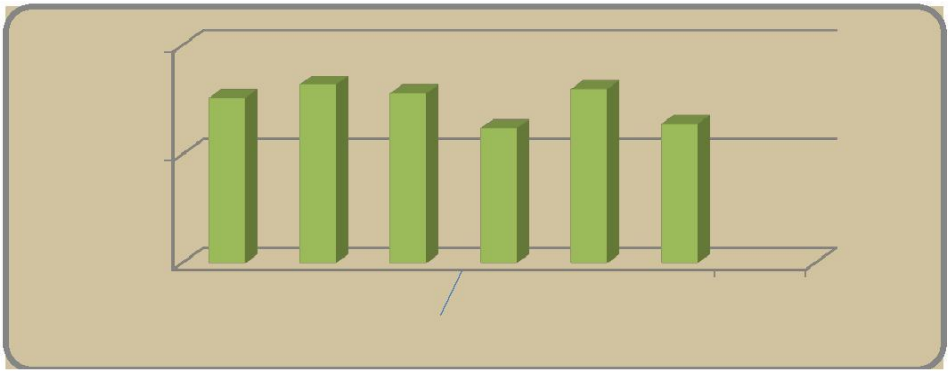
Quantitative assessment of antibacterial activity of Natural dyed fabric at 4%, 6% and 8% concentrations was carried out by AATCC 100-2004 test method,[1]which shows the percentage of bacterial reduction against *S.aureus* and *E.coli.* The antibacterial activity of 50:50 bamboo/cotton sample dyed with natural dye source,*Bixa orellana* (Annatto seed) at 4%, 6% and 8% concentrations, were given in the following table 4 and figure 1 and 2.

TABLE 3
QUANTITATIVE ASSESSMENT OF NATURAL DYED FABRICS AT DIFFERENT CONCENTRATIONS

S.No.	Natural dye Source	Concentrations	Antibacterial activity against *S.AUREUS*	Antibacterial activity against *E.COLI*
			A	A
1	*Bixa orellana* (Annatto seed)	4%	76	62
		6%	**82**	**80**
		8%	78	64

A- 50:50 bamboo/ cotton blend

FIGURE 1
QUANTITATIVE ASSESSMENT OF BIXA ORELLANA DYED FABRIC AT DIFFERENT CONCENTRATIONS



From the above Table 3 and Figure 1 it was concluded that 4% *Bixa orellana* (Annatto seed) dyed 50:50 bamboo/cotton knitted fabric namely A shows bacterial reduction of 76 % against *S.aureus* and 62% against *E.coli*, 6% *Bixa orellana* (Annatto seed) dyed knitted fabric shows bacterial reduction of 82 % against *S.aureus* and 80% against *E.coli.* 8% *Bixa orellana* (Annatto seed) dyed knitted fabric shows bacterial reduction of 78 % against *S.aureus* and 64% against *E.coli.*Among all dyed fabrics, 6% *Bixa orellana* (Annatto seed) dyed fabrics shows higher percentage of bacterial reduction.

An organic mordants widely used was tannin, which was good for dye fixation on textiles,[4].Hence, application of natural dye source *Bixa orellana* (Annatto seed) at 6% concentration with biomordant *Punica granatum* (Pomegranate rind) at 3% concentration using pre mordanting technique was carried out to the selected fabric 50:50 bamboo/cotton.

CONCLUSION

Using natural dye with natural mordant on natural fiber made fabric causing no harm to the environment and human beings.In today's world, naturally renewable resources are increasingly being required as a result of human dedication to protect environment. The natural dyes are eco-friendly, bio-degradable and non-carcinogenic. Uses of natural dyes increased due to the eco-friendly approach of the people.

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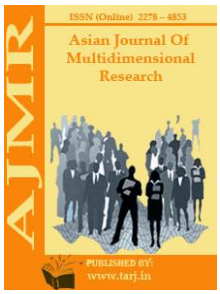

Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

STUDY ON THE SUSTAINABILITY OF KNITWEAR GARMENT INDUSTRY IN TIRUPUR

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ABSTRACT

Sustainable development is a development that "meets the needs of the present without compromising the ability of future generation to meet their own needs"(Brundtland Commission1987). In the past two decades there has been a lot of awareness about sustainability in the fashion industry. This paper contributes to current awareness of sustainability in the Tirupur garment industry and its application in garment production. Tirupur is considered the hub of the knitwear industry and is one of the largest foreign exchange earning towns in India. It houses exporters; merchant exporters, who take contracts from exporters; and domestic suppliers. A survey study was conducted in the Tirupur garment industry and data was collected by conducting interview schedule on the principles and practices followed in the industry for attaining sustainability. It was clear from the study that the Tirupur knitwear garment industry is going through a phase of maturation by catering to the increasing demand of sustainable clothing. The pressure from the overseas buyers to include sustainable practices in the supply chain has made the industry to look for innovative ways for reducing their carbon footprint.

KEYWORDS: *Sustainability In Garment Industry; Awareness Of Sustainability; Application Of Sustainability; Tirupur Knitwear Garment Industry.*

INTRODUCTION

Tirupur popularly known as "Baniyan City" which means the city of vests, of South India is a small town located 450 km south of the capital of Tamil Nadu, Chennai. It is the hub of the knitwear industry which produces approximately 56% of India's total knitwear export which is a very big figure, taking the size of the town into consideration. There are more than 7000 garment units in the town which houses exporters; merchant exporters, who take contracts from exporters; and domestic suppliers (Tirupur garments business directory 2014). Tirupur is one of the largest foreign exchange earning towns in India with export of Rs. 26,000 crore (The Times of India. 2017). The Tirupur cluster alone provides employment opportunity to close to 6,00,000 people (Business Standard 2014)

The garment industry in Tirupur is still in the blooming stagewhere everyday new garment units are opening, which is causing a great pressure on the ecology of the region. Rapid industrialization and urbanisation has lead to severe pollution problemsin Tirupur district. Government is imposing new laws everyday to monitor the daily production operations andthere has also been a lot of pressure from foreign buyers who come to Tirupur for their knitwear needs, to follow more sustainable practices. In the last ten years Tirupur has witnessed a significant trend shift from being economically sufficient to being ecologically sufficient.

The word sustainability has gained a lot of importance and the industries in Tirupur are taking measures to reduce their carbon footprint. Being more sustainable is now the aim of the majority of garment producing units in Tirupur and a number of studies are being performed to come up with innovative means for reducing the total carbon footprint of the product, corporate social responsibility, sustainable design operations and labour laws. A lot of research isbeing done on sustainability in the garment industry but a very few of these studies have touched the topic of awareness on sustainability in this industry. Finding out the level of awareness in the garment industry will help us to know if sustainable measures are being implemented at the ground level. Labour issues and working conditions of labours in the garment industry was not investigated in the study. This paper will work as a foundation for further studies on sustainability in the garment industry.

OBJECTIVES

- To find out the level of sustainability awareness in Tirupur garment industry.
- To investigate about the sustainable practices followed in the garment industry.

METHODOLOGY

Selection of Survey Method

Measuring the level of sustainability awareness was explorative in nature; hence a pilot study was conducted in the Tirupur garment industry. Survey research design was implemented to collect relevant information by means of interview schedules.From company labours to company proprietors were interviewed for their knowledge on questions like- energy-efficient processes, alternate energy utilization, low impact dyes, effluent treatment plant, sustainable fibers, sustainable manufacturing certificates, demand of sustainable products, waste disposal, role of Tirupur Export Association etc.

Selection of Area

A total of 30 garment units were selected for the survey from different places of the Tirupur knitwear cluster. Care was taken to incorporate all types of unit's like- knitting units, manufacturing units, dyeing and printing units, and finishing and packaging units in the survey.

Selection of Sample

The target population for this study were persons on the job in various garment production units in Tirupur area.An attempt was made to collect information from persons working in both export agencies and domestic garment manufacturing companies.

The data collected was tabulated and frequency and percentage of the answers were calculated. Inferences were drawn from the tables based on different categories regarding sustainable practices followed in the garment companies. The questions asked may not be enough but gave a clear indication about sustainable practices followed in the Tirupur garment industry.

RESULTS AND DISCUSSIONS

ENVIRONMENTAL CONCERN

Many factors are taken into consideration while finding out the environmental concern of an organization. Energy-efficient processes, alternate energy utilization and low impact dyes in manufacturing are some of the factors which were considered in this study. It was observed that the industry had greatly reduced its usage of energy by implementing energy saving methods. Old machines had been replaced by new energy efficient machineries and a considerable amount of energy was being conserved with the usage of LED lights in place of old incandescent ones. A general statics had shown that garment units in Tirupur had concern about the environment andabout 29.6% of the industries interviewed were using or had future plans of using alternate sources of energy like wind and solar energy. 21.4% companies had installed solar hot water system andwere taking steps to reduce the consumption of energy in garment processing.46.7% companies were having low material to liquor ratio-soft flow machines for dyeing and cutting down the consumption of water in the dyeing process. The dyes used for dyeing and printing were eco-certified dyes of low impact. 40.7% of the companies were performing regular energy audits and 74.1% organizations were keeping daily records for energy utilized in their production units (Table 1.1).

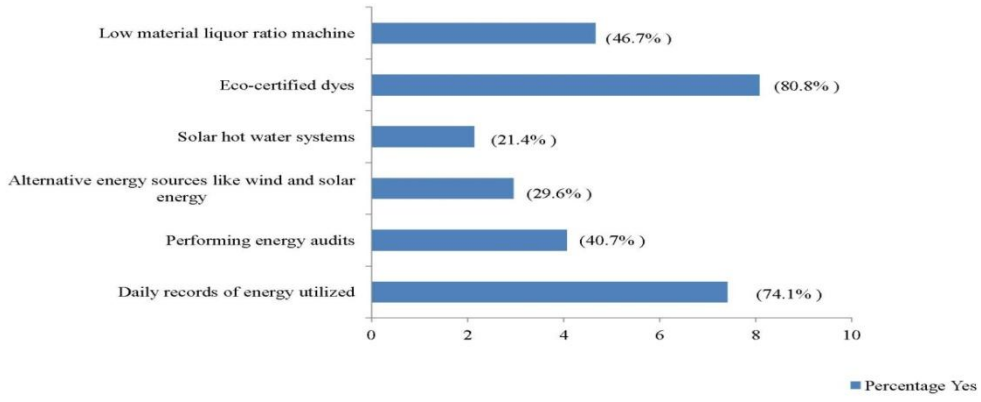


Table 1.1: Factors for environmental concern in the garment industry

COMMON EFFLUENT TREATMENT PLANT

The dyeing industryis considered as one of the most pollution creator industry with dye effluents posing a serious impact on the environment and affecting the aquatic ecosystem. Most of the effluents are released during the wet processing of the knitted fabric. More than 450 dyeing units in Tirupur had collectively set up 18 Zero Liquid Discharge enabled Common Effluent Plants (ETP) with a total cost of Rs 1,013 crore. The study revealed thata75% of the dyeing units in Tirupur wereeither connected to the common effluent treatment plant of their locality or were having in-house effluent treatment plants.57.1% companies had their own effluent treatment plants of which 54.5% companieswere using reverse osmosis technology in comparison to zero liquid discharge technology which was used by 45.5% processing units in Tirupur.A very small percentage- 9.1% of companies used evaporation technology in theirin-house effluent treatment plants (Table 1.2).

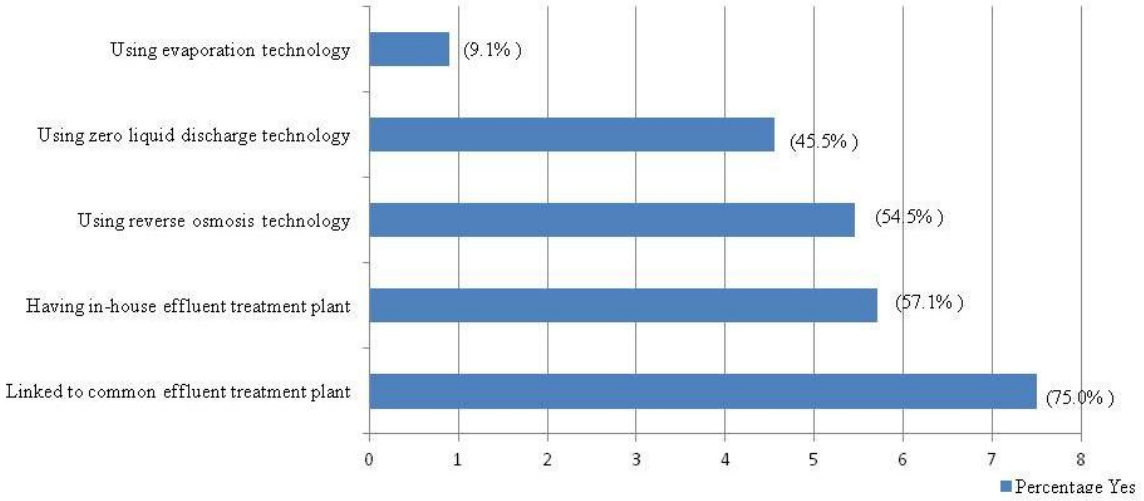


Table 1.2: Linkage to effluent treatment plants and the technology involved in treating effluents

SUSTAINABLE TEXTILE FIBRES

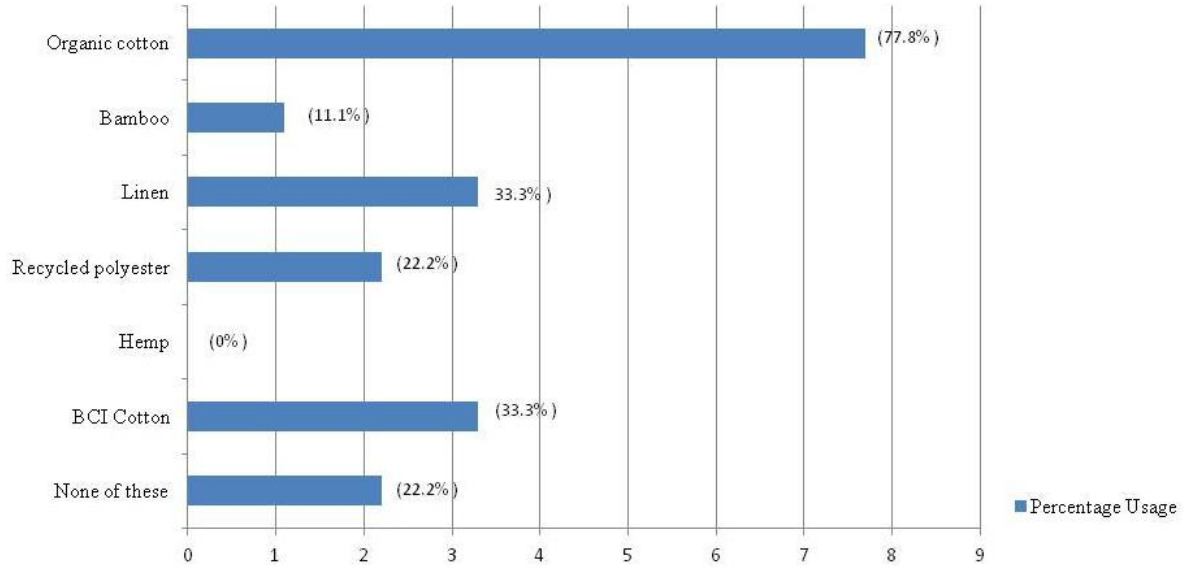
Cotton, as a renewable resource is the main raw material for the knitwear industry. However, chemicals and pesticides are largely used in growing conventional cotton fibre. Organic cotton is the substitute for conventional cotton which is grown without using pesticides or synthetic fertilizers making it a more sustainable choice. The study revealed that organic cotton was amongst the most popular sustainable textile material with 77.8% demand by the environmentally conscious buyers. Other sustainable materials like BCI (Better Cotton Initiative) cotton, which is a global project of producing cotton and providing better farming techniques to cotton farmers and linen werethe second choice with approximately 33.3% customers each demanding it. The Tirupur garment industry had also lately seen demand for raw materials like bamboo and recycled polyester. Recycled polyester which has an added advantage of saving energy, saving water and lowering greenhouse gas emission while processing was being utilized by 22.2% Companies and bamboo was seen least in demand in the knitwear industry with only 11.1% use in recent past (Table 1.3).

Table 1.3:Usage of sustainable textile fibers in the industry

SUSTAINABILE MANUFACTURING

The garment industry brings upon many kinds of negative impact on the environment in all stages of garment manufacture. As the earth is not able to support the current level of production, due to the fast depletion of natural resources, there is a need for more concern for environment in manufacturing apparels. It was observed that in order to show the evidence of company's achievement in environmental management and sustainability, the garment units in Tirupur were verifying their practices of sustainable manufacturing via third party certifications. Many organizations in Tirupur had strengthened their brand image by adopting International certificates to standardize their supply chain.

Approximately 45% of the companies which were interviewed had SA 8000 certification. . SA 8000(Social Accountability International) is an awarding agency which certifies factories and



organizations for their social performance in areas like- child labour, forced or compulsory labour, health and safety, freedom of association and right to collective bargaining, discrimination, disciplinary practices, working hours, remuneration and management system. GOTS (Global Organic Textile Standard)was the second most popular certificate with 40% owners. GOTS isa worldwide leading textile processing standard for organic fibres, including ecological and social criteria, backed up by independent certification of the entire textile supply chain.

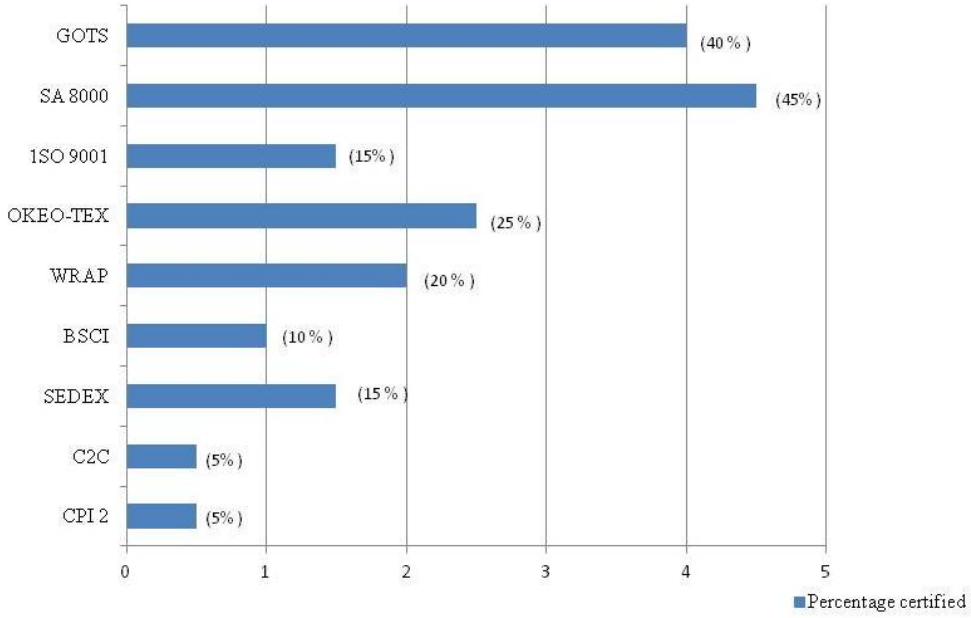


Table 1.4: International certificates possessed by the researched garment units

OEKO-TEX is another independent testing and certification system for raw, semi-finished, and finished textile products at all processing levels, as well as accessory materials used. 25% of the companies in this survey had this certificate. The fourth most popular certificate was WARP (Worldwide Responsible Accredited Production) with 20% acquirers. WRAP certification agency promotes safe, lawful, humane, and ethical manufacturing through certification and education. SEDEX (Supplier Ethical Data Exchange) and ISO 9001 (International Organization for Standardization), were also popular with 15% companies each. SEDEX is a membership organisation for businesses committed to continuous improvement of the ethical performance of their supply chains. ISO 9001 is the international standard that specifies requirements for a quality management system. Organizations used these standards to demonstrate the ability to consistently provide products and services that meet customer and regulatory requirements.Other certifications like C2C (Cradle to Cradle Certified), CPI_2(Carbon Performance Improvement Initiative) were some uncommon certificates owned byfewercompanies in the survey (Table 1.4).

SUSTAINABILITY IN WASTE DISPOSAL

The industrial symbiosis process is carried out in Tirupur garment industry where the by-products or the waste generated in the garment industry are used by other industries as resources. This allows for efficient use of material resources and at the same time bringing in money. The solid waste generated by the garment units like fabric trims, cans, paper, cardboard etc. were sold to scrap dealers for recycling or to be used by other industries as raw materials. An absolute majority of 96.2% companies sold the solid waste generated to the scarp dealers, whereas a contrasting percentage of 3.8%disposed the solid waste to the municipality. Only 7.6% garment units in the study used the solid scrap generated by their manufacturing units as fuel for other production processes. (Table 1.5).

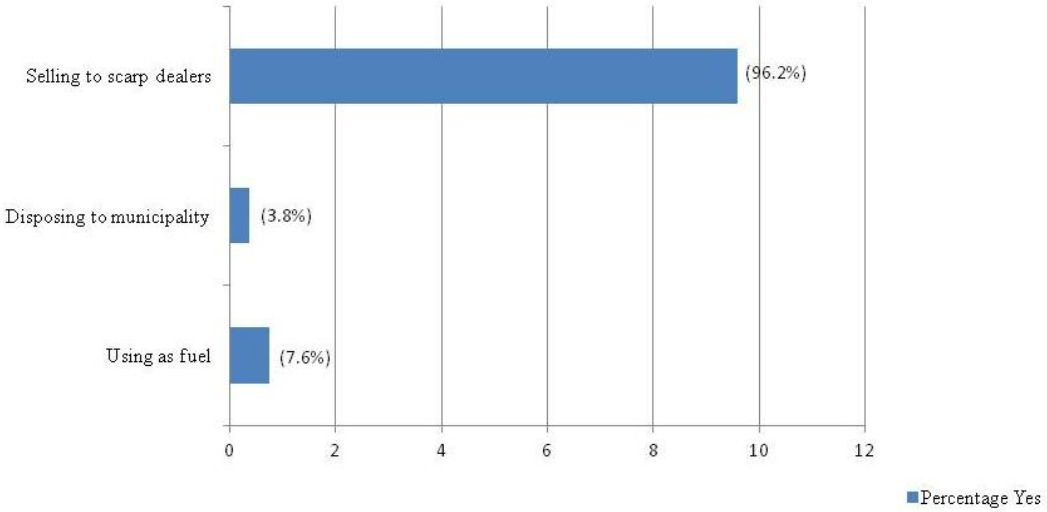


Table 1.5: Pattern for solid waste disposal by the garment industry

DEMAND OF SUSTAINABLEPRODUCTS

The demand for eco-friendly clothing had been increasing in the past few years. The consumer's awareness regarding sustainable clothing had grown tremendously and they are now ready to pay even more money to purchase sustainably produced garments. Due to this high demand for sustainable clothing, many brands are making sustainability as their core concept. The garment industry is now taking more efforts for obtaining sustainability while production processing starting form selection of raw material to final packaging of the garment. More and more number of brands are joining the sustainability campaign and manufacturing sustainable garments. Brands are incorporating transparency and tracebility in all their manufacturing processes like greenhouse gas emissions generated during production, transport and storage. This transparency in the supply chain had proved to be profitable for the companies by improving its brand image.

The study found that an average of 5 to10 % buyers of 37% companies enquire for sustainable garments. Equalling, 33.3% companies stated that approximately 10 to 30% of their buyers demand for eco-friendly clothing. 18.5% manufacturers got queries from 50 to 80% of their customers for sustainable products. 7.4 % organizations got enquiries from more that 80% of their buyers for sustainable garments.It was proven from the above figures that the high demand for more sustainable clothing from the buyershad played an important role in the growth of sustainable practices in Tirupur garment industry (Table 1.6).

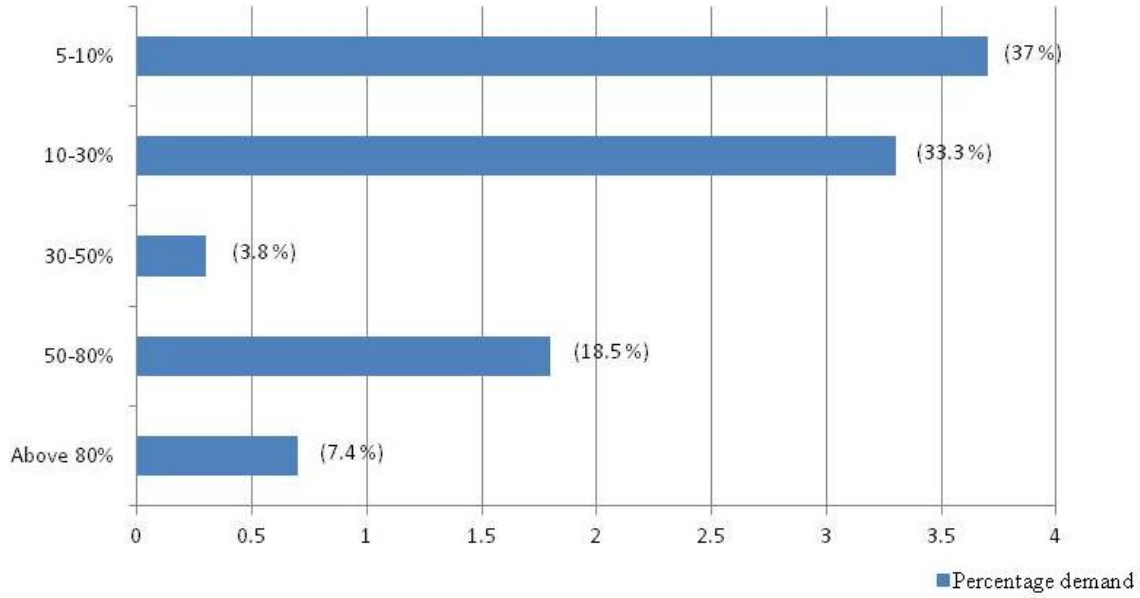


Table 1.6: Percentage of range of buyers who enquire for sustainable garments

TIRUPUR EXPORT ASSOCIATION

Tirupur Exporters Association also known as TEAwas established in the year 1990. This is an association exclusively for exporters of cotton knitwear who have production facilities in Tirupur. In the past two decades TEA has grown into a strong body of knitwear exporters.Today, TEA has a membership of 927 Life members and 155 Associate Members. TEA has played a major role in bringing sustainability to the Tirupur knitwear industry. Netaji Apparel Park, Tirupur Export Knitwear Industrial Complex, India Knit Fair Association are some of the developments of TEA to bring down the cost of production and formulating a sustainable supply chain in the industry. It was also instrumental in the execution of Tirupur water supply and sanitation project with New Tirupur Area Development Corporation Limited (NTADCL) which is considered as one of the biggest public private partnership projects in Asia for supplying industrial water to the knitwear units.TEA is also playing a pivotal role in conceptualizing Tirupur Stakeholders Forum (TSF). The chief objectives of this forum is to openly and collectively address broad, industry-level issues and challenges pertaining to the workforce and working conditions in the apparel export sector of Tirupur, and thereby finding and implementing sustainable solutions growth of the industry. All the companies covered in this study were members of TEA and got support from the organization in carrying out sustainable practices.

CONCLUSION

This paper was used to estimate sustainability in the Tirupur knitwear garment industry as a whole. The concept of awareness had been analyzed by questions based upon sustainable practices carried out in the garment units like-energy-efficient processes, alternate energy utilization, low impact dyes, effluent treatment plant, sustainable fibers, sustainable manufacturing certificates, demand of products, waste disposal, role of Tirupur Export

Association etc.The answers were aggregated and percentages taken to find out sustainability measures taken by the companies at the ground level.

Energy-efficient processes like keeping daily records of energy utilized were followed by the garment units.Alternate energy sources like wind and solar energy were being used by companies and if not they were eager to explore new energy sources in the future. Majority of the establishments covered in this study were linked to common effluent treatment plant or had their own In-house effluent treatment plants with reverse osmosis or zero liquid discharge technology in majority. The industry had good knowledge about sustainable textile materials and organic cotton was the most widely exploited textile yarn in the knitting industry followed by linen and BCI cotton. SA8000 and GOTS were the most widely owned third party certificates for verifying company's achievement in environmental management and sustainability. A good majority of garment production units in Tirupur sold the solid waste generated by their manufacturing units,to scrap dealers for recycling or to be used by other industries as raw materials.The study found that a good average of buyers of demand for eco-friendly clothing. All the companies covered in this study were members of TEA and got support from the organization in carrying out sustainable practices.

Sustainability means meeting the needs of the present without compromising the ability of the future generations to meet their own needs. The results of the interview schedule conducted proved that there is a good level of awareness among the people about sustainability in the Tirupur garment units. Sustainable practices are being followed in the industry in a fair magnitude this is due to the fact that foreign buyers are frequently asking for more sustainable products and there is a pressure on the industry to develop more sustainable practices. The companies which are not regarding sustainability are surely at a disadvantage though there exists a need from the government, to support the companies in pursuing sustainability.

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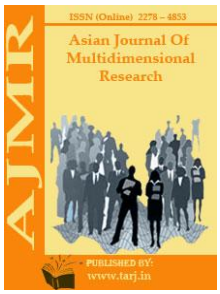

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

ANTIMICROBIAL ACTIVITY OF CASSIA AURICULATAON BAMBOO COTTON

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ABSTRACT

"Prevention is better than cure "is the key of today's consuming products. Therefore there is a need for many herbal treated health care products. Several natural plants extract exhibit strong antimicrobial properties. Therefore coating of antimicrobial bioactive plant extract on the fabrics is an emerging technology in the production of medical textiles. In the present study Cassia articulate flower extract coated on bamboo cotton fabric was found to be effective as antimicrobial finishing of textiles. Studies on the antibacterial activity of ethanol extract of dry flower of Cassia auriculata was conducted using agar diffusion method. The maximum activity was observed against both organisms. Presence of phytochemicals such as tannins, phlobatannins, glycosides, saponins, flavonoids, anthraquinons, quinons and phenols were observed. The optimization of Cassia auriculata extract was done by varying its time, temperature and concentration for finishing of bamboo cotton fabric. The antimicrobial activity for each optimized cotton fabric was carried out and its zone of inhibition was also recorded.

KEYWORDS: *Antimicrobial Activity, Bacteria, Cassia Auriculata, Ethanol Extract, Optimization, Phytochemicals.*

INTRODUCTION

The expanding bacterial resistance to antibiotics has become a growing concern worldwide [1]. Intensive care physicians consider antibiotic-resistant bacteria a significant or major problem in the treatment of patients [2]. A vast number of medicinal plants have been recognized as valuable resources of natural antimicrobial compounds [3]. Medicinal plant extracts offer considerable potential for the development of new agents effective against infections currently difficult to treat [4].Successful determination of photochemical present in plants such biologically active compounds dependent on the type of solvent used in the extraction procedure. Ethanol is the most commonly used organic solvent by herbal medicine manufacturers because the finished products can be safely used internally by consumers of herbal extracts [5].Additionally, the bioactivity of plant extracts depends on the water and ethanol concentration used in the extraction process [6]. Although a great amount of research has been performed to determine the antibacterial activity of medicinal plants, optimal extraction of bioactive compounds has not been well-established for most plants.

Therefore, the objective of this study was to determine the antibacterial activity and physiochemical profile of flower extracts of *Cassia auriculata*.

METHODOLOGY

Collection of source for extraction

*Cassia auriculata*L. commonly known as tanner's cassia, also known as “avaram” in Tamil language is a shrub belongs to the Caesalpiniaceous family. It is also used for the treatment of ulcers, leprosy and liver disease. The antidiabetic, hypolipidemic and antioxidant and hepatoprotective effect of Cassia articulate have been reported. Hence the *cassia auriculata* flower was selected for the study and was collected from the nearby plants and washed thoroughly in soft water to remove the extraneous matters and dried in shade for 2-3 days and then powdered.

Selection of solvent and Method of Extraction.

Usually herbal extraction was carried out with aqueous water, acidic, alkaline and with alcoholic solvents. To find maximum effectiveness of the antimicrobial activity, the flowers were extracted with water, ethanol and methanol solvents. The solvent which shows the maximum activity was selected to extract the flower.Hot Continuous Extraction (Soxhlet) method was used because large amounts of drug can be extracted with a muchsmaller quantity of solvent [7].

The material liquor ratio of 1:10 was followed for the application of finish to 100% Bbamboocotton woven fabric.

Selection of Fabric and Micro-Organisms

Cotton is one the oldest materials used for medical textiles with good absorbance. Bamboo is a new fiber with natural antimicrobial activity. Considering the non availability of cotton and antimicrobial property of bamboo, a bamboo cotton woven fabric was selected for the study. Many harmful infectious and blood borne bacteria and viruses such as *Pseudomonas candida, S.aureus* and *E.coli* are present in hospital locations which are conducive for growth of the micro-organisms Hence, gram positive – *Staphylococcus aureus* and gram negative – *Escherichia coli* bacteria was selected for the study.

Phytochemical screening

The extracts were subjected to tests for secondary metabolites such as tannins, phlobatannins, glycosides, saponins, flavonoids, anthraquinone, quinones and phenols. The tests were carried out using standard methods and analysis. Photochemical are the main constituents of any plant sample, which are responsible for secondary metabolites also.

Optimization of the Finish Process Conditions

Time, temperature and concentration are the three major factors influencing the antimicrobial activity against bacteria and fungi organisms. Thus the fabric was treated with the flower extract for optimization at different time intervals of 1, 3 and 5 hours at different temperatures of 40 and 50ºC respectively. The fabric was also treated with different concentrations of 0.5, 1.0, and 1.5 g of the flower extract. The antimicrobial activity for each optimized treated bamboo cotton fabric was carried out and its zone of inhibition wasrecorded. The optimized condition which shows the good zone of inhibition was selected for the further study.

Application of Extraction on Fabric and Evulation.

The fabric was finished in the padding mangle with the optimized time (3 hour), temperature (50ºC) andconcentration(1.5) of the *Cassia auriculata* flower extracts solutions. The finished fabric samples were evaluated for its antimicrobial activity.The antimicrobial activity of finished and unfinished samples was evaluated by qualitative methods (AATCC 147, AATCC 30) of agar diffusion test for bacteria and fungi of microorganisms.

RESULTS AND DISCUSSION

The phytochemical components of *Cassia auriculata* flower extract

The phytochemical analysis (Table 1) showed the presence of tannins, phlobatannins, glycosides, saponins, flavonoids, anthraquinons, quinons and phenols. These compounds are found to be biologically active and therefore, aid in the antimicrobial activities. The secoundary metabolites exert antimicrobial activity by different mechanisms. Tannins have found to be reactive and herbs that have tannins as their major components are used for treating intestinal disorders.the presence of saponins are used for managing inflammations. Flavonoids have also exhibit wide range of biological activity such as anti microbial, antioxidant, anti inflammatory and anti-allergic

TABLE 1- THE BELOW TABLE SHOWS THE PHYTOCHEMICAL COMPONENTS OF CASSIA AURICULATA FLOWER EXTRACT

Phytochemical components	Cassia auriculata flower extract
Tannin	+
Phlobatannins	+
Glycosides	+
Saponins	+
Flavonoids	+

Anthraquinones	+
Quinone	+
Phenols	+

(+ indicates presence)

Zone of inhibition of *S.aureua* and *E.coli* bacteria for the fabric treated at different optimized conditions

The table 2 show zone of inhibition formed in various optimized conditions. The fabric treated with 0.5 g of the flower extract kept at 50 °C shows the maximum zone of inhibition of about 12mm for S.aureus and E.Coli. Similarly the greatest inhibitory effect was observed against *Staphylococcus aureus* with a zone of inhibition of 16 mm diameter followed by *Escherichia coli* with a zone of inhibition of 15 mm diameter. Also it is clear from the table that the increase in the concentration of the flower extract shows the increase in the diameter of the zone of inhibition of about 17 and 18mm respectively.

TABLE 2 – ZONE OF INHIBITION OF S.AUREUA AND E.COLI BACTERIA FOR THE FABRIC TREATED AT DIFFERENT OPTIMIZED CONDITIONS

Concentration (g)	Temperatute (°C)	Time (hrs)	Zone of inhibition (mm)	
			S.aureus	E. coli
0.5	40	1	4	5
		3	4	6
		5	5	6
	50	1	3	6
		3	5	12
		5	12	3
1.0	40	1	4	8
		3	4	6
		5	3	10
	50	1	WF	3
		3	15	7
		5	16	15
1.5	40	1	5	4
		3	5	5
		5	6	7
	50	1	WF	4
		3	3	3
		5	17	18

WF- Weekly formed

CONCLUSION

The *cassia auriculata flower* extract finished fabric was proved to be effective. The agar diffusion method and phytochemical analysis tests also reveals the same. It is quite evident from

this review that Cassia auriculata contains phytoconstituents which reveals its uses for various therapeutic purposes. Thus modern technologies have opened new doors to use the herbs in a more effective manner. It can also boost Indian export market by showcasing the new avenues in medical textiles.

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ANTIMICROBIAL FINISHES IN TEXTILES AND ITS SCENARIO

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ABSTRACT

Antimicrobial Experiments are carried out in medical industry for varoius benifits. Textile industry may also be benefitted by this experimentation as both the professions can be made Interdisciplinary and the advantages of both can be diffused. There are many safe and long lasting antimicrobial finishes which show a promising future. Thus importance is being put on ecofriendly fibers and production methods as it is globally the need of the hour. All the countries now insist on a safer environment for our future generations.Recently there has been a swing in universal trend from synthetic towards herbal medicine as "Return to Nature". Medicinal plants have been recognized ever since millennia and are very much cherished all over the humankind as a rich source of therapeutic agents for the deterrence of diseases and ailments. A lot of efforts have been made to discover new antimicrobial compounds from a variety of sources such as microorganisms, animals, and plants. Systematic vetting of them may end result in the invention of new effective antimicrobial compounds (Tomoko et al. 2002).

KEYWORDS: *Herbal Medicines, antimicrobial.*

INTRODUCTION

In recent times there is lot of attraction towards natural based herbs as an antimicrobial agent because of its eco-friendly and health hazard free nature. The purpose of a bioactive finish taking place in the fabric is dual. It guards the wearer from microorganisms for aesthetic, hygiene, or medical reasons, and protects the textile from biodeterioration caused by mold, mildew, and fungi. Research is available worldwide with the centre of attention on new quality needs that include maintaining the inherent functionality of the product by an eco friendly production process. (1)

Antimicrobial finishes on the fabric can minimize the transfer of micro-organisms on to the wearer by creating a physical barrier.(2)

METHODOLOGY

Microorganisms and textiles

Textiles are an excellent substrate for bacterial growth and microbial proliferation under appropriate moisture, nutrients and temperature conditions . In a clinical setting, they can be an significant source of bacteria that possibly will contaminate the patients and clinician personnel . Bacteria and fungus, whichever pathogenic or not, are usually set up on human skin, nasal cavities, and other areas, such like in the genital area.

Microbial shedding from our body have a say to microorganism disseminating into a textile material moreover directly in attire or on adjacent textiles. Current studies powerfully support that contamination of textiles in clinical background may add to the dispersal of pathogens to the air which afterwards settle behind and communicate a disease to the immediate and non-immediate environment. It is one of the most probably causes of hospital infections . Typically, pathogenic microorganisms like *Klebsiella pnuemoniae*, *Pseudomonas aeuroginosa*, *Staphylococcus epidermidis*, *Staphylococcus aureus* and *Candida albicans* have been found on textiles.

In totalling, microorganism propagation can be the basis for stais, malodours and injure of the mechanical properties in the component fibres that may possibly be the groundwork of a product to be smaller amount effect in the anticipated use. In addition, may endorse skin contamination, inflammation and in receptive people, atopic dermatitis. Fortunately, the use of antimicrobial textiles may considerably lessen the risk of infections in particular when they are used in close contact amid the patients or in the immediate and non-immediate surroundings.(3)

The Effect of Microbes on Textile and Humans

Although microbes can be helpful in numerous ways, e.g. in brewing, baking and biotechnology, they can also be injurious to both cloth and humans. The range of effects of microbes are stated as behind:

- Dreadful Odour
- Skin and Soft Tissueillness
- Discoloration of Fabric
- Smooth slippery handle
- Failure of Functional Properties

 dwindle in Life of Textile

RESULT AND DISCUSSION

The Antimicrobials

The term antimicrobial refers to a broad array of technologies that supply varying extent of protection for products and buildings in opposition to microbes. Antimicrobials are exceptionally dissimilar in their chemical environment, style of action, impact on people and the surroundings, in-plant-handling features, permanence on various substrates, expenses, and how they act together with good and dreadful microbes. Antimicrobials are put on textiles to administer fungi, mould, bacteria, mildew and algae. This manage lessen or eliminates the trouble of deterioration, odours, staining, and health apprehension that they cause. The microbial infection in addition to body odour become crucial to study in innerwear for various concerns that include: to tackle physiological discomfort, to save textile itself from damage and stain to maintain aesthetics, to maintain proper hygiene and as a value addition to end product.(4)

Pathogenic Bacteria survive to almost many antibiotics which are available commercially around past 20 years, and there is a niche market for many new antibiotics, as new ones to be developed are limited (5). Hence there is a quest for identifying new antibacterial agents for pharmaceutical companies and researchers. Nowadays nanotechnology is upcoming area wherein new antimicrobial agents can be made to nanoscale materials. When compared to classic antibiotics, the nano scale materials do posses a less significant propensity to encourage advanced, one-step resistance alteration because of their multi-tasking action, elevated surface area when compared with volume ratio, and only one of its kind chemical and physical characteristics (6,7,8). In latest years, Abundant assortment of nanomaterials having antimicobial properties among chitosan, magnesium, alginate, titanium, copper , zinc and gold have been developed (9).

CONCLUSION

In current years, the antimicrobial nanofinishing of biomedical textiles has be converted to promising research area which could find great potential when compared to other textile surface modification experimentations. Antimicrobial textiles are naturally finding a position in the international textile market. It can find personalized application to suit the demand of Society.

Plant based antimicrobials correspond to a vast unexploited source of medicine. Plant based antimicrobials encompass enormous therapeutic potential as they can dole out the purpose and devoid of any side effects that are over and over again linked with artificial antimicrobials. In addition sustained investigation of plant derived antimicrobials is necessary nowadays

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ECOFRIENDLY METHODS OF WASTE WATER TREATMENT IN TEXTILE WET PROCESSING

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ABSTRACT:

The control of water pollution has become of increasing importance in recent years. Textile wet processes causes severe environmental pollution and health problems. It is no longer adequate to have a finished product to be safe only to human being, but the product has to be environmentally safe during the life time and even beyond. It is important for the textile industry to adopt pollution preventive approach. Recycling, reusing of chemicals and dyes helps in eliminating disposal costs and reducing raw material costs. The Indian textile industry has its importance in the national economy, but at the same time it is responsible for disastrous environmental impacts.Tightening government legislation is forcing textile industries to treat their waste effluent to an increasingly high standard. Removal of dyes from effluents is by some physical and chemical methods such as adsorption, membrane filtration, photo catalytic degradation and ozonation are quite effective in decolonization of dyes. Such methods are often very costly and there is a need to find alternative treatments that are effective in removing dyes from large volumes of effluents and are low in cost. This paper reviews the current available technologies and suggests several effective, cheaper alternatives for eco friendly approaches in textile processing and waste water treatments.

KEYWORDS: *Disposal, Photo Catalytic, Decolonization, Water Treatments.*

INTRODUCTION:

Reverse Osmosis is a process in which dissolved inorganic solids (such as salts) are removed from a solution (such as water). This is accomplished by household water pressure pushing the tap water through a semi permeable membrane. It uses a semi permeable membrane to remove ions, molecules, and larger particles from **water**. Reverse osmosis can remove many types of dissolved and suspended species from water, including bacteria, and is used in both industrial processes and the production of portable water.

How Does Reverse Osmosis Works?

A saltwater solution on one side of a tank and pure water on the other side, separated by a semipermeable membrane. We would apply pressure to the saltwater side of the tank--enough to counteract the natural osmotic pressure from the pure water side, and then to push the saltwater Sthrough the filter. But because of the size of the salt molecules, only the smaller water molecules would make it to the other side, thus adding fresh water to the water side, and leaving the salt on the other. Reverse osmosis takes place when pressure applied to a highly concentrated solute solution causes the solvent to pass through a membrane to the lower concentrated solution, leaving a higher concentration of solute on one side, and only solvent on the other.

Why Reverse Osmosis Is Best?

If other variables are kept constant, the water flow rate (flux) is proportional to the net pressure. The pressure range for RO systems varies from 10 Kg/cm2 to 65 Kg/cm2. Thus it is evident that RO can be advantageously used for the treatment of textile waste water provided the design, pretreatment stringency, operating parameters are strictly adhered to avoid fouling of membrane modules.

Applications

RO is more useful to separate salts and organic compounds from textile effluents. Some of the wastewater varieties from textile industry that can be treated by RO for recovery of reusable water such as:

1. Rayon industry process wastewater.

2. Textile dyes house effluent. Up to 80% of warm dye house wastewater can be recovered for recycle by RO membrane.

Criteria for Designing Reverse Osmosis System

Normally four parameters are considered for designing the systems: They are

Solution based variables such as

Suspended solids, dissolved solids-inorganic and organic, micro- organisms, sparingly soluble materials, oxidizing chemicals, organic solvents (nature and concentration), temperature and Ph.

Minimum pre treatment requirement

Acid or alkali dosing for pH adjustment, filtration to obtain required salt density index, and heat exchange for reducing the higher temperature of the solution

Membrane variable

Polymer type and module geometry, pressure, flow rate, pressure loss. Water recovery and concentration levels, minimum tolerable flux and desired flux levels, module arrangements.

Cleaning requirement

The fouling of membrane depend on the extend of pretreatment and module type chosen. The flux loss due to particulate or bacterial adhesion generally increases in the following order tubular>plate and frame>spiral wound> hollow fine fibre

Reverse Osmosis Seperation of Organic Pollutants from Waste water

Studies have been performed on the separation of organics and organic pollutants by RO membranes, and these studies have identified some of the unique aspects associated with organic separation.They found that organic separation can vary widely (from <0% to 100%) depending on the characteristics of the organic (polarity, size, charge, etc.) and operating conditions (such as feed pH, operating pressure,etc.).

Design speciality

RO membrane modules are commonly fabricated in a spiral configuration. An important consideration of spiral elements is the design of the feed spacer, which promotes turbulence to reduce fouling. The RO technique is a highly efficient process, in terms of high recovery, low operating cost. ROmembranes have 90%retentionand most ionic comppounds and that they can give permeate with high quality. This permeates seperates the salts, reactive dyes and chemical compounds, it requires greater energy incase of higher concentration of salts.

METHODOLOGY

The one of the leading dyeing unit SIPCOT, Perundhurai has collected wastewater from manufacturing units and the following parameters are tested.

1. Silica

2. Sulphate

3. Free Chlorine

4. Chlorides

5. Silicate

6. S.D. Index Then comparison between the results of RO feed and Permeate, RO feed and rejects parameters.

RESULTS AND DISCUSSION

This work is completely about RO process and ecofriendly methods for waste water treatments that to be adopted in wet processing units. Water is tested using three steps RO feed, RO permeate and RO reject. Each stage is tested with some parameters.

Zero Waste Water Concept

Some industries around Erode found that waste water treatment technically feasible and economically viable. Also the water recovered from RO membrane is found to have less

hardness and can be reused for finishing process and qualified dyeing. RO process also has the following advantages,

1. RO process doesn't involves any addition of chemicals as in the case of water clarification, by means of coagulation flocculation process.

2. High permeability to water and decreased production cost.

3. High efficiency of the membranes in selective mineral rejection.

4. The main advantage is, it has been designed with the concept of zero waste water.

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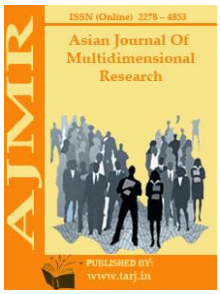

Asian Journal of Multidimensional Research (AJMR)
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A SURVEY ON AWARENESS OF INNOVATIVE SMART WEARABLE HEALTH MONITORING SYSTE

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ABSTRACT

Advances in science have modified every field in number of aspects. Even the field of textiles which was just drapes of leaves and animal skin in the Stone Age has been fine tunes to smart and electronic textiles in this digital era. E textiles are material woven or embedded with sensors to monitor a specific aspect for which it is designed. The pervasive healthcare systems provide rich contextual information and alerting mechanisms against odd conditions with continuous monitoring. This minimizes the need for caregivers and helps to provide quality care for the babies and little children. The need for improved quality of living and financial crisis has forced Indian women to take up jobs, and walk into offices at a very early stage after delivery leaving behind their loved infant in the care of maids or day care centers. Even when the new born is sick they are forced to be physically in their offices. A monitoring system if designed will be handy to the mother to be without tension. Considering this, a novel integrated system for monitoring healthcare of infants was planned to develop in order to facilitate proper care of health issues and overall wellbeing, including early detection of symptoms for various diseases, post-treatment monitoring. In this paper, a survey was conducted among parents especially mothers to understand their awareness and user requirements of wearable electronics, also we interviewed a doctor as a domain expert, and finally a wearable prototype of the system was framed.

KEYWORDS: *Healthcare Monitoring; Smart Textiles; Electronic Textiles; Wearable Systems; Wireless Sensor Network; Infants; Mother*

INRTRODUCTION

Healthcare is common term which means prevention of disease, illness, diagnosing, treatment, and injury, and other physical and mental impairments in humans and living beings. Healthcare is provided by practitioners in medicine, dentistry, nursing, pharmacy, chiropractic, allied health and other care providers (1). Healthcare sector is one of largest sectors in India, in terms of revenue and employment. With the World Health Organization's 2016 World Health Report ranking India's healthcare system at 112 out of 191 countries. The private sector in healthcare industry accounts for more than 80% of total healthcare spending in India.

