Vol.34, No. 1 January 2022 ISSN 0970 2733 IHMSF-34(1-264)2022

The Indian Journal of HOME SCIENCE

An Official Publication of

THE HOME SCIENCE ASSOCIATION OF INDIA

CARE Listed, Peer Reviewed

Published by

THE HOME SCIENCE ASSOCIATION OF INDIA

THE HOME SCIENCE ASSOCIATION OF INDIA

(Established in 1952)

OFFICE BEARERS (2021-2023)

President	: Dr. N. Vasugi Raaja (Coimbatore)
Vice President	
North Region	: Dr. Neelam Grewal (Ludhiana)
West Region	: Dr. Madhu Sharan (Vadodara)
South Region	: Dr. Jyoti Vastrad (Dharwad)
East region	: Dr. Anupama Mishra (Meghalaya)
Hon. Secretary	: Dr. Suman D. Mundkur (Mumbai)
Hon. Joint Secretary	: Dr. R. Jeyagowri (Coimbatore)
Hon. Treasurer	: Dr. Komal Chauhan (Vadodara)
Hon. Joint Treasurer	: Dr. A.Thirumani Devi (Coimbatore)
Chairperson Nominating Committee	: Ms. Alaukika Khachar (Rajkot)
Immediate-Past president	: Dr. Anjali Karolia (Vadodara)
Editor (Indian Journal of Home Science)	: Dr. Maneesha Shukul (Vadodara)
Joint Editor	: Prof. Nilima Varma (Bhopal)

The Indian Journal of

HOME SCIENCE

An Official Publication of

THE HOME SCIENCE ASSOCIATION OF INDIA

Vol.34, No. 1 Jan 2022 ISSN 0970 2733 IHMSF-34 (1-264)2022

CARE Listed, Peer Reviewed

Published by

THE HOME SCIENCE ASSOCIATION OF INDIA

Website: www.homescienceassociationofindia.com

From the Editor's desk

With the Continuing grip of pandemic -COVID 19 – people all over the world are constantly facing several challenges. Though, like people of the world, India is also trying very hard to live the new normal life, but with the waves or the rounds of the pandemic, they get a set back every time. The Government's efforts to help people in coping with the challenges need to be supported by the educational institutions.

Action projects and researches by the educational institutions are the need of the present time. Each field of Home Science has lots of scope –rather responsibility – to carry out activities for the community at large to help and guide them in coping up with the grim situation and challenges. Action projects enhancing KAP are required; such as : awareness about the disease, required safety measures for prevention and cure, the appropriate diet, change in life style as per the available resources, the counseling of children, youth as well as the older and even adults are some of the areas where actions and guidance are required. Awareness for being a wise user of electronic media is very much needed. Emphasis on fabric and clothing made by local artisans need to be highlighted. Home Science can play a significant role in training youth through formal as well as non-formal education in entrepreneurial skills for self-employment and start-ups so as to make India self-reliant. Each of such result – oriented project should have a research focus so as to have a strong feedback. These projects and researches can make significant contribution to the society and to the nation.

The Indian Journal of Home Science will play its role by publishing such research papers so that people from far and wide can refer them.

Prof. Maneesha Shukul

THE INDIAN JOURNAL OF HOME SCIENCE

An official publication of THE HOME SCIENCE ASSOCIATION OF INDIA

CARE Listed, Peer Reviewed

Vol. 34 **No.1** **January, 2022**

The Indian Journal of Home Science 2022: 34(1)

RELATIONSHIP OF SELF-ESTEEM WITH CLOTHING INTEREST DETERMINANTS AMONGST COLLEGE STUDENTS OF METROPOLITAN CITY DELHI, INDIA

Garisha Arora[1] and Dr. Jyoti Aggarwal[2]
[1]Ph.D. Research Scholar, [2] Associate Professor
Department of Fabric and Apparel Science,
Institute of Home Economics,
University of Delhi, Delhi, India.
gairry88leo@gmail.com; jyotiagg1975@gmail.com;

ABSTRACT

Psychological constructs have varied impacts on consumer behaviour which influences consumption. Self-esteem (SE) is an essential driver of consumption. Focus of other previous researches was on Clothing Interest (CI) as a single dimension. However, it has various sub-dimensions. No previous research has confirmed the relationship of various dimensions of CI with SE. The present research aims to validate the relationship of SE with five dimensions of the CI viz: "Interest in Clothing as Experimenting with Appearance" (ICEA), "Interest in Clothing as Enhancement of Individuality" (ICEI), "Heightened Awareness of Clothes"(HAC), Desire for Unique Clothes" (DUC) and Innovative Style of Clothing"(ISC). Gender differences with these constructs were also studied. The method used for data collection was quantitative using standardized scales. College students of the metropolitan city, Delhi, were selected for data collection. Reliability and validity were computed, followed by correlation analysis amongst these constructs. Results showed a positive correlation between SE and CI determinants (ICEI, HAC and DUC). While ICEA and ISC, showed insignificant correlation with SE. Evidence of a gender difference was observed in the data. While these relationships were significant among female college students, it was not the case for male college students; there the association of SE was only significant with DUC. Overall college students were found highly interested in ICEA, followed by HAC and moderately in DUC. The results would help in understanding the interests of niche customers. The marketers, advertisers, designers, and manufacturers will be able to plan, design, develop, and execute strategies for sales and promotion for specific age groups on the basis of this research.