During the 1990s, Indian healthcare grew at a compound annual rate of 16% and the total value of this sector is more than US$34 billion. This translates to US$34 per capita and roughly 6% of GDP. By 2012, India's healthcare sector reached its growth by nearly US$40 billion. Indian healthcare sector is growing at a 15 per cent CAGR and reached US$ 158.2 billion by 2017. The total size of Healthcare industry touched $160 billion by 2017 and is expected to reach US$ 280 billion by 2020(2) (3).

Health care textile is one of the fastest growing segments of the world. Very distinctive feature of health care textiles is that, it can make value addition as to ever application and end users. At the same time, it is a diverse and dynamic one, having wide range of materials, processes, products and application. The last decade has witnessed a tremendous increase of interest in new sensing and monitoring devices including wearable wireless monitors and sensory networks for several personal applications especially in healthcare, lifestyle, protection and safety(4).

Wearable electronic technologies are a relatively new entrant in the healthcare and medical fitness sector. Examples of healthcare and fitness wearable applications include health monitors, fitness trackers, activity monitors, and analysis aids. According to, healthcare and medical wearables accounted for 60% of the wearables market in 2013 and it is predicted that the healthcare wearables market will be worth roughly £ 3.7 billion by 2019 (5). The smart texiles – wearable electronic is one such emerging technology that has the potential to support remote infant monitoring in a reliable, affordable and cost effective manner thereby improving their quality of life (6)

Healthy children are the first step to a healthy adult population. In the past few decades, female participation in the labour force in the industrialized nations has greatly increased in present society (7). Subsequently, infant care has becomes difficult for many parents to continuously monitor the health and wellbeing of their children. This is especially true for children belonging to the age group of 2-5 years when they are unable to express themselves clearly and tend to become sick easily. If a system is developed which continuously gives updates about their infants during illness or during normal routine then it will be of great help to such members as they can work in stress less environment giving more fruitful output. Also urgent situation condition can be quickly be noticed and handled within less time (8).

Strategically placed wearable sensor enables parents, doctors and other medical personnel to safely monitor the infants vital signs, such as electrocardiogram (ECG), EEG and blood pressure; or important environmental parameters like temperature, respiration and humidity. The patient related data (gathered data) from all WBANs may ultimately be sent to a centralized healthcare repository for permanent records. Physicians can remotely access this data to assess the state of health of the patient. Additionally the patient can be alerted using SMS, alarm, or reminder messages.

Surveying has a number of advantages. Namely, it can reach a broad audience, and it permits participants to conduct the study at their own leisure in the comfort of a private environment, thus capturing a higher level of honesty in participant responses. The survey method was chosen because of the large scope of the thesis as it facilitated easy dissemination, large-scale data collection, and supported multiple viewing options in a controlled manner (9).

METHODOLOGY

In order to ascertain the awareness of Smart Textiles- Wearable Electronics among participants, a survey was conducted to know their level of interest and to create aware of them. Our aim of this paper is to explore the awareness of Smart Wearable Kids Health monitoring system among the participants through basic research method of data collection and also to create the awareness among them.

The Structured survey research design was adopted in carrying out the study among the young mothers with infants. Questionnaire is prepared to conduct the survey in data collection method. The data collection questionnaires were administered through face-to-face interviews. A sample of 100 young mothers was randomly drawn from different parts of Coimbatore district. The samples of different income level were selected using purposeful random sampling technique. The personal interviews were conducted by the researcher, and it took place at the pediatric clinic and hospitals among the young mothers who comes for their infant's regular health checkup. Some of the interviews were conducted by sending questionnaire through private e-mails after getting contact information through hospitals. All the above types of interviews had more flexibility more than only a paper survey as both the interviewer and the interviewee were able to clarify their doubts. In this study, the questionnaire was prepared using combination of both open ended and close ended questions. Also the individual privacy is maintained which refers to the evolving relationship between the technology and the legal right, or privacy in the connection and sharing of personal data. The interview also had a chance for free comments.

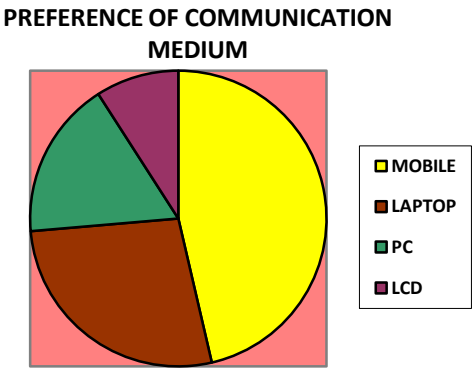
RESULTS AND DISCUSSION

The following findings were made by survey study:

1. When the difficulty in monitoring the baby's Body temperature during fever or illness is assessed among young mothers- 92%of them facing difficulty to monitor and 8% are not.
2. In case of awareness of the Smart Textiles -Wearable Electronics, 56% of young mothers are aware of Smart Textiles and its products but not used it except few and 44% of young mothers are totally unaware of Smart Textiles.
3. For the question on awareness in monitoring Body temperature through Wearable Electronics- 42% of young mothers replied YES and 58% of them replied NO.
4. Among young mothers, 39% of them are aware of the Smart Textiles that continuously monitor Heart Beat and Blood Pressure and 61% of them are unaware of it.
5. When we asked the question -Do you think Wearable Electronic garments can act as a doctor in monitoring the health care of the infant? 39% of young mothers knows the fact and 61% of them are unaware of such things.
6. 78% of young mothers preferred in using a safe Wearable Electronic garment when it is fabricated to monitor your infant's body temperature, Heart Rate and Blood Pressure?
7. The preference In selecting the key feature regarding the garment design for Wearable Electronics to monitor infant's healthcare, there is variation in selection of features like –

Reusable, disposable, washable, Removable Electronic device and Attached electronic device among young mothers. 48% of them preferred Removable Electronic device and rest is scattered result.

8. In selecting the preference of communication medium to use for monitoring the healthcare of infants, 51% of young mothers selected Mobile phone as it was a comfortable medium and followed by 30% of them selected Laptop, 19% for PC and 10% for LCD Display.



9. Depending on the cost of the wearable electronics garments 15% of young mothers preferred Less Cost garment and 68% of them preferred affordable while 17% of them are does not about the cost of the garment.

CONCLUSION

The findings of this study show that

The need for improved quality of living and financial crisis has forced Young mothers to take up jobs, and walk into offices leaving behind their loved infant in the care of maids or day care centers. The survey on awareness of Smart wearable Health monitoring garment among young mothers shows increased curiosity, interest in smart textiles and preferring safe wireless monitor for their infant's healthcare and awareness in wearable electronics. Based on young mother's response and comments in survey, a wearable prototype of the system was designed and framed.

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APPLICATION OF AROMA FINISH IN KIDS WEAR GARMENTS USING BAMBOO FABRIC

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ABSTRACT

Human beings are blessed with five sense organs and among that the most important one was the sense of smell. A pleasant and pleasing smell which can be incorporated in the fabric is called as AROMA finish or fragrance finish. Textiles play a major role in our day to day life. Bamboo fabric is very much similar to the softness of silk. Since the bamboo fibers are without chemical treatment, they are naturally smoother and rounder with no sharp spurs to irritate the skin, making the bamboo fabric hypoallergenic and perfect for those who experience allergic reactions to other natural fibers. Kids are the person who needs more care in our family. We should give additional care while selecting their garments. The kids clothes have to be designed such a way it should not hinder their freedom of movement. The Bamboo fibre was selected to which aroma finish was applied and converted into kids wear garments. The design selection, general appearance and ranking were evaluated using visual inspection.

KEYWORDS: *Aroma finish, Bamboo Fabric, Kids Garments*.

INTRODUCTION:

Today textiles are used in all the aspects and everyone is an ultimate customer. A pleasant and pleasing smell which can be incorporated in the fabric is called as AROMA finish or fragrance finish. The term aroma therapy and aromachology and their role in pharmaceutical industry is already established in the field of research. Aromatic treatments to textiles materials have gained importance in the recent years. The uses of this fragrance finish are diverse.

This aroma finish can be given by using microencapsulation technique. This technique of fragrance has been used to maintain a fresh aroma on textiles. In this microencapsulation technique the fragrance are applied in the form of atoms. Once the fabric got abrade with the wearer's body the aromatic atoms are broken out and produce the fragrance odor to the wearer. The microcapsules are a container which protects its contents from evaporation, oxidation and contamination till its release it's triggered by gentle rubbing.

Bamboo fabric is very much similar to the softness of silk. Since the bamboo fibers are without chemical treatment, they are naturally smoother and rounder with no sharp spurs to irritate the skin, making the bamboo fabric hypoallergenic and perfect for those who experience allergic reactions to other natural fibers.

Bamboo knitting is relatively a new entry in the knitting world, but it has become quite popular very quickly and with good reason. Bamboo is a beautiful natural fiber that wears well and is often considered as natural anti-bacterial. Bamboo gives better comfortless in knitting than weaving.

Kids are the most care able person in our family. So, we should give additional care while selecting their garments. During construction kids cloth should be loose enough to allow freedom of movement.

METHODOLOGY:

SELECTION OF YARN:

Bamboo fiber has the antibacterial characteristics which can be applied for kids' garments. It is an eco-friendly yarn too which does not do any harm to living beings and even to the environment. Hence, the investigator has selected Bamboo yarn for this study.

SELECTION OF KNITTING

The bamboo yarn of 40^S count has been knitted using interlock type. Hence bamboo yarn knitted with interlock was selected for the study with the following particulars.

SELECTION OF PRE-TREATMENT:

The pretreatment for the bamboo fabric are as follows:

1) Scouring
2) RFD – Ready For Dyeing.

SCOURING:

Wetting agent of 0.7 % was added with water at the temperature of 60^oc and the machine is set to run for ten minutes. Then the fabric is impregnated with SBWT chemical 15 and the machine is set to run at a temperature of 60^oc for ten minutes. During this time the neutralization of the

fabric takes place. After completion of this scouring process the fabric was taken and the waste water was drained. Then the fabric was set to dry.

RFD – READY FOR DYEING:

In this process the fabric was treated with hydrogen per oxide and soda is added and the machine was set to run for 30 minutes in a temperature of 100^{o}c. So that the chemicals change the natural yellowish colour of the fabric into white colour. Then the waste water was drained. Again the fabric was treated with acetic acid for the process of neutralization and the machine was set to run for 10 minutes at80^{o}c. After completion of this process the fabric was given hot wash, by allowing the fabric to run for ten minutes in hot water and the fabric was neutralized by using the killer solution to control the acid characters in the fabric.

SELECTION OF AROMA FINISH:

It is the method of imparting a good smelling agent in any textile substrate**.** This was done by micro encapsulation technique, by imparting the microcapsules in the fabric with the smelling agent according to the flavours. Once the wearer wear the garment consisting of aroma finish the fabric would abrade with the wearer's body where the micro capsules burst out the fragrance to make the wearer to feel the fragrance and it hides the unpleasant smell due to perspiration. It also gives a wonderful soft touch to the fabric. Hence the investigator has selected this finish.

SELECTION OF FLAVOURS

This selection of flavours had come to know by conducting a survey among 20 mothers whose children are of age group 4 to 5. This survey was conducted by placing ten kinds of fragrance samples readily available in the market. So from those ten kinds of flavours these mothers have chosen two best flavours according to their kids taste.

1) BUBBLE GUM

2) LAVENDER

APPLICATION OF AROMA FINISH:

The result of the best finishing of fragrance can be obtained by applying the microcapsules towards the end of the production process. The ratio of capsules to the binder is 4:1. Measure the correct weight of capsule of application. Mix the capsule paste well. Separately weight the binder needed. The weight of the binder was estimated 25% from the total weight of the capsules. So this equates the binder weight 500 g. Slowly add the binder to the capsule paste, with constant agitation. The mixture needs to be mixed for ninety seconds separately with a high shear mechanical mixer, so that the binder wraps around the capsules properly.

FINISHING PROCESS:

First the fabric is passed through the padding mangle which will apply the chemical consisting of fragrance flavours with binder. Then the machine was set to run for 5 minutes. So that the finish will impart in the whole length of the fabric. Then the fabric was taken away and the squeezing process was done. During squeezing the fabric pick up was about 70% - 80%. Then the fabric was sent to dry.

DRYING:

After dipping and soaking, the fabric was transferred to relax dryer to dry the finished fabric by maintaining the temperature at 140 ^{o}c. The temperature of the dryer should be maintained and it should not exceed 140 ^{o}c. If it exceeds then it will leads in damaging the capsules.

DESIGNING, DRAFTING AND CONSTRUCTION OF GARMENTS:

The designing drafting and construction of garments are done by designing 25 designs for girls who belongs to age group of 4 to 5 and 5 designs were selected and they are constructed as kids garments.

STANDARDISATION OF MEASUREMENT:

The investigator has selected 15 girls belonging to the age group of 4 – 5 from 2 nursery schools of Tirupur region. Based on their measurements the standardized measurement chart was prepared.

DRAFTING AND CONSTRUCTION OF GARMENTS:

The selected designs were drafted using the standardization chart and the designs were constructed as girl's garments for the age group of 4 to 5.

RESULTS AND DISCUSSION:

Evaluation has been done by conducting visual inspection. The results of the visual inspection are discussed under selection f design, General Appearance, and Ranking.

SELECTION OF DESIGN:

Sample S1 was rated as good by 82 per cent of the evaluators, 18 per cent of the evaluators rated it as fair. Sample S3 was rated as good by 94 per cent of the evaluators, 6 per cent of the evaluators rated it as fair. Out of all the samples sample S2 was the best and was rated as good by 96 per cent of the evaluators.

GENERAL APPEARANCE:

Sample S1 was rated as good by 84 per cent of the evaluators, 12 per cent of the evaluators rated it as fair, no one rated it as poor. Sample S2 was rated as good by 90 per cent of the evaluators, only 10 per cent of the evaluators rated it as fair, no one rated it as poor. Sample

Out of all the samples sample S2 was the best and was rated as good by 90 per cent of the evaluators in general appearance.

RANKING

Out of all the samples S5 got the fifth rank, Sample S1 fourth rank and sample S4 got third rank, sample S3 got second rank and the sample S2 got first rank.

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A STUDY ON ASSESSING COMBINATIONS OF COTTON BASED COMPOSITES FOR ITS CHARACTERIZATION

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ABSTRACT

Spinning technique results in the last waste cotton dust called willow waste or willow dust. This is mostly disposed off in the landfills or incinerated resulting in various forms of pollution. Globally, this waste has been less explored and hence the hypothesis was planned. The prime focus was on up cycling the selected willow waste into composites and testing them for various parameters based on which the suitability can be recommended. The willow waste was collected from local spinning mills go down and then tested for it properties. The commercial available polypropylene was purchased.Two combinations of 100% willow waste and by weight the polypropylene and willow waste was made into composite using hydraulic compression molding. The resultant composites were tested and values were compared.

KEYWORDS: *Recommended, Hydraulic, Polypropylene*

INTRODUCTION

The study focused on converting an organic waste from textile cotton spinning into a product beneficial for various other end uses under composite technology. The regional problem of Coimbatore was spinning wastes. This was collected and mostly burnt off by incineration, or just disposed in waste land, and mainly used to be thrown in agriculture field as compost. Reports suggest that every year 2, 10, 000 tons of this waste is thrown without recycling. Thus the study was planned to collect this waste and analyse its composition there by experimenting suitable end uses using this potential cotton waste.

The major objective of the study is to

- Collect the waste and analyse its composition
- analyse the possibilities using pilot study
- make eco-friendly textile composite and compare with commercial prototypes
- to perfom the techno economic feasibility of the study

METHODOLOGY

Willow waste as raw material for textile composite:

Since 1908 natural fiber are used as raw materials for making composites. Hemp, linen, straw and grass, kenaf , sisal and bamboo are few of the commonly used fibers. Contrastingly, thermoplastic resin like polypropylene is also used and is more popular due to its strength and bonding properties. The former plays a key role in producing a textile matrix that is eco-friendly. The waste selected for the study is also similar to the lingo cellulosic waste which has lignin to be the natural binder.

Selection of raw material:

The selected willow waste was collected from spinning units and tested for its composition. The sample was tested for its composition namely Carbon, nitro gen, bacteria,, fungi, zinc, manganese, iron, calcium, magnesium and reported.

Selection of binder for making composite:

Tamarind Kernal Powder for making sustainable composite and polypropylene for making synthetic textile composite. It was understandable that polypropylene along with lingo cellulosic material like willow waste can serve as a very good sound absorbing medium, along with being dielectric, and good thermal stability properties. The picture on left shows the natural gum TKP and Polypropylene as sheets ready to be combined with willow waste for making a composite.

Production of composite:

The willow waste sample was mixed with natural gum made in three ratios namely 40/60, 50/50 and 60/40. The pilot study resulted in optimized values for temperature and pressure to be 100°C and 30kg/cm^2. The sample and resin was mixed and compressed in a hydraulic compression machine. The polypropylene resin and willow waste was also made into a composite using the temperature and pressure obtained from pilot study which was 165°C and 40- 45 kg/cm^2 respectively.

Assessing the composites prepared using willow waste

The prepared samples were tested in Universal Testing machine for its tensile, elongation, modulus at 5% and flexural rigidity. Based on recommendations for standard ASTM 638-01 the prepared 10 samples under each combination were tested.

The mechanical properties of materials namely tensile, elong6ation, flexural and modulus were tested in Instron Universal Testing Machine. The results were tabulated and compared. The cost comparison was calculated and tabulated.

RESULTS AND DISCUSSION

The characterization of willow waste with tamarind kernel and polypropylene was tested and reported. The values were obtained and inferences were drawn. The tensile strength was 27.4 kg/cm^2, 44.65 kg/cm^2 and 45.7 kg/cm^2 in 60/40, 50/50 and 40/60 for the sample made in combination with polypropylene as a binding agent. The tensile for TKP combination was 1.86 kg/cm^2 in 60/40. The elongation for willow waste with polypropylene in 60/40, 50/50 6and 40/60 was 2.14%, 2.49%, and 2.16% respectively.

The modulus @ 5% was 2.23 kg/cm^2 and 3.4 kg/cm^2 in 60/40 and 40/60 of willow waste with polypropylene and 1.32 kg/cm^2 in 60/40 in the TKP combination. The study shows that among the two combinations Willow waste polypropylene composite had very good tensile and flexural properties.Cost comparison was done and tabulated as below

CONCLUSION

Lignocellulosic wastes have a potential future and willow waste being one of the less explored in the area of composites. Every industry is now shifting its production to green consumerism and hence such eco-friendly based composites will be a potential market scope in future.

COST ANALYSIS – COMPOSITES FROM WILLOW WASTE

PREPARARTION OF COMPOSITES FROM WILLOW WASTE						
Particulars required	Natural resin (TKP)			Synthetic resin (PP)		
	Quantity	Unit price	Total	Quantity	Unit price	Total
Willow waste	50	3	150	50	3	150
Natural resin – Tamarind kernel powder	1kg	300	100	-	-	-
Synthetic resin - polypropylene	-	-	-	2kgs	90	180
Total Unit price			250.00 5/pc			330.00 7/pc
Sample of dimension			9rs/ piece			7rs/ piece
			30 /sq.mt			24 /sq.mt
Commercial polypropylene composite	-	-	-	-	-	37 / sq.mt

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UGC APPROVED JOURNAL

NATURAL FIBER NONWOVENS FOR THERMAL INSULATION

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ABSTRACT

Natural fibers are employed in large numbers for making nonwovens by replacing the synthetic fibers due to environmental consciousness. This study aims to investigates on the properties of the needle punched nonwoven fabrics made of natural fibers extracted from the plants such as Sansevieria stuckyi and Hemp for assessing their suitability for Insulation products. The prepared fabrics are analyzed for the physical properties such as thickness, areal density, bulk density, air permeability, porosity, stiffness and thermal conductivity and the results are reported.

KEYWORDS: *Fiber, Hemp, Insulation, Nonwoven, Sansevieria Stuckyi, Thermal Conductivity*

1. INTRODUCTION

Today the nonwoven technology is considered as the most modern method constitutes for the low cost substitutes for producing textiles. Among textile applications, nonwoven are one of the fastest growing sector constitutes about one-third of the fiber industry [1]. The natural fibers include Cotton, Jute and Flax and synthetic fibers like Polyester, Polypropylene and Viscose and in case of special fibers such as Glass, Carbon and Superabsorbent fibers are used commonly [2-4]. The properties and performance of the fabrics are influenced by the fiber characteristics such as fiber diameter, length, tensile properties and the structure of the nonwovens [5]. Based on the properties, the nonwoven fabrics are used in large number of applications such as bio-medical devices, filtration applications, oil sorbents, automobile and constructional textiles for acoustic and thermal insulation [6].

Needle punching nonwoven is one of the simplest and oldest methods of textile fabrication. The needle punched nonwoven fabrics are has the feasibility for new application called acoustics and thermal insulation. The nonwoven fabric has a porous structure to hold the sound and take much time to transfer the heat. Hence the needle punching technique of nonwoven is used for the study.

While considering the natural fibers, the Sansevieria stuckyi plants are grown abundant in rocky areas and the fibers obtained from their leaves are more smooth and lustrous. The Sansevieria stuckyi fibers are the emerging fiber with good cellulose content and physical properties (Sangeetha, 2009). Hemp fiber is extracted from the bast of perennial plant called *Cannabis* cultivated in wastelands. The hemp fibers are graded according to color, cleanliness, lustre, density and strength [8]. Hemp fiber has the common characteristics such as soft, high strength, good absorption and air permeability and has antibacterial functions [9]. Hemp fibers are used earlier as a substitute for flax and some synthetic fibers. With the intention of biodegradability, environmental protection and to utilize the agricultural waste as natural resources for the development of green fiber and as reinforcement for synthetic materials in the technical textiles these fibers are chosen for the study.

The research is concerned with the development of needle punched nonwoven fabrics by utilizing the natural fibers for greater economic benefits. In this study, the needle punched nonwoven fabric is developed from the Sansevieria stuckyi and Hemp fibers. The prepared nonwovens are analyzed for the physical properties such as thickness, areal density, bulk density, air permeability, porosity, mechanical properties such as tensile strength and elongation and for the thermal characteristics such as thermal conductivity and resistivity. The influence of fiber properties on the nonwoven fabrics are analyzed and reported.

2. MATERIALS AND METHODS

The Materials need for the study is Sansevieria stuckyi fibers and hemp fibers. The matured Sansevieria stuckyi plants (**Fig. 1a**) are collected from the forest areas of Coimbatore, Tamil Nadu, India and are decorticated to obtain the Sansevieria stuckyi fibers (**Fig. 1b**). The Hemp fibers (**Fig. 1c**) are purchased form Edappadi, Tamil Nadu, India at the cost of Rs. 450/Kg.

(a) **(b)** **(c)**

Figure 1: Materials (a) Sansevieria stuckyi plants (b) Sansevieria stuckyi fibers (c) Hemp fibers

NEEDLE PUNCHING

The fibers are precut to the length of 6 – 9 cm and are opened manually in order to avoid damages during further processing. The fibers are then fed into the Dilo nonwoven plant consisting of opener, circular drums for carding and needle loom. During the operation the pre-needled web was prepared and the layers of the web were entangled by needle punching using barbed needles in the needle loom. The details of the needle punching operations are given in **Table 1**. The nonwoven fabrics are prepared with 100% Sansevieria stuckyi fibers (**Fig. 2a**) and Hemp fibers (**Fig. 2b**).

TABLE 1: DETAILS OF NEEDLE PUNCHING OPERATION

Parameter	Values	Parameter	Values
Machine width	100 cm	No. of needle board	2
Working width	60 cm	No. of needles	5000
In feed speed	0.75 m/min	Needle penetration depth	12 mm
Draw off speed	0.60 m/min	Punch density	25 punch/cm^2
Type of Lay	Parallel	Stroke frequency	225 strokes/min
No. of laps	30	Needle motion	Down stroke

(a) Sansevieria stuckyi **(b)** Hemp

Figure 2: Needle punched Nonwoven fabrics (100%)

3. TESTING AND EVALUATION

TESTING OF FIBERS

The extracted fibers are analyzed for the physical properties such as length, diameter (SEM), fineness (ASTM D 1577); mechanical properties such as single fiber strength and elongation (ASTM D 3822) by standard test methods and the structural properties using Scanning Electron Microscope (SEM).

TESTING OF FABRICS

The prepared nonwoven fabrics are tested for the physical properties such as thickness (ASTM D 5729), areal density (ASTM D 6242), bulk density (ASTM D 3776), air permeability (ASTM D 737), porosity (ASTM B 809) and bending length using Shirley stiffness tester according to ASTM D 5732 – 95 [10]. The insulation properties of the nonwovens are analyzed by testing the thermal conductivity and resistivity using lee's disc method.

5. RESULT AND DISCUSSION

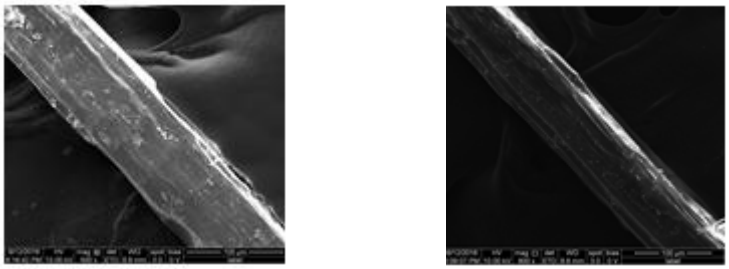
EVALUATION OF FIBER PROPERTIES

The **Table 2** shows the physical properties of the Sansevieria stuckyi and Hemp fibers. The **Figure 3** shows the structural characterization of Sansevieria stuckyi (Fig. 3a) and Hemp (Fig. 3b) fibers.

TABLE 2: FIBER PROPERTIES

Fiber Properties	Sansevieria stuckyi	Hemp
Fiber Length (cm)	116.2 ± 5.28	119.9 ± 9.87
Fiber Diameter (µm)	367.8 ± 17.26	107 ± 3.91
Fiber Fineness (tex)	7.67 ± 0.27	18.1 ± 3.14
Single fiber Strength (g/tex)	379.5 ±11.74	232.05 ± 62.19
Elongation at break (%)	2.99 ± 0.35	0.47 ± 0.23

Note: Mean ± Standard Deviation



(a) Sansevieria stuckyi **(b)** Hemp

Figure 3: Scanning Electron Microscope images of fibers (100 µm)

EVALUATION OF FABRIC PROPERTIES

The **Table 3** shows the properties of needle punched nonwoven fabrics made of Sansevieria stuckyi and Hemp fibers.

TABLE 3: FABRIC PROPERTIES

Fabric Properties		Sansevieria stuckyi	Hemp
Thickness (mm)		6.19	6.14
Areal Density (g/m^2)		530	525
Bulk Density (g/cm^3)		0.089	0.091
Air Permeability (cc/s/cm^2)		31.99	26.89
Porosity (%)		93.50	93.85
Stiffness (inch)	Machine Direction	7.86	7.92
	Cross Direction	7.60	7.32
Thermal conductivity (W/mK)		0.044	0.049
Thermal Resistance (m^{2}K/W)		0.134	0.118

EFFECT OF FIBER FINENESS ON THICKNESS OF FABRIC

The **Figure 4** shows the influence of fiber fineness on Thickness of nonwoven fabric. From the figure, it is clear that the increase in fiber fineness tends to decrease the thickness of the nonwoven fabric. Lower the density of fibers leads to more number of fibers per unit area of the nonwoven fabric and thus increases in thickness of the samples and result in the decrease of Bulk Density of the nonwoven fabric. Thus it is concluded that the areal density, thickness and bulk density are the interrelated physical parameters of needle punched nonwoven fabrics which simultaneously changes due to the needling operation [11].

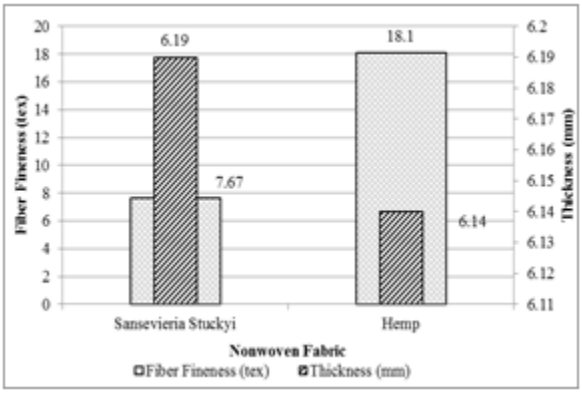


Figure 4: Effect of fibers fineness on thickness of fabric

EFFECT OF FIBERS FINENESS ON AIR PERMEABILITY OF THE FABRIC

The **Figure 5** shows the influence of fiber fineness on Air Permeability of nonwoven fabric. From the figure, it is clear that the increase in fiber fineness tends to increase the air permeability of the nonwoven fabric. Hence it is concluded that due to the higher density of the fiber and the porous structure of the fabric, the mass of the fabric increases with the increase in air permeability.

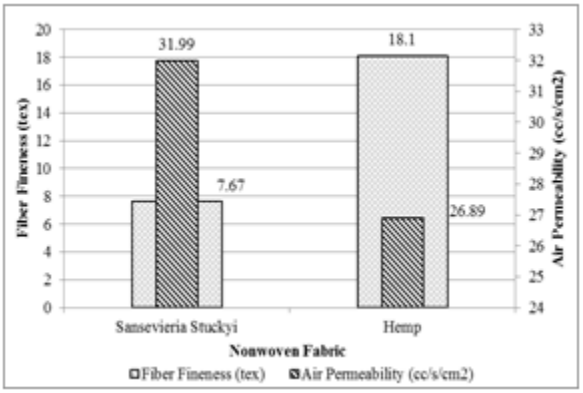


Figure 5: Effect of fibers fineness on Air Permeability of the fabric

EFFECT OF FIBERS ON THERMAL CONDUCTIVITY

The **Figure 6** shows the effect of fibers on thermal conductivity of nonwoven fabric. From the figure, it is clear that the higher thermal conductivity of the Hemp is due to increase in fiber density [12].

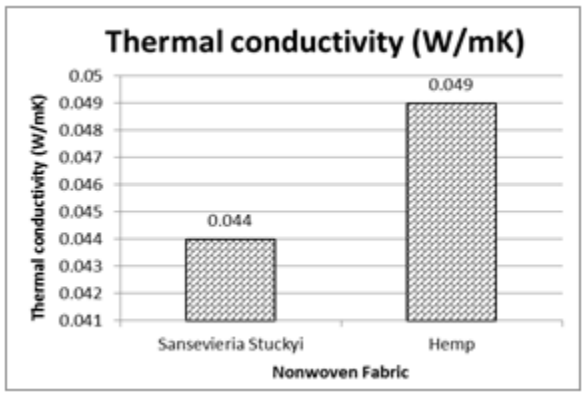


Figure 6: Effect of fiber on Thermal Conductivity

CONCLUSION

The conclusion emerges from the study are,

1. The physical parameters of needle punched nonwoven fabrics like thickness, areal density and bulk density are interrelated and are changed simultaneously due to the needling operation and can be controlled with the carding and needling.
2. Higher the diameter of the fiber; higher the air permeability of the nonwoven fabric. Thus the natural fiber with higher air permeability helps to transmit sound waves and may results in high sound absorption of the material. Thus these nonwoven fabrics may be used for acoustic materials in automobiles and room interiors.
3. The thermal conductivity of the nonwoven fabric prepared with natural fibers like Sansevieria stuckyi and Hemp shows that the fabric is suitable for insulation materials.
4. Thus the biodegradable products from natural resources are developed from the plant fibers are used in the technical textiles as an alternative for synthetic fibers.

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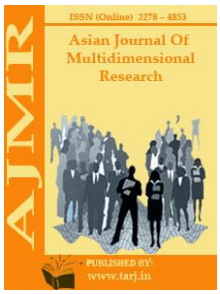

Asian Journal of Multidimensional Research (AJMR)
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UGC APPROVED JOURNAL

SCHOOL STRESS INOCULATION TRAINING (SSIT) AND STRESS INDICATORS OF MIDDLE SCHOOL STUDENTS

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ABSTRACT

The impact of stress on the individual in general and students in particular has become a primary concern for developmental psychologists and educationists owing to its alarming reality. Hence School Stress Inoculation Training (SSIT) with its three interlocking phases was tailored to the needs of middle school students and was employed on a preventative basis to inoculate them to future and ongoing stressors. The major objective of the study was to analyse the effectiveness of SSIT in enhancing the physical, mental and behavioural health of the middle school students by reducing the stress indicators. Field experimental research with 588 children of one government and one private school (experimental group – 238 and control group – 350) was carried out with a trivia of tools. SSIT was statistically found to be effectual in lessening the stress level of students. Also, the overall percentage of respondents who have had more number of indicators declined drastically from 24 per cent to 4 per cent, whereas amplified hugely from 43percent to 62 per cent for the students claiming moderate mean scores on stress indicator after the intervention. The augmented mean indicator score of the respondents of the experimental group in comparison with control group further establishes the effectiveness of SSIT. Moreover, the institution and gender-specific differences were also explored.

KEYWORDS: *School Stress Inoculation Training (SSIT), Stress Indicators, Physical health, Mental health. Behavioural health*

INTRODUCTION

Middle school period is considered as a tumultuous developmental period due to the rapid psychological, social and physical changes that these early adolescents experience as they go through puberty and increase independent living skills (Steinberg and Morris, 2001; ASRI, 2002). The changes occur in almost every domain of their life – physical, social, educational and familial. Most of these changes are gradual and have different timetables and magnitudes for different adolescents. Of all these changes the educational change that happens among adolescents doesn't vary in its magnitude or timetable. This change constitutes the increased academic demands and social challenges that can lead to stress and adjustment problems in them (Eccles *et al.,* 1993; Elias *et al.,* 1997).

As stress has been implicated in the onset and maintenance of so many acute and chronic diseases in the future of young adults as well as deteriorated interest, delinquent behaviours and poor performance in the present, scientific priorities have shifted to focus on primary and secondary prevention strategies by way of stress reduction and stress management techniques in order to reduce the dire consequences (Antoni, Saab and Ironson, 2001; Kromhout *et al.,* 2002). Early intervention assumes importance in addressing chronic stress symptoms and the studies need to be targeted at a group where corrective measures can bring about an impact. Therefore the present study attempted to formulate a corrective measure of incorporating coping skills in a way that the intervention addresses both the current and future stressors of the middle school students.

Detailed literature pertaining to stress management and training programmes were reviewed and examined to identify one intervention that could suit the adolescents in their early stage, who are not exposed to stress as of now. But at the same time, they perceive stress as something dangerous and will be exposed to stress very sooner as they get close to the public exam system. By looking at various angles, the investigator found that Stress Inoculation Training (SIT) is a different approach of having 'Inoculation' aspect within it. It is this intervention that focussed on tasks that must be performed in conditions quite unlike those encountered in the training classroom. Its primary goal is to prepare any individual to maintain effective performance in the high-stress environment along with ensuring acquisition of required knowledge, skill practice and retention.

Scope of the study

To employ SSIT on a preventative basis to inoculate middle school students against stress and thereby enhancing their physical and mental health and bringing about a desired behavioural change

Operational definitions

1. ***Student Stress Inoculation Training (SSIT)*** **-** It is an approach to stress management exclusively designed for school students. As the term 'inoculation' implies, this intervention is designed to impart skills to enhance resistance to stress with a three-stage intervention as given below

- Conceptualization or education phase – to better understand the nature of stress, its triggers and effects
- Skill acquisition and rehearsal – develop and practice a repertoire of coping skills and

- Application and follow through – application and generalization of learnt coping skills.

2. ***Stress Indicators*** – The various signs and symptoms experienced and the negative behaviour manifested due to the increased level of stress is defined as the stress indicators. Three types of stress indicators namely physical, mental and behavioural were appraised.

OBJECTIVES OF THE STUDY

General Objective

- Investigate the efficacy of SSIP among the selected adolescents on the stress indicators in terms of enhanced physical and mental health and desired behavioural change

Specific objectives

1. Appraise the stress indicator level of the adolescents and analyse its association with the stress level
2. Design and implement an intensive training session on 'Student Stress Inoculation Training' (SSIT) exclusively for the selected beneficiaries.
3. Assess the effectiveness of SSIP in reducing the stress indicator level of the selected students

Hypothesis

1. Stress indicator does not correlate with the stress score of the selected students
2. The SSIT part of CSSIP would not have an impact on the stress indicators of the selected students

METHODOLOGY

A combination of survey research and field experiment research was undertaken. The initial survey comprised of 1817 middle school students represented by three private and three government schools. The intervention phase of this research started with identifying experimental schools (one government and one private school) and categorizing the experimental and control group of sample (one section of each of the 6^{th}, 7^{th} and 8^{th} classes comprised the experimental group of students and the remaining students of other section of the experimental school constituted the control group). Thus SSIT was carried out for 136 private school children and (boys – 95 and girls – 41), and 102 government school children (boys – 44 and girls – 58). The control group comprised of 350 students (Private – 217 and government – 133). The training programme was conducted in three batches of approximately 40-50 students in each batch in both the experimental private and government school. An orientation programme scheduled for one day initiated the intervention followed by the actual three days training programme. After the completion of the three-day intervention in both the private and government school for all the batches, the follow- up session was held for every experimental batch separately for three hours. This session was conducted after three weeks of intensive training.

A Stress Indicator Checklist of 50 items that could gauge the signs and symptoms in the form of stress indicators exhibited by the selected students was framed. Each item was scaled as 1 (yes) and 0 (no). The total of 50 items was divided into three dimensions of stress indicators (physical - 17 items; behavioural - 15 items and mental - 18 items). A total score was obtained from summing up of scores for each dimension and were compared for further analysis. The Table – I

present the classification of the level of stress indicator concerning to the total score on physical, behavioural and mental indicators experienced by the students due to stress.

Table – 1: Grading the indicators of stress

Level of Stress indicator	Range of scores
Low	0-17
Moderate	18-34
High	35-50

The tool was subjected to face and content validation and it was found to measure the indicators of stress. The final version of the tool was developed after a pilot study. Three measures of reliability namely Spearman-Brown, Guttman and Cronbach's alpha were given to test the reliability of the check list on stress indicators and was between 0.89 and 0.92 which marks the constructed scale as fairly reliable.

RESULTS AND DISCUSSION

The results and its corresponding discussions were presented below

a. Categorization based on the levels of stress indicators of population sample

Table 2 projects the categorization of the selected sample based on the level of stress indicator score along with signifying the association between the stress score and stress indicator score.

Table – 2
Association between the stress level andstress indicator level

		Overall score on stress indicators						Total	
		Low (<= 17)		Moderate (18-34)		High (35-50)			
		No.	%	No.	%	No.	%	No.	%
Stress level	Low (<=25)	167	28	24	3.2	-	-	191	10.5
	Moderate (26-50)	412	69	590	79.6	214	44.7	1216	66.9
	High (51-75)	18	3	127	17.2	265	55.3	410	22.6
Total		597		741		479		1817	
Correlation between overall stress mean score and stress indicator score was 0.720*									

Out of the 191 respondents categorized under low level of stress, 167 of them secured less than 17 on the overall mean score on stress indicatorperforma. It also has to be noted that none of them were classified as experiencing severe signs of stress. The table also connotes certain imperative information regarding the association between the stress level and stress indicator as given below:

- Though only 191 students reported low stress, 597 of them secured scores between the ambits of 0-17 in the stress indicator checklist.

- Out of 1216 (66.9%) respondents, who reported a moderate level of stress, 590 of them also showed the moderate severity of the indicators experienced, followed by 312 students exhibiting a low reaction to stress. However, 214 of them reported that their severity ranged from above moderate to a high level with a mean score of more than 35.
- Amongst 410 children experiencing a higher level of stress 55.3% (265 respondents) could associate their high level of stress with their remarkable score on stress indicator, i.e., higher the level of stress was higher the severity of indicators in the form of signs and symptoms that the students experience due to stress. On the other hand, 18 respondents could not relate their level of stress with symptoms.

These statistics when subjected to correlation test a value of 0.720 significant at one per cent level was noticed. This indicated that the stress of the students was highly correlated to the stress indicators in the form of signs and symptoms experienced and behaviour manifested by them.

b. Level of Stress Indicator of the experimental group – pre and post

The Table 3 portrays vividly the effectiveness of SSIT among the selected children in confronting the stressors as and when faced and thereby reducing the frequency and number of physical, behavioural and mental indicators when compared to the mean score prior SSIT

Table – 3: Categorization of the experimental group based on the stress indicator level – pre and post-SSIT

Category	Private				Government				Total			
	Pre		Post		Pre		Post		Pre		Post	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Low (<=17)	71	52.2	47	34.7	8	7.8	34	33.3	79	33.2	81	34
Moderate (18-34)	45	33.1	82	60.2	58	56.9	65	63.7	103	43.3	147	61.8
High (35-50)	20	14.7	7	5.1	36	35.3	3	3	56	23.5	10	4.2
Total	136	100	136	100	102	100	102	100	238	100	238	100

Stress Inoculation Training which includes instruction in both cognitive and behavioural coping techniques was particularly effective in preventing and alleviating stress-related symptoms (Jorgensen, Houston and Zurawski, 1981; Cragon and Deffenbacher, 1984;; Deffenbacher, 1988; Meichenbaum and Deffenbacher, 1988). In lieu of these findings, the present finding has also proved SSIT's effectiveness but among school students.

Under stress, the individual may perceive a number of intrusive physical, behavioural and mental sensations. However, research has suggested that individuals under stress or novel conditions tend to over-interpret stress indicators and assign heightened importance to symptoms. The problem in case of students was not they experience these symptoms, but it was because of the novelty or unfamiliarity of these symptoms, they expend a disproportional amount of attentional capacity attending to them (Driskell and Johnston, 1998). Congruence to the above observation, the phase one of SSIT focussed on preparatory information strategy, addressed how the person

was likely to feel in stress setting, described the events that were likely to be experienced in the transition from normal to stress conditions and provided information on how he/she could adapt to these changes. Other two phases of SSIT facilitated them to practice, retain and generalize the learned knowledge and skills.

As the table signifies, the overall percentage of respondents who have had more number of indicators declined drastically from 24 per cent to 4 per cent, whereas amplified hugely from 43 percent to 62 per cent for the students claiming moderate mean scores on stress indicator between the ambit of 18 and 34.

A detailed analysis as presented in the table in relation to the institution-specific differences provided evidence of a drastic decrease in the number of respondents categorized under high-stress indicator level after SSIT (20 to7 in private school and 36 to 3 in the government school). Also, there was an augmentation in the number of around 37 students of private school exhibiting moderate indicators after SSIT, which was only seven with the government school. The bump of the government school respondents from just eight to 34 after SSIT in the category of low-stress indicator, had validated the positive impact of SSIT in lessening the number and frequency of symptoms experienced and better change in the behaviour manifested. On the whole, the percentage of respondents had a striking decline from 23.5 to 4.2 per cent and a remarkable swell from 43.3 to 61.8 in the high level and moderate level of stress indicators respectively.

c. Impact of SSIT on each of the stress indicator among the experimental group

As discussed earlier the stress indicators of the present study talk about the physical, behavioural and mental signs and symptoms experienced due to stress. This part of analysis deals with the influence of SSIT on all three indicators separately in relation to gender and type of school. The reason behind this analysis was to probe into the effectiveness of SSIT into each of the specified indicators and thereby facilitating the framework of SSIT for future applications. The Table 4 and compare the mean scores on all three indicators prior and post SSIT among the experimental group of both the government and private school.

Table – 4: Comparison of pre and post SSIT scores on the three stress indicators among the Experimental group

INDICATOR	Period	Pvt. Expt. Boys			Pvt. Expt. Girls			Govt. Expt. Boys			Govt. Expt. Girls		
		Mean	S.D	't'	Mean	S.D	't'	Mean	S.D	't'	Mean	S.D	't'
Physical	Pre	9.80	4.74	4.092**	9.05	4.28	2.332*	11.11	3.70	5.978**	9.74	3.48	4.680**
	Post	7.21	3.95		6.83	4.34		7.16	3.93		6.43	3.32	
Behavioural	Pre	8.18	3.81	4.711**	10.34	4.11	4.9024**	9.80	3.14	5.211**	8.59	2.68	4.574**
	Post	5.86	2.92		6.07	3.77		6.02	2.92		6.12	2.77	
Mental	Pre	10.81	5.15	5.168**	11.68	5.23	3.822**	11.73	3.60	5.055**	10.90	3.77	5.846**
	Post	7.11	4.72		7.46	4.76		7.68	3.16		7.31	3.35	

The core of conceptualization stage (Phase-I) of SSIT was to facilitate students realize that stressors were creative opportunities and puzzles to be solved, rather than mere obstacles. It also facilitated them to differentiate between aspects of their stressors and their stress-induced symptoms and responses (indicators) that were changeable and aspects that cannot change, so that they develop the coping repertoires namely, relaxation tips, deep breathing, muscle relaxation, guided imagery, positive thoughts etc. to be practiced in the second phase of SSIT and thereby could be used accordingly. During the final phase of SSIT, they were made to realize by a variety of simulation methods that acceptance–based coping strategies to be appropriate for situations that cannot be altered, while more active interventions to be appropriate for more changeable stressors.

The table which examined the physical, behavioural and mental indicator mean scores of the experimental group (with reference to gender and type of school) both prior and after SSIT had brought into being that the mean scores has reduced significantly for all the four experimental

groups (private boys, private girls, government boys and government girls). This verity was also proved by the statistically significant 't' value at one per cent level except for the physical indicator of private experiment girls which was found to be significant at five per cent level.

Concerning the clarification of hypothesis numbered two that states 'the SSIT do not have an impact on the stress indicators of the selected middle school students', the present finding provides a strong substantiation to refute it. Hence it was authentic that the SSIT had made a positive effect on the students in bringing down their stress indicator level and thereby their sufferings due to stress.

Interpreting the table, the difference in mean score between pre and post SSIT was found to be three to four for most of the indicators among the four categories of experimental students. But, the government experimental boys reported a much lower mean score with a difference of four to five in physical indicator and the private boys in both behavioural and mental indicators. Hence the future research should focus on the reasons of why such a difference in addressing the indicators through SSIT was possible and what can be done to make this intervention an even more effective one.

d. Comparison of pre and post stress indicator mean score between control and experimental group

Data presented in Table 5 depicts the comparative scores of experimental and control group in pre and post assessment stages with reference to the average mean stress indicator score reported by the selected sample. The comparison between the control and the experimental scores was undertaken with the objective of justifying that the change among the student population was only due to SSIT.

Table – 5: Comparison of pre and post stress indicator mean score between control and experimental group

Variables	Indicator mean score		Number	S.D		df	't' value
	Pre	Post		Pre	Post		
Private school							
Control group							
Boys	18.54	24.76	135	13.31	10.99	134	-4.454**
Girls	19.40	23.91	82	12.81	10.42	81	-2.536*
Experimental group							
Boys	28.79	20.18	95	12.80	10.35	94	5.098**
Girls	31.07	20.37	41	12.45	11.48	40	4.053**
Government school							
Control group							
Boys	35.46	32.52	61	8.93	8.01	60	1.404^{Ns}
Girls	32.49	30.74	72	8.52	9.78	71	1.145^{Ns}
Experimental group							
Boys	32.64	20.86	44	9,21	8.08	43	6.071**
Girls	29.22	19.86	58	8.81	7.79	57	5.777**

A glance at the table explains the verity that compared with controls, both the experimental group (private and government) showed a tremendous decline in the average mean score on stress indicator as reported post SSIT in comparison with pre SSIT, i.e., Private boys – 28.79 to 20.18; Private girls – 31.07 to 20.37; Government boys – 35.46 to 32.49 and Government girls – 32.64 to 29.22. Also the statistically tested 't' value of $p<.01$ provides evidence that the SSIT intervention that has provided the students with accurate information regarding normal physical and mental symptoms and behavioural responses to stress, has greatly reduced the distraction of having to interpret or attend to unfamiliar reactions present pre SSIT in their environment.

An important fact to be noted here was that prior SSIT, the private girls' experimental group though had a lower mean of stress score, outwit their counterparts in their stress indicator score, which was a telling statistic to be pondered upon. This particular finding is consistent with a study of Cohen and Williamson (1988), who has shown that person, can score high on perceived stress without elevated scores on the symptoms. However, post SSIT both the gender had shown a decline and reported a more or less equal mean indicator score.

The 't' value of the control group of both the gender of the private school has to be interpreted with caution because of its significance at one per cent and five per cent level respectively. The result could be explained by the observation of mean scores pre and post SIT, which shows a remarkable rise post SIT. Whereas meddling into the control group of government school, the 't' value was not significant indicating that the score on stress indicator in the form of signs and symptoms remained the same both before and after SSIT.

In sum, the SSIT intervention has proved its efficacy by evidently showing decreased stress indicator level, i.e., better physical and mental health and desired behavioural change among the experimental group of students. Hence the investigator strongly recommends that SSIT should be made a part of the curriculum for the students of middle school so that the stress management repertoires of these students will be built on a strong foundation. These repertoires of coping skills would certainly address the current as well as future stressors of these students.

Recommendations for further research

The recommendations for similar future research and policy decisions include the following:

- More mental health services on school campuses should function particularly because of the significant burden of depression and substance abuse among this population.
- Future studies should examine the correlation evidence found in this research to see if the reduction of stress persists over time among SSIT students and whether positive coping strategies increase or decrease over time.
- A more desirable system of education that would give students credit for a wider range of skills besides the narrow skills of memorization that are tested by current examination system has to come into existence.
- School administrators and policymakers should continue to investigate ways to increase a parent's positive attitude about their child's education and demonstrate to parents that their attitude is related to their child's well being. Taken together, the present study has identified mechanisms through SSIT by which the student could insulate themselves from stress and adapt to the ever-changing environment through practicing the coping skills to encounter even their future stressors.

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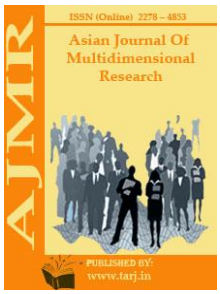

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MARITAL SATISFACTION AND PSYCHOLOGICAL WELL-BEING AMONG YOUNG AND MIDDLE-AGED COUPLES

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ABSTRACT

Marriage as a solemnized institution which has a fundamental role in helping two individuals to have a healthy personal and psychological growth and enrichment from established family life. A marital satisfaction is broadly known as a marriage and established family lives which are having unique qualities of human being, which makes them to be an integral element of social life. In today's highly stressful world the satisfaction of the married life is been decreasing. On the other hand, the individual's communications and viewpoints can have the main role to increase the satisfaction. Keeping this in mind, present study has focused to evaluate the level of marital satisfaction and psychological well-being among young and middle aged married couples and also focused to assess the relationship links between marital satisfaction and psychological well-being. In this pilot study, total samples of 61 married couples were selected randomly to assess their level of marital satisfaction and psychological well-being from Coimbatore city. A self prepared questionnaire on marital satisfaction (MS Scale) and a standardized tool on psychological well-being developed by Dr. Devendra Singh Sisodia and Ms. PoojaChoudhary was used to assess the objectives. The results concluded that age among wives did not predict any significant difference in preview of marital satisfaction and psychological well-being. Where as in case of husbands, majority proved that they are satisfied moderately in their psychological well-being but again in marital satisfaction no significance difference was observed in them. This study also proved that higher the marital satisfaction higher the psychological well-being and are positively correlated.

KEYWORDS: *Marriage, Marital Satisfaction, Psychological Well –being, age*

INTRODUCTION

"Marriage is one of the most intense human relationships. The quality of this relationship is continually redefined by spouses and is potentially crucial to their overall experience of family life" (Pimentel, 2000). The formation of a family is based on marriage. Marriage is a mutual, delicate, and complicated relationship between two humans which has a basic role in meeting man and woman's emotional-psychological and physical demands. Marriage is a symbiosis between a man and a woman, who has made a commitment and took an oath and accordingly has changed themselves. With the evolution of cultures, marriage has become a religious and sacred rite and tradition.

Marital satisfaction is a key element of perceived happiness. Durodoye (1997) defined marital satisfaction as an individual's subjective evaluation of the specific components within her or his marital relationship. Marital satisfaction is an essential element for successful family life and personal growth. The fulfilment and positive development will be possible only when the relationship between couples is coherent and satisfactory (Abdul Azeez,2013).

Agha Mohammad Hasan (2012) defines marital satisfaction as a feeling happiness, pleasure, and satisfaction by the wife or the husband when seeing all the aspects of conjugal life. Satisfaction is an attitudinal variable, so it is extremely considered as an individual feature. With the reference to what was stated, marital satisfaction is, in fact, a positive and pleasing attitude which is possessed by the couple from the parts of matrimonial life. It is essential to be stated that many different factors including marriage age, marriage duration, children, educational suitability, financial issues, sexual issues, relatives and acquaintances, religious beliefs, personality traits, the ability to understand the partner, communication skills, spare time, and commitment are all can be identified as essential components in marital satisfaction.

Psychological well-being is defined as possessing the capacity for good decision-making, effective stress management, good communication skills, effective parenting, and caring for oneself emotionally, according to Dr. Donald Franklin (2003). Measures of psychological well-being reflect the eudaimonic tradition, in which quality of life improves as individuals see themselves functioning more fully to their potential and capacities.

Mirahmadizadeh et al. (2003) stated that marital satisfaction was greater amongst those who were older and had a higher level of education at the time of marriage. It was greater among couples who have mutual respect for each other and hold both communication skills and more understanding.

Based on these reviews, the present study has framed the following objectives and hypotheses.

OBJECTIVES:

- To assess the marital satisfaction and psychological well-being of husband's based on their age
- To assess the marital satisfaction and psychological well-being of wives' based on their age
- To know the association of marital satisfaction and psychological well-being among married couples

Hypotheses:

- There is no significant difference among marital satisfaction and psychological well-being of husband's based on their age

- There is no significant difference exists among the marital satisfaction and psychological well-being of wives' based on their age
- There is no significant association observed among marital satisfaction and psychological well-being among married couples

METHODOLOGY

With this background, the present study was undertaken a Pilot study to assess the level of marital satisfaction and psychological well-being among married couples. The samples of 61 married couples who are belonging to young (20-40 years) and middle age (41-60 years) selected randomly from Coimbatore city.

A self-prepared questionnaire was used to collect the socio-demographic profile of the respondents and also marital satisfaction scale was prepared which composed of 48 statements in which three dimensions are covered with positive and negative statements. These statements comprise husband and wife relationships, household sharing and family issues. The scores were categorized by Likert scale, i.e., highly satisfied, moderately satisfied, less satisfied and not satisfied.

Another standardized tool of psychological well-being scale by Dr. Devendra Singh Sisodia and Ms. PoojaChoudharywas used which contains 50 statements in 5 areas namely- Satisfaction, Efficiency, Sociability, Mental Health, and Interpersonal Relations. All statements are of positive manner. The sum of marks is obtained for the entire scale, and scores are divided into four categories, i. e. strongly agree, agree, undecided, disagree and strongly disagree. The scores were falling between 50-83, 83-217 and 217-250, were categorized respectively as to indicate low, moderate and high levels of psychological well-being. The higher the score more is the well-being.

RESULTS AND DISCUSSION:

TABLE-I
DEMOGRAPHIC PROFILE OF THE RESPONDENTS

SL NO	Variables	Young		Middle		Total	
1	Husband	N	%	N	%	N	%
		23	37.7	38	62.3	61	100
2	Wife	29	47.5	32	52.5	61	100

Table-I represents the demographic profile of husband's and wives' with respect to their age.

Based on the above table we can say that, 62.3% of the husband's belongs to middle age and 37.7% are under young age.With respect to wives', 52.5% belongs to middle age and 47.5% are under young age.

TABLE-II
MARITAL SATISFACTION AMONG HUSBAND'S BASED ON AGE

Sl. No	Age	Marital satisfaction								Pearson chi-square
		Low		Moderate		High		Total		
		N	%	N	%	N	%	N	%	
1	Young	5	8.2	6	9.8	12	19.7	23	37.7	**.528**
2	Middle	13	21.3	10	16.4	15	24.6	38	62.3	**Ns**
	Total	18	29.5	16	26.2	27	47.3	61	100.0	

Ns-Not significant

Table II- represents the level of marital satisfaction of husband's based on their age.

The above table shows, majority of young aged husband's (19.7%) experienced high level of marital satisfaction, 9.8% husband's reported moderate satisfaction in marital relationships and8.2% of them having low marital satisfaction. With respect to middle-aged, majority, i.e., 24.6% experienced high marital satisfaction followed by 21.3% husband's with a low level of marital satisfaction and only 16.4% of them reported the moderate level of marital satisfaction. With the statistical (chi-square=.528)results it can be concluded that there is no significant difference observed among age with respect to marital satisfaction among selected husband's.Thus hypotheses-1 could be accepted.

TABLE-III
MARITAL SATISFACTION AMONG WIVE'S BASED ON AGE

Sl n0	Age	Marital satisfaction						Pearson chi-square
		Low		Moderate		High		
		N	%	N	%	N	%	
1	Young	9	14.8	6	9.8	14	23.0	**.241**
2	Middle	12	19.7	11	18.0	9	14.8	**Ns**
	Total	21	34.4	17	27.9	23	37.7	

Table III- represents the level of marital satisfaction of wives based on their age.

The above table shows, the majority of young aged wive's (23.0%) experienced a high level of marital satisfaction, 14.8% husband's reported low satisfaction in marital relationships, and 9.8% of them reported moderately satisfied in marital relationships. With respect to middle-aged, majority, i.e., 19.7% experienced low marital satisfaction followed by 18.0% wive's with a moderate level of marital satisfaction and only 14.8 % of them reported a high level of marital satisfaction. With the statistical (chi-square=.241) results it can be concluded that there is no significant difference observed among age with respect to marital satisfaction among selected wive's. Thus hypotheses-2 could be accepted.

TABLE-IV
PSYCHOLOGICAL WELL-BEING AMONG HUSBAND'S BASED ON AGE

Sl n0	Age	Psychological well-being						Pearson chi-square
		Low		Moderate		High		
		N	%	N	%	N	%	
1	Young	1	1.6	21	34.4	1	1.6	Value= 7.142
2	Middle	12	19.7	23	37.7	3	4.9	
	Total	13	21.3	44	72.1	4	6.6	P=.028*

***significant at 0.05% level**

Table-IV represents the psychological well-being of the husbands based on their age.

The above table shows, the majority of young aged husband's (34.4%) experienced moderate level of psychological well-being, 1.6% husband's reported low as well as high psychological well-being. With respect to middle-aged, majority, i.e., 37.7% experienced psychological well-being, 19.7% of them reported low psychological well-being and very few, i.e., 4.9% showed high psychological well-being.

With the statistical (chi-square=.028) results it can be concluded that there is a significant difference observed among age with respect to psychological well-being among selected husband's. Thus hypotheses-1 could be rejected.

A study conducted by Williams(2003), Perrin and Jennifer Suzanne(2008) evaluated the effects of marital status, marital transitions, and marital quality on psychological well-being for men and women and demonstrated that low levels of marital quality and high levels of marital stress are likely to increase depression and decrease overall satisfaction with life for both men and women. As the quality of marriage declines, the advantages--such as social support--associated with being married also decline; in essence, as the level of marital quality declines, the detriment to psychological well-being increases more than marital satisfaction will protect psychological well-being satisfied versus dissatisfied marriages.

TABLE-V
PSYCHOLOGICAL WELL-BEING AMONG WIVES BASED ON AGE

Sl n0	Age	Psychological well-being						Pearson chi-square
		Low		Moderate		High		
		N	%	N	%	N	%	
1	Young	1.2	19.7	11	18.0	6	9.8	Value= 2.884
2	Middle	8	13.1	19	31.1	5	8.2	
	Total	20	32.8	30	49.2	11	18.0	P=.530 Ns

Ns-Not significant

Table-V represents the psychological well-being of the wives' based on their age.

The above table shows, the majority of young aged wives's (19.7%) experienced a high level of psychological well-being, 18.0% wives's reported low psychological well-being and only 9.8% experienced a high level of psychological well-being. With respect to middle-aged, majority, i.e., 31.1% experienced moderate psychological well-being, 13.1% wives's with a low level of psychological well-being and only 8.2% of them reported a high level of psychological well-being. With the statistical (chi-square=.530) results it can be concluded that there is no significant difference observed among age with respect to psychological well-being among selected wives. Thus hypotheses-2 can be accepted.

TABLE-VI
CORRELATION OF MARITAL SATISFACTION AND PSYCHOLOGICAL WELL-BEING AMONG COUPLES

Variables	**No**	**Mean**	**SD**	Pearson Correlation	
Marital Satisfaction	121	135.95	56.642	1 122	.741** .000 122
Psychological well-being	121	138.67	51.562		
**. Correlation is significant at the 0.01 level (2-tailed)				.741** .000 122	1 122

****significant at 0.01% level**

Table-VI represents the correlation of marital satisfaction and psychological well-being among married couples.

The above table shows that couples secured a mean score of 135.95 in marital satisfaction and 138.67 in psychological well-being. With the statistical (Pearson Correlation =.741) results it can be concluded that there is a positive correlation observed among marital satisfaction and psychological well-being .it can be stated that higher the marital satisfaction, higher the psychological well-being and vise versa which was observed among selected couples. Thus hypotheses-3 could be rejected.

This result supported by Proulx et al.(2007), Davila, Bradbury, Cohan, &Tochluk (1997) said that there is a linkage between marital quality and psychological well-being. They reported that individuals with low psychological well-being encounter stressful interactions with their spouses and that, in turn, these stressful interactions lead to even greater declines in psychological well-being. For example, a wife with low psychological wellbeing might withdraw from family life, creating tension in her marital relationship and causing arguments with her husband. In turn, this tension might lead to further deterioration in the wife's well-being.

CONCLUSION:

From the present study, it can be concluded that psychological well-being is attained by achieving a state of healthy marital relationship and vice versa. Marital satisfaction could be considered as the highest effect on human stability and failure. The feelings and needs are

fulfilled through better husband-wife interaction, helping each other in household chores, good family relationships, maintaining proper interaction and communication.

According to psychological well-being theory, individual's psychological health depends on his positive functioning in certain aspects of his life. The individual should have in positive relationship with others; should be dominant over the environment; should accept himself and his past; should have a goal and meaning in his life; should have personal development and the ability to make his own decisions (Özen, 2005). For this reason, there is a potential tension between psychological well-being, happiness, and development (Ryff and Singer, 1998).

In this study, age did not predict any significant difference among wives with respect to marital satisfaction and psychological well-being, whereas husband's predicted moderate level pf psychological well-being with no significant difference in marital satisfaction. This study strongly proved that both marital satisfaction and psychological well-being are associated and inter-related. Higher the marital satisfaction, better the psychological well-being among married couples.

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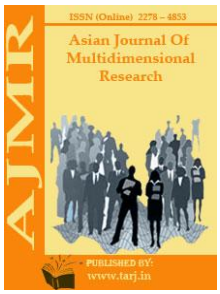

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ATTITUDES OF MOTHERS TOWARDS CHILD REARING

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ABSTRACT

Parenting is the process of promoting and supporting the physical, emotional, social and intellectual development right from infancy to adulthood. The attitude of parents towards children plays a pivotal role in healthy development of children. Child rearing attitudes are cognitions that predisposes an individual to act either negatively or positively towards a child. Over the last 25 years families have changed a lot and there is an increasing number of mothers being involved in productive employment within or outside the house. This has brought in tremendous change in the role of motherhood and also in their attitude towards child rearing. The study titled "Attitudes of mother towards child rearing" aims to figure out the attitudes of working mothers towards various aspects of child rearing. A total sixty working women (38 self-employed and 22 employed in outside firms) were chosen randomly for the study. The tools used were questionnaire to elicit their demographic profile and modified version of parental attitude scale. The objective of this study is to compare the parental attitudes in terms of warmness, encouragement of independence, strictness, aggravation, parent – child conflict and over protectiveness among working mothers on the basis of their employment status. The statistical analysis indicated that self-employed mothers and mothers employed outside showed significant difference in terms of warmness, encouragement of independence, aggravation and parent child conflict. The level of strictness and over protectiveness were similar among the mothers of both categories

KEYWORDS: *Parenting, Child rearing attitudes, Warmness, Encouragement of independence, Strictness, Aggravation, Parent – child conflict and Over protectiveness*

INTRODUCTION

Parenting refers to the process or the state of being a mother and father to children. Parenting can be defined as the process of developing and utilizing the knowledge and skills appropriate for planning, creating and rearing offspring (Morrison, 1978). Parenting is the quality of relationship a parent has with their offspring and it has a paramount impact on the children's optimal social and emotional development.Bavolek (1990) described aspect of parenting as the interaction and relationship intended to nourish, protect and guide each new life through their course of development.

Parents who are the prime and enduring social contacts for children should be the instructors, models and vehicles through which a vast range of cultural and personal attitudes, behaviours, values and ideas are conveyed. Parents play a major role in transforming an infant into wholesome adults. Parents provide moral and spiritual guidance, set limits and accepts responsibility for the total development of children. They also should guide the children in making sound and healthy decisions through open communication and mutual respect (Grusec and Danyliuk, 2014).

The structure and composition of families have changed tremendously over the last 25 years. The roles of family members also had underwent modifications accordingly. Women in modern times had increasingly engaging in productive employment. This change has brought in a shift in the roles of women in families. Because of this apparent division of spheres, the role of mothers in daily parenting is ambiguous and peripheral (Rubin and Chung, 2013)

Social roles continue to shift and as a result working women face challenges unique challenges of adjusting to their shifting roles both within and outside the family. Child rearing is still considered as the prime responsibility of women irrespective of their occupational status. According to Yavuzer (2012), each parent exhibits different attitudes towards their children and these will affect both moral and social development. Child rearing attitudes are cognitions that predisposes an individual to act either positively or negatively towards a child.

METHODOLOGY

The phenomenon of mother's employment is demanding and has an impact on the development and well-being of children in the society. A woman's attitude towards child rearing determines the quality of parent child interaction and thereby determines the overall healthy development of children. Thus the present study on "Attitudes of mothers towards child rearing" was taken up with the objective of figuring the attitudes of employed mothers in relation to the five aspects of child rearing - warmness, encouragement of independence, strictness, aggravation, parent – child conflict and overprotectiveness. The study also aimed to compare the attitudes of self-employed mothersand mothers employed outside towards child rearing.

A total 60 employed mothers (self – employed 38 and employed outside 22) were selected through simple random sampling from Sai baba colony andRS puram areas of Coimbatore City. These two areas were selected as they are among the fastest growing areas wherein lot of economic activities blooming. A self – constructed questionnaire to assess demographic profile and a modified version of Parental attitude scale were administered and the data thus collected were subjected to statistically analysis

Observation and analysis

1. Age and educational status of selected respondents

The mothers in the age group 25 – 40 years were selected as samples for the study. The age and educational status of selected respondents are depicted in Table I

Table I

Age and Educational status of the selected respondents

S.No	Age in years	Self Employed N = 38		Employed outside N =22	
		N	%	N	%
1	25 – 29	20	53	8	36
2	30 -34	8	21	10	46
3	35 – 40	10	26	4	18
	Educational status	Self Employed N = 38		Employed outside N =22	
		N	%	N	%
1	High school	6	16	-	-
2	Higher secondary	12	32	4	18
3	Graduation	10	26	12	55
4	Post graduation	10	26	6	27

Among the self-employed mothers, more than half of them (53%) belonged to the age group of 25 – 29 years followed by 26 % were in the age group of 35 – 40 years. Twenty one percent were in 30 – 34 years of age. Nearly half of the mothers employed outside were in the age group of 30 – 34 years, 36% belonged to 25 – 29 years of age and 18% represented 35 – 40 years.

Regarding educational status 32% self- employed mothers had completed higher secondary followed by graduates (26%) and postgraduates (26%) and 16% of them studied upto high school. More than half of outside employed mothers had completed graduation (55%)

2. Attitude of employed mothers towards child rearing

The parental attitudes of employed mothers towards child rearing was computed in terms of warmness, encouragement of independence, strictness, aggravation, parent child conflict and overprotectiveness. The raw mean scores were analysed statistically to assess the difference among self – employed and employed outside mothers in their attitude towards child rearing. The results are depicted in table II

Table II
Attitude of employed mothers towards child rearing

S.No	Aspects of child rearing	Mean scores of selected mothers		t value
		Self - employed	Employed outside	
1	Warmness	47.5263	53.4545	- 2.947*
2	Encouragement of independence	45.8947	52.7273	- 3.232*
3	Strictness	28.2632	28.9091	- 2.790^{NS}
4	Aggravation	29.5789	26.1818	1.075*
5	Parent – child conflict	31.1053	33.6364	- 0.619*
6	Over protectiveness	33.8947	38.7273	- 1.621^{NS}

***- significant at 5% level**
NS – Not significant

Comparison of mean scores obtained for aspects of attitudes towards child rearing with respect to warmness, encouragement of independence, aggravation and parent child conflict indicated that there was significant difference between the t values. Thus the hypothesis stating that there is no significant between attitudes of self – employed mothers and mothers employed outside towards child rearing is rejected. So it could be concluded that self – employed mothers and mothers employed outsidehad difference in the level of warmness, encouragement of independence, aggravation and parent – child conflict. Regarding strictness and overprotectiveness, comparison of mean scores depicted that there was no significant difference which proved that the hypothesis stating that there is no significant between attitudes of self – employed mothers and mothers employed outside towards child rearing is accepted. So it could summed up that employed mothers irrespective of their employment status showed similar strictness and over protectiveness towards their children

CONCLUSION

Parenting is a process of promoting and supporting the overall development of a child from infancy to adulthood. Both father and mother have equal role to play in the process of parenting. Attitude of parents towards child rearing determines the quality of parenting. Traditionally mother was considered to be the sole care taker of children but with advancement in life style, both father and mother need to be partners in parenting.They have shifted from being confined with unproductive household chores to equal or sole bread winners of a family. A working women has to take up the household tasks in addition to her work. The role of mother turning into productive employment within or outside the house has an impact on child rearing practices. Mothers whether employed or not have to balance between the traditional roles and modern day demands. The attitudes of mothers towards child rearing depend upon the mode and place of work. Thus appropriate child care facilities should be provided for working mothers.

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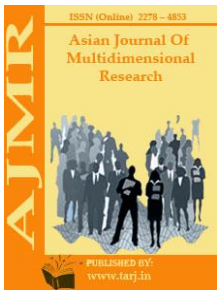

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THE SOCIOECONOMIC STATUS AND THE FACTORS INFLUENCING ACADEMIC ACHIEVEMENT OF THE ADOLESCENTS OF ARUNTHATHIYAR COMMUNITY

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ABSTRACT

The Arunthathiyars are one of the socially excluded and marginalized social groups in Tamil Nadu (Jadhav, 2010).Tamil Nadu is one of the states that has a high population of the Arunthatiyar community. They are densely concentrated in Coimbatore, Erode, and Salem - the western districts and loosely spread over inother parts of the state.Adolescents in India, account for one-fifth of the total population and are a significant human resource that needs to be given ample opportunity for holistic development towards achieving their full potential (NIPCCD, 2008). The caste is a majorbarrier to education. Arunthathiyars who form a section in Dalit community are marginalized, are vulnerable to exclusion and prevented from meaningful participation in the society, thought as powerless, thereby hampering their holistic development (Sangeeth, 2016).Only about 30 per cent of the Arunthathiyar adolescents continue high school, and most of them drop out either to get married or support parents in their work (Narayanaswam and Sachithanandam, 2011). In this study, an attempt has been made to identify socioeconomic and familial factors influencing the academic achievement of 494 adolescents in

the age group of 11- 19 years from Arunthathiyar community. The study was conducted in six villages in Madukkarai taluk of Coimbatore District; the tools used were a self-designed questionnaire to elicit the socio-economic profile of the selected respondents and the Likert's scale to assess their academic achievement. The data were analysed statistically using Chi-square test for associations; the major findings were that the family income and mother's education had significant influence on the academic achievement of adolescents

KEYWORDS: *Arunthathiyars, Academic Achievement of Adolescents*

INTRODUCTION

Within the state of Tamil Nadu, there are around 76 different types of SC groups. Of these, the three main groups are the Pallar, Paraiyar; and the Arunthathiyar.As quoted by Celeti (2015) "Arunthathiyars bear a low status and not many studies have been carried out." The studies particularly related to Arunthathiyar adolescents are hard to find. They are traditionally associated with the task of cleaning up the dead animals, scavenging the village, and work related to animal skin and leather. While such traditional work continues in some villages, many have taken up jobs in urban areas. The poor living conditions, desperate search for jobs with a decent wage, and constant harassment from money lenders and landlords are part of a day–to–day life of Arunthathiyars (Karuppusamy, 2015).

The educational status of Arunthathiyars was consolidated and presented by Krishnasamy (2011). According to his study, only 1.75 percent people of Arunthathiyar community are literates, and the rest of 98.16 percent are illiterates, 0.16 percent of the people have completed their high school. Due to the poor socio-economic status of the community, the children are rarely sent to elementary school, even when they go, they drop out of school. Most of the adolescents in the rural areas work as bonded labourers in the agricultural farms of the upper caste. In the urban areas, they are taken as temporary workers in restaurants / hotels, automobile mechanic sheds, garages. Even with much difficulty, the adolescents complete XII std, they are unable to pursue college education due to poor economical stability.

Though the socio-economic factors limit the progress in education, fortunately, some of the Non-Governmental Organizations (NGO's) are supporting the students for higher education. Vizuthugal (2016) an NGO, working with Arunthathiyars has supported students for higher studies. Rajkumar is the son of a sweeper in Tiruppur Municipal Corporation, the monthly income was scarce to support his education. The NGO motivated him to continue his studies and enrolled him in their evening coaching centre. Through this exercise the marks scored were 488 out of 500inpublic examinations. Vizhuthugal introduced him to the District Collector, who arranged for free education at Anthiyur Adharsh Vidhyalaya where he completed his higher secondary education for two years. Similarly, Priyanga hails from Panapalayam sweepers colony in Palladam, her parents work in a garment manufacturing unit. She was supported to continue her graduation (B.A) in L.R.G. Women's College, simultaneously she had joined B.Com (part-time), and she intends to join C.A.(Charted Accountant) course. These extracts are an indication of the adolescent's capacity to excel, and they need support.

Rationale of the study

The studies conducted on the Arunthathiyar community werefocussed more on the general status of families;this study is carried out mainly to contribute knowledge and information to build

literature on Arunthathiyars adolescents, to bring visibility to adolescents' academic problems and aid in policy influence and decisions.

OBJECTIVES

The objectives of this study were

1. To assess the socio-economic and familial background

2. To identify the association of socio-economical and familial factors with academic achievement

Hypothesis

1. The family incomedoes influence the academic achievement of the adolescents

2) Mother's education a does not influence the academic achievement of the adolescents

METHODOLOGY

With exploratory research design as the framework, multistage sampling method was chosen, as the population is spread out all over Tamil Nadu. The process involved in the selection of samples went through six stages, which helped the researcher understand the situation of this community. It was found that they were all the same as far as their socio-economic condition is considered. In the first stage, four districts from all the four regions of the state were selected. In the second stage, Coimbatore district was chosen as it had the highest Arunthathiiyar population. In the third stage, five taluks from all the four regions of the district were selected. In these taluks, a sample of 374 adolescents was chosen randomly, and details related to their personal and family background was collected as a representative data of the Arunthathiyar population in Coimbatore district. In the subsequent stages, Madukarai taluk was picked up for a detailed study, as it is densely populated with Arunthathiyars. In this taluk, six interior villages from the four regions were selected, and in the final stage, 494 adolescents (all the school/college going) in the age group 11 – 19 years were the sample chosen for the study.

A self-designed questionnaire was prepared, and a pilot test was conducted for validity. The questions were related to socio economic, familial details, school, neighbourhood and family environments. Likert's scale was used to elicit academic achievement. Majority of the adolescents were studying in Government schools. The academic performance of the quarterly, half yearly and annual exams was collected from the report cards. The grades were assigned as Poor, Good, Very Good, Excellent and these were equated with the total percentage of marks. Poor scored > 40 marks, good was between 41 – 59 marks, very good had marks between 60 – 79 and excellent scored marks 80<. The average of the three exams that is quarterly, half-yearly and annual exam marks were taken for the analysis. The findings were statistically analysed, Chi-square was the test used for associations.

RESULTS AND DISCUSSION

The findings were discussed under the following heads

1. Family profile

Table 1 gives the details of the family background – the type of family, language spoken and size of the family.

TABLE – 1 FAMILY PROFILE OF THE SELECTED RESPONDENTS

S.No	Details	N	%	S. No	Details	N	%
1.	**Type of Family**			3.	**Family size**		
	Nuclear	410	83.0		02	01	0.2
	Joint	84	17.0		03	41	8.3
	Total	494	100.0		04	285	57.7
2.	**Language spoken**				05	105	21.3
	Telugu	47	9.5		06	47	9.5
	Kannada	01	0.2		07	15	3.0
	Telugu, but speak Tamil	317	64.2		**Total**	**494**	**100.0**
	Tamil	129	28.1				
	Total	494	100.0				

The nuclear family system seems to be quite common among the rural population, as seen in the table majority (83%) are the nuclear families. Narayanaswamy and Sachithanandam (2010) conducted a study on "Occupational impact on the children of Arunthathiyars in four districts Coimbatore, Erode, Salem and Ramanathapuram" and concluded that irrespective of village, town or city, an average of 73 to 95 percent was seen to be nuclear families, In the villages the nuclear family type is around 75 percent and in the city corporations it was found to be much more. From the table, it is seen that although the mother tongue is Telugu, a majority (64%) speak Tamil.Considering the regional language being Tamil, the parents feel that practicing Tamil at home would help their children pick up the vocabulary and also support them in their future career. The average size of the family from median calculated is four, the next highest number in the family is five. However, the numbers below and above four members is insignificant.

2. Personal profile

The Table – 2 details personal background of the respondents regarding gender, age, type of institution, medium of instructionand the class/courses that the adolescents are pursuing

TABLE - 2 PERSONAL PROFILES OF THE SELECTED RESPONDENTS

S.No	Variables	N	(%)	S.No	Variables	N	%
1.	**Gender**			4.	**Class**		
	Male	242	49.0		Middle	129	26.1
	Female	252	51.0		High School	150	30.4
	Total	494	100.0		Certificate course	05	1.0
2.	**Age in Years**				Higher Secondary	144	29.1
	11	31	6.2		Diploma	10	2.0

	12- 13	103	20.9		Degree	56	11.4
	14- 15	173	35.0		Total	494	100.0
	16-19	187	37.9				
	Total	494	100.0				
3.	**Type of Institution**			**5**	**Medium of Instruction**		
	Government	430	87.0		Tamil	471	95.3
	Private	64	13.0		English	23	4.7
	Total	494	100		Total	494	100

The details in the table reveal that there is not much of gender disparity, in fact, it is quite interesting to note the girl's participation is 2 percent more than the boys. The average age of the respondents was 14 – 15 years(median calculated), while the majority age group is 16 – 19 years (38%). Out of this, 11 percent are in graduation and the rest in higher secondary. A majority (87%) of the respondents were enrolled in government schools, the rest 13 percent in private institutions. Tamil was the medium of language to the 95 percent of the respondents

Kajisa and Palanichamy (2009) opine that Tamil Nadu State has provided free public education up to lower secondary level since 1964 and for the upper secondary level. Since 1978 It was the first State to make schooling compulsory in 1993 (Gold and Harris White, 2004). According to Kajisa and Palanichamy (2009) policies implemented in the 1980s, such as midday meals (1982) and free uniforms and books (1985), helped reduce the costs of primary and upper primary education to almost its opportunity costs. Therefore, income and resource endowment has become less of an issue for families when investing in their children's schooling. These facilities seem to be of great importance to the respondents.

3. Family income and academic achievement

The table – 3 captures the family income and academic achievement.

TABLE – 3 FAMILY INCOMES AND ACADEMIC ACHIEVEMENT

Family Income	**Academic achievement**					**df**	**Chi-square value**	**p-value**
	<40	**41-59**	**60 -79**	**>80**	**Total**			
1001-3000	2	5	3	8	18	**15**	**25.498**	**0.044***
3001 – 5000	10	20	19	10	59			
5001 – 8000	33	59	81	37	210			
8001- 10,000	16	42	46	16	120			
10,001- 15,000	9	30	26	6	74			
>15,000	3	1	5	0	9			
Total	**73**	**157**	**183**	**77**	**490**			

***Significant at 5% level**

The table above captures the family income and its association in the Chi-square test with academic achievement being significant at five percent level. The null hypothesis numbered one stated is therefore rejected. The average income per month by the majority of the families (36%) was found to be in the range of Rs.5001 – 8000/- and the next highest income of 26 percent of the families was Rs. 8001 – 10, 000/-. The table above captures the highest number of academic achievers are from the income range of □5001 – 8000/-. Schoon, Parsons, and Sacker (2004) are of the opinion that although psychological problems are prevalent among adolescents from low socioeconomic backgrounds, these adolescents vary considerably in intellectual and psychological functioning. A sizable portion of adolescents from low socio economic backgrounds perform well and are good achievers in school; some perform better than many middle socioeconomic backgrounds. In such a case it is not unusual to find a parent or parents making special sacrifices to provide the necessary living conditions and support to contribute to school success. A study conducted with low-income parents found that parents high educational aspirations were linked to positive educational outcomes in adolescents

4. Mother's education and academic achievement

The following table - 4 identifies mother's education being another influential factor in the adolescent's academic achievement.

TABLE - 4 MOTHER'S EDUCATION AND ACADEMIC ACHIEVEMENT

Mother's education	**Academic achievement**					**df**	**Chi-square value**	**p-value**
	<40	**41-59**	**60 -79**	**>80**	**Total**			
Illiterate	17	52	68	43	190			
Primary	10	42	27	8	87			
Middle	10	18	21	5	54	**5**	**30.669**	**0.010***
H. School	24	38	64	17	143			
Hg. Sec	2	5	4	5	16			
Graduation	0	1	0	0	1			
Total	**73**	**156**	**184**	**78**	**491**			

***Significant at 5 % level**

The tables above capture the mother's status of education influencing the academic achievement of adolescents, and being significant in the chi-square test at five percent level. The father's education too was analysed and found that it was not significant. The table indicates that mothers illiteracy, as well as those with high school education, have influenced the adolescent's academic achievement. There are many media reports, where poor and illiterate Arunthathiyar families have children who scored high marks in the high school and Higher Secondary exams. One such report by The Hindu, (June 28, 2015) states, Prasanth an Arunthathiyar student from a poor family of agricultural labourers in Perambalur district scored 1,108 out of 1200 marks in his higher secondary exams.

Socio-economic status is the characteristics of households, in particular, one of the factors being parental education and occupation. They have long been known to be major determinants of

educational enrolment and achievement in both developing and developed countries (Evangelista de Carvalho Filho, Irineu 2008).

CONCLUSION

The study related to adolescents would perhaps be useful to open up a new chapter in the literature on Arunthathiyars, particularly on adolescents as not many studies have been found with some of the present variables that have been considered in this study. The community for generations are involved in the menial jobs with low income, and therefore their development was observed to be at a snail pace in all the districts visited by the researcher. The results throw light on family income and mother's education as some of the crucial factors to the adolescent's academic achievement, therefore this paves a way to ponder on possible solutions to their problems.

LIMITATIONS

- Lack of sufficient literature on Arunthathiyar adolescents has limited deeper thoughts into their problems

- Enumeration of good academic achievers at the Taluk level was not considered, for that would give an authentic data of the competencies of the adolescents.

RECOMMENDATION

- Urban adolescents could be considered in future studies, as their living and problems are more complicated.

- Dropouts could also be involved in the study, as it will help understand the personal and external reasons for dropout

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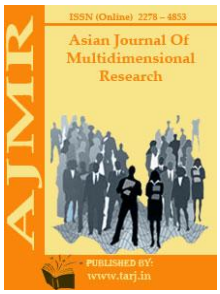

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UGC APPROVED JOURNAL

MARITAL SATISFACTION AMONG COUPLES IN COIMBATORE CITY

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ABSTRACT

Marital satisfaction is a mental state that replicates the perceived welfares and costs of marriage to every individual. It can be stated that the attitude of an individual towards his or her own marital relationships.Among this relationship, many contributing factors which progress satisfaction,i.e.,husband and wife relationships, household sharing, family issues, communication between husband and wife. The essential purpose of marriage is to achieve lifelong love, affection, mental comfort, general health and overall satisfaction. The aim of the present descriptive study is to investigate the marital satisfaction among couples. A total of 70 married couples were interviewed by random sampling method from Coimbatore city. A self-prepared questionnaire on marital satisfaction was used to attain the purpose of the study, and the data were analyzed using descriptive statistics including mean, SD, and independent t-tests. The results predicted that a significant gender difference was observed in marital satisfaction. It showed that husband's having higher marital satisfaction compared to wive's However, it was essential to inform young couple about the essential factors of marital satisfaction and dissatisfaction, high quality and supportive relationships are essential for developing healthy individuals especially in married couples. Findings could be promising for the policy makers to design specific interventions suited to the target population.

KEYWORDS: *Marital Satisfaction, Husband, Wife*

INTRODUCTION:

The institution of marriage in India has historically been seen as a life-long commitment, between two partners, for better well-being. Marital satisfaction can be defined as the process of variation of both partners in such a way as to avoid or resolve conflicts sufficiently so that the mates feel satisfied with the marriage and each other. Socially speaking, marriage is the only way to bring families into existence. "Women are more realistic while men are more idealistic or tend to deny problems when asked about their marriage, which accounts for the gender difference in marital satisfaction." Perrone et al., (2001) stated that marital satisfaction has a significant influence on general well-being in families and has been found to have a high correlation with overall life satisfaction.

Based on these reviews, the present study has framed the following objectives and hypotheses.

Objectives:

- To assess the level of marital satisfaction among couples

Hypotheses:

- There is no significant difference among marital satisfaction among couples

METHODOLOGY:

The present study was undertaken a Pilot study to assess the level of marital satisfaction among 70 married couples from north Coimbatore city. The samples were selected randomly.

A self-prepared questionnaire was used to collect the socio-demographic profile of the respondents and also marital satisfaction scale was prepared which composed of 48 statements in which three dimensions are covered with positive and negative statements. These statements comprise husband and wife relationships, household sharing and family issues. The scores were categorized by Likert scale, i.e., highly satisfied, moderately satisfied, less satisfied and not satisfied.

RESULTS AND DISCUSSION:

TABLE-I
DEMOGRAPHIC PROFILE OF THE RESPONDENTS

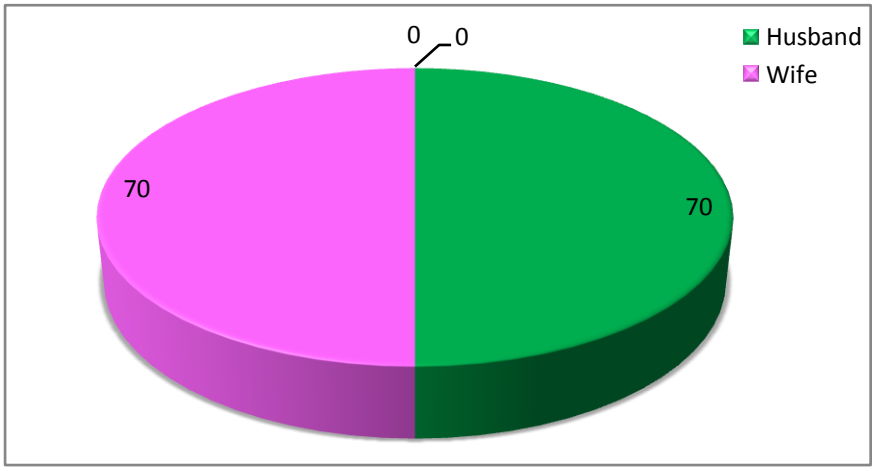

Fig-1 represents the demographic profile of husband's and wives'.

An equal number of husband's and wives', i.e., 70 were selected for the present study.

TABLE-II
MARITAL SATISFACTION AMONG COUPLES

Sl. No	Variables	Marital satisfaction						Total	
		Low		Moderate		High			
		N	%	N	%	N	%	N	%
1	Husband	15	21.4	17	24.2	38	54.2	70	100.0
2	Wife	33	47.1	25	35.7	12	17.1	70	100.0

Table II- represents the level of marital satisfaction among couples

The above table shows, the majority of husband's (54.2%) experienced a high level of marital satisfaction, 24.2% of husband's reported moderate satisfaction in marital relationships and 21.4% of them having low marital satisfaction.

Concerning to wives', a majority, i.e., 47.1% experienced a low level of marital satisfaction followed by 37.7% of a moderate level, and only 17.1% of them reported a high level of marital satisfaction. From these results, it could be stated that husbands are having better marital satisfaction compared to wives'.

TABLE-III
MEAN AND SD VALUES OF MARITAL SATISFACTION AMONG COUPLES

Sl. No	Variables	Marital satisfaction		t-test
		Mean	SD	
1	Husband	144.83	50.01	t = 3.1038 df = 138 p=0.0023 *
2	Wife	117.03	55.81	

*significant at 0.05% level

Table III- represents the mean, SD values of marital satisfaction among couples

The above table shows, the mean values of husband's concerning marital satisfaction was 144.83 and SD value of 50.01. In case of wives', the obtained mean value was 117.03 with SD 55.81. The above results show husband's obtained higher mean value compared to wives' in relation to marital satisfaction. The observed t-value for the above result is 3.103 and p-value 0.0023 which is significant at 0.05 % level. Thus hypothesis-1 could be rejected.

This result is supported by ShwetaNema, Indu Bansal (2016) proved that there is a significant relation between couples adjustment. Husbands were found to have better marital satisfaction. In couples who are married in 21-30 years of age, husbands were found to have better marital satisfaction than wives.

Another study by April Chiung-Tao Shen (2002), predicted that there are gender differences in marital satisfaction, husband and wives have different levels of marital satisfaction. It was reported that husbands have higher marital satisfaction than wives.

TABLE-IV
MARITAL SATISFACTION AMONG HUSBAND'S WITH RESPECT TO DIMENSIONS

Dimensions of MS	Husband					
	Low		Moderate		High	
	N	%	N	%	N	%
H-W relationships	23	32.8	14	20.0	33	47.1
Household sharing	33	47.1	28	40.0	09	12.8
Family issues	18	25.7	14	20.0	38	54.2

Table-IV represents marital satisfaction of husband's with respect to dimensions

From the above table it could be said that, in husband-wife relationships, the majority of husband's (47.1%) having high satisfactory relationships, 32.8% declared that they are less satisfied and only 20.0% of them experienced they are moderately satisfied.
Similarly, in case of house-hold sharing, the majority of husband's (47.1%) having low satisfactory relationships, 40.0% said that they are moderately satisfied and only 12.8% of them expressed they are highly satisfied.
Concerning to family issues, the majority of husband's (54.2%) having high satisfactory relationships, 25.7% claimed that they are less satisfied and only 20.0% of them experienced they are moderately satisfied**.**

TABLE-V
MARITAL SATISFACTION AMONG WIVES' WITH RESPECT TO DIMENSIONS

Dimensions of MS	Wife					
	Low		Moderate		High	
	N	%	N	%	N	%
H-W relationships	44	62.8	18	25.7	08	11.4
Household sharing	46	65.7	14	20.0	10	14.2
Family issues	39	55.7	16	22.8	15	21.4

Table-V represents marital satisfaction of wives' with respect to dimensions

From the above table it could be said that, in husband-wife relationships, the majority of wives' (62.8%) having low satisfactory relationships with their husband's, 25.7% expressed that they are moderately satisfied and only 11.4% of them experienced they are highly satisfied.

Similarly, in case of house-hold sharing, the majority of wives' (65.7%) having low satisfactory experience, 20.0% claimed that they are having moderately satisfied and only 14.2% of them expressed they are highly satisfied by husband's co-operation in house-hold sharing.

Concerning to family issues, the majority of wives' (55.7%) having low satisfactory relationships, 22.8% stated that they are moderately satisfied and only 20.0% of them experienced high satisfacti**on.**

CONCLUSION:

With the above results the quality of marital satisfaction varies among couples, this study proved that husband's predicted high satisfaction in marital relationships than wives'. The results also showed that, the amount of satisfaction depending upon the dimensions like husband-wife relationships, household sharing and family issues. Husband's reported that they are highly satisfied in husband-wife relationships as well as in family issues, but they indicated that they are moderately satisfaction in household sharing.

Whereas in case of wives', the majority of them expressed they are less satisfied with household task sharing with husband's and also in husband-wife relationships. This result shows that husband's are happy and satisfied with their marital and family relationships compared to wives'.

The institution of marriage is utmost important in our lives, but some previous patterns of marriage and marital relationships may become outdated as new patterns emerge as per the present condition of society. In this context, household sharing, husband, and wife relationships are the important contributors to the phenomenon of marital satisfaction. We could find the difference of opinion among couples in all the three dimensions. This study suggests that couples can bring opportunity to pursue their interests and to spend more time together and get high marital satisfaction.

Although this research is descriptive study, future research would benefit from exploring case studies in marriage and the impact on marital satisfaction through qualitative analysis. Qualitative research may provide more honest, truthful, concrete and sincere responses in depth. This could be achieved by a longitudinal study based on the number of years of married life.

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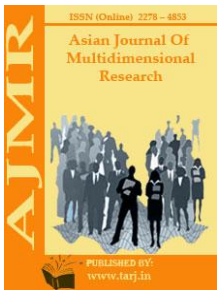

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

A STUDY ON RELATIONSHIP BETWEEN SCHOOL ENVIRONMENT AND ACADEMIC PERFORMANCE OF ADOLESCENT STUDENTS

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ABSTRACT

School environment is defined as the quantity and quality of emotional, social and cognitive support available to the students throughout their school life in terms of interaction between student and teacher. Academic performance refers to the knowledge accomplished by student and graded by teacher. According to the educational context academic performance is the achievement by a student in a period of time in various subjects which is evaluated by examinations and assessments. School environment influences the academic performance of the student. Student's academic performance improves in a school environment which encourages learning. In the recent past, research studies are being undertaken to know the determinants of academic performance. Hence, an attempt has been made to see the relationship between school environment and academic performance of the adolescent students. The study was a cross sectional study. Interview and questionnaire method were adopted to collect the data and the students were selected at random. The study was carried out in Mysuru city. A total of 240 adolescent boys and girls were selected. The selected students were in the age group of 14 to 16 years studying in class 9th and 10thstandards. Out 240 selected students 120 equally represented CBSC and state syllabus schools. Self developed questionnaire to collect general information was prepared. School Environment Inventory was used to assess the perception of school environment. The results showed that majority of the students perceived average level of school environment in all the dimensions except for acceptance. No significant association was found

between the perception of school environment and type of school of adolescent students. A significant difference and a highly significant difference in the performance in science and social subjects were found respectively between CBSC and state syllabus students at 5% and 1% levels. Significant correlation is found with regard to the dimension of cognitive encouragement with the performance in computer subject at 5% levels. A highly significant correlation of rejection in the school environment is found with the performance in science, maths, social and computer subjects at 1% levels. School environment influences the academic performance of the adolescent students in turn affects their grades. It is important to provide a qualitative school environment which helps the students to get higher level of academic performance.

KEYWORDS: *Adolescent Student, School Environment, Academic Performance*

INTRODUCTION

School environment is one among the two main factors along with home environment that plays an important role in the academic performance of a student. School environment is defined as the quantity and quality of emotional, social and cognitive support available to the students throughout their school life in terms of interaction between student and teacher (Mishra, 2000). School environment also refers to the psychological, social, physical and emotional climate as perceived by the student. These dimensions are inter-related and inter-dependent (Macchr and Midgley, 1991, Ames,1992).

Academic performance refers to the knowledge accomplished by student and graded by teacher. According to the educational context, academic performance is the achievement by a student in a period of time in various subjects which is evaluated through examinations and assessments. It is the outcome of the student's educational attainment. The education system revolves round the academic performance as the educational institution is appraised based on the academic performance of the students. Parents have high expectations as well as anxious and concerned over their children's academic performance as the results will lead to the future educational and career options of their children. Academic performance is not only influenced by the home environment that notch the personality and intellectual ability of the student but also school environment equally plays a role (Anshu Narad & Bilkees Abdullah 2016).

The school environment has its dynamic effect on the all round development of the students as students spend major part of their day at school. School environment influences the academic performance of the student which may include curriculum, teaching methods and techniques, student teacher relationship, support services to encourage students wellbeing, disciplinary rules and regulations concerning classroom and school campus behavior, adequate space for making adjustments comprising teachers, head of the institute and support staff, time table, co-curricular activities and support settings in school that ensures the safety and healthy development of students (Zais,2011, Makewa, Role, and Yegoh, 2011). Student's academic performance improves in a school environment which encourages learning. In the recent past, research studies are being undertaken to know the determinants of academic performance. However, research studies on relationship between school environment and academic performance are scanty. Hence, an attempt has been made with an objective to see the relationship between school environment and academic performance of the adolescent students.

METHODOLOGY

The major objective of the present study was to know the relationship between school environment and academic performance of adolescent students. With this objective, a cross sectional study was conductedin Mysuru city. Mysuru is located in the south interior part of Karnataka, South India. The students were selected as subjects at random from various CBSE and State schools located in Mysuru city. A total of 240 adolescent boys and girls were selected. The selected students were in the age group of 14 to 16 years, studying in class 9^{th} and 10^{th}standards. Out of 240 selected students, 120 equally represented CBSC and state syllabus schools. Depending on the study variables, research tools were selected. Interview and questionnaire method were adopted to collect the data. Self framed questionnaire was used to collect general information, socio demographic conditions and academic performance.School Environment Inventory developed by Karuna Shankar Misra (2002) was usedto assess how psycho-social climate of school is perceived by students.The collected data was tabulated and scored according to the norms given in the manual of the standardized scale. Frequency and percentages were calculated for the socio-demographic information and perception of students on school environment was classified according to the standard norms as given in the manual. Further the data was statistically processed to interpret the results. Chi-square test was applied to see the association between perception of school environment and type of school (state and CBSE) and Correlation coefficient was applied to see the relationship between the school environment dimensions and subject wise academic performance of the selected adolescent students.Mann Whitney U test was applied to see the significant difference between academic performances of state and CBSE students in subject wise. It is a non parametric test, since the academic achievement variables is an ordinal scale (scores were given to each grades like A+ (1), A (2), B+ (3),B(4), C+(5), C(6), D+(7), D(8) and FAIL(9) which shows the performance in terms of lower the score higher the grade. The statistical calculations were done using the SPSS for windows version 16.0.

RESULTS AND DISCUSSION

Table 1 shows the socio demographic information of the adolescent students. Half (50.41%) of the students were in the age group of 15 years followed by 41.25% in the age group of 14 years. Highest percentage of CBSE (57.5%) and State (43.33%) students were in the age group of 14 years. Equal percentage of boys and girls were observed under CBSE and State syllabus. As per birth order, 52.5% were first born and 43.75% were second born. Highest percentage of CBSE (57.5%) students were first born while highest percentage of State syllabus (50.83%) students were second born. Majority (81.6%) belonged to nuclear families and 65.4% of them had 4-5 members in their family. Higher percent of State syllabus (15.0%) students were from joint families compare to CBSE (8.33%) students. Majority (78.75%) of the students lived in pakka houses while 44.58% were from families with income of Rs 11,000/- to 20,000/- per month followed by 27.91% were from families with income of Rs 21,000/- to 40,000/- per income. Higher percent of CBSE (25.83%) students were from families with income of Rs. 21,000 to 40,000 than their counterparts (3.0%).