Key Words: Self-esteem, clothing, fashion, interest, consumption

INTRODUCTION

Self-esteem (SE) is one of the critical psychological constructs and an important driver of consumption. Consumers make their purchase decisions within the context of increasing or guarding self-esteem (Maden & Köker, 2013, p.571). Interestingly, when it comes to consumption, clothing is one of the highly consumable products as clothing fulfils an individual's physical, psychological, and emotional needs. Clothing converts social class and aids in distinguishing oneself from others.

Globalization has further increased the focus of individuals on clothing, which in turn has amplified the buying power for clothing enormously. Numerous investigators have discoursed the association between clothing and consumer involvement. Menon (2009) said that the major reason for increased consumer interest in fashion clothing is because of their personal desire to experiment with western fashion and lifestyle and their increased incomes. Indian consumers are

not left behind in this. In fact, as per the 'Images Business of Fashion' report (2017), the country has the world's largest youth population who are becoming fashion conscious. As per Statistics report from McKinsey's Fashion Scope, by 2022, it is estimated that Indian clothing market will be worth $59.3 billion, sixth largest in the world, in comparison to Germany's ($63.1 billion) and United Kingdom's ($65 billion) (Ahmed et al., 2019). Amongst Indians, this interest is not limited to elite or upper-income groups; but also includes middle income class, due to their increased will on buying luxury items (Khicha, 2012). It is predicted that India will become the world's largest middle-class consumer market by the year 2030 (Deloitte, 2013). Thus, it is essential to elaborate and understand consumers' clothing interests in Indian perspectives too and to find out how this potential market thinks and acts when it comes to clothing. This is because spending on discretionary goods is expected to increase by 2025 in India (Rahman & Kharb, 2018). Limited comprehensive researches are available, as in majority of researches Clothing Interest (CI) is measured either as a single construct or one or limited dimensions of CI were catered. This limits the understanding of consumers' various interests, since; CI has various dimensions which divide consumers into various segments. Given the authors' knowledge, no work has validated the relationship of SE with different dimensions of CI specific to the age group (18-24 years; a large potential consumer category). However, numerous works have been done on fashion clothing involvement (Khare, 2014 etc.). Interestingly, the measure of fashion clothing involvement is generic, like "Fashion clothing means a lot to me" etc. (2014, p. 51), and does not segment the consumer. This leaves further prospects to understand the consumer based on their 'interest' or 'psychological will' categories. Self-esteem is a central component of self-concept, which plays an essential role in taking consumer's decisions towards consumption.

Literature indicates the relationship of CI (as a single dimension) with self-concept. The changing lifestyles and interests of individuals makes it essential to assess the association of SE with the dimensions of CI viz: "Interest in Clothing as Experimenting with Appearance" (ICEA), "Interest in Clothing as Enhancement of Individuality" (ICEI), "Heightened Awareness of Clothes"(HAC), "Innovative Style of Clothing" (ISC),and "Desire for Unique Clothes" (DUC).

Clothing Interest (CI) and its dimensions

Gurel & Gurel (1979) defined CI as a belief, attention, or likeness towards clothes. ICEA is an experimental attitude towards appearance through clothes, one of the dimensions of CI. Such individuals love to experiment with their appearance through clothes. They enjoy the new style of clothes not necessarily to own them but to gain the new experience without thinking about its resultant effect. While, ICEI individuals show more interest in clothing for enhancing their individuality, stylish appearance and latest fashion clothing, for which individuals compromise their economy and convenience. For status symbols, such individuals' aim is to gain attention through unique, stylish, trendy, and expensive clothes to get noticed in the crowd. Interestingly, HAC individuals are sensitive to the characteristics of clothing and dress. They have the understanding to differentiate clothing and dress with appearance. Such individuals can focus on different garment details and also aware about others' clothing. However, personal involvement with clothes is not essential. The fourth dimension, i.e., ISC is "Domain-Specific Innovativeness (DSI)". DSI individuals tend to know and adopt innovative clothes and latest fashion actively (Goldsmith & Hofacker, 1991). The whole aim is just individuals' self-interest and personal satisfaction. On the other hand, DUC individuals like to acquire customized, scarce, outdated, and innovative clothing. For this reason, these individuals prefer to shop from unique small retail

outlets (or even vintage stores). Their interest is to have possession and hold on products which are not possessed by others or very few other individuals possess (Bearden, et al., 2011). This dimension is different from ICEI in terms of possessing scarce or outdated yet innovative and unique clothes instead of stylish, expensive, and trendy clothes. Nevertheless, the common aim is materialism and aspirations for status. This dimension is adding further depth to understand individuals' clothing interests (Lynn & Harris, 1997).