TABLE 1: SOCIO-DEMOGRAPHIC INFORMATION OF THE SUBJECTS FROM STATE AND CBSE SYLLABUS SCHOOLS

Socio-demographic characteristics		Type of Syllabus				Total	
		State		CBSE		No.	%
		No.	%	No.	%		
Age (in years)	14	50	41.66	49	40.83	99	41.25
	15	52	43.33	69	57.5	121	50.41
	16	16	13.33	2	1.66	18	7.5
	17	2	1.66	0	0	2	0.8
Gender	Boys	60	50.0	60	50.0	120	100.0
	Girls	60	50.0	60	50.0	120	100.0
Birth order	1	57	47.5	69	57.5	126	52.50
	2	61	50.83	44	36.66	105	43.75
	3 or Later born	2	1.66	7	5.83	9	3.73
Type of family	Nuclear	90	75.0	106	88.33	196	81.6
	Extended	12	1.0	4	3.33	16	6.66
	Joint	18	15.0	10	8.33	28	11.6
Family size	< 3	21	17.5	29	24.16	50	20.83
	4-6	79	65.8	78	65.0	157	65.4
	7-9	17	14.16	12	10.0	29	12.8
	≥10	3	2.5	1	0.83	4	1.66
Type of house	Pakka	102	85.0	87	72.5	189	78.75
	Semi pakka	14	11.66	30	25.0	44	18.33
	Kaccha	4	3.33	3	2.5	7	2.91
Family income per month	Below 5,000	3	2.5	11	9.16	14	5.83
	5,000 to 10,000	24	2.0	17	14.16	41	17.08
	11,000 to 20,000	49	40.83	58	48.33	107	44.58
	21,000 to 40,000	36	3.0	31	25.83	67	27.91
	Above 40,000	8	6.66	3	2.5	11	4.55

TABLE 2: PERCEPTION OF SCHOOL ENVIRONMENT OF THE ADOLESCENT STUDENTS

Type of school	Perception of School Environment	Dimensions of School environment											
		Creative stimulation		Cognitive encouragement		Permissiveness		Acceptance		Rejection		Control	
		No	%	No	%	No	%	No	%	No	%	No	%
State	High	36	30.0	54	45.0	38	31.6	66	55.0	46	38.3	30	25.0
	Average	74	61.6	51	42.5	67	55.8	42	35.	57	47.5	70	58.3

									0				
	Low	10	8.3	15	12.5	15	12.5	12	100.0	17	14.1	20	16.6
CBSE	High	26	21.6	44	36.6	32	26.6	65	54.1	51	42.5	23	19.1
	Average	83	69.1	55	45.8	68	56.6	43	35.8	58	48.3	65	54.1
	Low	11	9.1	21	17.5	20	16.6	12	100.0	11	9.1	32	26.6
Total	High	62	25.8	98	40.8	70	29.2	131	54.6	97	40.4	53	22.1
	Average	157	65.4	106	44.2	135	56.2	85	35.4	115	47.9	135	56.2
	Low	21	8.8	36	15.0	35	14.6	24	100.0	28	11.7	52	21.7
	Total	240	100.0	240	100.0	240	100.0	240	1000.0	240	100.0	240	100.0
Chi-Square		2.176		2.171		1.236		.019		1.552		3.879	
df		2		2		2		2		2		2	
Sig.		.337 NS		.338 NS		.539 NS		.990 NS		.460 NS		.144 NS	

Table 2 shows the perception of school environment of the adolescent students. From the table it can be observed that majority of the students perceived average level of school environment in all the dimensions except for acceptance. With regard to the dimension of acceptance majority (54.6%) perceived higher level of acceptance while 35.4% perceived average level of acceptance. With respect to the perception of state syllabus school adolescents and CBSE school adolescent students, it can be noticed that higher percentage of state students perceived higher level of creative stimulation, cognitive encouragement, permissiveness and control when compared to CBSE students. With the dimension of rejection, higher percentage of CBSE students perceived high level of rejection than state students. With regard to the dimension of acceptance almost equal percentage of state (55.0%) and CBSE (54.1%) perceived high level of acceptance. However, the data showed minor differences in the level of perception between state and CBSE students with regard to school environment, it was not statistically significant. Similarly a study by Anshu Narad & Bilkees Abdullah, (2016) also found that the perception of school environment by the higher secondary school girls of different type of schools did not

differ significantly except for the dimension of permissiveness. This can be explained that in all types of schools whether it is a state syllabus school, CBSE syllabus school, co-educational school or same gender school the perception of school environment by the students with regard to the dimensions of creative stimulation, cognitive encouragement and acceptance will be similar. In the dimensions of permissiveness, control and rejection though, they differ in level of perception but not statistically significant. It can be assumed that restrictions and opportunities are imposed and provided depending on the type of school and the need for exerting them.

TABLE 3: ACADEMIC PERFORMANCE SUBJECT WISE OF ADOLESCENT STUDENT SUBJECTS (CBSC AND STATE SCHOOL)

Subjects	CBSC		State		Z score	significance
	Number	Median	Number	Median		
Science	120	2.00	120	2.50	-2.491	.013*
Maths	120	2.00	120	3.00	-1.735	.083
Social	120	2.00	120	3.00	-4.053	.000**
English	120	2.00	120	2.00	-1.944	.052
Hindi	120	2.00	120	2.00	-.824	.410
Kannada	120	2.00	120	200	-.881	.378
Computer	120	2.00	120	2.00	-1.085	.278
Environmental science	120	2.00	120	2.00	-1.332	.183

*Significant, **Highly Significant

Table 3 shows the difference in subject wise academic performance between CBSC and state school students. To see the academic performance of adolescents in each subject,scores were given to each grades like A+ (1), A (2), B+ (3),B(4), C+(5), C(6), D+(7), D(8) and FAIL(9). Lower the score shows higher the grade. The above table reveals that the CBSC students have 2.00 as their median score for each subject, which means that the maximum CBSC students have A grade in each subject. Among state syllabus students the median score differs among subjects, for science they have a median of 2.50 which is considered as B+ grade, even in maths and social they have 3.00 as their median which means their grade is B grade, but in English, Hindi, kannada, computer and environmental science the median score is 2.00 which means their grades are A. A significant difference ('Z' score – 2.491, P < .013) in the performance in science subject and a highly significant difference ('Z' score – 4.053, P < .0001)in the performance in social subject was found between CBSC and state syllabus students at 5% and 1% levels respectively. A similar study showed no significant differences in the academic performance of senior secondary school girls studying in co-education schools and girls' schools (Anshu Narad & Bilkees Abdullah, 2016), which can be inferred that girls academic performance may not differ based on different type of schools.

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TABLE 4: CORRELATION BETWEEN THE SCHOOL ENVIRONMENT AND SUBJECT WISE PERFORMANCE OF THE SELECTED ADOLESCENT STUDENT SUBJECTS

School Environment Dimension	Corr.	Science	Maths	Social	English	Hindi	Kannada	Computer	Environmental science
Creative stimulation	Corr.	-.017	.040	-.005	-.060	.067	.003	-.010	-.021
	Sig.	.796	.539	.933	.353	.299	.960	.881	.746
Cognitive encouragement	Corr.	-.103	-.043	-.071	-.096	-.018	-.082	**-.153***	-.062
	Sig.	.111	.507	.271	.140	.787	.203	**.018**	.336
Acceptance	Corr.	-.008	.051	.033	-.030	.015	.002	.035	.017
	Sig.	.896	.432	.616	.642	.823	.977	.595	.792
Permissiveness	Corr.	-.093	-.033	-.088	-.055	-.023	-.060	.031	-.007
	Sig.	.151	.609	.172	.397	.728	.351	.631	.914
Rejection	Corr.	**.180****	**.174****	**.170****	.102	.122	.103	**.171****	.027
	Sig.	**.005**	**.007**	**.008**	.115	.058	.111	**.008**	.679
Control	Corr.	-.085	-.013	-.072	-.096	-.009	-.105	-.049	-.056
	Sig.	.188	.839	.266	.137	.887	.106	.448	.387

Table 4 reveals the correlation between the school environment and subject wise performance. It can be seen that a negative correlation is found with regard to the dimension of cognitive encouragement with the performance in computer subject with ('r' value -.153, P< .018) 5% levels. With reference to the dimension of rejection in the school environment a highly significant correlation is found with the performance in science ('r' value .180, P< .005), maths ('r' value .174, P< .007), social ('r' value .170, P< .008) and computer ('r' value -.171, P< .008) subjects with 1% levels. No other dimensions in the school environment had significant correlation with the subject wise performance of the selected adolescent student subjects. A study by Sudha and Haseen (2014) also found that school environment have significant positive correlation with academic achievement. Some studies carried out earlier have shown similar results where school environment correlates with academic performance and achievement. Brière, et. al. (2013) in a longitudinal study on school environment and adolescent depressive symptoms assessed Socio educational environment by a composite measure of social climate, learning opportunities, fairness and clarity of rules, and safety. The results found that there was a significant association between socio educational environments in school and depressive symptoms and it varied between schools. It appeared that school environment has greater influence on adolescent students.

A short term longitudinal research study by Ming-Te Wang(2010) on adolescents' perceptions of school environment, engagement, and academic achievement in middle schoolalso indicated that students' perceptions of school environment in previous grade contributed to the coming grade. The study found that students' perceptions of school environment influenced their academic achievement directly and indirectly. Dahar, Muhammad Arshad(2009) carried out a study on impact of the prior school environment on academic achievement of students at the secondary stage in Punjab.The results of the study showed that the prior school environment is an important predictor of academic achievement. The study observed that prior school environment is very helpful in producing the present school environment which makes it clear that both present and the prior school environments are important for better academic achievement of the students.

CONCLUSION

In conclusion, the present study highlights the following

- Majority of the students perceived average level of school environment in all the dimensions except for acceptance. Majority perceived higher level of acceptance. Higher percentage of state students perceived higher level of creative stimulation, cognitive encouragement, permissiveness and control when compared to CBSE students. Higher percentage of CBSE students perceived high level of rejection than state students. Equal percentage of state and CBSE students perceived high level of acceptance. No significant association was found between the perception of school environment and type of school of adolescent students.
- A significant difference and a highly significant difference in the performance in science and social subjects were found respectively between CBSC and state syllabus students at 5% and 1% levels.Maximum CBSC students have A grade in each subject while state students have B+ and B in science and maths, social respectively.
- Significant correlation is found with regard to the dimension of cognitive encouragement with the performance in computer subject at 5% levels. A highly significant correlation of rejection in the school environment is found with the performance in science, maths, social and computer subjects at 1% levels.
- School environment influences the academic performance of the adolescent students in turn affects their grades. It is important to provide an qualitative school environment like teachers sharing good relationship with students, encouraging of expressing opinion and ideas, encouragement for exchanging views, coming out of monotonous schedule and providing a space for activities that helps in development of personality and encouragement to work their maximum abilities and creativity and motivation for the development of friendly relationships with classmates which helps in the improvement in school environment in turn students move on a higher level of academic performance as well.

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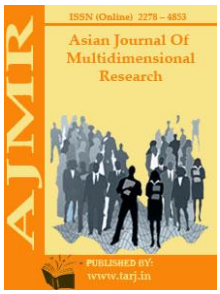

Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

RELATIONSHIP BETWEEN SMARTPHONE ADDICTION AND BEHAVIOURAL PROBLEMS AMONG THE ADOLESCENTS

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ABSTRACT

Smart phones have become an obligation for the people in today's generation as compared to another gadget. It provides the greatest resources for academic, business, relaxation, entertainment and socialising etc. The vast majority of its consumer belongs to the adolescent population. It is no doubt that their smart phone usage is much more developed as they are more prone to changing trends and style, making them more tech-savvy and compulsive addiction which can result in certain behavioural disorders. Thus, a cross-sectional study was conducted with the objective to find out the relationship between smart phone addiction and behaviour problem among the selected adolescents (N = 67) age ranges from 13 – 17 years residing in the Coimbatore city. A self-developed Smartphone addiction scale and Problem behaviour checklist (PBCL) developed by VimalaVeeraraghavan and ArchanaDogra (2000) were used to collect the required information. The findings reveal that 40 percent of the adolescents were moderately addicted to smart phone and 23 percent of total respondents reported were highly addicted to smart phone. The greater number of the study group were less problematic with the results of low behaviour problem (61.19%). However, 22.38 % of adolescents were reported to exhibit a high level of behaviour problem. The correlation analysis reveals that there is a positive

relationship between smart phone addiction and behaviour problem among study sample which is significant at 1% level.

KEYWORDS: *Smartphone Addiction, Compulsive Addiction, Behaviour Problem.*

INTRODUCTIONS

In the recent years, the relationship between people and their smart phone is much more developed than expected compared to the fixed telephone and even with their desktop or laptop computer (Carbonell, Oberst&Beranuy, 2013). It is particularly true among adolescents, as they spend much time with and on their smart phones; maybe because adolescents are more sensitive to rewards and cues than older people (Haverlag, 2013). Smartphone addiction, sometimes colloquially known as "nomophobia" which is referred as fear of being without a mobile phone, which is often fuelled by an Internet overuse problem or Internet addiction disorder because of its similarity in features (Kwon, Kim, Choi, Gu, Hahn & Min, 2013). It is on the rise especially among today's adolescents and youths.

People often don't turn off their smartphones, and carry with them everywhere, and use them for handling every mechanism like business, relaxation, and socializing. A survey on the use of Smartphone by Muhammad Sarwar and Tariq Rahim Soomrothe (2013) revealed that Smartphone serves as a stress reduction tool in busy work life. The smartphone enables users to stay connected with their friends and family as and when they get time like staying in touch while travelling, utilizing wait-on time to promote their social life, staying up-to-date with the latest news and development in the political and social circles resulting in reducing work stress.

However, there is frequently an undesirable situation with certain habits that become problematic and addictive among the smartphone users which may be contributed by some characteristics, such as stress, loneliness, or isolation (Young, 1999). In the case of nomophobia, the degree of discomfort the users feel at the thought of being separated from their smartphones is irrational. In fact, an increasing number of college students now shower with their cell phone. An average adolescent would rather lose a pinky-finger than a cell phone. Additionally, mobile phones have aided in smoothening the progress of social release of youngsters from parental authority (Ling, 2004). But, their parents often have more sense of security when their children travel independently outside their home along with their phones (Baron, 2010).

Some psychiatrists believe that mobile phone addiction is no different from any other type of addiction (e.g., drug, the Internet) and that mobile phone addiction has become one of the most prevalent non-drug addiction ("Mobile phones becoming," 2003). Several scholars (e.g., Park, 2005) have reported that some users are more dependent on their mobile phones than they are aware. They tend to become highly anxious and irritated when the mobile phone was unavailable for a time. This behaviour continued although these were troubling signs of addiction. It said that excessive usage and habitual checking on phones result in compulsive usage (Oulasvirta et.al.2012). When the compulsive behaviour is perceived to be inescapable, adverse consequences of psychological distress such as insomnia and depression (Thomee` et al. 2011, Matusik and Micket 2011). Other common behaviour problems such as lack of concentration, poor academic performance, insomnia, anxiety, body aches, eye strain, digital thumb are on the rise among the compulsive phone users. In the light of the intensity of the problem, an attempt

was made to study the relationship between smartphone addiction and behaviour problem among adolescents.

Objectives of the study:

I. To assess the level of smartphone addiction among the selected adolescents.
II. To explore behaviour problems among the respondents.
III. To analyse the relationship between smartphone addiction and behaviour problems among the selected population.

Hypothesis

I. There exists no relationship between smartphone addiction and behaviour problems among the selected adolescents.

METHODOLOGY

Participants

The Coimbatore city was selected as local of the present study. The Coimbatore is one of the fast-growing metropolitan city with its ever-expanding education hub and techno-based Industries where people are bound to use smartphones for every work. For the present study, the sample consisted of 67 adolescents and their parents to assess information on smartphone addiction and problem behaviour of adolescents respectively. The multi-stage sampling method was employed to identify the samples by setting few specific inclusive criteria for easy identification. The criteria for adolescents were, i) residence across the 4 km radius from Avinashilingam Institute for Home Science and Higher Education for women; ii) residing with parents; iii) should not be younger than 13 years and older than 17 years of age; iv) able to comprehend English and v) smartphone user.

Instrument

Tools used for present study were:-

I. A self-prepared questionnaire to elicits general information and personal profile of the selected adolescents.
II. Problem behaviour checklist (PBCL): PBCL is a 3 point rating scale developed and standardized by VimalaVeeraraghavan and ArchanaDogra (2000) to assess problem behaviour of children (above eight years) as perceived by their parents. The scale consists of 58 items indicative of behaviour problems, and the statements were to be tick – marked by the parents as to whether the symptoms occurred ‘most often', ‘occasionally' or ‘never' scoring as 3, 2 or 1 respectively. The problem behaviour were further divided into three categories: - low problem behaviour - (58 – 96), moderate – (97 – 135) and high – (136 – 174).
III. A self-developed Smartphone addiction scale: The scale was designed as a 5 point rating scale consisting 26 items indicative of smartphone addiction behaviour. The statements in the scale to be responded by adolescents with ‘very often', ‘often', ‘sometimes', ‘Almost never' and ‘Never' indicating the scores of 5 to 1 respectively. Further, the scores were divided into three categories: low, moderate and high addiction level.

Procedure

For data collection permission was sought from both adolescentparticipantsand their parents by providing clear information about the nature of the study. After establishing rapport and providing proper instruction, above-mentioned devices were used to study the target sample by a household survey for obtaining the data. The collected information was consolidated coded, scored and tabulated accordingly. The data were analysed statistically to yield the desired results by using percentage analysis, Karl Pearson correlation.

RESULTS AND DISCUSSION:

In present era,there is evidence of smartphone addiction among the individuals beyond social, cultural, and regional boundaries. Smartphone usage behaviours' e.g. duration of usage and use of mobile phones for accessing Internet are found to be the main risks by many researchers which can increase likelihood of hazards. Further there is evidence of excessive smartphone use and dependence by Indian teens causing (a) Stress (b) anxiety (c) insomnia (d) depression (e) delinquency (f) aggressiveness and (g) stunted interpersonal relationship (Ira and Bloomberg, 2012; Davey and Davey, 2014). Thus, the present study assesses the relationship between smartphones addiction and behaviour problems among the selected sample.The findings are discussedunder the following heads:

I. The demographic profile of the selected respondents
II. Level of smartphone addiction among the selected adolescents.
III. Level of behaviour problems of the selected respondents.
IV. Relationship between smartphone addiction and behaviour problems of the adolescents.

I. The demographic profile of theselected respondents:

Below table represents the personal information of the respondents including age, gender, residence, father and mother education and occupation.

TABLE I
DEMOGRAPHIC PROFILE OF THE SELECTED RESPONDENTS

Sl.no.	Variables	Particulars	N	%
1.	Age	13 14 15 16 17	30 26 6 3 2	**44.7** **38.8** 9 4.47 3
2.	Gender	Male Female	36 31	53.7 46.2
3.	Father education	Non-formal education Primary Secondary Graduate Postgraduate	1 12 28 17 9	1.49 17.91 **41.8** 25.37 13.43

4.	Mother education	Non-formal education Primary Secondary Graduate Postgraduate	8 14 25 17 3	11.96 20.89 **37.31** 25.37 4.47
5.	Father occupation	Clerical Teaching Professional Business Unemployed	6 3 6 51 1	8.95 4.47 8.95 **76.11** 1.49
6.	Mother occupation	Clerical Teaching Homemaker	4 3 60	5.97 4.47 **89.55**

As can be seen from the data the age composition of the selected adolescents were distributed across 13 to 17 years of age where 44.7 percent of were 13 years oldwhich is followed by 14years (38.8%). Few respondents were 15 - 17 years of age 9%, 4.47%, 3% respectively. An inspection of the gender differences, 53.7 % of the respondents were female where remaining 46.2% were male.Looking into the data of educational status of adolescents'parents, it is clear that both fathers andmotherswere fairly educated. The secondary level of education was accounted with highest number among adolescents parents (41.8 % - fathers and 37.31% - mothers).Taking a glance through the data of parent's occupation mothers were mostly homemaker (89.55%) and fathers were in the business area (76.11%).

II. Level of smartphone addiction among the selected adolescents

Unintended checking of smartphones becomes people's experience to excessive usage that affects their daily life and this follows by addiction towards the phones. This can be seen mostly in vulnerable groups i.e. adolescents. The figure given below shows the level of smartphones addiction among the selected respondents.

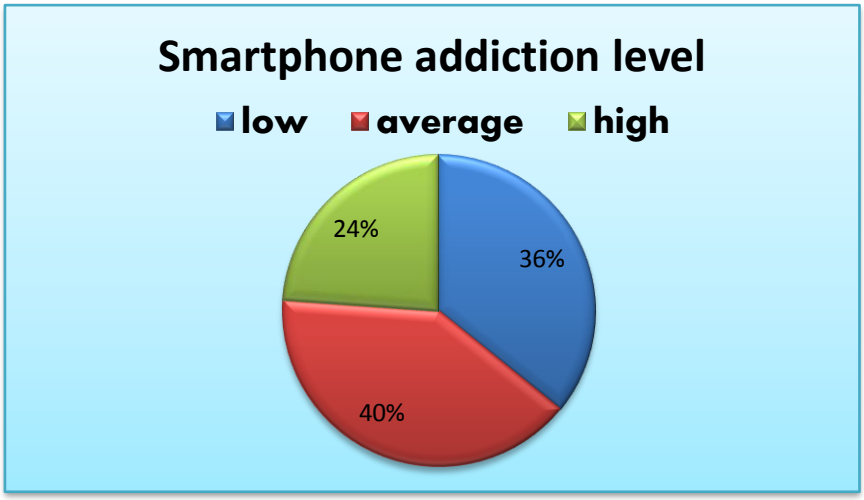

Fig I.Level of smartphone addiction

It is clear from the above data that one-fourth of the respondents were found to be highly addicted to smartphone. The addiction features were categorised under the different areas like from time span of using smartphones to symptoms related to it even their social relationship among families and friends etc. However it is very pleased to note that remaining population falls within the category of low to moderate level of addiction where 40 percent of the respondentswere accounted as moderately addicted and remaining (36 %) reflected as less addicted to smartphones.

III. Level of behaviour problems of the selected respondents.

Problem behaviour can be defined as a deviant behaviour of a child which does not conform to the expectations of the society and is considered detrimental to the welfare of self, family and society. The below figure depict the percentage analysis of the behaviour problems of the selected respondents.

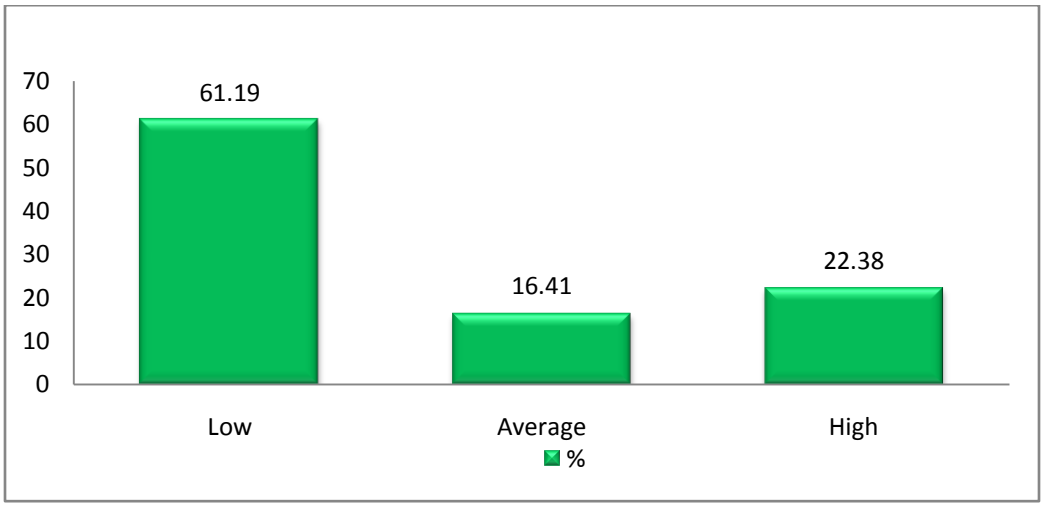

Fig.2 percentage analysis of behaviour problems

From the above data it is clear that a larger group of the respondents (61.19 %) show low behaviour problems.However more than one-fifth(22.38 %) of the respondents were reported to be highly problematic. Thisgroup of adolescents are likely to exhibit theexcessive levels of fighting or bullying, cruelty to animals or other peoples, vandalism, arson, theft, Pathological lying, truancy from home and school, unusually frequent and severe temper tantrums.

IV. Relationship between smartphone addiction and behaviour problems

Smartphones ability to access plunders of social networking and communication makes the users more induce towards it such behaviours leads to repetitive checking of phones that considered as compulsive behaviour (Oulasvirta et.al. 2012). The below table depict the relationship between smartphone addiction and behavioural problems.

TABLE II
RELATIONSHIP BETWEEN SMARTPHONE ADDICTION AND BEHAVIOURAL PROBLEMS AMONG ADOLESCENTS

Variables		Smartphone Addiction	Problem Behaviour
Smartphone Addiction	Pearson Correlation	1	.638**
	Sig. (2-tailed)		.000
	N	67	67
Problem Behaviour	Pearson Correlation	.638**	1
	Sig. (2-tailed)	.000	
	N	67	67

**: Significant at 1% level

The above result depicts the relationship between smartphone addiction and behavioural problems. Correlation result shows that there is a positive relationship between smartphone addiction and behaviour problems among the study sample which is significant at 1% level. The nature of the relationship between two variables clearly shows that higher the level of smartphone addiction higher the behaviour problem faced by the adolescents. Hence hypothesis 1 is rejected.Our finding is consistent witha study conducted by the Cho and Lee (2017) with the findings that smartphone addictive tendencies have significant positive effects on problematic behaviors. Some of the behaviour problems such as addictive, compulsive, habitual, dependent, etc. were found to be associated with mobile phone addiction.

CONCLUSION

Using a smartphone becomes an elegant status symbol for adolescents. They are on smartphone almost all the time whether their usage is purpose-oriented and productive or not.The study conforms with this as the larger group of study respondents were addicted to smartphone with varying degree. Further, it can be concluded from the results of the study that there is a positive relationship between the smartphone addiction and behaviour problem among adolescents.

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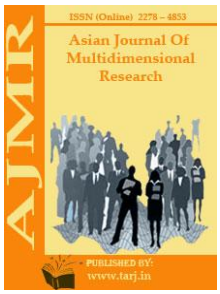

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ADOLESCENTS REPRODUCTIVE HEALTH: A SOCIO-DEMOGRAPHIC FACTOR ANALYSIS

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ABSTRACT

Adolescence is a significant period of life-span where children undergo the biological and psychosocial transformation. As adolescent comprises the largest reproductive age group, their sharing burden of reproductive health became a critical indicator determining India's public health concern. Addressing these concerns are challenging and rewarding at the same time. Indian adolescent's reproductive health issues are more complicated because of its socio-demographic diversity. The present study endeavors' to appraise the perceived adolescent's reproductive health knowledge, attitude and practice as well as to determine the influence of socio-demographic factors. For the present study, 782 school-going adolescent (13-17 years old) girls from Coimbatore District, Tamil Nadu state were selected randomly; and administered a general background information questionnaire and adolescent reproductive health on three separate parameters namely Knowledge, Attitude, and Practice (KAP). The findings reveal that majority of adolescents' score on knowledge and attitude were low, but their practice was found to be of average. Further, the multiple regression analysis results reveal that socio-demographic factors significantly influence the adolescent's reproductive health.

KEYWORDS: *Adolescent Reproductive Health, Socio-Demographic Factor, KAP*

INTRODUCTION

The adolescent's reproductive health is of growing concern today. Reproductive health is a state of complete physical, mental and social well-being, and not merely the absence of reproductive disease or infirmity. Reproductive health deals with the reproductive processes, functions and system at all stages of life. Many researchers and health practitioner emphasized that the foundation for Reproductive health is laid in adolescence. Adolescence is a transitional phase in human life that begins with the onset of puberty and ends with reproductive maturation which prepares young people for adult roles and responsibilities. Adolescents' reproductive and sexual health has become a priority for policy-makers and researchers in India due to the country's sizeable adolescent population and its high rates of child marriage and early childbearing (ICRW, 2006). According to UNICEF 2011 report, 1.2 billion adolescents around the world stand at the crossroads between childhood and adulthood. Around 243 millions of them live in India representing one-fifth (20%) of the population, the largest ever cohort to make its transition to adulthood. As they stand at these junctions, so do societies at large – the crossroads between losing out on the potential of a generation or nurturing them to transform society. As adolescents flourish, so do their communities, and all of us have a collective responsibility in ensuring that adolescence does, in fact, become an age of opportunity. They deserve attention as they hold the key to breaking entrenched cycles of poverty, inequity and deprivation. However available data shows that millions of today's adolescents do not have accessibility to quality education, sexual and reproductive health care, protection from violence, abuse and exploitation, support for mental health issues and disability, and forums for active participation (UNICEF India, 2011). The risks of neglecting adolescents sexual and reproductive health are significant; a painful or damaging transition to adulthood can without a doubt result in a lifetime of ill effects (Morris and Rushwan, 2015).

Imparting knowledge and right practices regarding menstruation are still a taboo subject in India, and prevalent socio-cultural restrictions result in adolescent girls to remain ignorant of the scientific facts and hygienic health practices, which lead to adverse health outcomes (Dasgupta and Sarkar, 2008). According to the Nutrition Foundation of India, the average age of menarche is 13.4; yet 50% of girls aged 12-15 do not know about menstruation. Prior awareness regarding menarche and menstruation among girls is low in most cultures (Jogdand and Yerpude, 2011; Omidvar and Begum, 2010; Deo and Ghattargi, 2005). It is true for rural as well as the urban poor. Many cases, mothers were to be the first source of information regarding menstruation (Jogdand and Yerpude, 2011; Singh et al., 2006; Khanna et al., 2005); much of this is in the form of restriction on her movements and behaviours (Khanna et al., 2005).

Adolescence being a period of pubertal changes, sexual and reproductive maturation become aware of their sexuality and initiates sexual exploration; and increase risk-taking behaviours results in susceptible towards various reproductive health issues (UNFPA, 1998). Sexual risk behaviours in adolescence such as sexual initiation at an early age, having multiple sexual partners, engaging in unprotected sexual intercourse, and sex while under the influence of alcohol or drugs (Kirby et. Al., 2011; Bankoleet. Al., 2007) are a cause of concern. It is so not only because they predispose adolescents to adverse health outcomes but also because they have been shown to be predictors of sexual risk behaviours later in life (Okigbo et al., 2015).

At any given time, the approximate number of Indian pregnant adolescents and adolescent mothers accounted 10 million. The high rate of early pregnancy and motherhood during

adolescence which is a common occurrence in India (ICRW, 2006) increase the risk of maternal or infant mortality and morbidities during childbirth and can compromise educational achievement and economic potential (Morris and Rushwan, 2015). Adolescents—girls in particular—face an increased risk of exposure to HIV and sexually transmitted infections, sexual coercion, exploitation, and violence. The incidents of sexually transmitted infection and abortion-seeking are also disproportionately high among adolescents. At least one-half of unmarried women seeking abortions at facilities are adolescents, many of whom are below 15 years of age, and 25% of the patient attending government STI clinics are younger than 18 years old (Jejeebhoy, 2000).

All of these can endanger not only on an individual's physical and mental health but also create a long-term emotional, economic and social impairment and losses for them, their families, and communities (Morris and Rushwan, 2015; Shirur, 2000). Moreover, the lack of accurate information on reproductive health and conflicting messages in mass media are increasingly posing problems and confusion for adolescents (Shirur, 2000). And unfortunately, the individual needs of these adolescents are rarely addressed by the educational, health and family welfare programs in India.

Investing in the reproductive health of adolescent is critical but profitable to achieving the quality of individual health, family well-being, and improving their economic productivity. However, in India problems of adolescent's reproductive health care are more difficult and complicated because of marked socioeconomic diversity. It is inevitable that an adolescent's reproductive health care is strongly linked to their particular social, cultural, and economic environment. Besides they are more diversified by age, sex, marital status, schooling, residence, migration, sexual orientation, and socioeconomic status, among other characteristics. Access to reproductive health care and sources of education, information, and support also varies widely. The differences demand country-level analyses of patterns but despite these variations, critical issues, barriers, and challenges, as well as potential solutions, can be identified across the board.

On this notion, the present study was undertaken to evaluate influences of socio-demographic factors on reproductive health among school going adolescent girls.

OBJECTIVES

- Appraise the Knowledge, Attitude and Practice (KAP) on adolescent reproductive health among the selected respondents
- Determine the socio-demographic factors on KAP of adolescent reproductive health

HYPOTHESES

$H_0$1The socio-demographic factors doesn't have significant influence on adolescent reproductive health Knowledge

$H_0$2 There exists no significant difference in the influence of socio-demographic factors on adolescent reproductive health Attitude

$H_0$3 There exists no significant difference in the influence of socio-demographic factors on adolescent reproductive health Practice.

METHODOLOGY

A Cross-sectional study was conducted in Coimbatore District of TamilNadu state. Two schools from the said location were identified for the present study. A sample of 782 adolescent girls age ranges 13 to 17 years old were randomly selected from the schools. A survey was conducted after the permission was sought, and consent has been given by the concern participants. The tools constructed to secure adequate information from the study sample were: i) Questionnaire to elicit background information and ii) A Scale to assess the level of adolescent reproductive health on three separate parameters namely Knowledge, Attitude, and Practice (KAP). Each parameter of the scale measures four significant areas of adolescents' reproductive health issues namely (a). Pubertal changes and menstruation, (b). Sexual conduct and behaviour, (c). Early marriage and adolescent pregnancy and (d). HIV/AIDS. The Knowledge scale consists of 68 items with three options were provided to respond carrying one or zero marks where one can score one mark for the correct option alone. The Attitude scale is a 5 point rating scale consisting 66 statements with the responses of 'strongly agree', 'slightly agree', 'undecided', 'slightly disagree' and 'strongly disagree'. The Practice scale is 4 point rating scale consisting of 57 items with 'never', 'sometimes'. 'often' and 'always' as options to rate carrying a score of 1 to 4 respectively. The Table – I provide the score ranges for the classification of the adolescent reproductive health KAP.

TABLE – 1: GRADING THE KAP OF ADOLESCENT REPRODUCTIVE HEALTH

Level	Range of scores		
	Knowledge	Attitude	Practice
Low	0 – 22	66 – 154	57 – 114
Moderate	23 – 45	155 – 242	115 – 171
High	46 – 68	243 – 330	172 – 228

The information were consolidated, scored, and statistically treated to yield the desire results. Frequency distribution and percentage analysis were employed to categorize the selected samples based on their scores of knowledge, attitude and practice. Multipleregression analyses were conducted to determine the various potential predictors of socio-demographic factors on adolescent reproductive health knowledge,attitude and practice.

RESULTS AND DISCUSSION

c. Categorization of adolescents based on the levels of their KAP score

The below table represent the categorization of the adolescents based on the level of their Knowledge, Attitude and Practicescore in regards to their reproductive health.

TABLE –2.CATEGORIZATION OF ADOLESCENTS BASED ON THE KAP SCORE

Sl. No.	Categories	Adolescent Reproductive Health Parameters					
		Knowledge		Attitude		Practice	
		N(782)	%	N(782)	%	N(782)	%
1	**Low**	648	82.9	540	69.1	163	20.8
2	**Average**	127	16.2	230	29.4	619	79.2
3	**High**	7	0.9	12	1.5	-	-

It is highly disheartening to note that the majority of the selected adolescents were found to be highly ignorant about reproductive health, only 16.2 percent were falls under the moderately knowledgeable category and not even 1 percent were accounted for highly knowledgeable category. A study by Rani and Rao (2015) also found that the knowledge regarding reproductive health issues were poor among adolescent girls. Kotecha et.al. (2012, 2009) also reported inadequate knowledge about understanding reproductive system, human reproduction and reproductive health related issues among adolescent students.

In regards to adolescents' attitude towards reproductive health, most of them doesn't have positive attitude. Nearly one-third of the selected sample's attitude were moderately positive however the larger group of 69.1 percent were reported to have negative attitudes towards reproductive health issues. It is interesting to note that despite the consistent low scores on adolescents' knowledge and attitude, the majority of selected adolescents' reproductive health practices were found to be relatively good. However one in every five adolescents' practices on their reproductive health care was unsatisfactory.

b. Influence of socio-demographic factors on adolescent reproductive health knowledge attitude and practice

Socio-demographic factors are considered to enrich the SRH knowledge and awareness of adolescents and to shape their behaviours (Ray, Mishra and Das, 2012).Multiple regression analyses were conducted to examine the various potential predictors of socio-demographic factors on adolescent reproductive health with specific reference to knowledge, attitude and practices.

TABLE – 3.INFLUENCE OF SOCIO-DEMOGRAPHIC FACTORS ON ADOLESCENT REPRODUCTIVE HEALTH KNOWLEDGE

Variables	Regression Coefficients (B)	Std. Error	Beta	t	R	R Square	F
(Constant)	10.433	3.204			.187	.035	**4.682****
Age	.205	.178	.041	1.149			
Academic performance	.568	.311	.065	1.826			
Area of residence	-1.077	.473	-.081	**-2.276****			
Family type	.916	.542	.060	1.690			
Father's education	.351	.183	.072	1.921			
Mother's education	.495	.190	.098	**2.608****			

Dependent variable: adolescent reproductive health knowledge score

**** -** significant at 1% level

The multiple regression model with all socio-demographic predictors produced $R^2 = .035$, $F = 4.682$, $p < .001$. Looking at the p-value of the t-test for each predictor, we can see that the variables 'area of residence' and 'mother's level of education' significantly influence the knowledge level of adolescents' reproductive health. As can be seen in Table - 3, the area of residence has a significant negative regression weight; it can be interpreted as among the two

area of residence (coded as urban = 1, rural = 2), urban has the higher influence to have better knowledge on reproductive health among adolescents. A study conducted by Mahajan and Sharma (2004) found urban adolescents more knowledgeable than rural adolescents in regards to reproductive system and organs. However contradicting our findings, Rani and Rao (2015) reveal in their study that there is no difference among rural and urban adolescents' knowledge on reproductive health issues.

Various studies indicated, mothers are considered to be the first sources of information on reproductive health for their adolescents (Rani and Rao, 2015; Jogdand and Yerpude, 2011; Singh et al, 2006; Khanna et. al., 2005); therefore it is crucial that the knowledge imparted by them is based on the facts. However, it can be achieved only when they themselves are knowledgeable with proper education. The result of present study is consistent with thisas mother's level of education reveal to have a significant positive regression weights, indicating the higher level of mother's education were expected to have higher adolescent's knowledge on reproductive health.

TABLE – 4. INFLUENCE OF SOCIO-DEMOGRAPHIC FACTORS ON ADOLESCENT REPRODUCTIVE HEALTH ATTITUDE

Variables	Regression Coefficients (B)	Std. Error	Beta	t	R	R Square	F
(Constant)	104.129	18.093			.150	.022	**2.970****
Age	1.187	1.006	.043	1.180			
Academic performance	.595	1.756	.012	.339			
Area of residence	-2.639	2.673	-.035	-.987			
Family type	-.156	3.062	-.002	-.051			
Father's education	2.177	1.032	.079	**2.111***			
Mother's education	2.624	1.072	.093	**2.449***			

Dependent variable: adolescent reproductive health attitude score

**** - significant at 1% level, * - significant at 5% level

Table – 4 summarizes the descriptive statistics and analysis results of various socio-demographic predictors on adolescent's attitude towards reproductive health. From the results, it is clear that out of all socio-demographic factors only level of parental education both father's and mother's has a significant positive influence on adolescents' attitudes on reproductive health. It can be further discussed that higher the level of education the parents has higher the chances of their adolescents having the positive attitude towards reproductive health.

TABLE – 5.INFLUENCE OF SOCIO-DEMOGRAPHIC FACTORS ON ADOLESCENT REPRODUCTIVE HEALTH PRACTICE

Variables	Regression Coefficients (B)	Std. Error	Beta	t	R	R Square	F
(Constant)	106.249	6.102			.186	.034	**4.615****
Age	.690	.339	.073	**2.034***			
Academic performance	.791	.592	.047	1.336			
Area of residence	-.438	.901	-.017	-.486			
Family type	.731	1.032	.025	.708			
Father's education	1.395	.348	.149	**4.010****			
Mother's education	.360	.361	.038	.996			

Dependent variable: adolescent reproductive health practice score

** - significant at 1% level, * - significant at 5% level

Out of the six socio-demographic factors, age of the adolescents and their father's educational status contribute significant positive regression weights. As can be observed in the above table, older the adolescents better their practices on reproductive health. It can also be highlighted that father's education has a significant influence on adolescent's reproductive health practices indicating higher the level of father's education better the practices of reproductive health adopted by their adolescents.

CONCLUSION

An attempt was made to study and determined the socio-demographic factors which influenced the adolescent's reproductive health. Among the various factors parental education were found to be major contributors various adolescent's reproductive health parameters. It can be an implication that the parents with the higher level of education are likely to be more knowledgeable thus provide awareness on their children and contribute to healthy practices of reproductive health.Adolescent girls need an extensive educationon reproductive health issuesalong with supportive education program for the parentsto improve the overall adolescent's reproductive health status.

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SPECIAL ISSUE ON

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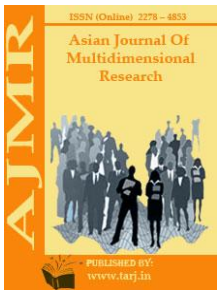

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

LIFELONG LEARNING FOR SUSTAINABLE COMMUNITY DEVELOPMENT

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ABSTRACT

Learning, we believe is a lifelong process of keeping abreast of change. There is no doubt that the need of lifelong learning is today stronger than ever. The notion "what I have learnt in school will get me through entire working life" is outdated. The amount of available knowledge is growing too fast to be mastered during years of formal education and the existing knowledge becomes outdated on a daily basis. Lifelong Learning or Continuous Learning is important in today's rapidly changing world. The terms lifelong learning and community development refers to different areas within the field of adult education. Lifelong learning, the capacity of individuals and communities to renew their knowledge and skills and adapt to economic and social change will be reduced considerably.Community development is defined as a social learning process, which serves to motivate and empower individuals and social groups by making them to take part in different income generating activities aimed at socio-economic regeneration, development and changes. (Mcclenaghan 2009) Sustainable Community Development focus on local community and economic development that is principles of preservation of local character and or important of quality of community life. This can be achieved by helping community members work together to development and sustain livelihood activities in healthy environment for a robust economy with good governance and sense of deep connection to their neighbours and the world. Sustainable community development fosters democratic values, social and economic justice, environmental integrity and respect care for the community life.This article explain the relationship between these two concepts, and also examines the different way in which lifelong learning programmes contributes to the sustainable development of the community.

KEYWORDS: *considerably, democratic, preservation*

INTRODUCTION

The term Community development and lifelong learning refers to different areas within the field of adult education. In order to provide the best possible match between the learning opportunities to people and the skills, knowledge, attitudes and behaviors that will strengthen economy and society. The Department of Lifelong Learning and Extension was established under the galaxy of Avinashilingam Institute for Home Science and Higher Education for Women on 24th August 2005. Since inception, it has been a pioneer in introducing carrier and self-employment oriented academic and skill building programmes in tune with the changing and emerging needs.

OBJECTIVES

The present study has been undertaken with the following objectives

A. To understand the various lifelongprogrammes offered between 2005 – 2017 for the development of community.
B. To study the impact of the Lifelong Learning programmes.

METHODOLOGY

The study is based on secondary data and information which is collected from the concerned sources as per need of the research. The relevant journal, annual reports, books, documents and various departments paper article are used in the study. The methodology of the training focus on demonstrative and hands on training, discussion with subject experts and successful entrepreneurs and industrial visit for certain aspects. The trainees are given exposure to bank officials and industrial experts to motivate them to start a business of their own, stimulate entrepreneurial skills and opportunities and economic empowerment.

RESULT AND DISCUSSION

A. LIFELONG LEARNING PROGRAMMES OFFERED BETWEEN 2005 – 2017 FOR THE DEVELOPMENT OF COMMUNITY.

Lifelong learning programmes provides learning opportunities for individuals and groups who want to develop their knowledge and skills without enrolling in regular academic programs **irrespective of their age and educational qualification. These programmes were offered in both a) on campus and b) off campus mode.**

a. The Lifelong learning programmesofferedis shown in Figure I

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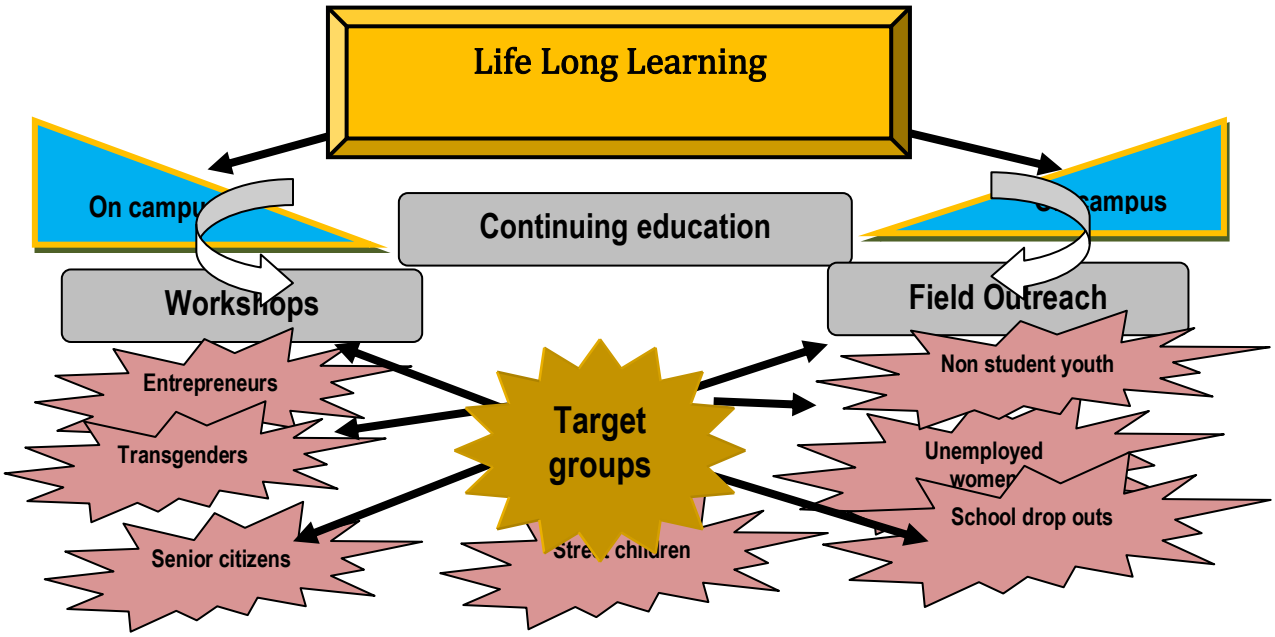
FIGURE – I



a. On campus programmes

i. Continuing education programmes

The department offered multifaceted continuing education courses from 5 days to 6 months for men and women irrespective of their age and educational qualification. The programmes were intended to close the opportunity gap and played an important role in providing a route out of poverty among the semiskilled and unskilled population.

Table-II gives the details about the courses (on campus) offered by the department during 2005 - 2017.

TABLE - II
CONTINUING EDUCATION COURSES OFFERED DURING THE YEAR 2005-2017

S. No	Courses offered	Duration	No. of beneficiaries
I	**Courses on textiles**		
1	Fashion Designing (On campus)	6 Months	6520
2	Pattern making		2212
	Total	3 Months	**8732**
II	**Courses on Needle Art**		
1	Hand embroidery (Basic	2 months	1440
2	&Advanced)	2 Months	1151
3	Aari embroidery	2 Months	1165
	Machine embroidery		**3756**
	Total		

III	**Courses on Beauty**		
1	Herbal Beauty Therapy	3 Months	5795
2	Herbal Beauty Therapy(Evening course)	3 Months	480
	Floral art	One week	1365
3	Hair styles and Hair cuts	One week	495
4	Mehandhi and Bridal make up		
5	**Total**	One week	1085
			9220
IV	**Courses on Arts and Crafts**		
1	Painting (Fabric, glass, nip, Pot etc.)	2 Months	3050
2	Soft toy making	15 days	916
3	Cushion making	15 days	710
4	Creative gift article	One week	75
5	Flower arrangement and bouquet making	One week	95
6	Warli painting	5 days	45
7	Depth mural	5 days	45
8	Artificial jewellery making	3 days	755
9	Artificial flower making	One week	345
	Total		**6036**
V	**Courses on Culinary Art**		
1	Nutritious fast food	2 Weeks	1164
2	Bakery techniques	One week	710
3	Preparation of salads and soups	One week	250
4	Fruits and vegetable preservation	One week	820
5	Home made chocolates and jellies	3 days	580
	Total		**3524**
VI	**Courses on eco-friendly products**		
1	Paper bag making	One week	1096
2	Jute Bag Making	One week	800
3	Cloth Bag Making	One week	2000
	Total		**3096**
VII	**Courses on Computers**		
1	Basic computer application	2 months	630
2	Photo shop	One month	170
3	Tally	3 months	228
	Total		**1028**
VIII	**Other courses**		
1	Spoken English	2 months	100
2	Preparation of homecare products	1 week	2948
3	Radio jockey training	One week	85
4	Yoga and Meditation	10 Days	327
5	Screen printing	One Week	465
6	Book Binding	One Week	850

	Total		**4775**
	Total		**40,164**

From 2005 to 2017, about 40,164 benefitted from various on campus continuing education programmes. Greatest enrolled in beauty care courses followed by textile course, arts and craft courses and Needle craft courses. This might be due to the immediate earning potential of these courses.

The department offers more than 40 courses stressing on the self employment skill based training programmes with a wide scope of matching to the current trend related to computer skills, fashion designing (basic and advanced level), beauty care and herbal beauty therapy, arts and crafts namely painting, hand embroidery, machine embroidery, aari embroidery, bead work and cushion making, soft toys making, artificial flower making, creative gift articles, artificial jewellery, floral arts, catering courses related to food processing and preservation, masala powders, nutritious fast foods, bakery techniques etc, ecofriendly courses namely paper bag making, jute and cloth bag making, preparation of home care products, book binding, screen printing, etc.,

b. Off Campus Programme

a) Continuing Education Centre

b) Tailoring Unit

The department established a) Continuing Education Centre on 15.07.2010 at Thudiyalur, 10kms away from city to impart need based skill training programmes at the door step of the community women. b) A Tailoring unit at Red Fields, Coimbatore where families of Junior Commissioned Officers and other ranks are being taught tailoring skills in order to ensure professional learning of tailoring skills. The details of Off Campus programme is given in Table – III

TABLE – III
DETAILS OF OFF CAMPUS PROGRAMME

S. No	Courses offered	Duration	No. of beneficiaries
1	Fashion Designing (Off campus)	6 Months	478
2	Basic Tailoring	6 Months	40

The above table shows that more than 400 women beneficiaries were interested to undergo training on Fashion designing.

c. OUTREACH PROGRAMMES

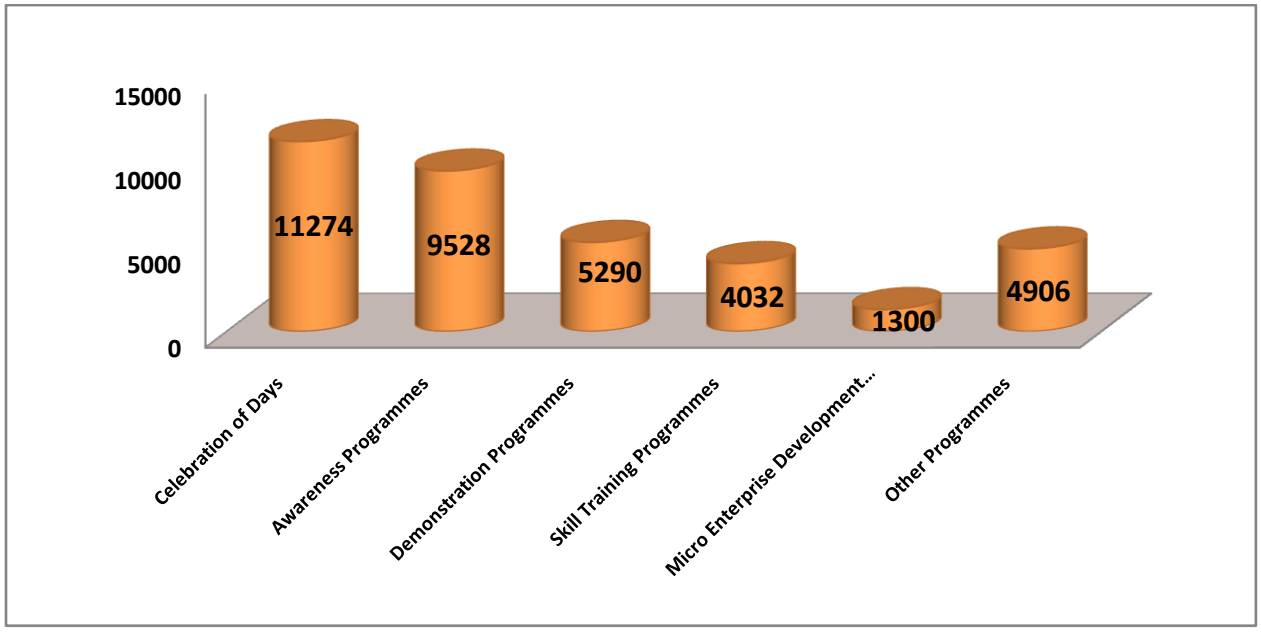
The department conducted the following field outreach activities based on the needs of the community.

- Celebration of National and International days
- Awareness programmes
- Skill training programmes

- Health camps

The details about the outreach programmes of the department during 2005 – 2017 is given in Figure III.

FIGURE III



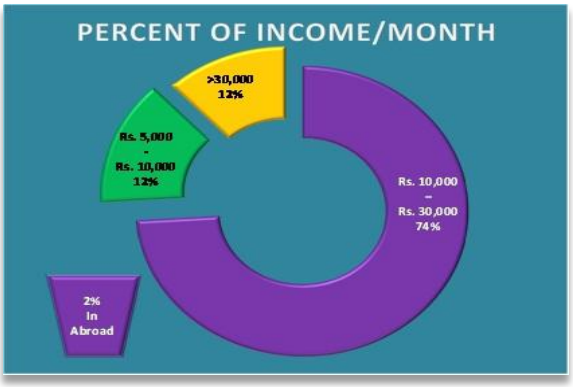
These programmes were organized at the door steps of the unreached segments and about 36,330 participants were benefited.

B. IMPACT OF THE LIFELONG LEARNING PROGRAMMES

The blooming impact of the women trained in the Department of Lifelong Learning and Extension is shown in Figure IV and Figure V

Figure IV
EMPLOYMENT STATUS

FIGURE V
INCOME STATUS



On the whole, greatest percentage (88 per cent) of trainees established their successful business venture at their economic level. Compare to other courses, majority of the Fashion Designing, Herbal Beauty Therapy and Embroidery participants started their own business and even enrollment rate also found to be high in these

courses might be due to the immediate earning potential of these courses. Trainees of Herbal Beauty courses are employed / self employed in Australia, Dubai, Singapore and Malaysia.

CONCLUSION

Lifelong learning is becoming increasingly important in the knowledge based economy, where knowledge and skills need to be continuously updated and upgraded (Abdullah Badawi, 2002). India has recognized the above benefits of lifelong learning programmesand are promoting if as a principal catalyst for economic growth.

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UGC APPROVED JOURNAL

ASSESSING THE KNOWLEDGE ON DIGITAL INDIA TO EMPOWER THE COMMUNITY THROUGH STUDENTS

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ABSTRACT

Digital India act as a Programme to make India for a forth coming knowledge. Hon'ble Shri Narendra Modi, Prime Minster of India has laid importance on National e- governance plan and has provided its approval for Digital India. The progrgramme has remained foreseen by Department of Electronics and Information Technology (DeitY) and it will affect the ministry of communications & IT, rural development, human resource development, health and others. It is benefit to all states and union territories, also recognized that digital India is the outcome of many innovations and technological improvements. It supports to transform the lives of people in numerous ways and develop new progressions in every sector for the next generation. The objectives of the study are: to assess the demographic status of the students and to assess the knowledge of digital India. The data has been collected randomly from the students of Avinashilingam Institute for Home Science and Higher Education for Women Coimbatore, with the help of questionnaire. The total size of the sample is 50 among the students. The Percentage statistical analysis was used. The findings of the study are most of the students have knowledge about digital India which is the flagship of the country and through them they can create awareness in the community since the students are the future for the next generation of the nation which will lead to the great transformation of the country.

KEYWORDS: *Digital India, Empower, Government, Knowledge, Society.*

INTRODUCTION

The digital world that we are living in today is that where every citizen has a cheerful vision to renovate their lives in several ways. It is the result of several inventions and knowledge of technology skill advances. The nation wants to be wholly digitalized that will empower society in an improved manner. The 'Digital India', an inventiveness of honourable Prime Minister Mr. Narendra Modi, will arise improvements in every sector and creates innovative endeavours for the next generation. The concept behind the programme is to build participative, transparent and responsive system. Digital India will carry all services by electronic means and inspire digital literacy. Digital Technologies which comprises the concept of cloud computing and mobile applications has occurred as the catalysts for rapid financial growth and empowerment for the citizen. Digital India –as a program where technological skills and connectivity will organized to make an influencein all aspects. Sundar Pichai, Satya Nadella, and Elon Musk have supported Modi's Digital India. It needs a lot of efforts and commitment from all departments of government as well as private segment. If it is applied properly, it will open numerous new opportunities for the citizens of the country.

The programme comprises of some responsibilities to make sure that government services are available to people and to get new information. Digital libraries, online magazines, e-books can be made accessible for free which will additionally help in knowledge sharing. Social media is reducing social barriers, it connects people on the asset of human values, where- as not identities. The technology is a bridge indeed, which connects the expectation that India's villages will be educated and aware the opportunity to access the internet for information from across the world. 'Digital India' is not just an initiative but it is essential for the country, it seeks to lay prominence on e-governance and convert India into a digitally empowered society.

The Department of Electronics and Information Technology (deitY) anticipates that the program will have an enormous impact on the Ministry of Communication and IT. The program will formulate the country for knowledge - based variation, it is focus on providing high speed internet services to its citizens and make services accessible in real time for both online and mobile platform. Modi's government mainly focused on providing broadband services, tele - medicine and mobile healthcare and tele-health services for more participation in all villages of the country. It is a determined initiative to stimulate a broadband revolution in rural areas. It aims to make network infrastructure accessible on a non-discriminatory basis by placing ascendable optical fibre network. The government had launched a 'Digi Gaon' initiative which will deliver telemedicine, education and skills through digital technology, which satisfy all the goals of Digital India. The beginning of biometrics technology- based on Aadhar card will be the big disruptor in the economic technology section. An 'Aadhar' card has 12-digit individual identification number and The Aadhar-Enabled Payment System (AEPS), allows online interoperable economic inclusion transaction at points of sale (MicroATM) through the commercial communicator of any bank using 'Aadhar' verification.It is also inspiring to see that situations are helpful for the positive formation of a digital ecosystem. A digital banking is a payment platform that allows an individual to make electronic transactions through a smart phone or computers. An individual's bank account can also be linked to a digital wallet through various kindlike Paytm, SBI-Buddy, etc that are predominant these days. Bitcoin is another digital and global money system (currency), which allows people to send or receive money transversely to the world.

Objectives:

- To assess the demographic status of the students and
- To assess the knowledge of digital purposes among the students.

METHODOLOGY:

The study was conducted in Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore city, Tamil Nadu State. A total of 50 student girls were selected randomly and primary data was collected for data collection purpose. Survey method was adopted for collecting the data with the used of the questionnaire. The percentage analysis was used in this study.

RESULTS AND DISCUSSION:

TABLE 1DEMOGRAPHIC STATUS OF THE STUDENTS.

Characteristic		**NO. of respondents**	**Percentage**
Age	15-18 years	13	26
	19-20 years	12	24
	21-26 years	25	50
Gender	Female	50	100
Caste	OBC	12	24
	SC	10	20
	ST	28	56
Religion	Hindu	26	52
	Muslim	12	24
	Christian	12	24
Education	Under graduate	25	50
	Post Graduate	25	50
Marital status	Married	20	40
	Unmarried	30	60
Types of family	Joint	3	6
	Nuclear	47	94
Occupation of the head family	Farmer	5	10
	Labourer	11	22
	Business	19	38
	Teacher	15	30
Annual Income of the family	60000-70000	5	10
	71000- 80000	19	38
	above 81000	26	52
Staying	Hostel	22	44
	Day scholar	28	56

The Table reveals about the demographic status of the students, 26 percent among the students belongs to theage group of15-18 years24 percent are under the age group of 19-20 years whereas 50 percent are under 21-26 years of age. Cent per cent are female since it is a college for women only. Among the student's 24 percent are from the caste of Other Backward caste, followed by 20 percent are from Schedule Tribe and 56 percent are from Schedule caste. Most of the students are found to be in Hindu religion which is 52 percent, whereas 24 percent are in Muslim and

Christian as well (24Percent). The education status of the students are Fifty-fifty percent which is Under graduate and post graduate qualification respectively. 40 percent of the students has been married and 60 percent are unmarried. Majority of the students are living in a nuclear family that is 94 percent and 6 percent lived in joint family. The Occupation of the head of the family is found that 10 percent are working as farmers, 22 percent as labourers, 38 percent doing business whereas 30 percent as teachers. 10 percent of the annual income of the head of the family are in the range of 60000-70000, followed by 38 percent in the range of 71000-80000 and 52 percent are in the range of above 81000. 44 percent of the students are hostellers and 56 percent are day scholars.

TABLE 2 THE PURPOSE OF USING DIGITAL TECHNOLOGIES

Purpose	**Agree**	**P**	**Strongly agree**	**P**	**Disagree**	**P**
Get information quickly	8	16	41	82	1	2
It helps to find out location	5	10	45	90	-	-
Give new ideas to the learner	6	12	44	88	-	-
Submission of work online.	10	20	39	78	1	2
Technology enables learners to learn at their own pace	18	36	32	64	-	-
Online banking	19	38	31	62	-	-
Online Marketing	15	30	35	70	-	-
Online payment	9	18	41	82	-	-
Online shopping	2	4	48	96	-	-
Transferring knowledge and communication	1	2	49	98	-	-
Uploading, editing, and downloading any information	-	-	50	100	-	-
Biometrics	5	10	45	90	-	-

***P=Percentage**

The table above show about the purpose of using digital technologies, 16 percent of the students are agreeing that the purpose of using digital technologies is to get information quickly, 82 per are strongly agree the least 2 percent are disagreeing about it. 10 percent of the students are agreeing that It helps to find out location and 90 are strongly agree. 12 percent among the students are agreeing that it use for Giving new ideas to the learner and 88 percent of the students are strongly agree with the statement. 20 percent of the students agree that it is use for Submission of work through online, whereas 78 percent are strongly agreeing and 2 percent are disagreeing (the reason is that it sometimes have problem in network connection) which is difficult for them to submit online. 36 percent of the students found that they are agree about the statement that the technology enables learners to learn at their own pace and 64 percent are strongly agree about it. 38 percent among the students are agree that digital technologies are used for the purpose of business, services through online banking and 62 percent are strongly agree

about it.30 percent of the students are agree on this statement (Online Marketing)and 70 percent are strongly agree about it, 18 percent are agreeing on the purpose of using digital through Online payment and 82 percent are strongly agree for the statement, 4 percent of the students are agreeing that the digital technologies can be used as a purpose of Online shopping and 96 percent are strongly agree about the statement, 98 percent are found that the students are strongly agree that the digital technologies used forTransferring knowledge and communication whereas the least 2 percent are agreeing for the given statement and Cent percent of the respondents are strongly agree that the digital technologies are using for the purpose of Uploading, editing, and downloading any information which is needed for the learners. 10 percent are agreeing that it is used for the purpose of biometric techniques and 90 percent are strongly agree about this statement.

TABLE 3. TYPES OF GENERATION NETWORK

Network Type	No. of Respondents	*Percentage
Wi-Fi	48	96
2G	2	4
3G	16	32
4G	32	64

*Multiple response

The table shows that 96 percent among the students are using Wi-Fi connectivity within the college campus, followed by 4 percent 2G connectivity, whereas 32 percent 3G and 64 percent are used 4G connectivity which is very essential nowadays for the students to have an internet connection in high speed connectivity.

CONCLUSION:

It was found from the study that majority of the students have knowledge about digital India which is the leading of the country and through them they can provide information in the community since the students are the future for the next generation of the nation which will lead to the great transformation of the country.Digital technologieshelp to connect the internet infrastructure in rural areas for delivery of services digitally.The students have knowledge on technologies like how to apply the knowledge on digital payment and digital purposes. The nation wishes to be fully digitalized to provide equal benefits to the user and service provider. Hence, an effort has been made in this paper to understand Digital India –where technologies and connectivity will come together to make an impact on all aspects of governance and the quality of life of the citizens for the development of the community as a whole through students so that they can create awareness to others.

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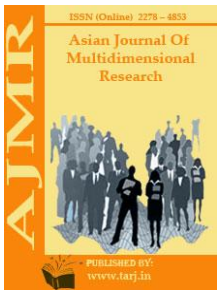

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

ASSESSING THE LEADERSHIP QUALITY AMONG STUDENTS

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ABSTRACT

Leadership definition captures the essentials of being able to inspire others and being prepared to do so. Effective leadership is based upon ideas, but won't happen unless those ideas can be communicated to others in a way that engages them enough to act as the leader wants them to act. The objective of the study: measure the leadership quality of the women. The methodology of the study: The study has taken at Avinashilingam Institute for home science and higher education for women, Coimbatore, Tamil Nadu. Sample of the study was 40 girl students. Primary data was collected through questionnaire. Secondary data was collected from the websit, article, newspaper ,journal etc. Findings of the study: Forty percent of the student age 16 to 17 years. Forty four percent student belongs to MOBC category. Types of family 52 percent girls from nuclear family and 44 percent students family size small family. Annual income of the students family, forty percent girl students family income below 1,00,000 Rs. Fifty percent of the student agree that they are problem solver. Sixty percent of the students revel that they are good speaker ,whereas seventy percent student said that they are hard worker. Cent percent of the student agree that they are helpful and loyal. All the students like to communicate with others. Eighty percent of the respondent make their decision input with others.

KEYWORDS: *Leadership, qualities, self-assessment.*

INTRODUCTION:

Youth is an important time for leadership growth. Increasing leadership in adolescence can reinforce self-esteem and be a catalyst for flourishing adulthood. Yet many adolescents are never offered the chance to act as leaders, and adult leadership models are often inappropriate for teens that have unique developmental needs .Youth leadership: a guide to understanding leadership development in adolescents. San Francisco, CA: Jossey-Bass.

Every individual may get an opportunity to be a leader at some point of time in his life span in some specific situations. However, he may not be an effective leader. Effective leadership requires special skills and qualities. Question as to whether leaders are made or born has intrigued thinkers for centuries. Do the leadership qualities develop after a person becomes leader or do they have qualities which make them a leader? Many thinkers say that good leaders are made, not born. If you have the desire and willpower, you can become an effective leader. Good leaders develop through a never ending process of self-study, education, training, and experience (Jago, 1982).

Gardner (1987) stated that school administrators at the federal, state, and city levels should adopt bold measures to address the leadership crisis by incorporating leadership skills development into classroom instructions. However, in order to address the leadership crisis, leadership in its historical context should first be defined.

Objective:

The present study was undertaken with the following objective.

- Study the leadership qualities of the girl students.

METHODOLOGY:

The study has taken atAvinashilingam Institute for home science and higher education for women, Coimbatore,Tamil Nadu.Sample of the study was 50girlsstudents. A questionnaire is a sheet of paper containing questions relating to contain specific aspect, regarding which the researcher collects the data. Because of their flexibility the questionnaire methods is by far the most common instrument to collect primary data. The questionnaire is given to the respondent to be filled up. Primary data has collect through questionnaire.Secondary data was collected from the website,article,newspaper, journal etc.The collected data was consolidated analyzed, tabulated, interpreted and presented.

RESULT AND DISCISSION

i) Socio economic background of the student

Table No I indicate the socio economic background of the student

TABLE NO I
SOCIO ECONOMIC BACKGROUND

Characteristics		**N(50)**	
		Frequency	**Percentage**
Age	i)Below 15 year	10	20
	ii)16-17 year	20	40
	iii)18-19 year	10	20
	iv)above 20 year	10	20
Category	i)OC	10	20
	ii)MOBC	22	44
	iii)ST	8	16
	iv)SC	10	20
Types of family	i)Nuclear	24	48
	ii)Joint	26	52
Family Size	i)Up to 2 [Small]	22	44
	ii)3 to 4[Medium]	18	36
	iii)Above 4[large]	10	20
Income(Annually)	Below 1,00,000	20	40
	1,00,000 to 5,00,000	10	20
	5,00,000 to 10,00,000	10	20
	Above 10,00,000	10	20

The table shows that socio economic background of the students.Forty percent of the students age between 16 to 17 years.Forty four percent students belongs to MOBC category.Types of family 52 percent students from nuclear family and 44 percent students family size small family.Annual income of the girls family forty percent students family income below 1,00,000 Rs per year.

II) QUALITIES OF THE STUDENTS

Table II explain the qualities of the student

TABLE NO II
QUALITIES OF THE STUDENT

Statement	Agree	Strongly agree	Neutral
I am a good delegator	30	20	50
I am problem solver	50	20	30
I am Good speaker	60	35	5
I am intelligent	70	20	10
I am hard worker	90	10	0
I am helpful	100	0	0
I am loyal	100	0	0
I am visionary	80	10	20
I am a good learner	90	10	0
I know how to influence people and get support	80	5	15

*Multiple responses

The study showsthat fiftypercent of the students neutral that they are good delegator ,whereas Fifty percent of the student agree that they are problem solver.Sixty percent of the students revel that they are good speaker ,whereas seventy percent student said that they are hard worker. Centpercent of the student agree that they are helpful and loyal.Eighty percent of the student are visionary and ninetypercent of the student are good learner and Eighty percent of the student agree that they know how to influence people and get support.

III) SELF ASSESSMENT

Self-assessment of the student is presented at Table No III

TABLE NO III SELF ASSESSMENT

Statement	Agree	Strongly agree	Neutral
I attend class regularly	100	0	0
I like to communicate with others	100	0	0
I make a decisions with input from others	80	10	10
My action are consistent	70	20	10
I keep focus through follow up	62	18	20
I have a confident	100	0	0
I have the power network and engage with others	80	20	0
I can take decision in any certain situation	0	100	0

I am punctual	10	90	0
I respect my teacher	0	100	0
I take permission from any teacher and older authority before conducting any task	0	80	20
I respect non-teacher stuff	0	100	0
I respect my college property and protect it	20	80	0
I have positive attitude towards college	30	70	0
I am enjoying every task including studying,helping other student,extracurriculamactivities,visits made.	40	60	0
I appreciate others and helps them to improve	30	70	0
I am honest and fair	50	50	0

*Multiple responses

The above table shows that self-assessment of the students.All the students attend their class regularly. All the students like to communicate with others.Eighty percent of the respondent make their decision input with others.Seventy percent of the respondent revel that their action is consistent.Sixty two percent of the girls they keep focus with their follow up. Centpercent girls have confident.Eighty percentrespondent have power to network and engage with others. Centpercent student strongly agree that they have power to take decision at any certain situation.Ninety percent of respondent strongly agree that they are punctual. Cent percent girls respect their teacher.Eighty percent of the girls strongly agree that they take permission before going to do any task.All girls are respecting all the non-teaching stuff also.Eighty percent of the respondent strongly they respect all the college property and protect it.Seventy percent of the respondent have positive attitude towards college.Sixty percent of the girls strongly agree that they enjoying every task including studying,helping other student, extra curriculumactivities, visits made and seventy percent of the respondent strongly agree that they appreciate others and help them to improve.Fifty percent of the respondent strongly agree that they are honest and fair.

IV) SKILL MANAGEMENT

Table NO IV Shown the skill management of the student

TABLE NO IV SKILL MANAGEMENT

Statement	**Agree**	**Strongly agree**	**Neutral**
I have communication skill	100	0	0
I have social awareness skill	60	40	0
I have Emotional management skill	20	30	50
I have self-awareness skill	20	20	60

I have Decision making skill	30	30	40
I have problem solving skill	30	50	20

*Multiple responses

The table shows that skill management of the girl students Cent percent of the girls agree that they have communication skill,whereas Sixty percent of the respondent have social awareness skill,sixty percent of the girls neutral about self-awareness skill,Forty percent of the girls neutral that they have decision making skill and Fifty percent of the girls have problem solving skill.

CONCLUSION:

Youth development is a process that prepares a young person to meet the challenges of adolescence and adulthood and achieve his or her full potential. Youth development is promoted through activities and experiences that help youth develop social, ethical, emotional, physical, and cognitive competencies. Leaders know the way,shows the way and goes the way.Through developing youth leaders we can empower our rural India.Students have good leadership qualities as well as good skill.

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ASSESSING THE STATUS OF KNOWLEDGE ON TELEMEDICINE AMONG STUDENTS

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ABSTRACT

Telemedicine has been used to stunned distance barriers and to improve access to medical services that would often not be reliably available in distant rural communities. Though there were distant signs to telemedicine, it is essentially a product of 21th century telecommunication and information technologies. These technologies permit communications between patient and medical staff with both convenience and conformity, as well as the transmission of medical, imaging and health informatics data from one site to another. Telemedicine is a kind of health services which delivered to the people even in the remote area at their doorways to get consultancy and medical assistance of high-quality Skype via or video conferencing, mobile across the country. The objective of the study is to assess the demographic profile and knowledge status of telemedicine among the student. There are 50 undergraduate and post graduate student has been taken as a sample of the study. The area of the study was Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore distract in Tamil Nadu. The interview schedule has been used for the collected data from the students. The outcome of the study that maximum students are belonging from medium family and which are unmarried and they have poor knowledge about telemedicine and e- health services.

KEYWORDS: *Telemedicine, Students, E- Health*

INTRODUCTION

India has a mixed health-care system, inclusive of public and private health-care service providers. It has been used to overcome distance walls and to improve access to medical services which may not be consistently available in distant all communities.ICT has also simplified telemedicine by which patients can also be observed, investigated, monitored, and can be treated. Tele-health is the use of electronic information and telecommunications technologies to support long-distance clinical healthcare, patient and professional health-related education and training, community health and health administration. The use of innovative technology to deliver healthcare at a distance has the potential to be one of the defining medical revolutions of the 21st century. In India, it has been observed that there is a great deal of gap in quality and access to healthcare between urban and rural regions. This healthcare split needs to be bridged since most of the Indian population live in rural areas. Telemedicine is emerging Information and Communication enabled health technology which has the potential to facilitate access to healthcare in underprivileged population if absorbed into existing healthcare delivery system. The scale of e-health services in India has been very small so far considering its size, mostly limited to medical record, health awareness through portals, telemedicine, hospital management system and customer service using the internet. Here the present study has been undertaken with the following objective: are to

- Assess the demographic profile of the students
- Assessing the status of knowledge on telemedicine

METHODOLOGY:

The area of the study was selected in Avinashilingam institute for home science and higher education for women, Coimbatore district in Tamil Nadu. There are 50 under graduate and post graduate student has been taken as a sample of the study. Primary data has been collected through interview schedule. Results have been interpreted with the use of percentage analysis.

RESULT AND DISCUSSION

Demographic profile of the students

Characteristics		No. respondent	Percentage
Age	18-23 years	20	40
	23-28 years	22	44
	33-38 years	7	14
	38 Above	1	2
Gender	Female	50	100
Caste	OBC	25	50
	SC	5	10
	ST	20	40
Religion	Hindu	30	60
	Muslim	5	10
	Christian	15	30
Personal occupation	Undergraduate	20	40
	Post graduate	30	60
Marital Status	Married	10	20
	Unmarried	38	76

	Widow	2	4
Types of family	Joint	10	20
	Nuclear	40	80
Family size	Up to 3 {small}	10	20
	4 to 5{medium}	35	70
	Above 5 {large}	15	30
Occupation head of the family	Unemployment	1	2
	Teacher	9	18
	Agriculture	11	22
	Business	7	14
	Government job	10	20
	Coolies	5	10
	Private job	4	8
	Working daily base	3	6
Annual income of head of the family	<20,000	5	10
	20,000-30,000	25	50
	30.000-40,000	12	24
	Above 40.000	8	16

The data indicated that forty four per cent of the students under the age group 23-28 years followed by two per cent are above 38. Fifty per cent of them belongto OBC categories whereas ten per cent are SC. Majority of the students are from Hindu religion and ten per cent are from Muslim religion .Out of total students sixty per cent are appearing post graduate and whereas forty per cent are undergraduate. In the base of marital status seventy six percent are unmarried and for per cent of them widow. Eighty per cent of them from nuclear family and only twenty per cent are from joint family. Fifty per cent of the students annual income range head of the family are between Rs. 20,000 to 30,000 and six per cent of them below 20,000.

Knowledge on Telemedicine

Knowledge	A	P	SA	P	D	P	N	P
Telemedicine as using satellite technology and video-conferencing kit to conduct a real-time consultation between medical specialists in two or more different location	30	60	5	10	-	-	20	40
It is an reserve and precarious care situations where moving a patient may be undesirable and/or not feasible	40	80	-	-	-	-	10	20
Telemedicine eradicate distance barriers and improve access to quality health services	33	66	5	10	2	4	10	20
Increased Patient Engagement	20	40	7	14	3	6	20	40
Extended Specialist and Referring Physician	40	80	-	-	-	-	10	20

Access								
More Convenient and Accessible Patient Care	15	30	5	10	7	14	23	46
Telemedicine reduce unnecessary travel time for health professionals	28	54	2	4	7	14	13	26
Reduce inaccessibility of rural practice by upgrading their knowledge through tele education	10	20	-	-	8	16	32	64
Telemedicine is rapidly developing application of clinical medical	20	40	5	10	-	-	25	50
Creation of medical home network administration by primary care physician	15	30	2	4	-	-	33	66
Linked to specialist, hospital and information centres by a satellite base telemedicine network between patient and doctor	25	50	5	10	-	-	20	40
It is a Patient centre approach to health care	30	60-	-	-	-	-	20	40
A story to improve access to quickly health care at lowest price	35	70	-	-	10	20	5	10

A=Agree, SA=Strongly Agree, D=Disagree, SD= Strongly Disagree, N= Neutral

The data reveal the knowledge about telemedicine among the students sixty per cent are agree that telemedicine as using satellite technology and video-conferencing equipment to conduct a real-time consultation between medical specialists in two or more different location whereas forty per cent are neutral. Sixty six per cent of them are agree that telemedicine eliminate distance barriers and improve access to quality health services and four per cent of them are not agree with this. Sixty four per cent are neutral about that telemedicine reduce isolation of rural practice by upgrading their knowledge through tele-education. Telemedicinelinked to specialist, hospital and information centres by a satellite base telemedicine network between patient and doctor there are fifty per cent of students are agree with this whereas ten per cent are strongly agree. Seventy per cent of them are agree that telemedicine a story to improve access to quickly health care at lowest price and ten per cent are neutral about it.

Attitude towards different types of telemedicine

Types	R	P	MR	P	NR	P
Store and forward telemedicine(Asynchronous)	30	60	15	30	5	10
Remote patient monitoring	35	70	5	10	10	20
Real time telemedicine	30	60	20	40	-	-

R= Relevant, MR= More Relevant, NR= Non relevant, P= Percentage

The data represent the attitude towards different types of telemedicine among students sixty per cent of them are opined that Store and forward telemedicineand Real time telemedicine are

relevant. Ten per cent are opined that store and forward telemedicine are non-relevant whereas forty per are opined that real time telemedicine are more relevant.

Advantages of Telemedicine services

Advantages	A	P	SA	P	D	P	N	P
It is tool for a medical home network to improve care in medically underserved rural and frontier areas.	30	60	-	-	-	-	20	40
A reduction in unnecessary duplication of services	15	30	5	10	2	4	3	6
It saves lives in the emergency situations, while there is no time to take the patient at a hospital	10	20	-	-	-	-	40	80
Telemedicine can play anvital role to provide healthcare facilities to the victims of natural disasters such as earthquake, tsunami, flood.	5	10	-	-	-	-	45	90
Telemedicine technology provide home health care for elderly or underserved, homebound patients with chronic illness	30	60	5	10	-	-	15	30
It is offer an excellent opportunity to improve health care delivery in rural as well as urban areaquickly	15	30	-	-	-	-	35	70
Eliminate gaps in coverage	20	40	3	6	7	14	20	40
Treat health problem more quickly	10	20	-	-	15	30	25	50
Telemedicine eliminates the possibility of transmitting infectious diseases between patients and healthcare professionals	50	100	-	-	-	-	-	-
Reduce waiting list and speed up specialist	20	40	5	10	15	30	10	20
Physician may not personally visit a person in home, they can easily monitor and assist many residing in remote side simultaneously telemedicine	20	40	-	-	5	10	25	50
It is an essential tool in real-time monitoring of diseases, locally and globally	20	40	-	-	8	16	22	44

A=Agree, SA=Strongly Agree, D=Disagree, SD= Strongly Disagree, N= Neutral, P= percentage

The data indicate that attitude towards the advantages of telemedicine, Cent per cent of students agree with that telemedicineeliminates the possibility of transmitting infectious diseases between patients and healthcare professionals whereas six per cent of them are strongly agree that telemedicine eliminate gaps in coverage. Thirty per cent of them are disagreeing that it treat health problem more quickly and whereas fifty per cent are neutral about it. Majority of student

are neutral with that telemedicine can play an important role to provide healthcare facilities to the victims of natural disasters such as earthquake, tsunami, flood whereas ten per cent are agree with this.

CONCLUSION

Telemedicine is emerging as a critical component of the healthcare crisis solution. It holds the promise to significantly impact some of the most challenging problems of our current healthcare system such as access to care, cost effective delivery, and circulationof limited providers. Telemedicine can change the current paradigm of care and allow for improved access and improved health outcomes in cost effective ways. For successful and spreading knowledge on telemedicine UGC, government and non-government organization should create telemedicine awareness programme because majority of student they are neutral about advantage of telemedicine because they do not have clear knowledge about it.

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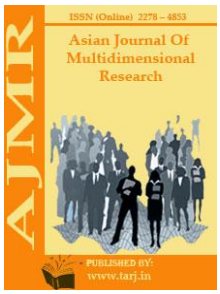

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UGC APPROVED JOURNAL

CLIMBING AHEAD: EMPOWERING RURAL WOMEN THROUGH ECONOMIC DEVELOPMENT PROGRAMMES

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ABSTRACT

India is a complex society where the status of women is not homogeneous. As per 2011 census in Tamil Nadu, the total SC population is 14,438,445 where SC women constitute 7,233,758 of the population. Tamil Nadu stands fifth among the states having the large population of SC women in the country. But the SC community people are the most disadvantaged and discriminated group in the society. For the well being of these communities the Government of Tamil Nadu has taken several steps in framing and implementing various welfare schemes. The study brings out the awareness level of SC women towards the employment related schemes of the Tamil Nadu Government. It was disheartening to find the percentile distribution of SC women who had the awareness about Entrepreneurship Awareness Programme with the distribution of 36 percent of SC women at Karur district and 45 percent of SC women at Perambalur district. Only 55 percent of the respondents knew about the employment schemes in Karur district and 56 percent in Perambalur district respectively. The reasons expressed for not utilizing the schemes were lack of education, lack of awareness about the scheme, lack of communication between the officials and the women, non-availability of bus service to Block Development Office (BDO), less payment to women workers by NREGS and politician's favouritism in allotting the schemes. A council for convergence of services ought to be implemented if SC women are to be active participants in the process with service providers.

INTRODUCTION

India is a complex society where the status of women is not homogeneous. As per 2011 census in Tamil Nadu, the total SC population is 14,438,445 where SC women constitute 7,233,758 of the population. Tamil Nadu stands fifth among the states having the large population of SC women in the country. In reality there is a wide gap between SCs and the rest of the population with respect to the availability of basic civic amenities such as electricity, banking services, pucca houses, water supply, toilet facilities, and drainage and telephone facilities. Women are the focal population of any community, but women are oppressed to be the most exploited section of the country also.For the well being of these communities the Government of Tamil Nadu has taken several steps in framing and implementing various welfare schemes.

The Government felt instead of giving subsidies, providing the poor unskilled SC families with income earning skill was given importance. As a preliminary initiation, this study could serve as a path pointer to bring out the realities into limelight and remedies to be taken to achieve the desired results. The study brings out the truth if the socially disadvantaged group of scheduled caste have received special focus for their economic advancement towards the employment related schemes of the Tamil Nadu Government.

METHODOLOGY:

Thestudy was confined to two districts namely Karur and Perambalur selected from the state Tamil Nadu. Karur district comprise eight blocks. They are Krishnarayapuram, Kulithalai, Karur, Thogaimalai, Kadavur, Aravakurichi, K. Paramathy and Thanthoni.Perambalur district comprise four blocks namely Perambalur, Veppanthatai, Veppur and Alathur. The respondents were 400 SC women from Karur and 400 SC women from Perambalur districts respectively.

Work related information's about the selected SC women

a. Economic development programmes

Awareness about the economic development programmes, beneficiaries on each training centres at each blockwise and district wise comparison of the beneficiaries in each schemes are discussed here.

i. Awareness about the Economic Development Programme (EDP)

It is disheartening to find the percentile distribution of the SC women who had the awareness about EDP with the distribution of 36 percent of SC women at Karur district and 45 percent of SC women at Perambalur district. This result was treated statistically and the chi square value of 6.342 shows that there is a significant difference at 5 percent level ($p<0.05$) in the awareness about EDP between the respondents of Karur and Perambalur.

RESULTS AND DISCUSSION

TABLE I

AWARENESS ABOUT THE ECONOMIC DEVELOPMENT PROGRAMME

Districts / Blocks	*Economic development programme*			
Karur (n=145)	*Yes*	*Percentage*	*No*	*Percentage*
Blocks				

Krishnarayapuram	18	24	56	76
Kulithalai	18	44	23	56
Karur	5	11	42	89
Thogaimalai	25	58	18	42
Kadavur	14	33	28	67
Aravakurichi	13	34	25	66
K.Paramathy	24	41	34	59
Thanthoni	28	49	29	51
Total	**145**	**36**	**255**	**64**
Perambalur(n=181)				
Blocks				
Perambalur	51	59	35	41
Veppanthatai	30	29	75	71
Veppur	58	45	70	55
Alathur	42	52	39	48
Total	**181**	**45**	**219**	**55**

From the tableit is found that 58 percent of the respondents in Thogaimalai block, 49 percent of them in Thanthoni, 44percent of the respondents in Kulithalai reported that they had the awareness about the economic development programme. In Perambalur block 59 percent of the respondents got the awareness about the EDP. Fifty two percent in Alathur, 45 percent of the respondents in Veppur and 29 percent of the respondents in Veppanthatai had the awareness about the economic development programme.

ii. Beneficiaries at each training centre blockwise

There are four training schemes / centre (one each) in all the blocks of Karur and Perambalur district, for which the percentile distribution is shown in Table II.

TABLE II
ECONOMIC DEVELOPMENT PROGRAMME BLOCK WISE

Districts / blocks	***Economic development programmes***			
Karur (n=145)	***1***	***2***	***3***	***4***
Blocks				
Krishnarayapuram	1	-	1	-
Kulithalai	2	-	-	-
Karur	1	-	1	-

Thogaimalai	-	-	-	-
Kadavur	-	-	-	-
Aravakurichi	-	-	-	1
K.Paramathy	-	1	1	-
Thanthoni	1	1	1	-
Perambalur (n=181)				
Blocks				
Perambalur	5	2	11	8
Veppanthatai	6	1	7	1
Veppur	3	-	8	-
Alathur	-	-	-	-

1. ***Cottage industries training centers***
2. ***All India civil services examination training centre***
3. ***Special coaching for recruitment of AdiDravidar persons***
4. ***Supply of tools and appliances to technically trained persons***

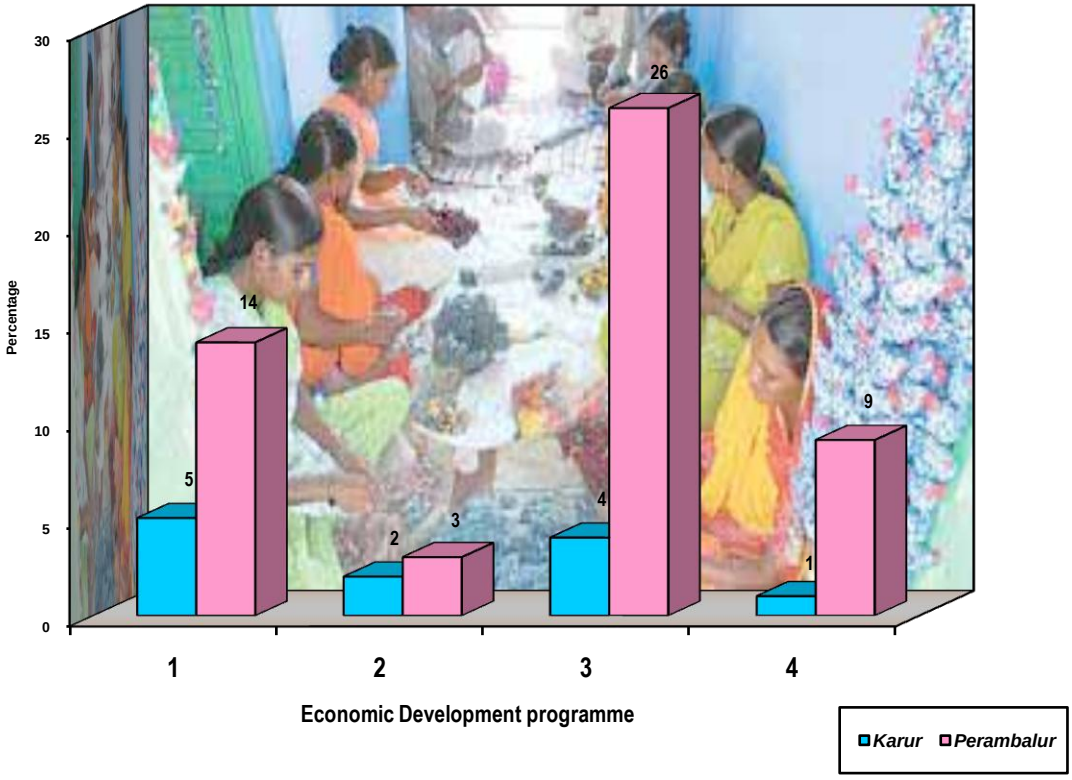
Only two percent of the respondents in Kulithalai, one percent of the respondents in Krishnarayapuram, Karur and Thanthoni blocks had training in cottage industries training centers. One percent in both K.Paramathy and Thanthoni blocksutilized the All India civil service examination training centre to prepare them for the Government service. The other two schemes like special coaching for recruitment of AdiDravidar persons and supply of tools and application to technically trained persons also there were less number of beneficiaries.

In Perambalur district, six percent of the selected SC women in Veppanthatai, five percent in Perambalurand three percent in Veppur had benefitted from cottage industries centre. Eleven percent of the respondents in Perambalur, eight percent of them in Veppur and seven percent of the respondents in Veppanthatai were benefitted from the scheme of the special coaching for recruitment of AdiDravidar persons. Eight percent in Perambalur block availed the supply of tools and appliances to technically trained persons. Thus the result shows that only very few percentage of the respondents utilized the scheme of the economic development programme.

iii.Beneficiaries at each training centre districtwise

The beneficiaries of the economic development programme districtwise are shown below in Figure 1. It is evident that five and 14 percent of the selected SC women in Karur and Perambalur districts respectively were benefitted from the cottage training centers. Students did not utilize the Indian civil service examination training centre,but only little percentage of them got benefitted from the training centres. Twenty six percentage students of SC community from Perambalur utilized the special coaching for recruitment of Adidravidar persons. Nine percent of the selected SC women in Perambalur stated that their children received the tools and appliances supplied to technically trained persons.

ECONOMIC DEVELOPMENT PROGRAMME DISTRICT WISE



1. ***Cottage industries training centers***
2. ***All India civil services examination training centre***
3. ***Special coaching for recruitment of AdiDravidar persons***
4. ***Supply of tools and appliances to technically trained persons***

FIGURE 1

TABLE III
CHI SQUARE TEST TO FIND THE SIGNIFICANCE IN DIFFERENCE WHILE COMPARING THE ECONOMIC DEVELOPMENT PROGRAMME

Programs benefited	Groups	District				Total		Chi-Square	Df	Sig.
		Karur		Perambalur		No.	%			
Cottage industries training centres	Not Benefited	138	95.2	155	85.6	293	89.9	**7.034**	**1**	**
	Benefited	7	4.8	26	14.4	33	10.1			
All India Civil	Not Benefited	142	97.9	175	96.7	317	97.2	**.117**	**1**	**Ns**

Services Examination Training Centre	Benefited	3	2.1	6	3.3	9	2.8			
Special Coaching for recruitment of AdiDravidar persons	Not Benefited	140	96.6	135	74.6	275	84.4	**27.794**	**1**	**
	Benefited	5	3.4	46	25.4	51	15.6			
Supply of Tools & Appliances to technically trained persons	Not Benefited	143	98.6	164	90.6	307	94.2	**8.015**	**1**	**
	Benefited	2	1.4	17	9.4	19	5.8			

Ns – Not significant *–Significant at 5% level **–Significant at 1% level

Among the economic development programmes the percent beneficiaries significantly differed between Karur and Perambalur districts at one percent level for the programmes namely cottage industries training centres (χ^2=7.034, p<.01) special coaching for recruitment of AdiDravidar persons programme (χ^2= 27.794, p<.01) and supply of tools and appliances to technically trained person's programme (χ^2=8.015, p<0.01).

CONCLUSION:

Mere functioning of these welfare schemes are not an end but means of development. For the effectiveness of these schemes it is important that these schemes emerge as sustainable units. So, for sustainability components are concerned, they include capacity building programme through awareness generation, training programmes and making the SC women to involve in income generating activities under the Economic Development Programs. So the sustainability of these welfare schemes largely depends on the above components. If their capacity is built, the SC women respondents will become real change agents and instruments of sustainable development. Now they are only in a stepping stone but the successful accessibility and utilization of these schemes will enable them to progress in their life style and empowerment characteristics.

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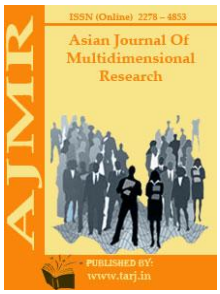

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

DOMESTIC VIOLENCE, POWERLESSNESS OF WOMEN AND ACCESS TO HEALTH CARE: A STUDY ON FISHERFOLK WOMEN IN KERALA, INDIA

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ABSTRACT

Domestic violence has been now seen as a public health issue in the world. Its closely related with social development of a region and consequent equality of sexes and gender norms. Women's education has been the central component of Kerala model of development. It has been highly admired by the proponents for its attainment of substantially higher level of human development indicators with below-normal level of state domestic product. Almost all social groups in the State benefited out of the progressive policies of the State. However, dalits & fisherfolk households represent the unrepresented/ underrepresented in the development story of the Kerala model of development. Macro and quantitative indicators fail to adequately portray the real disempowerment of women in the State where measures like gross enrolment ratio and literacy rate tell a different story. This is exactly the paradox the study is trying to unfold in a detailed manner. The fishing sector is an important source of livelihood for women.

KEYWORDS: *Domestic violence, Powerlessness, helath care access, fisherfolk women*

INTRODUCTION:

The fisher women in Kerala play an important role in the fisheries sector in terms of their involvement in fishery related activities such as fish vending, fish drying, prawn peeling, sorting, grading, fish packing, and net making. Kerala is one of the states having the highest quality of life in the country. Fishing community always has a number of unattended problems with them. They form a different segment from the general population. Apart from the differences in the income levels, quality of life, level of education, culture, and life styles, they are apart from the general population. One of the major problems faced by the fisher folk is related to their health and the expenditure incurring behalf of it. This constitutes one of the major components of the vicious cycle of poverty among them (Pandey, 2009)

The women living in the coastal areas are mostly illiterate and less aware of the health and nutritional status of life. Imparting nutrition education has an essentiality in their life to improve the health status of fisher women. Women face various barriers in visiting a health centre to seek maternal and reproductive health care. This include cost of care, access to clinics, cultural factors, quality of care, and a lack of health awareness and use of any type of family planning. Physical access is an important barrier as longer distances entail higher transportation and opportunity costs. Distance to health services applies a dual influence as it is a burden in seeking care in the first place, and also an actual problem in reaching the care centre after a choice has been made to avail it. The adverse effect of distance is stronger when combined with lack of transport, poor roads, and poor quality of health care (Gangadharan, 2015). Taking in to consideration of the above said facts, the present study was designed to understand the status of fisher folk women with the objective of analysing the extend of powerlessness, domestic violence and access to health care needs .

Objectives of the study

Following objectives were put forward for the present study:

- To analyse the socio-economic status of the fisher folk women in the coastal areas of Thiruvananthapuram.
- To understand the major health problems faced by the women in the coastal areas.
- To analyse the extend of domestic violence faced by the fisher folk women, and
- To findout the level of freedom in decision making enjoyed by the samples.

METHODOLOGY:

Thiruvanathapuram District is the southernmost district of the coastal state of Kerala, in South India. The district has an area of 2,192 square kilometres and a population of 3,307,284. Fisher folk in Kerala come from three different religions group the Hindu, Muslims and the Christian's. For the present study, four coastal areas of the district, Thumba, Anjuthengu and Poovar and Vizhinjam were purposively selected, owing to the feasibility of the investigator. One hundred married fisher women in the age group of 18-60 years were selected from the coastal areas through convenience sampling method.

A well structured interview schedule was prepared to find out the socio economic background of the samples. It consists of age, place, religion, family income, type of house and family income, accessibility to health care and details regarding the decision making power of the samples.

A domestic violence assessment scale was prepared by the investigator to understand the

prevalence of domestic violence among the samples selected for the study. It consists of 25 statements. The responses of the samples were made on a 4 point scale. The 4 point were 'Sometimes', 'Often' 'Always' and 'Never' and were given a scoring of '4' '3' '2' and '1' respectively for a positive statement and vice versa for a negative statement. The total scores that a sample can obtain if she answers all the statements positively is 100 and minimum score is 25.

Both primary and secondary data were collected for the present study. Primary data were collected by personally approaching the selected samples and Secondary data were collected from extensive review of the related literature. The collected data were statistically analysed and interpreted using appropriate statistical tools.

RESULT AND DISCUSSION

1. Socio economic status: Thirty six percent of the respondents belong to the age group of above 50years of age. Twenty three percent of the respondents belong to the age group of 30-40 years. Twenty two percent of the respondents belong to the age group of 40-50 years and remaining nineteen percentage of the respondents belonged to the age group of 20-30 years. Majority of eighty nine percent of the samples were Christians. It was found that forty three percent of the respondents belong to above Rs 5000 income group. While analyzing the age at marriage, ninety two percent of the samples belong to the age group 15-20 yrs of age.