Self-Esteem (SE)

According to Rosenberg (1965), self-esteem is the "negative and positive attitude of the individual to oneself, and is an upshot of the self-evaluation of the individual". Self-esteem affects various other aspects of life and is influenced by an individual's environment and life experiences. Self-esteem will increase for some while decrease for those who are in a less favourable setting. Thus, Self-esteem can be low, moderate, or high, where moderate/medium is considered as healthy for various psychological functions. Low/high self-esteem levels indicate inconsistent and indecisive self-attitudes. Since "self-esteem is an attitude, the more specific the self-esteem is, the more accurately it should predict relevant behaviour" (Rosenberg et al.1995). Orth, et al., (2012), revealed that for life outcomes, self-esteem is a cause, not a consequence.

Self-Esteem and Clothing

Various researchers have studied the relationship between clothing and self-esteem. They concluded that how one feels about oneself affects one's clothing choice, and the clothes individuals decide to wear also affect their feelings about themselves. Thus, clothing is used as a tool to boost an individual's morale.

Kwon (1997) found an association between interest in clothing and social self-esteem and facial attractiveness. According to Creekmore (1974), individuals with lower self-esteem use clothing as an adaptive function where the dress helps by improving feeling about oneself. On the contrary, those who have higher self-esteem are expressive through clothes as clothing helps in expressing a positive self-concept visually. Jimenez (2016) found an insignificant correlation between individuality (distinctive clothes) and self-esteem amongst UK students. Kulshrestha & Kashyap (2007) indicated a relationship between self-concept and CI as a single dimension.

Research question: Since, self-esteem is a central component of self-concept, a question arises -Do individuals have different relationships between self-esteem and various dimensions of CI?

OBJECTIVE OF THE STUDY

To establish a relationship between self-esteem and five determinants of Clothing Interest **(**CI) viz:

Interest in Clothing as Experimenting with Appearance (ICEA);
Interest in Clothing as Enhancement of Individuality (ICEI),
Heightened Awareness of Clothes (HAC),
Desire for Unique Clothes (DUC), and
Innovative Style of Clothing (ISC)

HYPOTHESES

H1a: There is a significant correlation between self-esteem and ICEA
H1b: There is a significant correlation between self-esteem and ICEI.
H1c: There is a significant correlation between self-esteem and HAC.
H1d: There is a significant correlation between self-esteem and DUC.
H1e: There is a significant correlation between self-esteem and ISC.

METHODOLOGY

Sample

Clusters of government and private colleges were made from which fourteen colleges (seven private and seven government) were selected randomly from the metropolitan city of India, Delhi. From each college, 50-60 students from varied courses within the age group of 18-24 years were identified (Male: Female, 1:1). G* Power software was used for calculating sample size, which came out to be 782 (Faul, et al., 2007). Data was collected using a convenience sampling technique. Various other factors were also considered for selecting convenience sampling methods like: students' availability, teachers' permission, college timings and availability of free slots in the timetable. For data collection, prior consent was obtained from the concerned department of selected colleges as well as individual respondents.

Tool Design

The tool consists of six standardized scales. All the items used in the scales were without any edition. The questionnaire consisted of seven sections, of which the first section comprised two demographic questions-age and sex. There respondents' names were not requested to maintain anonymity. The next section of the questionnaire, a self-esteem scale developed by Morris Rosenberg (1965) consisted of 10 items. Section three, four, five, six and seven had five dimensions of clothing interests, viz: ICEA (12 items), ICEI (11 items), HAC (9 items), DUC (8 items) and ISC (6 items). All the scales used to measure CI determinants were standardized five-point Likert scale (Strongly Disagree =1, to Strongly Agree = 5). Ethical clearance was taken from the Institutional Ethics Committee.

Analysis

Pre-testing was done to finalize the tool for which Cronbach's alpha value was calculated to check the internal consistency of each scale on a sample of 20. Respondents' feedback was also taken to eliminate any elusiveness in the items, if present. For analysis, descriptive statistics (frequency and percentage) were computed. Before testing hypotheses, measurement tool was validated by Confirmatory Factor Analysis (CFA) using SPSS (version 21) and AMOS (version 20) (Hair et al., 2010), followed by CMB test (using Harman's one-factor method) to check the presence of bias, if any (Podsakoff et al., 2003). Finally, single item scores (variables) for each scale were imputed. These imputed scores were used for testing hypotheses, i.e., the correlation between SE and CI determinants.

FINDINGS AND DISCUSSION

In the final questionnaire, all the items were retained. Cronbach's alpha value for all the scales in pre-testing results came within an acceptable range. A total of 798 individuals filled the questionnaire. After data cleaning, 784 (412 females, 372 males) was the final sample, which was higher than the calculated sample size (Faul et al., 2007). Based on descriptive statistics results (Table -1), it was found that 43.8% respondents had moderate self-esteem. However, nearly one-third of respondents were found with either low or high self-esteem.

In the case of CI determinants, respondents were found highly interested in ICEA (61.7%) as the majority of respondents were towards agreement. While in the case of DUC, approximately 50% of the respondents were not interested, while 44% were moderately interested in unique clothing and a smaller number of college students displayed a high interest in DUC. Interestingly, respondents showed slightly less interest in ICEI and ISC as the majority of respondents were leaning towards disagreement. This alludes that college students are not much interested in adopting the latest trends and enhancement of individuality through clothing. From the survey conducted for clothing awareness, it can be derived that almost equal number of respondents were in agreement and disagreement and marginal number (18.2%) of respondents showed moderate interest.

Table -1 Descriptive statistics (frequency & percentage) of SE and determinants of CI (n=784).

Construct	Disagreement		Moderate		Agreement	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
SE	244	31.1	343	43.8	197	27.6
ICEA	126	16.1	184	23.5	474	61.7
ICEI	597	76.1	178	22.7	9	1.1
DUC	390	49.7	345	44.5	45	5.7
ISC	535	68.2	249	31.8	0	0
HAC	321	40.9	143	18.2	320	42.7

The tool was found as reliable and valid (Table -2 and 3), where reliability results, ranged from good to excellent. All the parameters of convergent and discriminant validity came within range (Hair et al., 2010). Convergent validity results indicated that all the items of each construct are explaining the construct satisfactorily (<50%). On the other hand, discriminant validity results indicated that all the dimensions are distinct from each other, and instead of manifestations, five dimensions of CI are the determinants of CI. Fornell & Larcker criteria was used to check the validity (convergent and discriminant) of the tool (Table -3), where Average Variance Explained (AVE), Composite Reliability (C.R.), Average Shared Variance (ASV), Maximum Shared Variance (MSV) were computed (Gaskin, 2016). For all the six constructs, C.R. (Composite Reliability) and AVE (Average Variance Explained) values were above 0.7 and 0.5, respectively. Thus, no item was deleted from the questionnaire. Measurement model showed a good fit (Table -2) with a CMIN/df value less than 3. All the fitness indicators were within range, i.e., <0.90 (goodness of fit) and >0.10 (badness of fit) (Hair et al., 2010). As shown in Table -2, regression weights for all the statements of each construct in the questionnaire were also significant,

i.e.,>0.05. The tool also passed the CMB test with a total variance of 19.077 %, which is less than 50% (Podsakoff et al. 2003).

Subsequent to the tool validation, the proposed hypotheses were tested. Results showed (Table-4, and Figure -1), a significant positive correlation of self-esteem with ICEI, HAC, and DUC. This indicates that with increase in self-esteem, desire for unique clothing, interest in clothing awareness, and interest in individuality enhancement through clothes also increases. Thus, H1b, H1c, and H1d were accepted, while H1a and H1e were not accepted, as results showed no significant correlation of self-esteem with ICEA and ISC. Gender also depicted a varied difference where in females showed significant positive correlation of SE with ICEI, HAC and DUC. In the case of males, the relationship was only significant with DUC. Interestingly, a negative relation (though insignificant) was found between SE and ISC.

Table -2 Reliability, and model fitness of final model (n=784; 6 constructs-all zero orders)

Construct	Regression Weight	Cronbach's Alpha (α)	CMIN/df	Model Fit						
				Goodness of Fit				Badness of Fit		
				NFI	CFI	GFI	IFI	Standardized RMR	RMSEA	RMR
SE	P<.05***	0.954								
ICEI	P<.05***	0.931								
ICEA	P<.05***	0.948								
HAC	P<.05***	0.938	2447.831/ 1469 =1.666	0.923	0.968	0.898	0.968	0.037	0.031	0.046
ISC	P<.05***	0.880								
DUC	P<.05***	0.923								

*** signifies p-value<0.01

Table -3 Fornell & Larcker criteria for convergent and discriminant validity (n=784).