It was shocking to note that, being a State having higher level of literacy rates, twenty nine percent of the respondents were illiterate, sixty percent attained primary education, Only eleven percent of the respondents had higher education, ie up to class X. Selling of fish and making of dry fishes were the major activity and income generation option of the respondents.

TABLE NO:1 CHRONIC ILLNESSES OF THE RESPONDENTS

Sl.no	Category	Percentage	Ranking
1.	Diabetes	53	1
2	Hyper tension	33	3
3	Reproductive tract infections	52	2
4.	Allergy and related issues	12	4
5.	Gynecological problems	4	5

The study revealed the fact that majority of the respondents suffer from diabetes, hypertension, reproductive tract infections, allergy and gynecological problems. It was found that majority of fifty two percent of the respondents, have one or another problem related to their reproductive health. About twenty nine percent of the respondents have the problem of irregular menstrual cycle. Remaining thirteen percent of the respondents have the problem of urinary infection, which occurs very frequently. Nine percent of them reported that they experience itching and smelly white discharge on many days in a month.

2. Decision making power in the family:

Regarding the decision making capacity of the respondents, the results obtained were

disheartening. It was reported that only nineteen percent of them have equal freedom and participation in the decision making activities in their family. Majority of seventy four percent reported that they were not even asked about any opinion on household matters, childrens education or marriage and related future aspects.

TABLE NO:2 DECISION MAKING POWER OF THE RESPONDENTS

Sl.no	Category	Percentage n=100
1	Taking decision alone	7
2	Full and equal participation in all matters	19
3	Never asks for opinion on any matters	74
	Total	100

- **Extend of Domestic Violence faced by the respondents:**

TABLE NO:3 DISTRIBUTION OF THE SAMPLES BASED ON THE PREVALENCE OF DOMESTIC VIOLENCE

Prevalence of Domestic violence	Percentage (%) (n=100)
Low	23
Medium	10
High	67

Though the prevalence of domestic violence was high among the fisher folk women, respondents were afraid to open up about the issue. It was clearly understood during data collection sixty seven percent reported high extend of domestic violence, but the severity is high. About ten percent reported that they were suffering from medium level of domestic violence, and twenty three percent reported it as very low. It was also found that while comparing the variables with the extend of violence among the respondents, it was found that there exist significant differences between the place of residence, early age of marriage, income and type of family, where as variables like religion, occupation of the spouse, type of house, educational qualifications doesnot reflected to have any significant relationship with domestic violence.

4. Access to health care:

Study revealed that ninety percent of the respondents do not prefer to go hospitals or doctors for any ailments or difficulties. They maily seek the assistance of the medical practitioners, onlywhen they feel like it is disturbing or creating difficulty to their routine chores, and this is mainly due to lack of easy accesibility. Eighty three percent of the respondents depends on the primary health care for treatments. Many do not go to hospitals if they are been referred to any referral centres or private hospitals It was also noted that the respondents do not give any preference for any particular system of medicine; rather they focus on price of the medicines. Many (58%) have the habit of getting medicines from medical stores without prescriptions.

CONCLUSION:

Women's education has been the central component of Kerala model of development. It has been highly admired by the proponents for its attainment of substantially higher level of human development indicators with below-normal level of state domestic product. Almost all social groups in the State benefited out of the progressive policies of the State. However, the present study clearly reveals that the fisher folk households represent the unrepresented/ under-represented group of people in the development story of the Kerala model of development. Macro and quantitative indicators fail to adequately portray the real disempowerment of fisher folk women in the State where measures like domestic violence, freedom of expression and the literacy rates tell a different story. Domestic violence, in its different form, affects the health status of the women in multiple ways as well. Hence serious interventions to safeguard the health, and status of women in the coastal areas of Kerala needs special attention.

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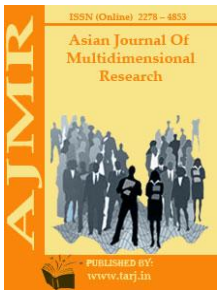

Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

A STUDY ON CREATIVE PROCESS OF SOCIAL ENTREPRENEURS IN COIMBATORE

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ABSTRACT

Social entrepreneurship is a growing phenomenon that bring about positive changes to areas relating to social issues ranging from education to healthcare, renewable energy, e-learning, e-business, water and sanitation, etc. the sole component of social entrepreneurship is to introduce sustainable and dignified living for the marginalized sections of the society. Well- being of the society through eradication of social problems and bringing up alternative solutions through innovative ideas are the key roles played by a social entrepreneur. Social entrepreneurship provides employment opportunities and job training to those segments of society that are at an employment disadvantage. Social entrepreneurs are on a social mission to bring about changes in society. The present study entitled "A study on creative process of social entrepreneurs in Coimbatore" was a descriptive survey to assess the socio- economic profile and creative process of social entrepreneurs. A sample of fifty social entrepreneurs have been selected through random sampling method from different sectors of enterprise in Coimbatore for the study. The study revealed that majority of the entrepreneurial ideas came from their own self- belief and self- efficacy in order to achieve their goals and vision for the future.

KEYWORDS: *Social Entrepreneurship, Social Issues, Solutions, Entrepreneur.*

INTRODUCTION

Social enterprises are the organizations which aim their efforts toward improving the general welfare of society and they apply market –based strategies to achieve a social purpose. The movement includes both non- profit and for-profit organizations incorporating a social agenda into their business model. However, many of India's social entrepreneurs continue to struggle as the social venturing landscape lacks appropriate sources of financing, proper regulations, societal recognition and suitable information systems (Santhoshi, 2016).

Social entrepreneurship, thus, is not area of few industrialists or social service organizations. In order to eradicate completely the socio economic problems like illiteracy, poverty, unemployment, untouchability etc. As the field is in its early stage of development, social entrepreneurship provides highly attractive playground for research from various perspectives. In order to develop the field as a full pledged discipline, academic industry, government and nongovernmental organizations should synthesize their efforts and thereby new and relevant concepts and theory to be developed. This will pave way for developing the society that was dreamt by the freedom fighters.

Having this in view, the present study on "A study on creative process of social entrepreneurs in Coimbatore" was undertaken by investigator with the objectives to identify the socio-economic profile of the selected respondents and to assess the creative process of selected social entrepreneurs

METHODOLOGY

The area selected for the study are Ganapathy, Saibaba colony, Perur and Thudiyalur, SundaraPuram in Coimbatore district. A sample of fifty social entrepreneurs has been selected through random sampling method from different sector of enterprise.The primary data were collected through interview schedule and personal contact by investigator from the selected sample respondents, in details about their socio economic background, nature of the enterprise and creative process of social entrepreneurs. Secondary data was collected from books, journals and social entrepreneurship manuals.The data thus collected were coded, tabulated and analyzed using the tools and findings emerged from the analysis of the data were suitably discussed and interpreted.

RESULT AND DISCUSSION

The socio -economic profile of the respondents is depicted in Table I

TABLE I
SOCIO ECONOMIC PROFILE OF THE RESPONDENTS

Sl.NO	DETAILS	NO OF RESPONDENTS(50)	PERCENTAGE (%)
1.	**Gender** Male Female	 31 19	 62 38
2.	**Age** Below 30 31-40	 10 22	 20 44

	41-50 Above 50	11 7	22 14
3.	**Education** Illiterate Literate Primary Higher secondary Graduates Diploma	 1 2 4 6 34 3	 2 4 8 12 68 6
4.	**Marital status** Single Married Widow Widower Others	 12 32 4 2 -	 24 64 8 4 -
5.	**Religion** Hindu Christian Muslim	 32 10 8	 64 20 16
6.	**Nature of family** Nuclear family Joint family	 36 14	 72 28
7.	**Monthly income** Below 5000 50001-10,000 10,0001-15,000 15,0001-20,000 Above 20,000	 4 8 5 14 19	 8 16 10 28 38
8.	**Years of experience** Less than 5 6-10years 11-15years 16-20years Above 20 years	 18 13 14 3 2	 36 26 28 6 4

The above table describes the socio economic background of the entrepreneurs like gender, age, education, marital status, religion, caste, monthly income, and their years of experience. Out of the 50 respondents, 62 percent were males and remaining 38 percent were females.Regarding the age wise distribution, majority 44 percent of the respondents belonged to the age group of 31-40 years and only 14 percent belonged to the age group of above 50years.

Majority 68 percent of the respondents had education up to graduates and 12 percent of the respondents had finished their higher secondary level and least 2 percent of the respondents were illiterates.

As far as the marital status is concerned, out of 64 percent of the respondents are married and 24 percent of the respondents are single. Whereas 8 percent of the respondents are widow and rest of 4 percent of the respondents are widower.

The present study also highlights the facts that 64 percent of the respondents were Hindus, Twenty percent of them falls under the categories of Christian and 16 percents falls under the categories of Muslim.

It was found that more than 72 percent of the families were found to establish the small family norm. Only 28 percent of them were found to be living in joint family.

Regarding the monthly income 38 percent of the respondents drawn up to Rs.20, 000/-above per month. Twenty eight percent of the respondents of earning more than Rs. 15,000-20,000. Sixteen percent and ten percent of the respondents were earning more than Rs. 5,000-15,000. A little above the value of Rs. 5000 was earned by 8 percent of the respondents.

As far as the work experience, 36 percent of the respondents having less than 5 years of experience, followed by 28 percent of the having 11-15 years of experience, followed by 26 percent of them having 6-10 years of experience, and 6 percent of the respondents of having 16-20 years of experience and 4 percent of the respondents having above 20 years of experience.

Nature of enterprise established by the respondents

The figure I depicts the nature of enterprise established by the respondents

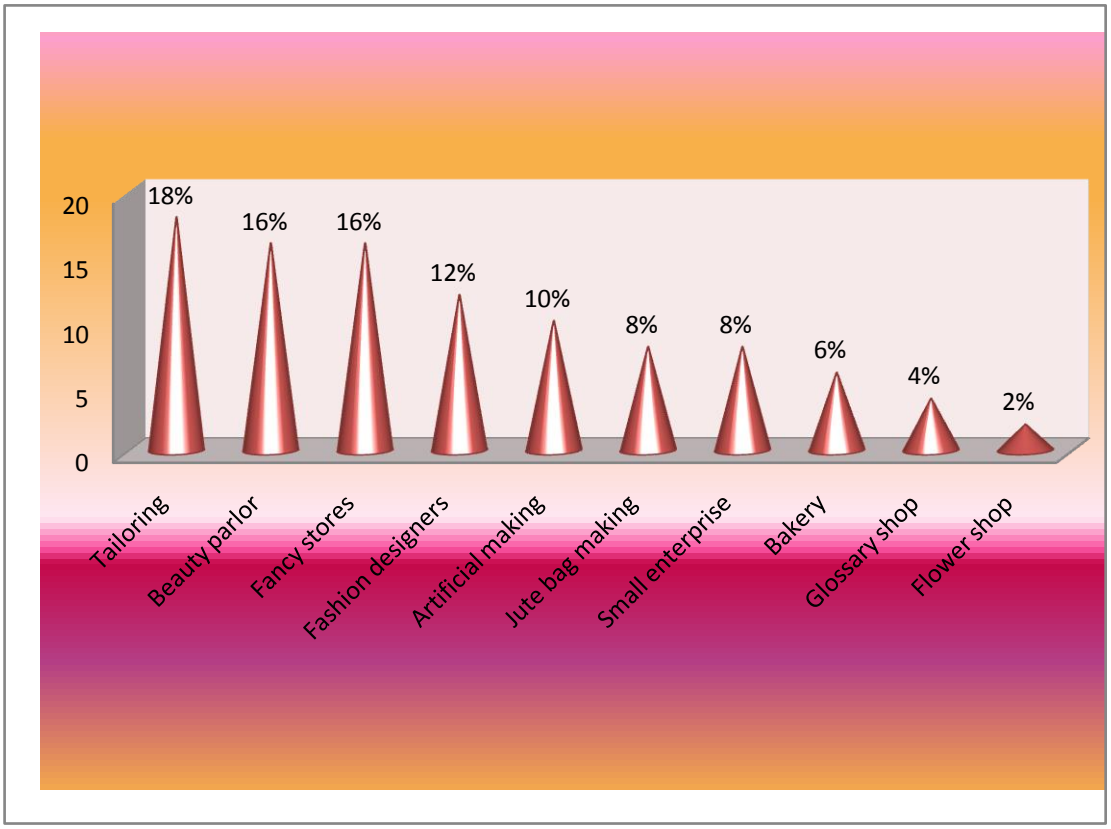

Figure I
Nature of enterprise established by the respondents

Figure I shows that 18 percent of the respondents were engaged in Tailoring, whereas 16 percent of the respondents were engaged in beauty parlour and fancy stores and 12 percent of the respondents are fashion designers. Whereas 10 percent of the respondents are making artificial jewellery. While 8 percent of the respondents are involved Jute bag making and running small enterprises. Six percent of the respondents are working bakeries and 4 percent of the respondents were engaged in Glossary shop and remaining 2 percent of the respondents are involved flower shop.

As far as the nature of enterprises of the sample respondents, they were engaged tailoring, beauty parlor, fancy stores, fashion designers, artificial making, Jute bag making, small enterprise, bakery, glossary shop, flower shop. Enterprise may be carried either individually or in a group.Some of them can do it independently and most of them like to do the work in a group. All the 50 respondents are involved in entrepreneurial activities. This speaks volume of their determination to survive in the business despite all the constraints and bottle neck.

Needs of social entrepreneurship

The table II shows the need of social entrepreneurship

TABLE II
NEEDS OF SOCIAL ENTREPRENEURSHIP*

S.NO	PARTICULARS	NO OF RESPONDENTS(50)	PERCENTAGE
1.	Innovative business model	45	90
2.	Social purpose	38	76
3.	Create a social venture	34	68
4.	Employment generation	27	54
5.	Benefit to society	20	40
6.	Uphold social value	16	32
7.	Environment conservation	12	24
8.	Solution to social problems	10	20

*Multiple responses

It is evident from the table that majority 90 percent of the respondents said that needs of social entrepreneurship is pursuing the investment through the innovative business model. Whereas, 76 percent of the respondents said that social purpose of improving business with effect to social cause and 68 percent of the respondents said that social entrepreneurs creates new social venture.Fifty four percent of the respondents creating employment generation and give opportunities to youth and 40 percent of the respondents said that social entrepreneurs is benefit to society in every aspect. Whereas, 32 percent of the respondents said that helping this we can up-hold social value. Twenty four percent of the respondents stated that environment conservation to the society and 20 percent of the entrepreneurs said that this venture solve great solutions to social problems.

Creative process and ideas of social entrepreneurs

The figure II shows the creative process of social entrepreneurs

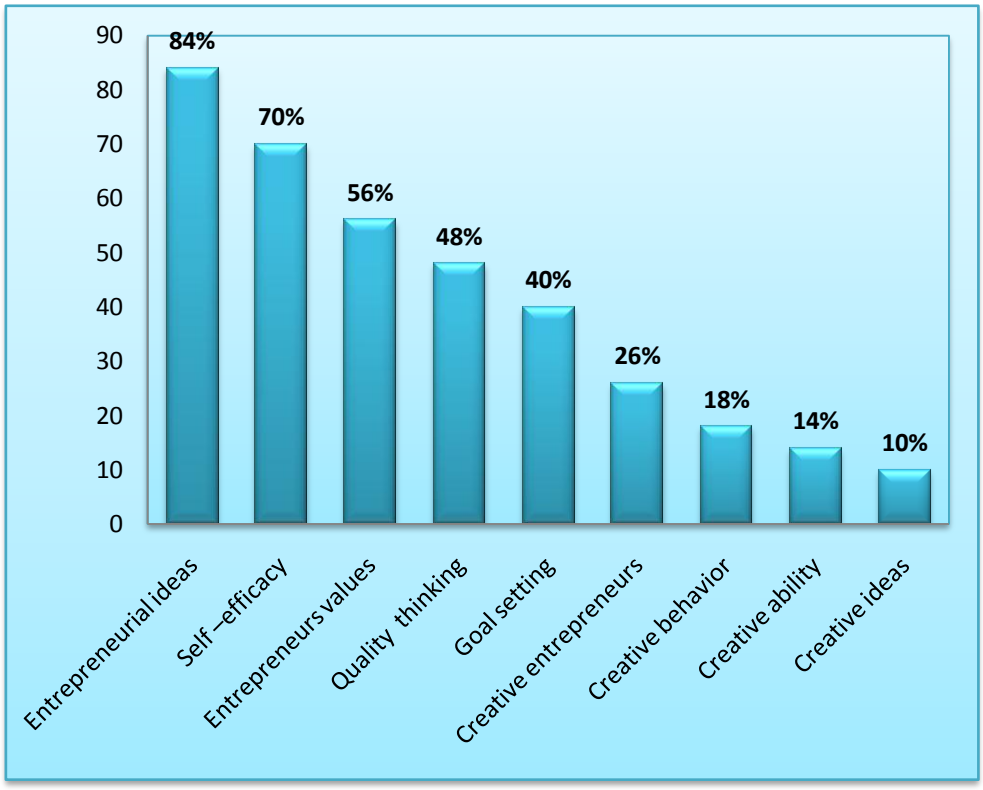

Figure II
Creative process and ideas of social entrepreneurs

*Multiple responses

Majority of 84 percent of the respondents said that entrepreneurial ideas was highly rated by the entrepreneurs, with chance and were explaining as a possible explanation as to how the idea came to them and played a crucial part in the discovery process of their ideas. Majority of the 70 percent respondents stated that self -belief and self -efficacy in what they were doing and their ability to make things happen in order to achieve their goals and vision for the future.

Entrepreneurs values is very clear that most of the 56 percent respondents entrepreneurs had standards, values and beliefs that they meet to uphold. Majority of the 48 percent entrepreneurs recognized the importance of high quality thinking felt to be important. 40percent of the respondents said that goal setting was looked upon by the entrepreneurs as being an essential requite enterprise, and 26 percent creative entrepreneurs possess high levels of energy and great degrees of prevalence and imagination, which combined with willingness to take moderate risk enable them to transform what often began as a very simple, ill defined idea in to something concrete. Eighteen percent of the respondents stated that creative behaviour complex, person-situation, interaction, influenced by events of the past, as well as silent aspect of the current situation.Whereas, 14 percent of the respondents opined creativity is ability, is a mental activity, it takes place in conditions that facilitate or inhabit. Creativity something new and original will

be produced. Ten percent of the respondents said that creative ideas and skill ensured that the finished product or service met the requirement the market opportunity.

CONCLUSION

Social entrepreneurs have become a strong driving force in today's world .social entrepreneurs are various kinds of solutions to the society. There's hope in social entrepreneurship ability to make development sustainable, and meet the needs of us, without compromising the ability of future generations to meet their own needs. The social entrepreneurs are having basic indigenous knowledge, skill and potential to manage enterprise.

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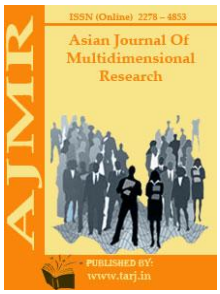

Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

A STUDY ON THE CONSTRAINTS FACED BY FARMERS INVOLVED IN AGRIPRENEURSHIPIN THIRUVANANTHAPURAM

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ABSTRACT

Agriculture is viewed as a traditional occupation and way of living. It contribute a considerable portion to the national economy and thus became the sole of India's national income. Farmers are the professionals in the field of agriculture. They have to develop competencies of effective marketing, presentation and quality maintenance, in order to sustain in the current scenario. Farmers have to become agripreneurs where he identifies real business opportunities... Every farmer is an entrepreneur in one way or other way. It is one way an entrepreneurial and self-employment venture as it involves production and marketing of agricultural products. Agribusiness ranges from cultivation of crops to livestock management. Fifty farmers both men and women from Venganoor, Kottukal and Kalliyoor Panchayats of Thiruvananthapuram were taken as the samples for the study through purposive sampling technique. Both primary and secondary data were collected to investigate on the current scenario of agripreneurship in and the constraints faced by them in selected places of Thiruvananthapuram. A well- structured interview schedule was used to collect primary data from the samples. The study concentrated on the constraints faced by farmers involved in agripreneurship in selected areas of Thiruvananthapuram. The major constraints faced by the respondents of the study were lack of credit facilities, market price variations, high infrastructural and distribution cost, involvement of middle men and so on.

KEYWORDS: *Agribusiness, Employment, Agripreneurship, Constraints.*

INTRODUCTION

Agriculture forms the back bone of Indian agrarian economy. Farmers are agents of economic development. Improvement in the standard of living of farmers is need of the hour. Agripreneurship is the key term that bring about changes in the agricultural sector thereby the national economy. Farmers have to become skilled entrepreneurs who can take up the challenges in modern markets and keep pace with the changes to become competent in the global market.

Developing entrepreneurship in agricultural sector or agribusiness is called agripreneurship. It involves activities related to production, propagation and distribution of products and services related to agriculture and allied activities (Khanka, 2014).

According to Davis and Goldberg, who had first defined the term agribusiness in 1957, agribusiness is the sum of all operations involved in the manufacture and distribution of farm supplies, production operations on the farm, storage, processing and distribution of farm commodities and items made from them.

The present study was formulated to assess the constraints faced by farmers involved in agripreneurship activities in Thiruvananthapuram.

OBJECTIVES

Objectives of the study are:

1. To analyse the socio economic profile of the farmers involved in agripreneurship in selected places of Thiruvananthapuram.
2. To elucidate the constraints faced by the farmers involved in agripreneurship in selected places of Thiruvananthapuram.

METHODOLOGY

The present study was carried out as a survey research among fifty farmers residing in Venganoor, Kottukal and Kalliyoor Panchayats of Thiruvananthapuram. Both primary and secondary data were collected for the study. A well- structured interview schedule was used to collect primary data. Respondents were selected using purposive sampling method. Secondary data was collected from books, journals, websites, etc. Percentage analysis was used to analyse the collected data.

RESULTSANDDISCUSSION

A. Socio- economic Profile of the respondents

The socio economic profile of the selected respondents of the study entitled"A Study on the Constraints Faced by Farmers Involved in Agripreneurship in Thiruvananthapuramis presented in table 1.

TABLE NO. 1
SOCIO- ECONOMIC PROFILE OF THE RESPONDENTS

Sl. No.	Particulars	Number (n=50)	Percentage (%)
1	**Age**		
	≤35 years	13	26
	36- 50 years	27	54

	>51 years	10	20
2	**Gender**		
	Male	44	88
	Female	6	12
3	**Marital status**		
	Married	50	100
	Unmarried	-	-
4	**Educational qualification**		
	Illiterate	0	0
	Primary school	5	10
	High school	20	40
	Higher Secondary school	14	28
	Graduation	9	18
	Post- graduation and above	2	4
5	**Type of family**		
	Nuclear family	34	68
	Extended family	15	30
	Joint family	1	2
6	**Monthly income (in Rs.)**		
	Below Rs. 50000	8	12
	Rs. 50000- Rs. 100000	16	32
	Rs. 100000- Rs. 200000	12	24
	Rs. 200000- Rs. 400000	10	20
	Above Rs. 400000	4	8

It can be found out from the above table that, regarding the age, majority (54 percent) of the respondents were in the age group of 36- 50 years.Forty percent of the respondents have an educational qualification up to high school level and it was welcoming to know that no one was illiterate among the study sample. About 32 percent of the selected farmers earn an income of Rs. 50000 to Rs. 100000 annually and only 8 percent of the respondents earn above Rs. 400000 per annum.

B. Agripreneurship details of the respondents

The agripreneurshiop details of the selected farmers are given in table 2.

TABLE NO. 2

AGRIPRENEURSHIP DETAILS OF THE RESPONDENTS

Sl. No.	**Particulars**	**Number (n=50)**	**Percentage (%)**
1	**Land holdings**		
	≤25 cents	23	46
	26- 50 cents	19	38
	>50 cents	8	16
2	**Experience in farming**		
	≤5 years	11	22
	6- 10 years	13	26
	>10 years	26	52

3	Type of agripreneurship activity		
	Coconut farming	9	18
	Vegetables farming	8	16
	Tapioca cultivation	8	16
	Banana farming	8	16
	Dairying	6	12
	Poultry farming	5	10
	Paddy cultivation	3	6
	Mushroom cultivation	2	4
	Aquaculture	1	2

It is clear from the above table that majority (78 percent) of the respondents make use of their own land for agriculture and agripreneurship activities. Regarding the land holdings, it is less than 25 cents for forty six percent of the respondents and 52 percent of the respondents have more than ten years of experience in farming.

Regarding the type of agripreneurship activities among the selected respondents, 46 percent of the respondents take part in agripreneurship activities. Coconut framers constitute 18 percent of the samples. They maintain coconut farm for more than ten years and sell coconut, tender coconut and copra. The by- products of coconut like coconut husk and shell are supplied to small scale industries, fertilizer units and handicraft units. Some farmers (5 out of 9) have their own oil mills to extract coconut oil and the residue is sold as cattle feed.

About 16 percent of the respondents are engaged in vegetable, tapioca and banana cultivation. Only six percent of the respondents are engaged in paddy cultivation.

Dairying is another agripreneurship activity engaged in by 12 percent of the respondents. It was observed that about 10 percent of the respondents are engaged in poultry farming.

Mushroom cultivation is taken up by only four percent of the samples.

Ornamental fish culture is another agripreneurship activity that constitute only two percent in the study area. Several species of ornamental fishes are cultured and marketed in small scale to nearby places.

C. Constraints faced by the selected respondents

The constraints faced by the selected respondents of the study area is presented in table 3.

TABLE NO. 3
CONSTRAINTS FACED BY THE SELECTED RESPONDENTS

Sl. No.	Constraints	Number (n=50)	Percentage (%)
1	Lack of credit	8	16
2	Lack of skilled and managerial man power	8	16
3	Market price variations	7	14
4	Lack of training	6	12
5	High infrastructural and distribution cost	5	10
6	Involvement of middle men	5	10

7	Lack of awareness about career in agripreneurship	3	6
8	Seasonal variations for the products	3	6
9	Lack of adequate technical guidance	3	6
10	Storage problems	2	4

From the above table it can be understood that, lack of credit facilities, lack of skilled and managerial man power are the major constraints faced by the respondents which account for 16 percent each out of the total sample. About 14 percent of the respondents face market price variations as the major constraint followed by comes lack of training, high infrastructural and distribution cost and the involvement of middle men. The least percent of constraint was storage problems. Lack of awareness about career in agripreneurship, seasonal variations for the products and lack of adequate technical guidance accounts for only six percent each.

CONCLUSION

Agripreneurship and other entrepreneurial activities have a great role to play in the economic development of a nation. The need for developing agripreneurship are generation of employment, regional development, resource utilization and foreign exchange and so on. The study concentrated on the socio- economic profile as well as the constraints faced by the farmers involved in various agripreneurial activities. Major constraints faced by the respondents in the selected area of study are lack of credit and lack of skilled and managerial man power.

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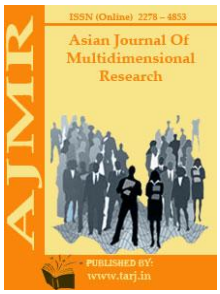

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

EMPOWERMENT OF WOMEN THROUGH SELF HELP GROUPS

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ABSTRACT

Women constitute nearly half of the rural population in India and play a vital role in its rural economy. Recent experiences have shown a strong link between education and development of rural women. SHG is the means for empowerment of women. The SHG not only help the women to empowerment herself but also the family and community as a whole through collective action for development.

KEY WORDS: *Women, Empowerment, Self Help Group.*

INTRODUCTION

"Progress of our land cannot be achieved without the active participation of Our Mothers, Sisters and Daughters"

-Dr. S.Radhakrishnan

Women constitute nearly half of the rural population in India and play a vital role in its rural economy. Recent experiences have shown a strong link between education and development of rural women as education is vital to human resource development. Education and training will go a long way in achieving a fair treatment to rural women and help in raising their status. Training of rural women is especially important to increase their involvement in the development process, enhance their skills and make them equal partners in the national development. (Nandhini Upreti, 2004)

SHG is the means for empowerment of women. The SHG not only help the women to empowerment herself but also the family and community as a whole through collective action for development.

SHGs play a vital role in reducing poverty levels, generating employment and empowering women. Micro financing or group lending act as an instrument and considered as a golden stick for development and has become a ladder for uplifting the poor women in the social ladder.

The SHGs help the poor women to uplift the economic conditions, create the habit of saving, utilization of local resources and Entrepreneurship development.

Self-Help Groups playa pivotal role in reducing poverty levels, generating employment and empowering women. Various studies have proved that different models of credit linkage programmes are highly successful and the repayment rate is more than 95% .Micro financing or group lending is being looked upon as an instrument that can be considered as the golden stick for development and has become a ladder for uplifting the poor women socially, mentally and attitudinally. Some studies have highlighted the fact that the micro-enterprises of SHGs do not have market development strategies and they face a lot of difficulties in positioning their products in the market, relating to other competitors, products and markets. (Nagarajan,2007) .

Assessment of the credit needs of members is done periodically at group meetings. The claims for credit are settling within the group by consensus. In case of any surplus, the amount is deposited in the bank or post offices. Defaulters are subjected to severe penalties but such occurrences are unusual. There is always peer group pressure on those who avail loans which to a large extent prevent defaults. The influence of the group on members is very powerful because it can put actions against defaulters and monitor the behavior of members in order to forestall default. (Thampi,2006).

METHODOLOGY

Research is an academic activity which gives creativity, thinking and knowledge. The goal of research is progress and development for a good comfortable life. Research has proved to be an essential and powerful tool is the modem world. Research is a matter of rising questions and then trying to find answer to the questions. It plays a vital part in the developmental process of human civilization. Research is an

art of scientific investigation, which adopts proper methods and techniques for solving problems. It seeks to find explanations to unexplained phenomena, to clarify the doubtful facts to correct the misconceived facts. Research methodology is a significant and vital step in research work, because it involves preliminary work in a chronological order and it shows a current methodology project.

Objective: To

Study the socio-economic profile of the SHGs find out the impact of SHG and the women empowerment. Both primary and secondary data were collected. Sixty SHG women were selected randomly from Madhukarai Block.

Majority (60 per cent) of the women belonged to the age group of 25 -29 while 18 per cent women belonged to the age group of 30 and above.

Twenty three percent of women had primary education and 53 per cent of women were illiterates and 85 percent of women were married, 88 percent of women belonged to backward caste while 7 percent of women belonged to Scheduled Caste and 82 percent of the women belonged to Hindu religion. The women leader monitor the group well and conducted the meeting regularly and participating the decision making process. Women developed self confidence and involved in income generating activity and it enables them to support their family. Being in the group they are aware of rights. The Self Help Group is a loan for women to achieve economic and social empowerment .

Sources of Data

The data were collected directly from theself help group women.

Secondary data

The secondary data were collected through various sources such as books, journals, web references.

Research Design

The following inclusion and exclusion criteria was followed in selection of the respondents. The study includes only the Self Help Group Women. The study excludes the men and children. The study sample constitutes 60 respondents from the Self Help Group. The women of Self Help Group were selected for the study from Madhukarai Block, Coimbatore District. Hundred Self Help Groups were organized under Westric NGO. Out of which 10 Self Help Groups were selected randomly for the present study. Sixty women randomly selected for the present study.

To calculate the simple percentage method, the following formula used.

Simple percentage = (Number of respondents/Total number of Sample) x l 00

RESULT AND DISCUSSION

- About (22 percent) of women belonged to the age group of20-24, and (60 percent) of women belonged to the age group of 25-29, and (18 percent) of women belonged to the age group of30 and above.
- Regarding educational status (22 percent) of women had primary education, (25 percent) of women had high school education, and 53 (percent) of women

were illiterates.

- (Eighty five percent) of women were married. The unmarried constitute (10 percent), and five percent of women were widows.
- (Eighty percent) of women belonged to the nuclear family while (20 percent) of women belonged to the joint family.
- Regarding the community wise distribution (88 percent) of women belonged to backward community and (7 percent) of women belonged to Schedule caste, remaining five percentage of women belonged to other caste.
- It is found that about (82 percent) of the women belonged to Hindu religion while (15percent) of women belonged to Islam three percent of women belonged to Christianity.
- All the women leaders able to manage and monitor the group well and had good relationships with its members.
- The women had developed the habit of attending the meeting regularly (100 percent) and regular repayment of loan (88 percent) they had developed knowledge to maintain the accounts (80 percent) and record keeping 100 percent.
- Being the member of Self Help Group they are participating decision making process (95 percent) and problem solving (87 percent).
- Women developed the self confidence (100 percent) and become self reliance they also developed the ability to take right decision in many matters (87percent), they had involved in income generating activity, and it enables them to support their family.
- There is an increase in the ability their communicate well (100 percent) and share their ideas to other members (78percent).
- The Self Help Group creates awareness among the women. (78percent) of women revealed that they were recognized by the community (70percent), Eighty eight percent of women had strongly agreed to participate in the community.

CONCLUSION

One of the principles of selfhelp groups approach is reaching out of the poorest, empowerment of communities through nested instruction and poverty reduction. Empowerment means involving oneself in decision making, gaining control over their resources and achieves higher quality of life.

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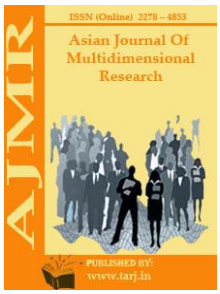

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EMPOWERING PERSONS WITH DISABILITIES THROUGH EMPLOYMENT

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ABSTRACT

Persons with disabilities face more hurdles and saddles in their daily lives in different situations. They were given inequitable treatments in different societies during different period of time. Ignorance, neglect, superstition and fear are the social factors that have worsened the isolation of persons with disabilities understood from the traditional history. The level of employment of persons with disabilities are limited in number and the people working for their job opportunities are also very few. This situation could be changed by showing the skills, talents and performance of existing employees who are disabled. The performance at work varies with respect to each and every individual. The variations in performance of an employee can be attributed based on the ability of an individual towards their own capabilities as well as the effective maintenance of stressful and unfavourable situations one could come across in their life. Hence, in this study an attempt was made to analyze the performance of persons with disabilities working in private organizations which help them towards empowerment. The study is descriptive in nature and the researcher adopted simple random sampling tippet method for selecting the persons with disabilities employed in manufacturing industries. The findings state that most of the office works are performed by persons with blindness (20%) and 15.5% of respondents who have more than 80% of disability are making their income between Rs.5001 - Rs.10000.

KEYWORDS: *Persons with Disabilities, Empowerment And Employment*

INTRODUCTION

Persons with disabilities were given inequitable treatments in different societies during different period of time. Thomas (1957) in Munyi (2012) noticed that societal perceptions and treatments of persons with disabilities within cross cultural settings as a kaleidoscope of varying types that reflect patience, hatred, love, fear, awe, respect and repulsion. Census of India, 2011 data gave a highlight that about 26.8 million population reported to be with either one or the other form of disability conditions, in which 56 per cent (15 million) are males and 11.8 million (44%) are females. The growth of disabled population during 2001-2011 accounted for 22.4 per cent, which is much higher than the general population growth of India (17.6). Interestingly, such growth rate is much higher in urban areas than in rural areas as well as among females than among males. The prevalence rate of disability is about 2.21 in India, which is comparatively higher among females as against males and also among those living in rural areas as compared to those residing in urban areas, irrespective of their gender background. Getting an employment is really a greater problem for person with disabilities. Unemployment rate among person with disabilities is found more than double the unemployment rate of nondisabled counterparts. The reasons lie in the suspicions of the employers who believe on medical model and consider them inferior to their non-disabled counterparts. They do prefer donations for the welfare of persons with disabilities instead of giving them employment opportunities (Kazan, et.al. 2013). Employment level of persons with disabilities are limited in number and the people working for their job opportunities are also very few. This situation could be changed by showing the skills, talents and performance of existing employees who are disabled. The performance at work varies with respect to each and every individual. The variations in performance of an employee can be attributed based on the ability of an individual towards their own capabilities as well as the effective maintenance of stressful and unfavourable situations one could come across in their life.

METHODOLOGY

The study was conducted by having the following objectives

- To study the demographic profile of the persons with disabilities
- To analyze the performance of persons with disabilities at work
- To provide social work interventions which support the persons with disabilities to empower themselves

The research was conducted among the persons with disabilities working in private manufacturing industries in Coimbatore. The study is descriptive in nature and the researcher adopted simple random sampling tippet method for selecting the persons with disabilities employed in selected manufacturing industries and adopted 60 respondents in different types of disabilities. The primary data was collected by using work performance scale for persons with disabilities consisting of 31 items with two dimensions framed with an intention to measure the task performance and contextual performance.

RESULTS AND DISCUSSION

The data collected were coded, tabulated and analyzed by using SPSS and were discussed based on the obtained results.

TABLE NO: 1
SOCIO DEMOGRAPHIC PROFILE OF PERSONS WITH DISABILITIES

S. No	Socio Demographic Profile		Frequency (N=60)	Percentage
1	**Age**	Up to 30 years	15	24.5
		31-40 years	24	40.3
		41-50 years	13	21.9
		Above 50 years	8	13.3
2	**Sex**	Male	40	66.7
		Female	20	33.3
3	**Type of disability**	Blindness	5	8.3
		Person with Low vision	8	13.3
		Leprosy cured person	4	6.7
		Hearing impairment	9	15
		Locomotor disability	34	56.7
4	**Percentage of disability**	40 - 60 %	14	23.3
		61 - 80%	24	40
		More than 80 %	22	36.7

It was understood from the study that nearly half of the respondents 40.3 per cent belong to the age group of 31 - 40 years, 66.7 per cent were males with disabilities were more in getting employment when compared to females, little more than 1/4th of the respondents 29.5 per cent completed their bachelor degree of education, nearly 2/3rd of the respondents 65.10 per cent of the respondents are married. More than half of the respondents share their place of residence both in rural and semi urban areas, in which 34.5 per cent were in rural and 34.2 per cent in semi urban areas. Nearly 3/4th of the respondents 71.2 per cent are Hindus followed by Christians and Muslims. A little more than half 51.4 per cent of the respondents are living in joint family system and the rest of the respondents are living in nuclear families, nearly half of the respondents 47.8 per cent are making an income of Rs.5001 - Rs.10000. 1/4th of the respondents 24.1 per cent are working in Non GovernmentalOrganisation sector, nearly 1/3rd of the respondents 31.3 per cent are provided with office work including assisting in the regular work routine with the support of

electronic media. The number of years of experience of persons with disabilities is explained with 40.6 per cent of the respondents who have 3-6 years of experience in their work.

Ramps, wheel chairs in organisations have to be kept accessible in organisations and doors and ways has to maintain unlocked and unblocked. While offering seats to persons with limited mobility; chairs with arms or higher seats has to arranged in manner which is easy for them to use and gives them comfortability. Adequate warning signs are essential specifically in watery and slippery floors. Assistance is essential in reaching, grasping or lifting objects and display cases as well as in operating vending machines and other equipments.

The persons with low vision and visual impairment have to be concentrated to provide non visual informations in conversations. Braille system has to upgrade for better level of understanding. The allocation of works in organisation has to make in such a manner to prove the efficiency and knowledge of persons with low vision or visually impaired and it should not be framed to put them in hurdle. Good lighting is important for persons with low vision to perform but it should not be too bright as even very shiny paper or walls could produce a glare that disturbs people's eyes.

CONCLUSION

Persons with disabilities are more likely to experience different problems in the society which is majorly due to poverty. They are also less likely to access basic services due to stigma, discrimination and inaccessibility. The lack of access to vital services contributes to their marginalization and exclusion with little or no option to escape from poverty. Societies that are inclusive of their diverse populations are more likely to be democratic, participatory and equitable. The laws enacted require to be effectively implemented to achieve the desired goal welfare of persons with disabilities. To overcome various problems faced by the persons with disabilities it is essential to manage the situation effectively by providing them better employment opportunities not only in public sectors as per the norms of the government but also the employment opportunities has to be generated and provided in private sector organizations.

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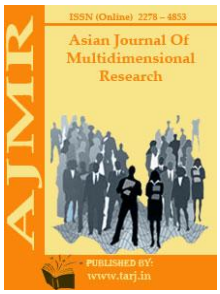

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CHALLENGES FACED BY WOMEN ENTREPRENEURS IN COIMBATORE AND IMPHAL DISTRICTS

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ABSTRACT

Entrepreneurship today is regarded as an important tool of development all over the world. Entrepreneurship is a purposeful activity indulged initiating, promoting and maintaining economic activities for the production and distribution of wealth. In compliance with the objective of establishing social justice, equity and diffusion of economic power, it is necessary to develop the latent skills of entrepreneurship in women who hold the key to rabid and sustain economic development of the society and the ultimate prosperity of the nation. (Singh.K. 2012, Reddy.J.A.2015, Premchander.C.2015).The emergence of women as entrepreneurs would promote growth in industrial development, bring out socio-economic reform, ensure better family living condition and ultimately increase the status of women in the society. (Renuka.V.2015). Challenges faced by women entrepreneurs in Coimbatore and Imphal District was conducted , selecting 50 women entrepreneurs from Coimbatore District, Tamil Nadu State and 50 from Imphal District, Manipur State, with the following specific objectives: To study the socio-economic background of women entrepreneurs in Coimbatore and Imphal Districts and To understand the constraints faced by the Women entrepreneurs.

KEYWORDS: *constraints, entrepreneurs, Entrepreneurship, prosperity*

INTRODUCTION

Entrepreneurship today is regarded as an important tool of development all over the world. Entrepreneurship is a purposeful activity indulged initiating, promoting and maintaining economic activities for the production and distribution of wealth. In compliance with the objective of establishing social justice, equity and diffusion of economic power, it is necessary to develop the latent skills of entrepreneurship in women who hold the key to rabid and sustain economic development of the society and the ultimate prosperity of the nation..(Singh.K. 2012, Reddy.J.A.2015, Premchander.C.2015).

METHODOLOGY

The emergence of women as entrepreneurs would promote growth in industrial development, bring out socio-economic reform, ensure better family living condition and ultimately increase the status of women in the society. (Renuka.V.2015) .Challenges faced by women entrepreneurs in Coimbatore and Imphal District was conducted , selecting 50 women entrepreneurs from Coimbatore District, Tamil Nadu State and 50 from Imphal District, Manipur State, with the following specific objectives:

- To study the socio-economic background of women entrepreneurs inCoimbatore and Imphal Districts and
- To understand the constraints faced by the Women entrepreneurs.

Interview method was used for collecting the data and the salient features finding of the study are given below:

RESULT AND DISCUSSION

Socio-economic Profile of the Women Entrepreneurs

In Coimbatore the age profile of women entrepreneurs revealed that 46 per cent are in the age group of 31 – 40 years; 90 per cent were Hindus; 70 per cent belonged to Backward Community and 80 per cent had an monthly family income below Rs.15,000. The educational profile revealed that 50 per cent had collegiate education 96 per cent of women were married and 70 per cent belonged to the nuclear family pattern.

In Imphal 42 per cent of women were in the age group of 31 – 40 years 96 percent were Hindus; 52 per cent belonged Backward community and 74 per cent of the women had their monthly family income below Rs.15,000. The educational profile revealed that 48 per cent of the women had collegiate education. Marital status revealed that 86 per cent were married and 72 per cent were belonging to nuclear family.

Constraints faced by women entrepreneurs

Self-sphere system constraints

In Coimbatore, among the constraints faced by the women, lack of leisure time (0.90 mean score) scored the highest rank. Forty four percent had lack of knowledge about the various loan schemes and procedure of financial institutions which were the main constraints with a maximum mean score of 0.88. In Imphal excessive tension was the constraint having highest rank (0.52 mean score) and lack of knowledge about agencies and institutions working for entrepreneurship development got maximum mean score of 0.66.

Socio-psycho sphere system constraints

The socio-psycho sphere system is conceptualized as a specific set of social conditions and particular psychological characteristics of women entrepreneurs. Constraints phased by the women are given in Table – I

TABLE – I
SOCIO PSYCHO SPHERE SYSTEM CONSTRAINTS

Constraints	Coimbatore		Imphal	
	Mean Score	Rank	Mean Score	Rank
Conflicts due to dual responsibilities	0.98	I	0.18	VIII
Faculty socialization and problem of public relation	0.40	II	0.16	IX
Male domination	0.24	III	0.18	VIII
Lack of emotional maturity	0.24	III	0.24	VI
Lack of time to care children / husband	0.14	IV	0.5	III
Lack of appreciation from family and society	0.10	V	0.66	I
Lack of time to do the household activity	0.10	VI	0.44	IV
In consistent to traditional	0.04	VI	0.44	IV
Lack of self confidence	-	-	0.26	V
Lack of confidence in women's ability	-	-	0.20	VII
Poor chance of mobility for women	-	-	0.62	II
Lack of motivation	-	-	0.20	VII
Inferiority complex	-	-	0.10	X
Over all Mean score	0.17	-	0.30	-

It could be inferred from the above table that the majority of women entrepreneurs in Coimbatore faced conflicts due to dual responsibilities. In Imphal, lack of sufficient time to do the household activity obtained the maximum mean score.

Resource system constraints

In Coimbatore arrangement of the finance (0.82 mean score), lack of marketing (0.78 mean score), seasonal price variation (0.72 mean score) non availability of modern technologies related to their field (0.32 mean score) and limited working capital (0.64 mean score) were the main constraints.

In Imphal arrangement of the finance (0.66 mean score), lack of marketing sources (0.52 mean scores), seasonal and price variation (0.66 mean score), non-availability of modern technology (0.14 mean score, inadequate assistance from financial institution and bank (mean score 0.84) and lack of collateral security (mean score 0.84) were the main constraints encountered by the women entrepreneurs.

Support system constraints

Time wasted due to visits to financial institutions and lack of promotion was the major constraints (mean score 0.93) in Coimbatore and inadequate incentives provided by the government in Imphal (mean score 0.76) were the major constraints.

The table below gives the overall mean score of various constraints

Overall Mean Score of Various constraints faced by the Women Entrepreneurs

TABLE - II

Type of Constraint	Overall mean score	
	Coimbatore	Imphal
Self Sphere System	0.40	0.40
Socio-psycho sphere system	0.17	0.30
Resource system	0.32	0.27
Support system	0.51	0.26

The above table exhibits that the majority of women entrepreneurs had suffered the support system constraints which has got a maximum mean score of 0.51 in Coimbatore whereas in Imphal the majority of women had the self sphere system constraints which has got a maximum mean score 0.40.

Suggestions and Recommendations

The recommendations emerged out of this study may be considered by the concerned authorities for improving the performance of women entrepreneurs.Re-orientations of the educational system for women with due emphasis on career guidance and entrepreneurial awareness from the school stage itself.Special concessions for women entrepreneurs for setting up industrial units and simplifying and stream lining the procedure for availing of special schemes for women entrepreneurs.The government department and agencies should form a net work for marketing the produce from the trades of women entrepreneurs.

CONCLUSION

Entrepreneurship is presently the most discussed and encouraged concept all over the world to overcome economic challenges. Women being the vital gender of the overall population have great capacity and potential to be the contributor in the overall economic development of any nation. Therefore, programs and policies need to be customized to not just encourage entrepreneurship as well as implement strategies which can help support entrepreneurial culture among youth. Media has the potential to play the most vital role in entrepreneurial development by creating and highlighting all such platforms which can bring out the creativity and innovation among the women and men to grow entrepreneurship culture in society.

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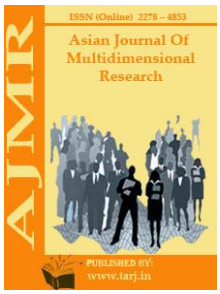

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STUDY ON HYGIENE PRACTICE OF SLUM DWELLERS

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Coimbatore, INDIA.

ABSTRACT

Today, improving health and lives of people living in slums are priority goals for international development. With this, international community must concentrate more of its efforts on improving the lives of the urban poor if the Millennium Development Goals (MDGs) is to be achieved (Health Jockey, 2011). The main objectives of the study is to assess the housing conditions of slum dwellers and study the hygiene practices followed by the slum dwellers. The total sample size fifty was drawn from Baraboo nagar of Coimbatore which is one of the slum areas in Coimbatore Corporation. Simple random sampling techniques were used to select the sample for study. Structured Interview schedule method was used to carry out the research. Primary data were collected from 50 slum household of the Baraboo Nagar of Coimbatore district through well structured interview schedule. The main finding of the study is The maximum number of families lived in pucca houses. Higher per cent of the respondents (82 per cent) get access to drinking water from outside premises-public tap. About 90 per cent of the respondents reported that, sanitation and hygiene challenges in slum in terms of poor basic services results in lack of access to sanitation facilities and safe water sources. This is due to the lack of waste collection services, a poor rain water drainage system and poor infrastructure facilities. In short multi prolonged strategy required not only to address the needs of slum dwellers for shelter but also the problems of urban poverty, unemployment, low incomes and lack of access to basic urban services.

KEYWORDS: *Respondents, Sanitation, Corporation,Structured*

INTRODUCTION

The Census of India defines a slum as "a compact area of at least 300 in population or about 60-70 households of poorly built, congested tenements in an unhygienic environment usually with inadequate infrastructure and lacking proper sanitary and drinking water facilities."Slums are an essential urban phenomenon worldwide and are strung at the lowest rung of the socio -economic collection. They are the shadow zones of urban existence where poverty, crime, aesthetic pollution apart from other types of pollutions, disease and deprivation co-exist. Nevertheless they provide the essential labor-force to work in the industrial and commercial sectors of the cities, not to speak of the service sector which can also be stretched over to cover domestic help in a big way. Physically, they display a dense packing of houses and a further dense clustering of population within the houses. This in turn, is associated with various physical and social problems (Prakash, 2007).

The problems that people living in slums face are the challenges for a better future. Real solutions are only feasible if and when their inhabitants are allowed to play a leading role. Their responsibilities and possibilities have been the starting point. This is what Cordaid dedicates itself to (Amis and Rakodi, 2005).