	CR	AVE	MSV	ASV	ICEI	SE	HAC	DUC	ISC	ICEA
ICEI	0.931	0.552	0.191	0.068	0.743					
SE	0.954	0.681	0.021	0.009	0.091	0.825				
HAC	0.938	0.628	0.122	0.046	0.349	0.106	0.793			
DUC	0.923	0.600	0.191	0.069	0.437	0.145	0.310	0.775		
ISC	0.882	0.559	0.037	0.014	0.136	0.006	0.000	0.124	0.748	
ICEA	0.948	0.602	0.037	0.013	0.042	0.057	-0.033	0.143	0.192	0.776

Table -4 Correlation of self-esteem with determinants of CI (n=784), and by gender.

	SE	ICEI	ICEA	HAC	ISC	DUC	SE	
							Females (n=412)	Males (n= 372)
SE	1	.096**	.060	.111**	.006	.153**	-	-
ICEI		1	.045	.370**	.147**	.468**	.073*	.043
ICEA			1	-.034	.207**	.152**	.096	.091
HAC				1	.000	.329**	.114*	.097
ISC					1	.135**	.019	-.010
DUC						1	.153**	.139**

**; * indicates significance at 0.01 and 0.05 level respectively.

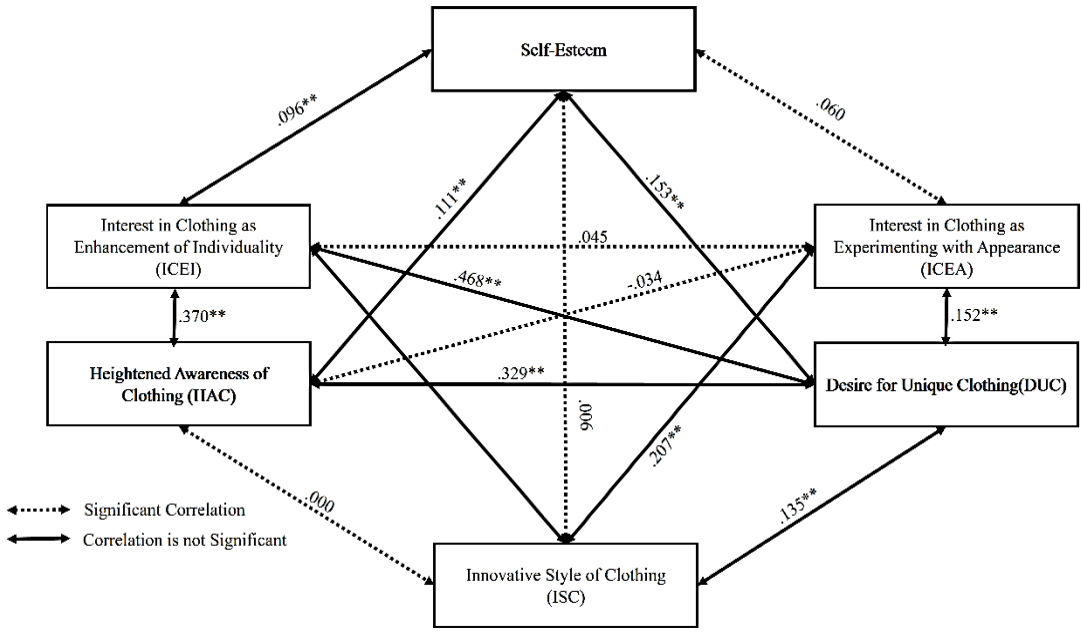


Figure -1 Correlations (Cronbach's alpha value) between SE, HAC, ICEI, ISC, ICEA and DUC (n= 784).

CONCLUSION, MANAGERIAL IMPLICATIONS, FUTURE RESEARCH DIRECTIONS AND LIMITATIONS

In the present study, the majority of college students were found with moderate self-esteem. Maximum number of college students agreed towards ICEA, moderately preferred unique clothing and showed interest in clothing awareness. However, most of them showed least interest in ISC followed by ICEI.

Results indicate a significant positive correlation of self-esteem with CI determinants (ICEI, HAC and DUC) amongst college students of Delhi. This shows that as individuals' self-esteem increases, their preference towards enhancement of individuality, clothing awareness and interest in unique clothing may also increase. Accepting unique clothes or wearing scarce clothing requires openness, confidence (which comes with self-esteem), and broad thinking. The positive relations also confirm the role of social comparison theory where individuals with high self-esteem are motivated to enhance their self. Among both males and females there was a significant positive correlation of SE with DUC. However, this was not the case in respect of HAC and ICEI in males. This means gender influences the students CI in relation to SE. Overall, Indians college students were found less oriented toward materialism or showed less interest in branded or innovative clothing. They were found more interested in experimentation and innovation, which was in line with Khare (2014) findings. However, insignificant relation of SE with ICEA and ISC indicates that other factors may play a more important role to influence this behaviour like personality traits and celebrity, and social media influence.

The present study enriches the literature by confirming the association of self-esteem with five different dimensions of clothing interest specific to the age group. The study would be helpful for marketers in targeting their niche customers for planning marketing strategies. It would also be beneficial to designers and manufacturers who could design and manufacture by considering their specific segment of consumers' interests. Moreover, the study would help the advertisers of niche brands in the promotion of new fashion concepts and styles, which would ultimately produce demand and purchase intention towards a particular brand, closely matching these consumer categories, e.g., using slogans in promotional activities like "I am what I am" for brands which deal with trendy or stylish silhouettes in garments, which can enhance an individual's personality and feeling about one self. This may attract consumers who fall under the category of ICEI. It will act as an emotional connection for brands with consumers. Another example: "Being unique is better than being perfect" can be used to promote unique, scarce, antique, designer wear clothes or traditional crafts to attract customers who prefer unique clothes. Also, second hand -scarce clothing can be modified into more experimental silhouettes (like using zero wastage garment construction technique/multi-functional garments, which can be offered in the market at lower price to attract potential consumers (college students) and to promote sustainable fashion. Thus, the study can be helpful for brands whose cutting edge is sustainable fashion as results of present research depict that this age group of the twenty-first century (18-24 years) is not much interested towards materialism and much more aware about clothing aesthetics. The present study opens future research options also. Various other dimensions of self like: appearance, self-consciousness, personality traits, and conformity, etc., unlocks a possibility for future research with self-esteem in relation with CI dimensions. Since gender showed a significant difference in relation of SE with CI-dimensions, higher effects like the moderation effect of gender can be tested on this relationship. Tier-2 or 3 cities can also be studied and may show consistency or inconsistency based on geographical location.

Relationships with other age groups could be tested to check the behavioural pattern with changing age. The convenience sampling method was used for data collection, which limits the generalization of the results. Due to feasibility issues, non-collegiate and correspondence students were not catered in this age group (18-24 years), who may vary in their buying power, self-esteem, clothing interests, and purchase decisions, which influence their clothing interests and self-esteem levels.

REFERENCES

- Ahmed, I., Balchandani, A., Beltrami, M., Berg, A., Hedrich, S. &Rölkens, F. (2019). How India's accent could change the Fashion Industry. McKinsey & Company Report. Retrieved on 29.03.2020, from https://tinyurl.com/47uzmubk
- Bearden, W. O., Netemeyer, R. G., & Haws, K. L. (2011). *Handbook of marketing scales: Multi-item measures for marketing & consumer behavior research*. 3rd(ed.), (64, 111 & 126). Sage.
- Creekmore, A.M. (1974). Clothing related to body satisfaction and perceived peer self. Technical Bulletin, Research Report 239.
- Deloitte (2013). India matters: Winning in growth markets. Deloitte. Retrieved fromhttps://www2.deloitte.com/content/dam/Deloitte/uk/Documents/about-deloitte/deloitte-uk-about-india-matters.pdf
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioural, and biomedical sciences. *Behaviour Research Methods*, *39*, 175-191. https://doi.org/10.3758/BF03193146
- Gaskin, J. (2016). Stat tool package old. Stats Tools Package. Retrieved on January 1, 2019, fromhttp://statwiki.kolobkreations.com
- Goldsmith, R. E. &Hofacker, C. (1991). Measuring Consumer Innovativeness. Journal of the Academy of Marketing Science, *19*, 1004-1016. https://doi.org/10.1007/BF02726497
- Gurel, L. M. &Gurel, L. (1979). Clothing interest: conceptualization and measurement. Home Economics Journal, 7, 274-282. https://doi.org/10.1177/1077727X7900700501
- Hair, J. F., W.C. Black, Babin, B. J., & Anderson, R. E. (2010). Multivariate Analysis. 7th ed. Pearson Prentice Hall.
- Images Business of Fashion. (2017, October 15). *Indian fashion apparel market: 2017 & beyond*. Retrieved on 27 March, 2020 from https://tinyurl.com/4scm866t
- Jimenez, H. G. (2016). Association between cosmopolitanism, body appreciation, self-esteem, and sought functions of clothing. *Personality and Individual Differences, 101*, 110-113. https://doi.org/10.1016/j.paid.2016.05.056
- Khare, A. (2014). Antecedents to fashion clothing involvement: Role of global self-identity, cosmopolitanism, and normative influence. *Journal of Global Fashion Marketing: Bridging Fashion and Marketing, 5*(1), 39-59. https://doi.org/10.1080/20932685.2013.856099
- Khicha, P. (2012). Riding the luxury wave. Business Standard. Retrieved from http://www.businessstandard.com/article/management/riding-the-luxury-wave-112032600055_1.html
- Kulshrestha, U., & R. Kashyap. (2007). *Clothing behaviour: Psychological analysis*. Pointer Publishers. Jaipur 302 003 (Raj.) India.
- Kwon, Y. H. (1997). Sex, sex-role, facial attractiveness, social self-esteem, and interest in clothing. *Perceptual and Motor Skills, 84*, 899-907. https://doi.org/10.2466/pms.1997.84.3.899
- Lynn, M., & Harris, J. (1997). The desire for unique consumer products: A new individual differences scale. *Psychology & Marketing*, *14*(6), 601-616. https://tinyurl.com/2p8jzamv