Governments, municipalities, donors, NGOs companies worldwide are working together to improve the situation of millions of people living in slums. Slums are often not included in the urban planning process of a city. When slums are improved, different departments work in isolation from each other, without an integrated plan. Most plans are also not development in a participatory way and do not include the voice of communities and slum dwellers (Carolini et. al., 2005).

The Study on “Housing problems of slum dwellers was under taken with the following objectives.

- To assess the housing conditions of slum dwellers
- Study the problem faced by slum dwellers

METHODOLOGY

The present study is basically designed to analyse and study the Housing problem of slum dwellers in selected slum area of Baraboo nagar of Coimbatore District, Tamil Nadu.

The sample drawn for the study was 50, using simple random sampling method. Interview method was the tool used for collecting data for the study.

The independent and dependent variables were identified, based on the data collected from the respondents.

The independent variables such as Age, Sex, Educational qualification, Caste, Religion of the respondent and head of the family, Occupation and Monthly income were measured with the actual information of the respondents.

The dependent variables such as Personal hygiene practice, Solid waste management and Health problems were measured with the scale developed for the study.

The data thus collected were coded, tabulated and analysed using the statistical tools discussed below and findings emerged from the analysis of the data were suitably discussed and interpreted and necessary conclusions and inference as were drawn in the following chapters.

RESULT AND DISCUSSION

Socio Economic Profile

Table I depict the Socio Economic Profile of the Respondents.

TABLE I
SOCIO ECONOMIC PROFILE OF THE RESPONDENTS

Aspect	Percentage of the respondents (N=50)
Age	
20-25	8
26-30	16
31-35	24
36-40	26
41-45	24
45 and above	2
Educational qualification	
Illiterate	14
Primary School level	26
Middle School level	20
High School level	18
Higher Secondary School level	16
Degree	6
Caste	
Backward Caste	24
Most Backward Caste	26
Scheduled Caste	50
Religion	
Hindu	90
Muslim	10
Occupation	
House wives	50
Daily wage	34
Private sector	16
Monthly income	
2000-3000	40
3001-4000	48
4001-5000	8
5000 and above	4

Source: Field survey 2016

Age

In terms of age of respondents twenty six per cent of the respondents' age is between 36 to 40 years, 24 per cent of the respondents age is between 31 to 35 years and 41 to 45 respectively, 16 per cent of the respondents belonged to the age between 26 to 30 years and two percent of them are 45 years. This indicates that majority of the respondents age is between 36-40 years in adult stage. This means most of the respondents are found in the working age group, but as the key

informant data shows that these slum dwellers do not perform formal jobs because of the consequence associated with living in slum area. And all the respondents were married.

Educational Qualification

Educated people are essential than illiterate people to understand the existing situation of an area, to create new jobs and to solve any problems happened. As Table III reveals majority of respondents (26 per cent) are belongs to primary levels, (20 per cent) middle levels, (18 per cent) high levels, (16 per cent) higher secondary levels and the remaining (6 per cent) of the respondents are graduated from colleges and universities. This analysis indicated that many of the dwellers are not regarded as skilled in terms of educational and it can be one of the causes for lack of formal job opportunities and become a low income earning group.

Caste

Half of the respondents in that slum area belonged to the scheduled caste, 26 per cent of the women were under the category of Most Backward Community and remaining 24 per cent of the respondents belonged to Backward Caste.

Religion

Religion is a cause, principle or activity pursued with zeal or conscientious devotion. It is obvious that majority of the women (99 per cent) were Hindus and a small per cent of them (10 per cent) were Muslims. Thus, the study area was dominated by the Hindu Religion.

Occupation

In terms of occupation (50 per cent) of respondents are House wives, (34 per cent) are Daily wage and (16 per cent) of respondents are Private sector have no permanent job. Regarding to this information the highest percentage of respondents is included under House wives. Their daily income is very low even they can't feed themselves.

Income

The rates of income, wage and productivity are very low among the urban poor. As they are involved in coolie, low paid jobs in informal sectors of work they are unable to earn more despite their efforts. So that some of the households (40 per cent) have a very low level of income (up to 2000-3000 per month) and they are unable to support themselves. Another more than 48 per cent have a level of income (3001-4000 per month) and 8 per cent of households have earnings Rs.4001-5000/- and very least per cent of them earning money had earning Rs. Above 5000/ month.

Infrastructure Facilities

Details on Infrastructure Facilities such as land tenure status, type of the house, types of roof, fuel for cooking, access to drinking water, toilet facility, educational facilities and health care facilities were gathered, analysed and listed below, in Table II.

TABLE II
INFRASTRUCTURE FACILITIES OF THE RESPONDENTS

Aspect	Percentage of the respondents (N=50)
Land tenure status	
Patta	10
Public land encroached	86
Rented	4
Type of the house	
Pucca	76
Katcha	24
Types of roof	
Tarpaulin/ wooden	25
Asbestoses	15
Tiled	14
Cement/slab	46
Electricity connectivity	**100**
Fuel for cooking	
Gas	20
Kerosene	48
Firewood	32
Access to drinking water	
Private	18
Outside premises-public tap	82
Toilet facility	
Private	18
Public toilets	10
Open defecation	72
Educational facilities	
Primary school	100
Middle School	100
Health care facilities	
Private Hospital	100
Government Hospital	100

Source: Field Survey 2016

Land tenure status

The residences form the major occupied houses in the slum with 86 per cent of public land and Patta houses in 10 per cent in the selected slum area, the remaining (4 per cent) of them were lived in rented houses from private .

Type of the house

Housing is one of the three means of subsistence for the human existence. The maximum number of families lived in pucca houses (76 per cent) followed by Katcha. It could be of interest to note that among the slum dwellers more families lived in pucca.

Types of roof

About 42 per cent of the women reported that the dwellings made of permanent like brick walls and reinforced cement roofs. One forth of them has semi-permanent structure (Tarpaulin/ wooden roofs) and only 14 per cent them had permanent structure (Concrete roof).

Electricity connectivity

Cent per cent of the respondents reported that they had electricity connection in their home. While collecting the information, the investigator was observed that many areas of these settlements had to rely on poor-quality and unsafe electricity. People had to buy illegal connections from local cartels. Services and business activity were highly constrained, insecurity was rife, and electric fires were common

Fuel for cooking:

The problems due to indoor pollution were found to be very common owing to lack of separate kitchen and smoking inside the room. Additionally, the use of fuel wood and coal as cooking fuel inside the commonly shared room was found to be source of indoor pollution in the slum dwellers of present study area.

The type of fuel has considerable effects on the health of individual. In the present study, the fuels commonly used by these slum dwellers include kerosene oil (48 per cent) fire wood/charcoal (32 per cent) and very least per cent only using gas stove for their cooking (20 per cent). Which not only adversely affect their health but are also cause of environmental pollution.

Access to drinking water

According to the Table V, only eighteen per cent of the respondents have private water taps and higher per cent of the respondents (82 per cent) get access to drinking water from outside premises-public tap.

Toilet facility

For healthy living, the availability of toilet facilities in the houses is necessary. It helps in maintaining good sanitation in and around the houses. So every household must have private toilet Therefore, the details on its availability were collected. From the data, it is evident that 10 per cent in overall had individual toilet facilities in their homes. However, it was disheartening to note that 72 per cent of them were using open spaces as toilets, and it was considered highly unhygienic. Remaining 18 per cent of households were using public toilets.

Educational facilities

In terms of educational services the slum needs additional education facilities within the slum, because education plays an important role of multi sector development of one area.

Health care facilities

As it is indicated in Table V above this area has low access to health services such as Hospitals, Health centers and Clinics. There is one private clinic and Government hospital. These health services are not enough to support this large number of people. According to this the majority of people get sufficient treatment of health.

Correlation between Socio Economic Profile Vs Hygiene practices of the respondents in h
Table III revels, there is a significant relationship between the age and removal of carpets from houses and washing them regularly and regularly cleaning the toilet with toilet cleaner at 5 percent level. There is a significant relationship between the educational qualification and properly dispose of waste, Removal of carpets from houses and washing them regularly, washing the vegetables after cutting at one percent level and clean their home regularly moping The floors with detergents , washing the vegetables before cutting at 5 percent level.

TABLE III
CORRELATION BETWEEN SOCIO ECONOMIC PROFILE VS HYGIENE PRACTICES OF THE RESPONDENTS IN HOUSE AND HOUSEHOLD SURROUNDING

Aspects	**Age**	**Educational qualification**	**Caste**	**Religion**	**Occupation**	**Monthly income**
Clean the home regularly	0.130 0.369	0.298* 0.036	0.088 0.542	**0.426**** **0.002**	0.041 0.776	0.138 0.338
Moping the floors with detergents	0.130 0.369	**0.298*** 0.036	0.088 0.542	**0.426**** 0.002	0.041 0.776	0.170 0.238
Properly dispose of waste	0.235 0.101	**0.457**** 0.001	0.252 0.078	**0.320*** **0.023**	0.080 0.580	0.162 0.262
Removal of carpets from houses and washing them regularly	**0.292*** 0.040	**0.460**** 0.001	0.441 0.001	0.239 0.094	0.042 0.771	0.011 0.940
Use garbage cans to store waste	0.257 0.072	0.205 0.153	**0.790**** 0.000	0.156 0.279	0.260 0.068	0.006 0.969
Wet the floor with Water before sweeping	0.245 0.087	0.269 0.059	**0.736**** 0.000	0.145 0.313	0.218 0.128	0.175 0.224
Cleaning the toilet with toilet cleaner	**0.329*** 0.020	0.263 0.065	**0.681**** 0.000	0.134 0.352	0.173 0.230	0.138 0.338
Washing vegetable						
Before cutting	0.130 0.369	**0.298*** 0.036	0.088 0.542	**0.426**** 0.002	0.041 0.776	0.186 0.197
After cutting	0.252 0.077	**0.479**** 0.000	0**.381**** 0.006	0.261 0.067	0.041 0.776	0.157 0.275
Clean the vessels						
Sand/brick powder	0.219 0.126	**0.444**** 0.001	0.228 0.111	**0.333*** 0.018	0.040 0.783	0.080 0.580

Coal/ash	0.224 0.117	0.224 0.117	0.507* 0.000	0.218 0.128	0.131 0.365	0.006 0.969
Soap/ dish wash bar/ soap solution	0.245 0.087	0.269 0.059	**0.736**** 0.000	0.145 0.313	0.218 0.128	0.052 0.718

There is a significant relationship between religion and hygiene practices such as clean their home regularly, moping the floors with detergents, washing the vegetables before cutting at one percent level and properly dispose of waste, clean the vessels by using sand brick powder at five percent level.

There is no significant relation between occupation and monthly income with hygiene practices of the respondents.

Environmental Problems

Table IV reveal the Environmental Problems faced by the respondents in the selected slum.

TABLE IV
ENVIRONMENTAL PROBLEMS FACED BY THE RESPONDENTS

Aspect	Percentage of the respondents (N=50)*
Air pollution	92
Lake of pure drinking water	90
Noise problem	90
Lack of drainage facility	80
Poor management in waste disposal	76
Lack of ventilation because of over crowd	54

Source: Field Survey 2016 *Multiple Responses

Table IV indicates that, about 90 per cent of the respondents reported that, sanitation and hygiene challenges in slum in terms of poor basic services results in lack of access to sanitation facilities and safe water sources. This is due to the lack of waste collection services, a poor rain water drainage system and poor infrastructure facilities.

Most of the respondents (80 per cent) do not have any drainage facility for their houses, it is dishearten to hear that they were following open defecations, Dirty water from the houses was poured outside and stagnant water was a common feature during rainy seasons posing health hazards due to breeding of mosquitoes; and children played in the dirty water further endangering their health. This posed as a health hazard especially to young children who are more vulnerable than adults.

Correlation between the selected socio economic profile Vs Solid waste management

TABLE V
CORRELATION BETWEEN THE SELECTED SOCIO ECONOMIC PROFILE VS SOLID WASTE MANAGEMENT OF THE RESPONDENTS

Aspects	Age	Education qualification	Caste	Religion	Occupation	Monthly income
Garbage disposal	0.229 0.109	0.083 0.569	0.011 0.939	0.176 0.221	0.203 0.157	0.086 0.552
Mode of disposal of home waste	0.185 0.199	0.009 0.953	0.024 0.870	0.134 0.352	0.058 0.691	0.051 0.723
Arrangement for garbage disposal	0.071 0.623	0.044 0.760	0.085 0.559	0.048 0.743	0.143 0.322	**0.419**** 0.002
Clearance of open drains	0.115 0.426	0.151 0.295	0.157 0.276	0.012 0.932	0.259 0.069	**0.468**** 0.001

****Significant at 1per cent level**

The Table V reveals that there is a significant relationship between the monthly income and arrangement for garbage disposal and Clearance of open drains at 1per cent level.

F. Health Problems

Table VIshows the health problems faced by the respondents

TABLE VI
HEALTH PROBLEMS FACED BY THE RESPONDENTS

Health Problems	Percentage of the respondents(N:50)*
Diarrhea and Dysentery	100
Dermatological Problems	100
Respiratory Infections	68
Whooping Cough/Cold	62
Throat/Eye Infections	60
Typhoid	34
Jaundice	8
Malaria	4
Dengue	2
Tuberculosis	2

Source: Field Survey 2016 *Multiple Responses

Poor sanitary condition and poor quality of water lead to illness like diarrhoea and other water borne diseases. Slums are considerably disadvantaged as far as source of drinking water were concerned.

Table VI indicates, Diarrhea and Dysentery and Dermatological Problems were observed as a major health problem reported by cent per cent of the respondents, followed by Respiratory Infections (68 per cent) whooping cough/cold (62 per cent), Throat/Eye Infections (60 per cent),

Typhoid (34 per cent), Jaundice (8 per cent) , malaria (4 per cent), Dengue and Tuberculosis (2 per cent).

Keeping in view, the needs of urban slum health care and data on health problems of slum population are very scanty and there is a need to study the slum morbidity patterns of major cities in India. This will facilitate the policy makers, health administrators in the fields of health and family welfare, to plan an effective strategy for improving the health conditions of the urban slum population.

CONCLUSION

The rapid growth of population in urban centers since independence has led to the emergence and growth of urban slums in the country. The developmental activities in urban centers provide employment to the rural migrants as well as the local urban population. These low income groups, in the absence of proper shelter were settled in pockets of the slum areas characterized by overcrowding, dilapidated dwellings, lack of sanitation and civic amenities. Realizing the gravity of the situation governments have implemented a number of schemes and programmes to improve the living conditions of people living in slums.

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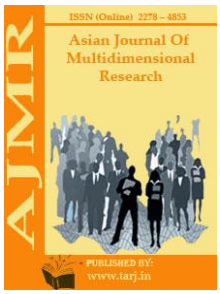

Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

A STUDY ON RURAL EMPOWERMENT THROUGH SHGS IN THENI DISTRICT

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ABSTRACT

This paper focused on universal role of SHGs in rural woman empowerment as a base of rural empowerment through rural development programmers. Regional inequality is the basic feature of Indian Economy. Rural area is the biggest assests and it is the backbone of the Indian economy. The rural woman is the center of rural development in terms of alleviation of rural poverty with economic growth and stability. This present paper analysis the contribution of SHGs in women's development in Theni district and the major conclusion of the study is that women groups are successful in leading group activities and they were found satisfied with their socioeconomic empowerment.

KEYWORDS: *Socioeconomic, Empowerment, Inequality*

INTRODUCTION

A Self group (SHG) is a community based financial intermediate committee usually composed of 10-20- local women or men. And SHG is generally an economically homogenous group formed through a process of self-selection based upon the affinity of its members. SHGs in rural woman empowerment as a paradigm of rural empowerment through rural development activities.The Self-help Group movement became a silent revolution within a short span in the rural credit delivery system in many parts of the world. Micro finance programme has an important role to play in Indian budget for boosting micro entrepreneurial activities for creating productive assets coupled with service generation. The present paper focuses on the rural empowerment through women empowerment programs. Woman SHG program has proved that rural empowerment is possible through empowering women component in the process of growth.

NEED OF THE STUDY

The main purpose of the study to conclude that women development is the basis of empowerment in all aspects, socially, politically,and economically and thus towards rural empowerment.

OBJECTIVES OF THE STUDY

The main objective of research study is to study the pre and post Status of SHGs members and to evaluate the impact of SHGs in empowering women.

METHODOLOGY

The present study is undertaken in Theni district of Tamil Nadu. Primary and secondary data have been used for the present study.Stratified random sampling method has used for this study and 150 beneficiaries were selected from the SHGs of Theni district.

RESULT AND DISCUSSION

TABLE: 1
THE IMPACTS OF SHGS ARE ANALYZED ON BASIS OF OCCUPATION OF THE RESPONDENTS.

Occupation of selected beneficiaries	Pre Stage	Post Stage
Rearing cattles	25-(17%)	10-(07%)
Handicrafts	05-(03%)	12-(08%)
Agriculture	35(-23%)	37-(25%)
Weaving	12-(08%	15-(10%)
No occupation	10-(07%)	04-(03%)
Income generating activities	63-(42%)	70-(47%)
Total	150-100	150-100

Source: From Survey.

Table 1 shows the occupation of the selected respondents of Pre and Post stage is analyzed.The study shows that 7% of the respondents were no occupation whereas in post stage only 3% were without occupation.

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TABLE: 2 INCOME OF THE RESPONDENTS

Monthly Income	Pre stage	Post stage
Upto Rs 3000	35-(23%)	40-(27%)
Rs 3000-5000	68-(45%)	70-(47%)
Rs 5000 and above	37-(25%)	40-(27%)
No Income	10-(07%)	-
Total	150-(100)	150-(100)

Source: From Survey.

Table 2 reveals that SHGs members yield more income .It is evident that before joining SHG 7% were have no income due to no occupation but after post survey it shows that 27% were earning more than above Rs 5000.The increased income has helped to supplement the incomes to reduce the level of the poverty to a great extent in several families.

TABLE: 3 BENEFITS OF THE SELECTED RESPONDENTS

Benefits	Agree	No opinion	Disagree	Total
Savings habit	130-(87)	20-(13)	--	150-(100)
Income increases	123-(82)	22-(15)	05-(3)	150-(100)
Life style changed	138-(92)	-	12-(8)	150-(100)
Power of decision making	146-(97)	-	04-(3)	150-(100)
Positive attitude	128-(85)	17-(11)	05-(3)	150-(100)

Source: From Survey.

Table 3 shows the benefits of the respondents that after the post stage their savings habit is increased due to more income and there is a change in decision making authority. And attitude towards their life is changed whereas life style changed.

TABLE: 4 WOMEN EMPOWERMENT

Areas of Empowerment	Agree	Disagree	No opinion	Total
Skill Development	69-(46)	54-(36)	27-(18)	150-(100)
Improve the standard of living	78-(52)	42-(28)	45-(30)	150-(100)
Health awareness	93-(62)	12-(08)	45-(30)	150-(100)
Decision making in household	78-(52)	30-(20)	42-(28)	150-(100)
Leadership quality	90-(60)	24-(16)	21-(40)	150-(100)

Empowerment of women through SHG

The SHG program mainly focuses on empowerment of rural women and making them and politically capable. The above table analyses the empowerment of SHG women in the study area. Table 4 reveals the opinion of the respondents regarding the women empowerment through SHGs.The respondents were able to contribute towards their family income and they empowered benefits like get awareness on health,decision making authority,leadership quality and most important that they improved their living standard.

1.7% of the selected respondents have no occupation while after post stage only 3% of the respondents were in no occupation.

2. In Pre- stage, 42 percent of the respondents are engaged in other income generating activities

which increased to 47 percent in post- stage.

3. Before joining SHG 7 percent of the respondent were no income, while in SHG 27 percent were earning above Rs 5000.

4.87 percent of respondents are of the opinion that they have developed the saving habit after joining SHG. Whereas 82 percent of respondents revealed that their income level had increased after joining SHG.

5. In pre-SHGs stage, majority of respondents i.e. 23 percent are having income ranges upto

Rs.3,000 per month but after joining SHGs, 27 percent of respondents mentioned that theirincome have increased to Rs 5000 per month.

6.92 percent of respondents have opined that SHG that their life style changed whereas majority of respondents i.e. 97 percent of respondents have expressed their satisfaction that SHG have

helped them to live better life and their involvement in decisions making power.

7.46 percent of respondents were developed their skill,52 percent were improved their living standard, while 62 percent of respondents were aware of their health,52 percent opined that they were able to make decisions in their houses, and 60 percent of respondents leadership quality is improved.

CONCLUSION

Rural development is the basis of the rural empowerment for the development of the country. In this study SHG have served the cause for empowerment of women and it act as tool for development for women.SHG In many aspects SHG serve as platform for women empowerment.

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UGC APPROVED JOURNAL

A CASE STUDY OF DRINKING WATER AND SANITATION IN SANSAD ADARSH GRAM YOJANA (SAGY) VILLAGE

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ABSTRACT

This paper deals with the watershed management and harvesting of rainwater for drinking and agricultural purpose in Shivapuram Gram Panchayat of North and Middle Andaman District of Andaman and Nicobar Islands which was selected under Sansad Adarsh Gram Yojana (SAGY). The area of study was Shivapuram Grampanchayat of Andaman and Nicobar Islands and this panchayat consists five revenue villages such as Thiruvanchi Kulam, Dharmapur, Shivapuram, Padmanaba Puram, Panchavati with a population of 4000. The major source of drinking water is rainwater and its stored in the pond and check dam constructed by the Panchayat and water is being supplied through pipeline to the villages. Open air defecation is seems to be high (41.8 %) and among the villages in Panchavati around 90 households still using the open area. Out of the total households i.e 574 around 398 households (69.3 %) are not doing any kind of treatment for purifying the water and consuming as such and only 167 households (94.8 %) are boiling the water before consuming and 9 families (5.1%) are making filtration. With these preliminary problems of water and sanitation this panchayat has been selected under the Sansad Adarsh Gram Yojana (SAGY) by Shri Bishu Pada Ray, Member of Parliament, Andaman & Nicobar Islands.

KEYWORDS: *Water, Sanitation, Health, SAGY, KAP, FGD, Member Of Parliament Etc.,*

INTRODUCTION:

Water is food and fire is the eater of the food.
Fire is established in water and
Water is established in fire

-Taittiriya Upanishad 3.8

When you ask what water is, a person from chemistry background will tell that "Water is a chemical substance with the chemical formula H_2O". The same question is put forth infront of farmer he will tell that "Water is a Lifeline".. India is a developing country with 16% of the World's population, 2.4% of the World's land resources and 4% of the World's fresh water. On an average, every year India gets 4,000 billion cubic meters (BCM, 1 BCM = 1 cu. km) of water by way of mostly rainfall and some snowfall.

Water in Indian Constitution:

The Constitution of India lays down the legislative and functional jurisdiction of the Union, State and local Governments regarding 'Water'. Under the scheme of the Constitution, 'Water' is basically a State subject and the Union comes in only in the case of inter- state river waters. List II of the Seventh Schedule, dealing with subjects regarding which states have jurisdiction.

The National Water Policy of India (2002) recognizes that development and management of water resources need to be governed by national perspectives and aims to develop and conserve the scarce water resources in an integrated and environmentally sound basis. The policy emphasizes the need for effective and economical management of our water resources by intensifying research efforts in use of remote sensing technology and developing an information system.

WATER is a natural resource, fundamental to life, livelihood, food security and sustainable development. India has more than 17 % of the world's population, but has only 4% of world's renewable water resources with 2.6% of world's land area. There are limits on utilizable quantities of water, owing to uneven distribution over time and space.

There are challenges of frequent floods and droughts in one or the other part of the country. Growing population of fast pressure on utilizable water resources that may lead to deepening water conflicts among different user community. Watershed management envisages a systematic and scientific approach towards conservation, harvesting, proper utilization and safe disposal of flowing water on sustained basis (Chatterjee, K., 2014).

It has been witnessed through the last decade, an enormous interest in application of GIS and remote sensing in hydrology and water resources. Digital image processing technology provides access to spatio- temporal information on watershed from regional to global scales. New sensors and imaging technology have increased the capability of remote sensing in hydro-morphological applications (Bakir, M. et al.)

Human population of the Indian subcontinent is increasing, thereby, increasing the demand for water for domestic, agricultural and industrial use. However, the quantum of rainfall and surface water availability has remained the same; thus, resulting in over-exploitation of ground water, declining water table and deterioration of water quality (Ramakrishnan, D., et al 2009).

Water Problem in India.

In many parts of India, remote villages people have to walk 3-4 miles to fetch a murky and contaminated water for drinking purpose. India is a huge and diverse country with a population of over one billion people, of which over 30% live in poverty. With a rapidly growing population and rural to urban migration increasing, there are vast numbers of people living without sanitation and water. For every 1,000 children, 68 die before their fifth birthday, mainly from preventable diseases such as diarrhoea. Only 15% of the rural population has access to a toilet. In order to meet the Millennium Development Goal of halving the number of people without sanitation, access will need to be provided for 21 million people every year. Water is scarce, precious resource and a crucial parameter whose effective development, conservation and management is widely recognized as critical for sustainable economic growth and poverty reduction in many developing countries.

Safe water is one of the most important felt needs in public health in developing countries in the twenty first century. The year 2005 marked the beginning of the "International Decade for Action: Water for Life" and renewed effort to achieve the Millennium Development Goal (MDG) to reduce by half the proportion of the world's population without sustainable access to safe drinking water and sanitation by 2015. It is estimated by World Health Organization (WHO) and United Nations International Children's Emergency Fund (UNICEF) that 1.1 billion people lack access to improved water supplies and 2.6 billion people lack adequate sanitation.

Open air defaecation, a common practice among villagers, may lead to contamination of the water supply system and result in outbreaks of diarrhoeal disease. The practice of tethering animals close to human dwellings and the consequent proximity to animal faecal matter further enhances the risk of contamination of drinking water. The key to providing microbiologically safe drinking water lies in understanding the various mechanisms by which water gets contaminated, and formulating interventions at critical points to decrease and prevent contamination of drinking water

Study Area justification

The area of study was Shivapuram Grampanchayat of Andaman and Nicobar Islands and this panchayat consists five revenue villages such as Thiruvanchi Kulam, Dharmapur, Shivapuram, Padmanaba Puram, Panchavati with a population of 4000. The primary source of income in the villages is micro agriculture. Almost 80 per cent of the families owning a land in which coconut and areacanut trees are occupying the prime position alongwith the vegetable cultivation. In addition to that allied activities such as dairy, poultry, pisciculture and Goat rearing are also being undertaken. The major source of drinking water is rainwater and its stored in the pond and check dam constructed by the Panchcyat and water is being supplied through pipeline to the villages. This Grampanchayat has been selected under the Sansad Adarsh Gram Yojana (SAGY) by Shri Bishu Pada Ray, Member of Parliament, Andaman & Nicobar Islands.

METHODOLOGY

The study was conducted in the five villages of the adopted gram panchcyat by employing primary and secondary data in a well designed village level and family level base line format which has been developed by the SAGY wing of Ministry of Rural Development, Government of India to collect the primary information.

Followed by Knowledge, Attitude and Practice scale along with Focused Group Discussion (FGD) was used for creating more awareness among the rural masses on using latrine, washing hand with soap after using latrine and heat treatment of water before consuming to avoid diseases.

RESULTS AND DISCUSSION

TABLE 1 DISTRIBUTION OF THE RESPONDENTS IN VILLAGEWISE

Sl.No	Village	Household surveyed	Total families			Men Headed	Women Headed
			Gen	OBC	Others		
1	Thiruvanchi Kulam	52	46	6	0	39	13
2	Dharmapur	94	73	18	3	72	22
3	Shivapuram	148	134	11	3	118	30
4	Padmanaba Puram	124	118	3	3	93	31
5	Panchavati	156	123	27	6	124	32
	Total	574	494	65	15	446	128

Around 60 per cent of families have two children per family and 10 per cent of families have more than three Children. Out of the 574 household surveyed 494 are belong to General category and 65 are from OBC and 15 others category.

TABLE 2 DRAINAGE AVAILABILITY

Sl.no	Village	No Drainage	Open Drainage	Covered Drainage	Waste Collection	
					No	Yes
1	ThiruvanchiKulam	43	4	5	51	1
2	Dharmapur	52	34	8	91	3
3	Shivapuram	74	65	9	131	17
4	PadmanabaPuram	64	32	28	121	3
5	Panchavati	109	46	1	150	6
	Total	342	181	51	544	30

- Around 58 % of the surveyed area doesn't have proper drainage facilities.
- Due to stagnation of water, mosquito breeding is common.
- Waste collecting mechanism is also not available.

TABLE 3
AVAILABILITY OF HOUSEHOLD LATRINE AND COMMUNITY LATRINE

Sl.no	Village	Attached	Community	Open
1	Thiruvanchi Kulam	25	4	23
2	Dharmapur	74	1	19
3	Shivapuram	104	5	39
4	Padmanaba Puram (RRO)	51	4	69
5	Panchavati	64	2	90
	Total	318	16	240

- Open air defecation is seems to be high (41.8 %) and among the villages in Panchavati around 90 households still using the open area.
- In RRO, PadmanabaPuram also 69 households are not having the toilet.
- Community toilet found in Shivapuram, i.e the employees of the Betapur Saw Mill quarters are having the community toilet and cluster

TABLE 4
DISTRIBUTION OF THE STUDY AREA POPULATION ON WATER SUPPLY, STORAGE & PURIFICATION

Variables	**Characters**	**No (%)**
Main source of drinking water (n=574)	Piped Water supply (individual) Piped Water supply (community) Well	328 (57.14) 241 (41.9) 5 (0.87
Type of water supply (n=569)	Continuous Intermittent	495 (86.9) 79 (13.3)
Queuing for drinking water (n=574)	Yes No	34 (5.92 %) 540 (94.0 %)
Queuing for drinking water (n=34)	<10 min 10-20 min	20 (58.8 %) 14 (41.1 %)
Storage container (n=574)	Plastic bucket Plastic bottles Earthen pot Metal pot Others (glass container etc)	337 (58.7 %) 67 (11.6 %) 97 (16.8 %) 69 (12.0 %) 4 (0.6%)
Frequency of cleaning container (n=574)	Daily >1 time weekly Once weekly Monthly When container is dirty	166 (55.33) 56 (18.66) 54 (18.00) 4 (1.34) 20 (6.67)

Purification of drinking water (n=574)	Yes No	176 (30.6) 398 (69.3)
Method of purification of drinking water at household level (n=176)	UV radiation Boiling Filtration	0 167 (94.8) 9 (5.1)

About 328 households (57.14%) of the study population receiving piped drinking water supply and 241 households (41.9 %) are getting water through community pipe water supply which is located around 10-30 metre of distance from their house. Majority of the households i.e 495 (86.9 %) are getting water supply through panchayat continuously and remaining 79 households (13.3 %) are getting intermittent water supply. Only 5.92 % of the households opined that they had to go for a queue for fetching water for drinking purposes and remaining doesn't had any problem in collecting water. Out of the total households around 398 households (69.3 %) are not doing any kind of treatment for purifying the water and consuming as such and only 167 households (94.8 %) are boiling the water before consuming and 9 families (5.1%) are making filtration.

TABLE 5
SANITARY FACILITIES AND WASTE MANAGEMENT IN THE STUDY AREA

Variables	**Characters**	**No (%)**
Sanitary latrine (n=574)	Present Absent	334 (58.18) 240 (41.81)
Ownership of Sanitary latrine (n=334)	Owned Common	301 (90.11) 33 (9.88)
Defecation practice (n=574)	Open defecation Sanitary latrine	240 (41.81) 334 (58.18)
Reason for not using sanitary latrine (n=329)	Not present No practice Hesitation others	240 (72.94) 49 (14.89) 23 (6.99) 17 (5.16)
Disposal of solid waste (n=574)	Garbage pit Buried Burnt Open Panchayat service	97 (16.8) 27 (4.70) 21 (3.65) 381 (66.37) 48 (8.36)

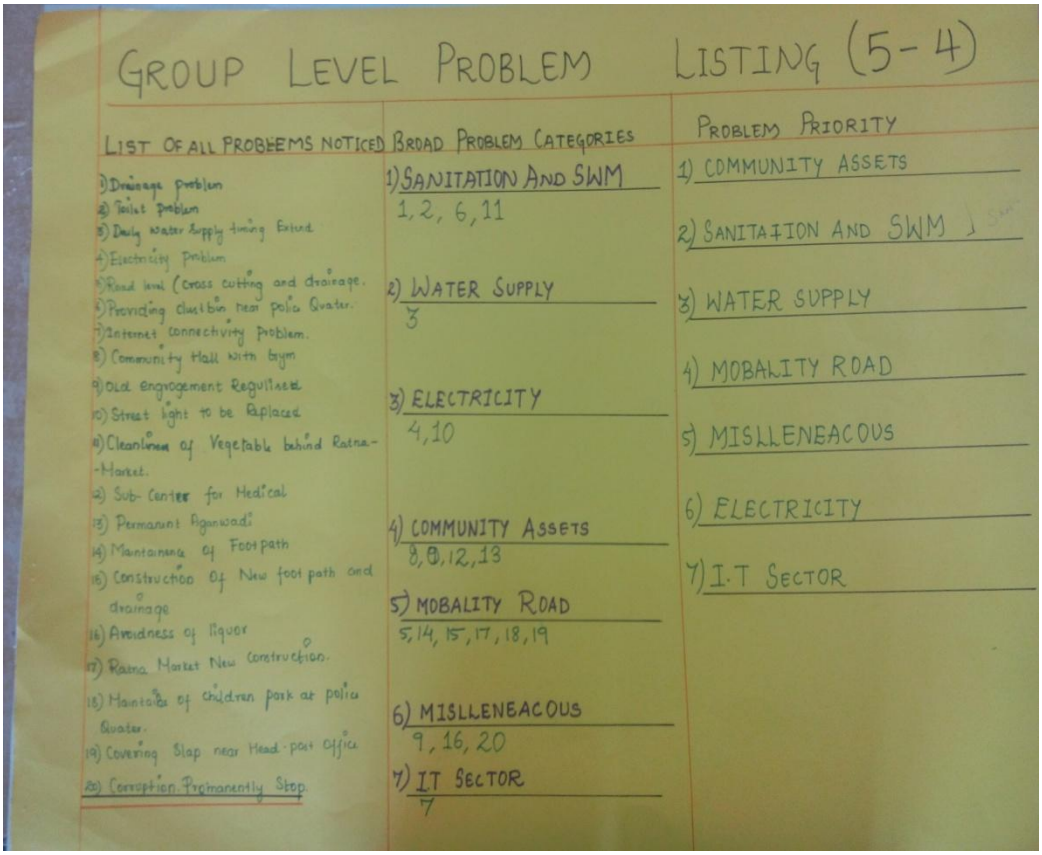
The above table clearly indicates that 240 households (41.81%) doesn't have the individual household latrines . and 329 are not using the latrine due to unavailability in their house 240 ((72.94 %), 49 opined not having practice and 23 are having hesitation to use the latrine and 17 opined for other reasons.

As far as waste disposal is concerned 381 (66.37 %) are throwing in the open area and 97 (16.8 %) are making a garbage pit and decomposing the same in their garden land. Otherwise majority are throwing and burning the waste in the open place and panchcyat has also collecting the waste from the collection centre earmarked by them

Focussed Group Discussion with the Rural Women of Shivapuram on water and sanitation.

- While survey found that 70 % of the respondents are using encroached land for their dwelling and for agricultural purposes. Out of which majority are from revenue encroachment and some from forest encroachment. The Panchayat should identify the eligible household of both BPL and ABL under the encroachment category for providing assistance to construct pucca house under the Prime Minister AawasYojana and also extend the assistance under SBM mission for constructing household latrine to those who do not have**.** Community Toilet covering 12 families with additional septic tank should be constructed in Panchavati and RRO Fisherman Colony.
- The water supplied by the Panchayat through pipeline is untreated and that invites various waterborne diseases. The RO plant should be installed with the help of MPLAD, APWD, PRI and through CSR of various Navaratna companies of GOI and local philanthropist and business firms. The treated water shall be supplied to the public on nominal rate i.e 10 litres for Rs.3-5 and the amount is to be used for maintenance. The waste water of the RO plant shall be connected through outlet and after treating shall be used for other uses.
- Drainage system in the villages of panchcyat is still in worst condition as there is no proper draining system is established. The waste water released from the houses is just percolated at their vicinity and becomes a breeding centre for mosquitos. Though this village has 574 houses, only 318 houses (55.4 %) are provided with toilet facilities, 16 houses using the community toilets and 240 (41.8 %) families are still adopting open defecation system in the village. An exclusive scheme must be prepared for awareness creation, construction of toilets for rest of all the households and follow-up action through involving voluntary organisations or Panchayati raj institution in the village.
- Other than the focused group discussion the participating women were divided into three different groups and they were asked to inform the problems in their locality. The group were named as A, B and C. All the group members were given equal time to inform the problem and that has been noted by the moderator. Followed by that were listed in the chart paper by the moderator and for the particular problem ranking was also dong by the members in the group and finally they prioritized the particular problem which require urgent attention.
- In all the three groups A, B & C the major problem faced the women were Drinking water, Sanitation, Sewerage and Toilet. These three problem were taken into the account and informed to the Panchayat Secretary. The entire exercises was done in the presence of the Pradhan (President) Grampanchcyat and Hon'ble Member of Parliament.

GROUP A

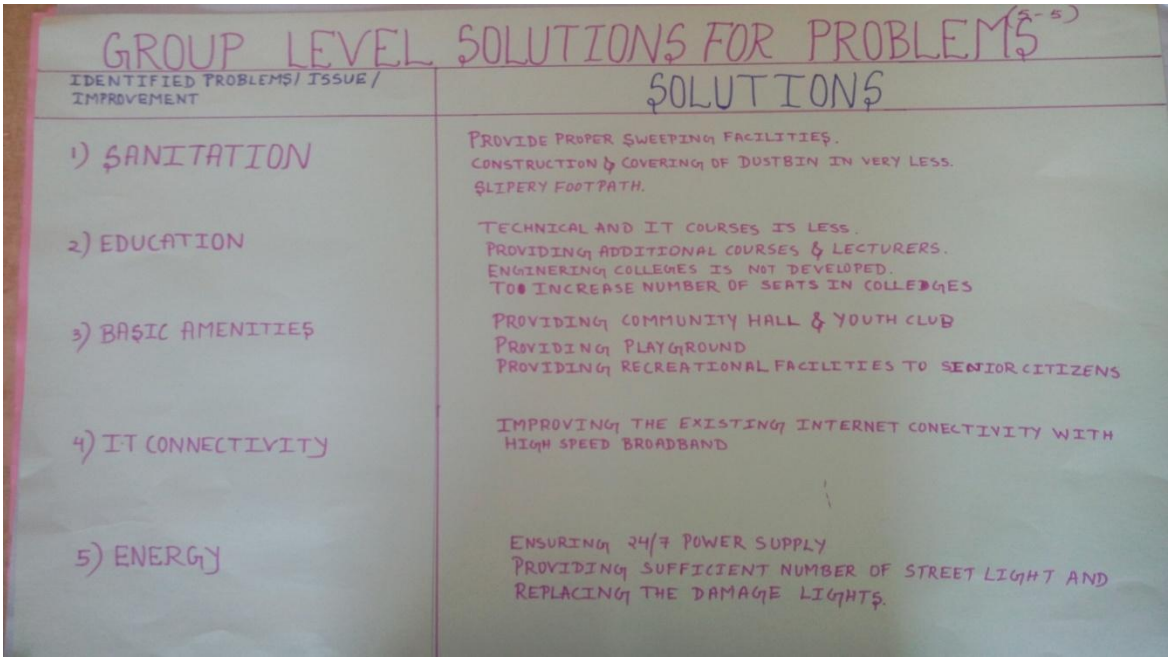


GROUP LEVEL PROBLEM LISTING (5-4)

LIST OF ALL PROBLEMS NOTICED	BROAD PROBLEM CATEGORIES	PROBLEM PRIORITY
1) Drainage problem 2) Toilet problem 3) Daily water supply timing Extend 4) Electricity problem 5) Road level (cross cutting and drainage. 6) Providing dustbin near police Quater. 7) Internet connectivity problem. 8) Community Hall with Gym 9) Old engrogement Regulated 10) Street light to be Replaced 11) Cleanliness of Vegetable behind Ratna-Market. 12) Sub-Center for Medical 13) Permanent Anganwadi 14) Maintainance of Footpath 15) Construction of New foot path and drainage 16) Aweidness of liquor 17) Ratna Market New Construction. 18) Maintains of children park at police Quater. 19) Covering Slap near Head post office 20) Corruption Permanently Stop.	1) SANITATION AND SWM 1, 2, 6, 11 2) WATER SUPPLY 3 3) ELECTRICITY 4, 10 4) COMMUNITY ASSETS 8, 9, 12, 13 5) MOBALITY ROAD 5, 14, 15, 17, 18, 19 6) MISLLENEACOUS 9, 16, 20 7) IT SECTOR 7	1) COMMUNITY ASSETS 2) SANITAION AND SWM 3) WATER SUPPLY 4) MOBALITY ROAD 5) MISLLENEACOUS 6) ELECTRICITY 7) I.T SECTOR

Figure 1

GROUP B

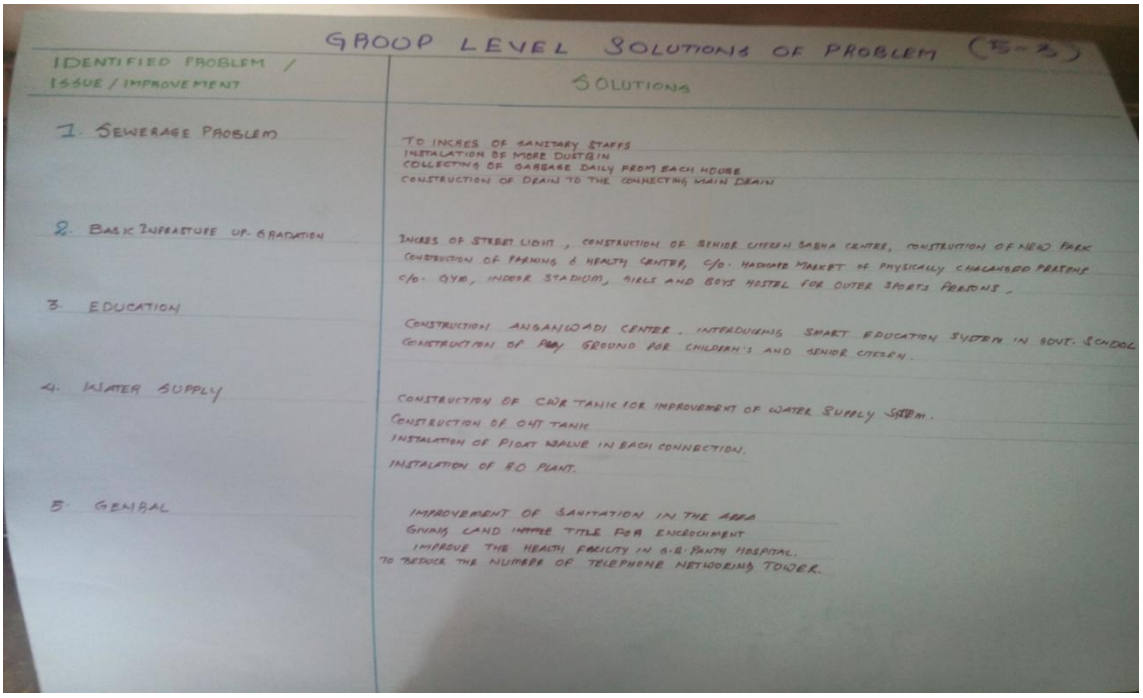


GROUP LEVEL SOLUTIONS FOR PROBLEMS (5-5)

IDENTIFIED PROBLEMS/ ISSUE / IMPROVEMENT	SOLUTIONS
1) SANITATION	PROVIDE PROPER SWEEPING FACILITIES. CONSTRUCTION & COVERING OF DUSTBIN IN VERY LESS. SLIPERY FOOTPATH.
2) EDUCATION	TECHNICAL AND IT COURSES IS LESS. PROVIDING ADDITIONAL COURSES & LECTURERS. ENGINERING COLLEGES IS NOT DEVELOPED. TO INCREASE NUMBER OF SEATS IN COLLEDGES
3) BASIC AMENITIES	PROVIDING COMMUNITY HALL & YOUTH CLUB PROVIDING PLAYGROUND PROVIDING RECREATIONAL FACILITIES TO SENIOR CITIZENS
4) IT CONNECTIVITY	IMPROVING THE EXISTING INTERNET CONECTIVITY WITH HIGH SPEED BROADBAND
5) ENERGY	ENSURING 24/7 POWER SUPPLY PROVIDING SUFFICIENT NUMBER OF STREET LIGHT AND REPLACING THE DAMAGE LIGHTS.

Figure 2

GROUP C


GROUP LEVEL SOLUTIONS OF PROBLEM (5-3)

IDENTIFIED PROBLEM / ISSUE / IMPROVEMENT	SOLUTIONS
1. SEWERAGE PROBLEM	TO INCRES OF SANITARY STAFFS INSTALATION OF MORE DUSTBIN COLLECTING OF GARBAGE DAILY FROM EACH HOUSE CONSTRUCTION OF DRAIN TO THE CONNECTING MAIN DRAIN
2. BASIC INFRASTUCTURE UP-GRADATION	INCRES OF STREET LIGHT, CONSTRUCTION OF SENIOR CITIZEN SABHA CENTRE, CONSTRUCTION OF NEW PARK CONSTRUCTION OF PARKING & HEALTH CENTER, C/O. HARDWARE MARKET OF PHYSICALLY CHALLANGED PERSONS C/O. GYM, INDOOR STADIUM, GIRLS AND BOYS HOSTEL FOR OUTER SPORTS PERSONS,
3. EDUCATION	CONSTRUCTION ANGANWADI CENTER, INTERDUCING SMART EDUCATION SYSTEM IN GOVT. SCHOOL CONSTRUCTION OF PLAY GROUND FOR CHILDREN'S AND SENIOR CITIZEN.
4. WATER SUPPLY	CONSTRUCTION OF CWR TANK FOR IMPROVEMENT OF WATER SUPPLY SYSTEM. CONSTRUCTION OF OHT TANK INSTALATION OF FLOAT VALVE IN EACH CONNECTION. INSTALATION OF RO PLANT.
5. GENRAL	IMPROVEMENT OF SANITATION IN THE AREA GIVING LAND PATTA TITLE FOR ENCROCHMENT IMPROVE THE HEALTH FACILITY IN G.G. PANTH HOSPITAL. TO REDUCE THE NUMBER OF TELEPHONE NETWORKING TOWER.

Figure 3

Focused Group Discussion

Figure 4

INTERACTION OF MEMBER OF PARLIAMENT SHRI BISHNU PADA RAY

Figure 5

CONCLUSION:

The study area is located in the mainside of the road which leads to the North Andaman of Andaman & Nicobar Islands. Though the villages are located near the Tehsil headquarters the basic amenities like drinking water and sanitation are not taken care of properly which require urgent attention. There is a strong link between the literacy level and the usage of latrine. In the study area its found that those who are having the toilet in their house the literacy rate was high and also they are making compost pit for waste. Further its noted that they are making the water through heating and filtering before consuming it. But this case is entirely absent among the illiterate families. Therefore the KAP Scale was used to assess the level of knowledge on water borne diseases, safe handling of water and using latrine was assessed. A powerpoint presentation was made to the selected participants followed by the simple questions were raised to know the acquired knowledge level on various health and sanitation and water issues. Total 30 women were selected and out of them 27 are able to give correct answer in almost all questions and developed peer group pressure for using toilet and waste management in the area.

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FORMULATION, STANDARDIZATION AND SHELF LIFE STUDY OF BANANA FLOUR INCORPORATED PAPPADAM

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ABSTRACT

Product formulation is an act of formulating to suit a particular purpose within a given industry or industries, or the product itself. New product development is the process of developing, designing, or creating and refining a product.In the present study Banana Flour was incorporated Pappadam at four variations 5%, 10%, 15%, and 20% along with standard, subjected to sensory analysis and most acceptable proportion was selected and subjected for nutrient analysis and shelf life studies. The nutrient value of fiber and carbohydrate was higher in the sample product when compared to the standard product. The standard and selected proportion of Banana Flour incorporated Pappadam packed in Zip lock cover and aluminum foil was kept in room temperature and analyzed for a period of 12 days. There was no microbial growth in both standard and sample immediately after preparation and on 1^{st}, $3^{rd,}$ $7^{th,}$ and 11^{th} day of storage study The sensory analysis of products on storage, Banana flour incorporated Pappadam had a good shelf life up to 12 days . The mean sensory score of popularization, most of the people showed a positive attitude towards the product.

KEYWORDS: *Banana Flour, Standardization, Sensory Attributes, Nutrient Content Of Banana Flour.*

INTRODUCTION

Food is any substance consumed to provide nutritional support for the body. It is usually of plant or animal origin, and contains essential nutrients, such as carbohydrates, fats, proteins, vitamins or minerals. The substance is ingested by an organism and assimilated by the organism's cells in an effort to produce energy, maintain life or stimulate growth **(Stanley, 2008).**

The design of various food products focuses on identification of the structure and composition of food ingredients that have the desired characteristics. A thorough understanding of the functions and properties of the various ingredients is the basic key to formulating for the desired attributes. The revealing of structural properties of a food product is the main task of food formulation problem **(Kather, 2012).**

In the green stage, banana is of great value and suggested for many disease conditions. When it is in the green stage, banana is considered to be a functional food of the prebiotic type **(Mastro et.al., 2007**). The most important factor for considering green bananas as a prebiotic food is its resistant starch content, characterized by the portion of the granule or its degradation products that are not digested or absorbed in the small intestine and are fermented in the large intestine (**Teixeira et al.,1998 and Acevedo et al.,2012**).