- Maden, D. &KÖker, E. (2013). Empirical research on consumer innovativeness in relation with hedonic consumption, social identity, and self- esteem**.** *Journal of Educational and Social Research, 3* (7), 569-578.https://doi.org/10.5901/jesr.2013.v3n7p569
- Menon, B. D. (2009). Luxury brands are back to wooing Indian customers. Business Line.
- Orth, U., Robins, R. W., &Widaman, K. F. (2012). Life-span development of self-esteem and its effects on important life outcomes. *Journal of Personality and Social Psychology, 102*(6), 1271–1288. https://doi.org/10.1037/a0025558
- Podsakoff, N. P. (2003). Common method biases in behavioural research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88*(5), 879-903. https://doi.org/10.1037/0021-9010.88.5.879
- Rahman, O., &Kharb, D. (2018). Fashion innovativeness in India: Shopping behaviour, clothing evaluation and fashion information sources. *International Journal of Fashion Design, Technology and Education*, *11*(3), 287-298. https://doi.org/10.1080/17543266.2018.1429498
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rosenberg, M., Schooler, Schoenbach, C., & Rosenberg, F. (1995). *American Sociological Review, 60* (1), 141-156. https://www.jstor.org/stable/2096350

The Indian Journal of Home Science 2022: 34(1)

INVESTIGATING FITTING PROBLEMS IN READY TO WEAR CLOTHING FACED BY INDIAN WOMEN

Hina Kausher[1] and Prof. Sangita Srivastava[2]

[1]Ph.D Scholar, [2]Vice chancellor

Department of Home Science, University of Allahabad, Prayagraj, India

E-mail: elf.hina@gmail.com

ABSTRACT

Indian women have to face ill-fitting of ready-made clothing as India does not have its original, systematic sizing system based on Indian women anthropometry. This study was conducted to investigate fitting problems on different body locations in ready-to-wear garments that women have to face often. Data from 300 women was collected through the questionnaire. Random sampling method was implemented. The result showed that most women do not get correct fit dresses; they have to try many dresses to get one dress of proper fit; even after, it needs alteration to make it wearable.

Keywords: ill-fitting, ready-made clothing, sizing system, anthropometry.

INTRODUCTION

Fashion and clothing have been an integral part of our society for centuries. There are many fashion elements that contribute to making a beautiful garment. But among all the fashion elements, the fitting of a garment plays the most crucial role in creating beautiful apparel while also making the wearer comfortable and confident (Yertutan, 2001, et al., Fan 2004; Alexander et al., 2005; Vuruskan and Bulgun,2011). Good fitting of garments not only enhances the beauty of clothes but also affects the health and work capacity of the wearer (Smathers and Horridge, 1978-79).

In particular, women have been very fond of beautiful clothing. In earlier times, most of the women used to live at home and do household works. It was a common practice in India, but gradually, many factors such as economic need, urbanization and being independent came into account. It resulted in women starting to go outside and pursue a job. Therefore, they needed stitched dresses to get comfort and fast movements. The demand for stitched garments created the need for women's measurements to make fit garments. Local tailors fulfilled that need for stitched clothing, but after the industrial revolution, many ready-made factories were established in India (Burns and Bryant, 2000; Hsu and Wang, 2005; Gupta, 2007; Zakaria & Gupta, 2014). Globalization and modernization made women much aware of fashion, fitting, and trends.

There are many options available in the Indian ready-made clothing market in terms of colour, design, textile, and style, but there has been a lack of correct fit of garments. Unfortunately, Indian women do not get the right fit clothing. Right fit demands accurate measurements of the wearer. But unfortunately, a systematic, all-India anthropometric survey was never conducted to make a sizing system to produce garments for Indian women. Because of the lack of such a sizing system based on Indian women anthropometry, Indian women have to face the pain of ill-fitting clothes. Manufacturers use other country's sizing systems or arrange some little anthropometric surveys privately to make garments for their own brands. This way of producing garments is going on even today.

Women have to take many trials before purchasing a dress. Sometimes dress becomes too loose or tight; sometimes, it's too lengthy or short to wear. They have to wear and try many dresses to get one of proper fit (Gupta, 2007). Manufacture or Retailer also have to bear the extra expenses to get the returned dresses, and sometimes clothes get damaged during the trial because of fitting problem issues. Manufactures also go at a loss because many dresses are not bought because of their ill-fitting (Petrova, 2007). The literature shows the need for all India anthropometric surveys of Indian women to make our own original Indian sizing system based on Indian women anthropometry.