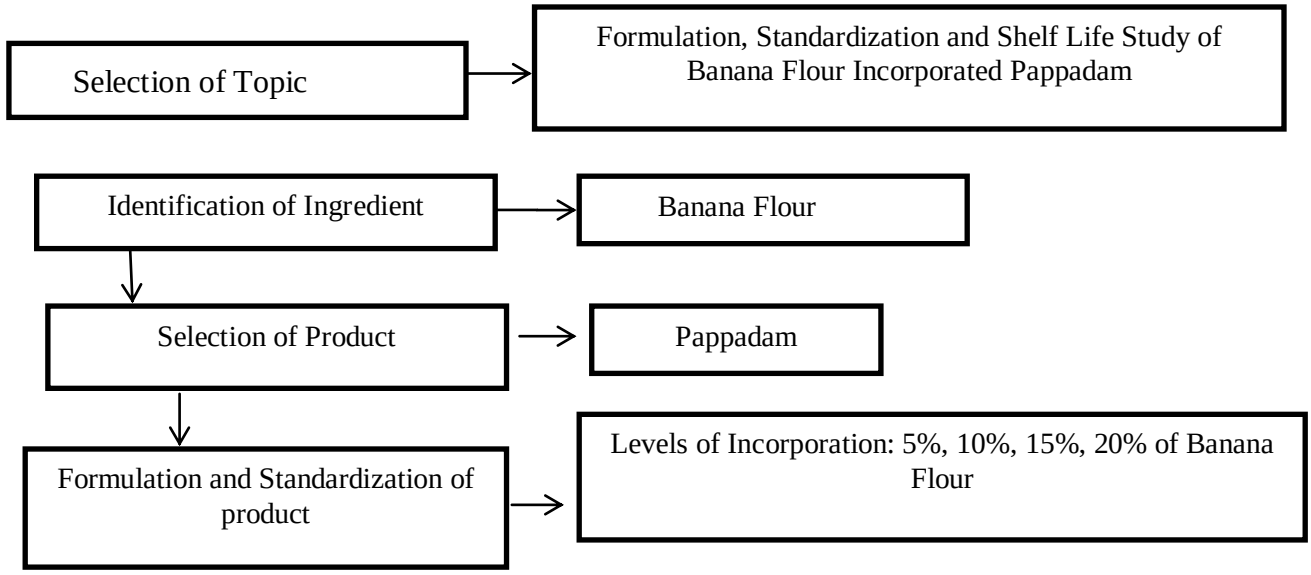
OBJECTIVES

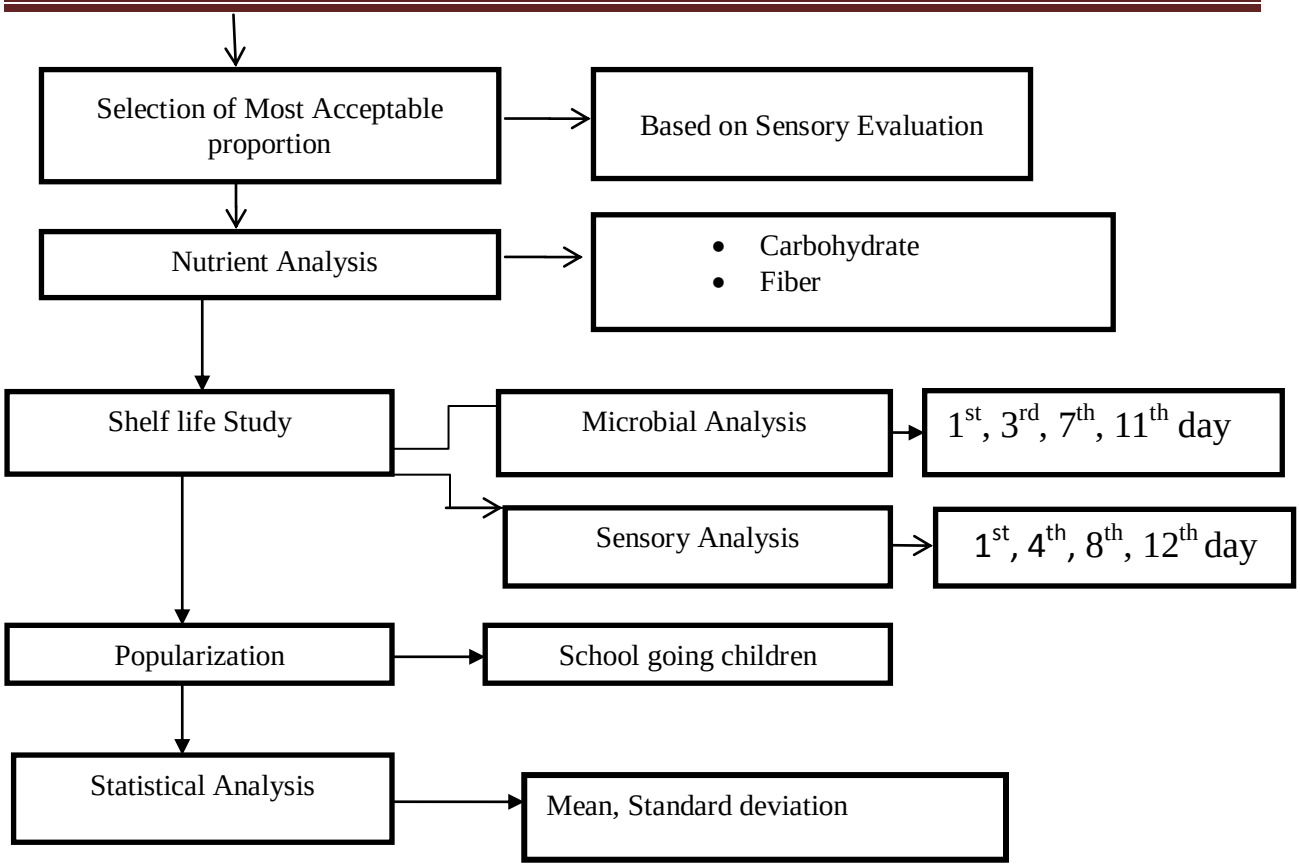
- To formulate and standardize the Banana Flour incorporated Pappadam
- To select the most acceptable proportion after sensory evaluation.
- To ascertain shelf-life of selected food products.
- To analyze the Fiber and Carbohydrate content of Banana Flour incorporated Pappadam.
- To popularize nutritional benefits of Banana Flour incorporated Pappadam among School going children.

METHODOLOGY

The experimental procedure adopted for the present study is given in the form of flow chart in **Figure 1.**

Methodology





RESULTS

Mean Sensory Analysis of Standard and Banana Flour Incorporated Pappadam

The mean sensory scores obtained by standard and varying proportions of banana flour incorporated pappadam is given in Table I

TABLE I
MEAN ORGANOLEPTIC SCORE OBTAINED BY VARYING PROPORTION OF PAPPADAM

S.No.	Criteria	Max Score	Standard Mean±SD	Sample A Mean±SD	Sample B Mean±SD	Sample C Mean±SD	Sample D Mean±SD
1	Appearance	5	5±0	4.83±0.37	4.7±0.46	3.7±0.83	3.1±0.80
2	Colour	5	5±0	4.7±0.46	3.76±0.72	3.23±0.81	2.76±0.76
3	Texture	5	5±0	4.83±0.37	4.56±0.56	3.83±0.79	3.16±0.83
4	Flavour	5	5 ±0	4.7±0.46	4.63±0.55	3.76±0.62	3.43±0.67
5	Taste	5	5±0	4.56±0.50	3.53±0.50	2.73±0.63	2.66±0.54
	Overall acceptability			4.94±0.03	4.88±0.05	4.84±0.03	4.77±0.06

From the above Table it is observed that Sample A had the highest mean score in all the criteria when compared to other samples like sample B, C and D. So Sample A was chosen as the best product and subjected `to further analysis.

Nutrient Analysis of Banana Flour Incorporated Pappadam

Nutrient analysis refers to the process of determining the nutritional content of foods and food products. The details regarding nutrient analysis of Banana Flour incorporated Pappadam is given in **Table II**

TABLE II
NUTRIENT ANALYSIS OF THE SELECTED PRODUCT AND STANDARD PRODUCT

SI.No	NUTRIENT	STANDARD (per 100g)	SAMPLE (per 100g)
1	Fiber (g)	6.23	6.73
2	Carbohydrate (g)	65.46	65.66

From the above Table it is observed that the Fiber content was 6.73g/100g in selected product and 6.23g/100g fiber in standard product. Carbohydrate content was 65.66g/100g in selected product and 65.46 g/100g carbohydrate in standard product. From the results, it can be concluded that there is a slight increase in fiber and carbohydrate content on incorporation of banana flour.

Shelf life study

Shelf life is the recommended maximum time for which products can be stored during which the defined quality of a specified proportion of the goods remain acceptable under expected conditions of distribution, storage and display. Use prior to the expiration date does not guarantee the safety of a food or drug and a product is not necessarily dangerous or ineffective after the expiration date. For food, shelf life from expiration date; the former refers to food quality the later to food safety. A product that has passed it shelf life might still be safe, but quality is no longer guaranteed.

The standard and selected products were analyzed for its shelf life period by evaluating their sensory attributes and total microbial load after packing with Aluminum foil and Zip Lock cover, at an interval of 4 days for a period of 12 days.

Microbial Analysis of the Standard and Selected Banana Flour Incorporated Pappadam on storage.

Microbial analysis is the primary indicator in shelf-life studies. Microbiological testing on food products includes presence/ absence of pathogens, total coli form and aerobic plate counts. The details regarding the microbial content in standard and selected proportion of Banana Flour Incorporated Pappadam on storage is given in **Table III**

TABLE III
MICROBIAL LOAD OF THE STANDARD PRODUCT AND SELECTED PRODUCT ON STORAGE

Days	Name of the Product	Indicator Test Result (CFU / gram) and Interpretation/Standard Plate Count. Aluminum foil	Indicator Test Result (CFU / gram) and Interpretation/Standard Plate Count. Zip lock cover

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		G	M/S	US	P H	G	M/S	US	P H
1ST day	Standard	✓	-	-	-	-	-	-	-
	Sample	✓	-	-	-	-	-	-	-
3rd day	Standard	✓	-	-	-	-	-	-	-
	Sample	✓	-	-	-	-	-	-	-
7th day	Standard	✓	-	-	-	-	-	-	-
	Sample	✓	-	-	-	-	-	-	-
11h day	Standard	✓	-	-	-	-	-	-	-
	Sample	✓	-	-	-	-	-	-	-
Remark	On the 12th day after sampling NO contamination was found.					On the 12th day after sampling NO contamination was found.			
Organism identified	No Bacterial growth was observed.					No Bacterial growth was observed.			

(Good= **G**; Satisfactory = **S**; Marginal = **M**; Unsatisfactory = **US**; Potentially Hazardous = **PH)**

From the above Table it is clear that there was no microbial growth in both standard and sample immediately after preparation and on 1st,3rd , 7th and 11th day. So, from the result we can conclude that the product is safe for consumption microbially on storage in both Zip lock cover and Aluminium foil.

Sensory Analysis of the Standard and Selected Banana Flour incorporated Pappadam on storage.

Sensory analysis implies sensory of taste, smell, and other senses. Sensory analysis is used to compare similarities or differences in a range of dishes or products, evaluate a range of dishes or products, analyze food samples for improvements ,example is acceptable vs. unacceptable, explore specific characteristics of a product , whether a final food product meets its original specification, provide feedback data to enable informed decisions to be made.

The details regarding the mean overall scores of standard and Banana Flour incorporated Pappadam on storage in Zip lock and aluminium foil given in **Table IV**

TABLE IV
COMPARISON OF STANDARD AND SELECTED BANANA FLOUR INCORPORATED PAPPADAM ON STORAGE IN ALUMINIUM FOIL AND ZIP LOCK COVER

S.No	Days	Zip lock cover		Aluminium Foil	
		Standard	Sample	Standard	Sample
1	1	4.94±0.03	4.88±0.05	4.92±0.03	4.78±0.05
2	4	4.91±0.01	4.84±0.03	4.81±0.01	4.64±0.03
3	8	4.85±0.04	4.85±0.04	4.75±0.04	4.75±0.04
4	12	4.84±0.03	4.77±0.06	4.74±0.03	4.67±0.06

Above Table clearly shows that there was a negligible decrease in standard and sample on storage in Zip lock cover and Aluminum foil. So it can be concluded that both packaging material are equally good in retaining the sensory attributes of pappadam

Popularization of the Selected Product

Popularization among public helps to determine their food habits, preference. The Banana Flour incorporated Pappadam was popularized among the school going children in RVS school, Sulur, Tamil Nadu and the results are given in **Table V**

TABLE V
POPULARIZATION OF BANANA FLOUR INCORPORATED PAPPADAM

No.	QUESTION	YES	%	NO	%
1	Constipation is common problem among school children	26	86	4	13.3
2	Fiber is a most important for normal bowel movement	20	66	10	33.3
3	About pappadam	30	100	-	-
4	Daily consumption pappadam with meals	2	6.6	28	93.3
5	Variety of pappadam in Tamil Nadu	25	83.3	5	16.6
6	Consumption of Banana Flour	3	10	27	90
7	Banana Flour is rich in Fiber	22	73.3	8	26.6
8	Banana Flour is edible	7	23.3	23	76.6
9	Banana flour incorporated product in market	30	100	-	-
10	Recipes of Banana Flour	2	6.6	28	93.3

The above table clearly shows that 26 children were aware of constipation problem. About 20 children knew fiber help in normal bowel movement. All the children knew about pappadam. Twenty five children were aware about different varieties of pappadam. Twenty two children were aware of fiber content in banana flour. Seven children are aware about banana flour are edible. Thirty children have seen the banana flour incorporated product in market. Two children consumed banana flour in recipes made at their household.

The details regarding the acceptability of Banana Flour Incorporated Pappadam among school children is given in Figure **2.**

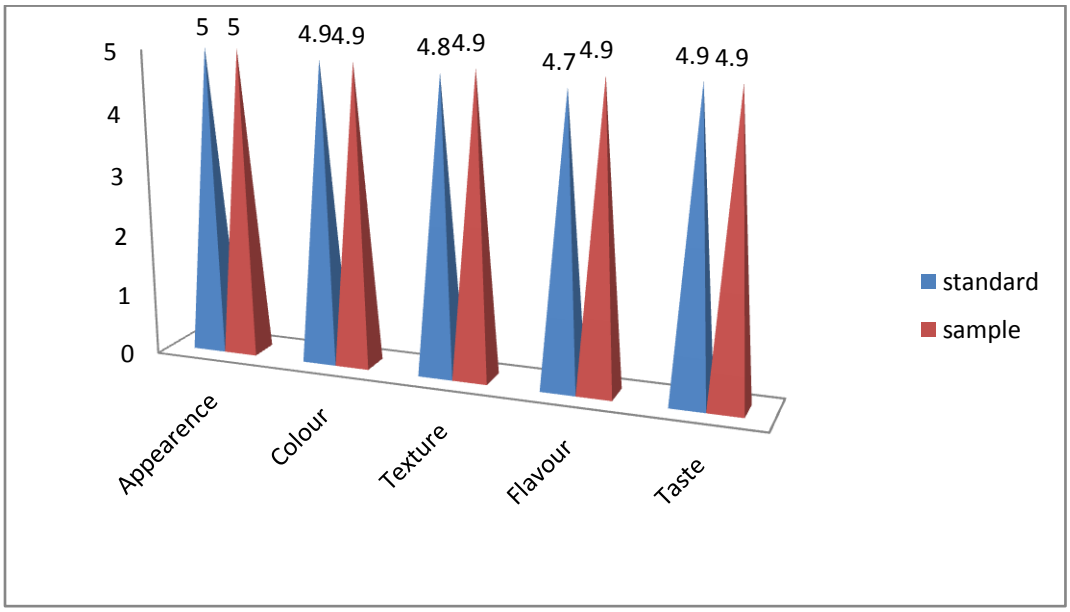

Figure 2

Mean Score for Sensory Analysis on Popularization

From the above Figure it is observed that Banana Flour incorporated Pappdam had a mean score of 4.97±0.18, 4.97±0.18, 4.93±0.25, 4.97±0.18 5±0 for appearance. Color, texture, flavor and taste respectively. The mean sensory score of popularization showed all the selected subjects showed preference towards the product.

CONCLUSION

From the study, it is concluded that the Banana Flour incorporated Pappadam with 5% of the Banana Flour was accepted in studies. The prepared product is high in Fiber and Carbohydrate when compare to the standard product. The prepared product is acceptable till 12th day without any microbial deterioration if it is stored in Aluminum foil and Zip lock cover properly. The cost of the prepared best product was slightly higher than standard. In the popularization study, the entire participants accepted the product

RECOMMENDATIONS

- Studies can be carried out by incorporating Banana Flour in other food products.
- Long term shelf life can be done using modified atmospheric storage.

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Asian Journal of Multidimensional Research (AJMR)

(Double Blind Refereed & Reviewed International Journal)

UGC APPROVED JOURNAL

FRENCH CULTURE AND CUISINES IN PUDUCHERRY

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ABSTRACT

The Union Territory Of Puducherry Has Its Speciality As It Is Connected To French Culture As It Has Been Colonised Long Before By The French Dutch And English. Puducherry Previously Known As Pondicherry, Pondy And Little France Too As The French Had A Great Impact On The Territory And Its Residents. Years After The French Left Pondicherry, The Connections Are Still Strong. The French Architectural Buildings Are Preserved The Customs Are Practiced And Food Is Still Prevalent In Many Hotels And The French People Come To Pondicherry To Enjoy Their Winter Vacations And Avoid The Snow And Chillness In France. The Streets Which Are Narrow And Connected To One Another Are Just Like Thae French Roads And The Shops And The Boutiques Are More French Styled Selling French Scarfs And Perfumes . The Sea Shore Hotels, The Cafeterias And The Bakeries Pastries Shops Are All Designed Like Those Seen In France. The Buildings Found Near The Sea Side Is Called The White Town And Is Mostly Painted In Yellow And White And Is So Varied Beautiful With The French Architecture Which Shows Arch And French Windows And Door Patterns. Most Of The Locals Speak French And The Still Use French Words In Their Day To Day Life. The Streets Named After The French Politicians And Leaders Is An Honour Paidbto The French With Regard To Their Service In Pondicherry. The Eglise De Notre Dame Des Anges Church Still Celebrates Mass In French Once A Week. The Botanical Garden, Pondicherry Museum, French War Memorial, Gelato Factory, And Cafés Serving French Crêpes Are Some Of The Places You Can Visit. The French Influence Is Strong. The Streets Still Have French Names And Some Restaurants Are Owned By French Nationals. French Hotels Are Numerous In Pondicherry. In A Survey Conducted It Was Found That Nearly 15 Hotels Are Named French In The Main Town And Are Very Reputed. They Are The Hotel De L'orient, Hotel Bon Sejour, Hotel Du Parc, Le Dupleix, Le Pondy, Le Royal Park, The Promenade, Palais De Mahe, Olive De Villa, Les Boganveillea, Les Chateau, Dune Mansion Calve, Hutte Royal Resort, Villa A La Mode, Bonjour Bonheur Ocean Spray.

The Hotels Are Famous For Their French Name Architecture And The French Cuisines.The Hotels Were Studied For Their French Recipes And The Most Demanded Recipes And Hotel Famous Famous Recipes Were Recorded. The Impact Of French Culture And Food In Pondicherry Invites Tourists From Various Parts Of The World And Makes Pondicherry A Very Special Place.

KEYWORDS: *French, Cuisine, Culture, Architecture, Recipe*

INTRODUCTION:

The Union territory of Puducherry has its speciality as it is connected to French culture as it has been colonised long before by the French Dutch and English. Puducherry previously known as Pondicherry, Pondy and Little France too as the French had a great impact on the territory and its residents. Years after the French left Pondicherry, The connections are still strong. The French architectural buildings are preserved the customs are practiced and food is still prevalent in many hotels and the French people come to Pondicherry to enjoy their winter vacations and avoid the snow and chillness in France. The streets which are narrow and connected to one another are just like thae French roads and the shops and the boutiques are more French styled selling French scarfs and perfumes . The sea shore hotels, the cafeterias and the bakeries pastries shops are all designed like those seen in France. The buildings found near the sea side is called the white town and is mostly painted in yellow and white and is so varied beautiful with the French architecture which shows arch and French windows and door patterns. Most of the locals speak French and the still use French words in their day to day life.The streets named after the French politicians and leaders is an honour paidbto the French with regard to their service in Pondicherry. The Eglise de Notre Dame des Anges church still celebrates mass in French once a week. The Botanical Garden, Pondicherry Museum, French War Memorial, gelato factory, and cafés serving French crêpes are some of the places you can visit. The French influence is strong. The streets still have French names and some restaurants are owned by French nationals.

Today, Pondicherry still has a community of French people living in the city and French is also an official language. There are 6,500 French people registered in South India, and of these about 5,500 are in Pondicherry. The French Indians are the wealthiest group in Pondicherry (aside from those running the Aurobindo Ashram), deriving much of their income from pensions (some 20 percent are retirees), Social Security, welfare, and other programs of the French government. They are also entitled to emigrate to France, although few do so and the French government does not encourage the practice. (Wikipedia)

French companies in India are present in various sectors such as energy, IT, environment, automobiles, traditional manufacturing industries like St Gobain, and engineering. They also have exporters of fish and other seafood, textiles, leather and luxury goods. L'Oréal has a presence in India, and Louis Vuitton has taken a stake in Hidesign in Pondicherry.(Gautier, François, 2005)

The French community in India is a consolidated group, brought together by a number of different organizations that aim to promote French culture in India. The French Club of Bombay is an organization that unites French speakers living in the city. The club meets at different locations in various parts of Mumbai so that meetings are conveniently located and have a good attendance. (Gautier, François, 2008)

The Architecture of Pondy is so connected to French. The French styled architecture is suited for this town because of the salubrious weather with its long and huge windows with vertical cast iron bars as grills, ornate balconies, large courtyards, circular arched gates, columns, engaged columns and stucco designs.

The houses built by the French are French styled and they are painted yellow and white and they have big French doors and windows. INTACH, is responsible for conserving these buildings. , there are also a few VMF (Vieilles Maisons Francaises) awarded houses in White Town. VMF is a French organisation which works towards restoration and conservation of French architecture across the world. The influence of the French culture can lso be seen in street art around the town and in the decor of most houses. Much of the decor has a unique Franco-Tamil influence. (Slow Poke, 2015).

STUDY ON FRENCH CULTURE AND FOOD IN PUDUCHERRY

The French Culture in Pondicherry is very fascinating and invites a lot of tourists to spend their winter vacations and have a relaxing stay at the sea shore hotels of Puducherry and enjoy the French cuisine and not feel away from home.

Thus a study on the French Culture and food was felt interesting to study as the investigator is a resident of Pondicherry.

A survey was decided to be conducted to identify the Hotels with French name and it was found that nearly 15 Hotels in Puducherry have a name in the French language and is also very prominent among the customers.

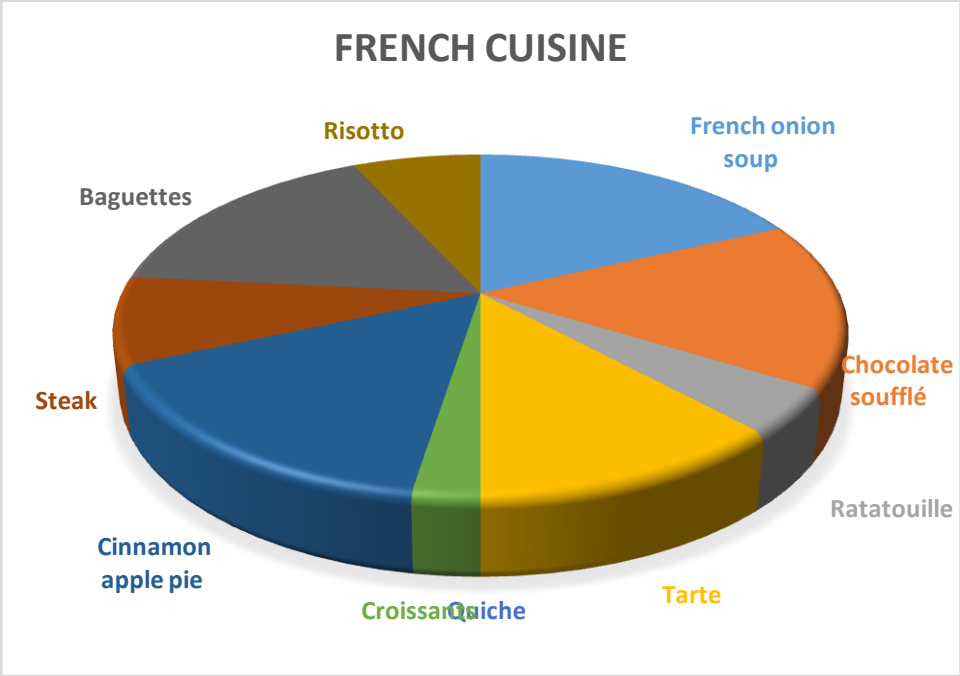
The culture is an undiluted confluence of the Tamil and the French. French hotels are numerous in Pondicherry. In a survey conducted it was found that nearly 15 hotels are named French in the main town and are very reputed. They are the Hotel de L'Orient, Hotel Bon Sejour, Hotel Du Parc, Le Dupleix, Le Pondy, Le Royal park, The Promenade, Palais de Mahe, Olive de Villa, Les Boganveillea, Les Chateau, Dune Mansion Calve, Hutte Royal Resort, Villa a la mode, Bonjour Bonheur ocean spray. The hotels are famous for their French name architecture and the French cuisines.The Hotels were studied for their French recipes and the most demanded recipes and hotel famous famous recipes were recorded.

These fifteen hotels were surveyed to identify the French cuisines. About 10 French recipes were identified

- French onion soup
- Chocolate soufflé
- Ratatouille
- Tarte
- Quiche
- Croissants
- Cinnamon apple pie
- Steak
- Baguettes and breads
- Risotto

Among the ten hotels surveyed it was found that French onion soup was found in 100 percent of the Hotels, Chocolate soufflé was found in 88 percent of the Hotels, Ratatouille was found

only in 24 percent of the hotels, Tarte was found in 66 percent of the hotels, Quiche a rare French recipe was found in 14 percent of the hotels, Croissants a type of stuffed bread was found in about 88 percent of the hotels, Cinnamon apple pie is a dessert which is found in about 46 percent of the hotels, Steak a famous delicacy of meat was found in 92 percent of the Hotels, Baguettes and breads are different styles of hotels which are found in 80 percent of the hotels and Risotto is found only in 38 percent of the hotels.



CONCLUSION

Pondicherry being a multi-ethnic multi linguistic and multi cultured area ,has its French dominance in Puducherry and the Hotels of Puducherry has its impact of French architecture culture and the cuisines are so prevalent inviting the French tourists and also tourists around the world. The impact of French culture and food in Pondicherry invites tourists from various parts of the world and makes Pondicherry a very special place.

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Asian Journal of Multidimensional Research (AJMR)

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UGC APPROVED JOURNAL

EFFECT OF SUPPLEMENTATION OF NUTRIENT RICH COOKIES FOR DEPRESSION IN PREMENSTRUAL SYNDROME

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ABSTRACT

Premenstrual symptoms (PMS), even though mild to moderate in intensity might have an adverse effect on the daily activity and work productivity. These symptoms result in the deterioration of interpersonal relationships, personal health and functional efficacy of the body. That may result in depression and other related mental disturbance also. Study area- Semi-urban area of Coimbatore; Population- Reproductive age women; sample size-100; Research design- A quasi experimental two group pretest-post test design; sampling technique-purposive sampling; Tools used- A structured questionnaire- for gathering general information; standard tool for depression. From the study it was noted that the supplementation of nutrient dense cookies was able to reduce the severity of depression that was prominent in the luteal phase of menstrual cycle or during Premenstrual Syndrome (PMS).

KEYWORDS: *Supplementation, Premenstrual, Interpersonal*

INTRODUCTION:

Fertility is the natural human capability of producing offspring. A woman's fertility peaks in the early and mid twenties, after which it starts to decline, being accelerated after the age of 35 years with advanced maternal age causing an increased risk of female infertility. This period is also popularly known as the age and stage of fertility problems like Premenstrual Syndrome (Kumari, et. al., 2015). Premenstrual Syndrome (PMS) refers to a group of menstrually related disorders, characterized by physical and mental symptoms that occur in the luteal phase of menstrual cycle. These symptoms result in the deterioration of interpersonal relationships, personal health and functional efficacy of the body. That may result in depression and other related mental disturbance also. Halberich (2004) mentioned that approximately eight per cent to 15 per cent of reproductive age group women suffered from PMS. Potter *et al*., (2009) and Wittchen *et al*., (2010) reported that more than 20 per cent of menstruating women experienced PMS to a degree that warrants clinical treatment.

PMS is probably multi-factorial and it is more complicated than one or two supplements or mineral deficiencies might cause. Dietary intakes of certain micronutrients including Calcium, VitaminD, Thiamine and riboflavin have been associated with the development of PMS (Bertone-Johnson *et al*., 2005 and Chocono- Bedoya, 2011). Iron, Magnesium, Copper, Manganese, Potassium, Zinc and Sodium are involved in the patho-physiology of PMS through a variety of mechanism.. Blood level of Potassium, Magnesium and Zinc fluctuate across the menstrual cycle (Das and Chowdhury, 1997) in a cross sectional study done among 1057 women, total intake of non-heme Iron, Magnesium, Manganese, Potassium, Zinc and Copper were modestly highly correlated with the severity of PMS.

The present study focuses on the relationship between depression and nutritional intake of the health supplement rich in micro nutrients.

METHODOLOGY

Study area- Semi-urban area of Coimbatore; Population- Reproductive age women; sample size- 100; Research design- A quasi experimental two group pretest-post test design; sampling technique-purposive sampling; Tools used- A structured questionnaire- for gathering general information; Standard tool for depression. Supplementation of nutrient rich cookies was carried out for a period of 120 days.

RESULTS AND DISCUSSION:

PMS is related to deficiency of various nutrients. Supplementation of micronutrients in the form of supplement powder or tablet has yielded good results. The health mix is rich in micro nutrients hence it supplied good amounts of calcium and magnesium.

Correlation with serum calcium and magnesium levels:

Correlation of mean depression score had a statistically significant negative correlation with serum calcium ($r = -0.214$, $p<0.05$) and serum magnesium ($r = -0.245$, $p<0.05$) levels. Studies have pointed out that calcium and magnesium play a role in mood problems and depression.

Correlation of depression with other PMS physical, emotional and behavioral symptoms:

It was noted that the mean depression score had a mild degree of positive correlation with PMS symptoms like anxiety ($r=0.132$), back pain ($r=0.103$), forgetfulness ($r=0.164$), and negative

correlation with loss of appetite (r=-0.164) and sensitivity (r=-0.122) and were not statistically significant.

Impact of supplementation of nutrient rich cookies Depression Level

Depression was noted as a major reason for premenstrual symptoms. The depression level of the selected participants was identified using a standard tool. The level of depression among the selected participants before and after intervention is presented in Table-LVI

TABLE-I DEPRESSION SCORE

Group	Level of depression	Before		After		Mean depression score (Initial)	Mean depression score (Final)	Category	t-value
		Frequency	Percent	Frequency	Percent				
Experim. group (N=50)	Mild depression (1-21)	17	34	30	60	20.12±8.83	15.3±7.28	IVF	2.17*
	Moderate (22-42)	29	58	15	30				
	Severe (43-63)	1	2	2	4				
	No depression	3	6	3	6				
Control group (N=50)	Mild depression (1-21)	15	30	16	32	20.18±6.03	19.02±6.55	IVF	0.89^{NS}
	Moderate (22-42)	32	64	32	64			EVC	3.186**
	Severe (43-63)	2	4	1	2				
	No depression	1	2	1	2				

*Significant at 5% level **Significant at 1% level NS- Not Significant IVF initial vs final; EVC experimental Vs control

From Table-I, it was noted that majority of the selected participants in experimental group (58 per cent) and control group (64 percent) had moderate depression both. The mean score of the experimental group before intervention was 20.12±8.83 and after intervention was 15.3±7.28. The initial and final mean score of depression for the control group was 20.18±6.03 and 19.02±6.55 respectively. There was no significant difference in the initial and final mean score of depression among the selected participants in the control group. But there existed statistically significant difference in the initial and final mean score of the experimental ($p<0.05$) as well as the final mean score of experimental and control group ($p<0.01$). From the table it can be concluded that the depression score has reduced significantly in the experimental group due to

nutrition intervention. Even in the control group severe symptom was reduced from four per cent to two per cent which might be due to nutritional intervention.

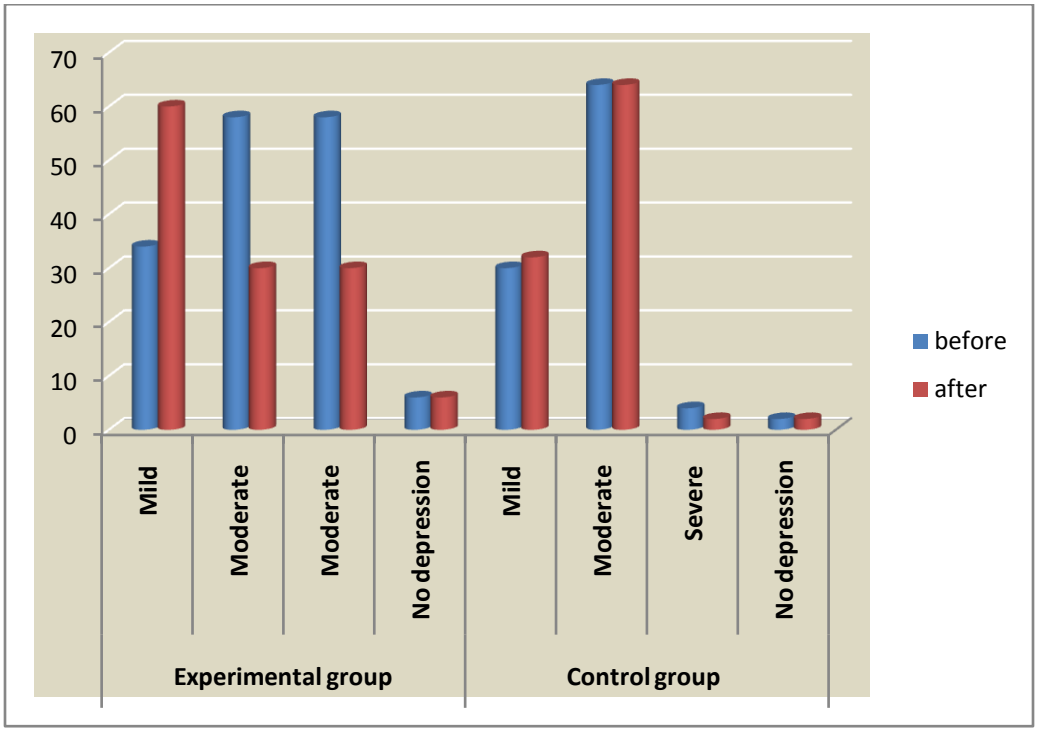

Figure-16 Level of depression scores of the selected participants

CONCLUSION:

From the study it was noted that depression level was high in the luteal phase (PMS). There was a negative correlation with the depression level and calcium and magnesium levels. The supplementation of nutrient rich cookies was able to reduce the severity of depression from severe to moderate and m ild level in the experimental group compared to the experimental group. Hence it may be concluded that micronutrient rich supplements can aid in improving the micronutrient status in the body there by improving the depression and related symptoms particularly during Premenstrual syndrome.

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RESILIENCE AMONG RURAL SCHOLASTICALLY BACKWARD CHILDREN

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ABSTRACT

Current trends in education or academic performance and social development of child scholastic backwardness are recognized as one of the important problems in children. A sample of 150 scholastic backward children in the age group of eleven to sixteen years school going children were selected from rural government school students of Madurai district. The children's are categorized as having academic backwardness based on their academic grade cards issued by the respective schools. To assess resilience among rural youth parameters like Socio-Economic Status Scale developed by Aggarawal et al. (2005), I.Q of the academically selected children using Standard Progressive Matrices Scale, socio emotional problem scale developed by AICRP center, Udaipur and standardized scale to measure resilience among students were used. Results highlighted that, both boys and girls shown that, low level of internal and external resilience.

Poor academic performance, poor living condition and high risk of socio emotional problem were the causes of the low internal resilience. Poor environmental condition, conflicts among the family members and poor peer models are reason of low external resilience among adolescence. Both boys and girls have shown that, the same level of socio-emotional problems and age is considered as an important factor affecting the socio emotional problems. From the results of the study it is suggested that, family and school environment should be provided in right manner for better learning and to achieve in examination.

KEYWORDS: *Academic Backwardness, Rural School Students, Resilience*

INTRODUCTION

Academic backward children are the children who have troubles with education and their capability of learning belongs to the lower level than it is required according to the general standards. Academic stress in children can present as physical, behavioral or emotional problems. Unrecognized and unresolved, scholastic backwardness has a lifelong impact on the child and adolescent, affecting school completion, higher education, interpersonal relationships, prospects for employment, marriage etc. It is reported that around 20% of school children have scholastic backwardness (Karande S, Kulkarni M., 2005). Scholastic backwardness contributes to school dropout, especially after the primary school years (Kamat VV., 1934) and should be recognized and remedial measures initiated, in the primary classes itself for best results. Scholastic backwardness usually provides feelings of anxiety and inadequacy in children. This in turn can have negative impact on the emotional and social functioning of the child. Scholastic backwardness is mainly caused by learning disabilities. Apart from learning disability there are so many factors which provoke learning disability and ultimately lead to scholastic backwardness.

In every country there is a problem with academic backward children and pedagogues work hard to create effective methods of teaching and improvement the chances for children to receive normal education. There are many factors which influence the problem of the child's academic backwardness and they depend to the physical, genetic, psychological, social, economic and other fields. It is important to identify the risk factors for scholastic backwardness so that these children can be identified early and corrective measures can be initiated at school, familial and societal level. The causes for a child being poor in academics are varied and range from physical causes to psychological causes the later being more common. Studies confirm that a large percentage of school dropouts in India are due to unsatisfactory academic performance (Pratinidhi et al., 1992). Various emotional, environmental and medical factors can also affect the academic performance of adolescents. Emotional disorders such as anxiety, obsessive-compulsive, mood disorders, depression, and psychosomatic disorders are common in students. Poor school performance may also be due to environmental factors especially at home, school, friends and neighborhood surroundings. The 'behavior problems' are having major impact on child's bodily and social development. The family provides emotional support to an individual as well as plays a major role in the formation of one's personality.

Academic backwardness usually engenders feelings of anxiety and inadequacy in children. This in turn can have negative impact on the emotional and social functioning of the child. Hence learning problem is an issue of concern not only for students, but also for parents and all the

professionals involved in child welfare. Poor school performance is a common problem faced by schools and parents. Poor school performance can be defined as a school achievement below the expected for a given age or academically bacward (Rebollo *et al.*, 2007; Fonseca, 2008). It not only results in the child having a low self esteem, but also causes significant stress to the parents. It is usually a reflection of a larger underlying problem in children hence poor school performance should be analyzed systematically so that proper interventions can be given in this direction. Also, majority of India still lives in villages and so the topic of rural education in India is of utmost importance. Early identification, early intervention and adequate remediation is important and can make a big difference to the child's future (Gaikwad, 2015). This paper reviews with the aim of resilience among academically backward students

METHODS AND MATERIALS

A sample of 150 academically backward boys and girls in the age group of 11-16 years, where 60 students were belonged to 11-13 years old and 90 students were belonged to 14-16 years old who were studying in 7th to 9th classes were selected from the three villages of Alaganallur block, Madurai District , Tamil Nadu state. All the Government schools from selected villages were surveyed to collect the information of academic backward children on the basis of academic performance of children in the previous class and teacher's assessment /opinion. The resilience of the rural youth was studied by assessing the Intelligent quotient using the standard progressive matrices by Ravens *et al.* (1998), social-emotional problems using the socio-emotional problem scale developed by AICRP Udaipur, Internal and external resilience using the internal and external resilience scale for youth and vocational interest inventory Socioeconomic status was also judged by Aggrawal *et. al*. (2005) scale. To perform the descriptive statistics data was analyzed.

RESULTS

TABLE 1: SOCIO – ECONOMIC STATUS OF THE SELECTED STUDENTS
N=150

Socio-economic status classifications	Boys n=75	Girls n=75
Upper high	0	0
High	0	0
Upper middle	0	0
Lower middle	0	0
Poor	38 (51.00)	45(60.00)
Very poor	37(49.00)	30(40.00)

Figures in the parenthesis indicate percentage.

Based on the socio economic status, 51 per cent of the boys belonged to poor category and the remaining 49 per cent belonged to the very poor category (Table 1). Likewise about 60 per cent of the girls found to be in poor category and 40 per cent in very poor category. None of the students were belonged to high and middle category.

TABLE 2: IQ SCORE OF THE SELECTED STUDENTS
N=150

Grade	Level of IQ	Boys n=75	Girls n=75
I	Intellectually superior	0	0
II	Above average intellectual coping	0	0
III	Intellectually average	40(53.00)	29(39.00)
IV	Below average intellectual	32(43.00)	42(56.00)
V	Intellectually impaired	3(4.00)	4(5.00)

Figures in the parenthesis indicate percentage.

With respect to the IQ level of the student, 53 percent of the boys and 39 percent of the girls are having average intellectual capacity. Likewise about 43 percent of the boys and 56 percent of the girls had below average intellectual level (Table 2). None of the students were found in above average and intellectually superior category.

TABLE 3: INTERNAL RESILIENCE OF ACADEMICALLY BACKWARD CHILDREN
N=150

Area	Gender	Low	Average	High
Cooperation and communication	Boys (n=75)	47 (62.67)	18(24.00)	10(13.33)
	Girls (n=75)	49 (65.33)	20 (26.67)	6(8.00)
Self efficacy	Boys (n=75)	57(76.00)	10(13.33)	8(10.67)
	Girls (n=75)	45(60.00)	25(33.33)	5(6.67)
Empathy	Boys (n=75)	44(58.67)	20 (26.67)	11(14.66)
	Girls (n=75)	38(50.67)	11(14.66)	26(34.67)
Problem solving	Boys (n=75)	40(53.33)	14 (18.67)	21(28.00)
	Girls (n=75)	54(72.00)	12(16.00)	9(12.00)
Self awareness	Boys (n=75)	42(56.00)	17(22.67)	16(21.33)
	Girls (n=75)	36(48.00)	11(14.67)	28(37.33)
Goal and Aspiration	Boys (n=75)	55(73.34)	10(13.33)	10(13.33)
	Girls (n=75)	45(60.00)	22(29.33)	8(10.67)

Figures in the parenthesis indicate percentage.

With regard to the external resilience of academically backward children, both the selected boys and girls shown low level of internal resilience in all the areas. Majority of boys and girls(62 and 65 % respectively) shown low level in cooperation and communication followed by average and high level. Similar pattern was found in areas like self efficacy, empathy, problem solving, self

awareness, goal and aspiration. Girls shown low level of internal resilience in cooperation and communication (65%) and problem solving (72%). Boy shown that, low in internal resilience at self efficacy (76 %), empathy (58 %), self awareness (56%) and goal and aspiration(73 %)

TABLE 4: EXTERNAL RESILIENCE OF ACADEMICALLY BACKWARD CHILDREN N=150

Area	Gender	Low	Average	High
School assets	Boys (n=75)	59 (78.67)	10 (13.33)	6 (8.00)
	Girls (n=75)	47 (62.67)	16 (21.33)	12 (16.00)
Home assets	Boys (n=75)	53 (70.67)	14 (18.67)	8 (10.67)
	Girls (n=75)	47 (62.67)	18 (24.00)	10 (13.33)
Community assets	Boys (n=75)	51 (68.00)	16 (21.33)	8 (10.67)
	Girls (n=75)	61(81.33)	10 (13.33)	4 (5.33)
Peer assets	Boys (n=75)	52 (69.33)	8 (10.67)	15 (20.00)
	Girls (n=75)	53 (70.67)	12 (16.00)	10(13.33)

Figures in the parenthesis indicate percentage.

With respect to the external resilience of academically backward children, both the selected boys and girls shown low level of external resilience in all the areas. Poor environmental condition, conflicts among the family members and poor peer models are reason of low external resilience among adolescence. Girls shown low level of external resilience in community assets (81%) and peer assets (70%). Boy shown that, low in external resilience at school assets (78%) and Home assets (70%)

TABLE 5: THE SOCIO-EMOTIONAL PROBLEM OF ACADEMICALLY BACKWARD CHILDREN N=150

Gender	Age	Mild	Moderate	Severe
Boys	11 – 13 years	4(11.00)	21(60.00)	10(29.00)
	14 – 16 years	5(12.00)	19(48.00)	16(40.00)
Girls	11 – 13 years	3(12.00)	17(68.00)	5(20.00)
	14 – 16 years	10(20.00)	25(50.00)	15(30.00)

Figures in the parenthesis indicate percentage.

Regarding socio-emotional problem, both boys and girls showed that, the same level of socio-emotional problems. Majority (60 %) of the boys who were 11-13 years old belonged to moderate level of socio- emotional problems followed by severe (29 %) and mild level (11 %). Likewise the majority (48 %) boys who were 14-16 years old belonged to moderate level of socio- emotional problems followed by severe (40 %) and mild level (12 %) (Table 5). With respect to girls who were 11-13 years old 68 per cent of them belonged to moderate level of

socio- emotional problems followed by severe (20 %) and mild level (12 %). Similar pattern was found in the age group of 14-16 years old girls.

DISCUSSION:

In the present study in almost all the childrens were belonged to the poor and very poor socio economic status. Obeta (2014) studied "home environment factors affecting student's academic performance in Abia state Nigeria. The results indicated that socio-economic status of student's family influences the academic performance of children. This research is similar with above study (Table 1and 2).

Regarding internal resilience of academically backward children (Table 3), both the selected boys and girls shown low level of internal resilience in all the areas. Poor academic performance, poor living condition and high risk of socio emotional problem may be the causes of the low internal resilience. Majority of girls shows low level of internal resilience in problem solving ability (72%) and cooperation and communication (65%).The reason of low problem solving ability among the girls may be due to the wrong up-bringing done by the parents, poor home atmosphere, cultural taboos and restrictions etc. Moreover, the psychological and physical make up of the child also affects the problem solving ability. Boys shown low in self efficacy (76%) and goals and aspiration (73%). Feeling of anxiety, impatience or irritation and feeling of negativity leads to low self efficacy in boys.

However, it should be noted that the relationships between students' behavioural problems and academic difficulties are not known. In other words, we do not know whether the academic deficits or the behavioural problems cause the other difficulty. Furthermore, many children with academically backward exhibit no behavioural problems at all (Heward, 2003). Research further suggests that social interaction problems for students with academically backward seem to be more evident in those who have problems in math, visual-spatial tasks, tactual tasks, self-regulation, and organization *i.e.* school assests (Table 4) (Worling *et al.*, 1999). After reviewing 152 different studies, Kavale and Forness (1996) concluded that 75 per cent of students with academically backward exhibit deficits in social skills *i. e.* community assets. Studies of teacher ratings also suggested that students with learning difficulties have lower social status than other students.

Both boys and girls showed that, the same level of socio-emotional problems. But age is considered as an important factor affecting the socio emotional problems. It can be concluded that there was no significant change in the socio emotional problems of both the gender (Table 5). As the age increases the severity of the social emotional problems were increased. But the project envisages 29 per cent of boys in the age group of 11 to 13 years are affected severely against 10% reported in girls. The problem is more pronounced when there is increase in age. The increase is due to peer pressure and poor family relationship prevailing among boys. Gender discrimination, possessing of good physique and appearance may be the reason for the high socio emotional problems.

CONCLUSION:

From this study it can be concluded that the it rural children were facing familial problem as a cause for academic backwardness. Major causes for academic backwardness of rural school students were found to be belonged to low level of socio economic status, non-conducive home associated factors, academic associated incapacities and their below IQ. For this it can be

advocated that socio-economic status of family, family and school environment should be improved for developing interest of rural students to learn better in classes and achieve better in examination. It can be resolved through proper interventions at school and family level. Early recognition and adequate remediation is important and can make a big difference to the child's future. The family environment is one of the most important factors for a child doing well in academics and parents play a very important role so it in turns helps internal and external resilience of the children.

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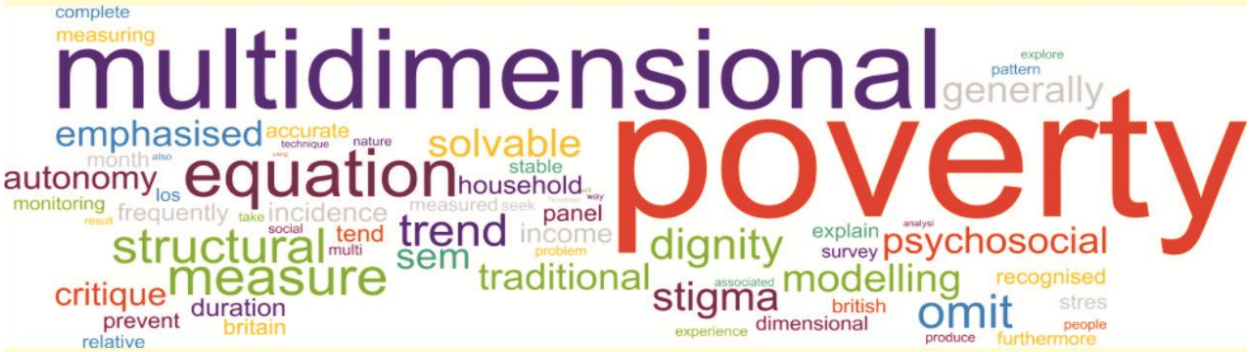

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