OBJECTIVE OF THE STUDY

- To determine the problems faced by Indian women in ready-made garments on different body locations.

MATERIAL AND METHODS

1) Questionnaire to investigate fitting and sizing issues in ready-to-wear garments

To investigate fitting and sizing issues in ready-to-wear garments experienced by Indian females, this study employed the use of a questionnaire as a method of collecting data. The questionnaire contained closed and open-ended questions. The four-point Likert scale technique was used for developing a questionnaire and to perform analysis. The Likert scale is a rating system used in a questionnaire study that is designed to measure people's attitudes, opinions, or perceptions.

The respondents were asked questions related to demographics, level of satisfaction for ready-made clothes, frequency of clothing alteration, fit problems experienced at critical points, unfitting of garments on different body locations, and Satisfaction level for the hem length of the garments. Respondents were helped when they sought clarification. The answers given by respondents were confidential between the researcher and the respondent.

2) Sampling and Data collection technique

Random sampling was used for collecting the data. A sample of 300 females, aged between 16 to 80 years, were selected locally from the Prayagraj district, Uttar Pradesh for the study. An introductory note about the questionnaire was attached with the questionnaire requesting the respondent to fill the questionnaire. Respondents were requested to complete the questionnaire in the presence of the researcher in case of any explanation was required for the questions. A high rate of response was secured through it.

3) Data analysis

IBM SPSS Statistics Version 20, statistical software was used for performing all the analyses. The purpose of this study was to investigate fitting and sizing issues in ready-to-wear garments experienced by Indian females aged 16-80 years through a four-point Likert scale survey. The data regarding respondents' demographics, satisfaction with the fit of ready-made clothes, fit problems experienced at critical points, and frequency of clothing alterations were analysed.

FINDINGS AND DISCUSSION

The findings regarding apparel fitting issues experienced by Indian females are presented under various sub-heads.

1) Age of respondents

Table:1 shows the age categories of the subjects. The distribution of respondents for age groups 26-35, 36-45, and 46-55 were 27.7%, 24.3%, and 25%, respectively. The distribution of respondents was nearly equal for these mentioned groups, whereas; 37 (12.3%) and 25 (8.3%) questionnaires were filled by the age group of 16-25 and 26-35, respectively. A minimum number of questionnaires (2.3%) was filled by the age group of 66-75. Most of the questionnaires (77%) were covered by women aged 26 to 55.

Table-1 Age distribution

Age of respondents (years)	Frequency of respondents	Percentage (%) of respondents
16-25	37	12.3
26-35	83	27.7
36-45	73	24.3
46-55	75	25.0
56-65	25	08.3
66-75	07	02.3
Total	300	100%

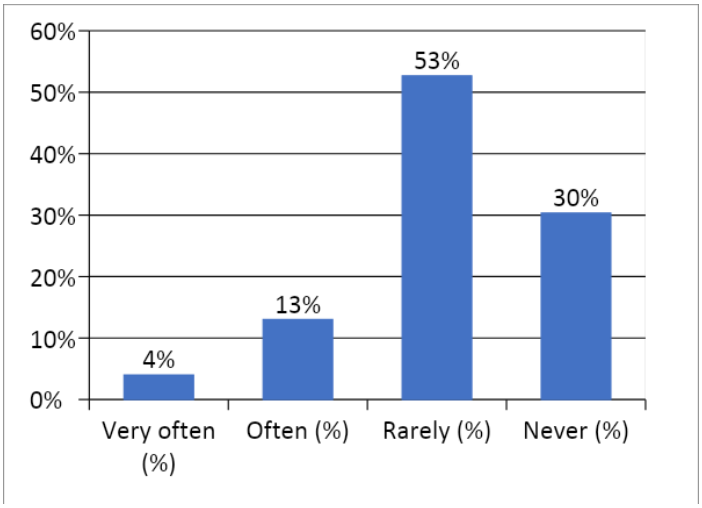
2) Respondents' opinion for ready-made garments

Table-2: Respondents' satisfaction level for ready to wear (question 2), frequency of clothing alterations (question 3), unfitting of garments on different body locations (question 4), and response regarding the length of the garment (question 5)

Respondent's opinion	Very often (%)	Often (%)	Rarely (%)	Never (%)	Total (f)	%
(2) Respondents' Satisfaction level for ready to wear	4	13	53	30	**300**	**100%**
(3) Frequency of clothing alterations	64	24	11	1	**300**	**100%**
(4) Unfitting of garments on different body locations	65	29	5	1	**300**	**100%**
(5) Satisfaction level for length of the garment	21	21	20	38	**300**	**100%**

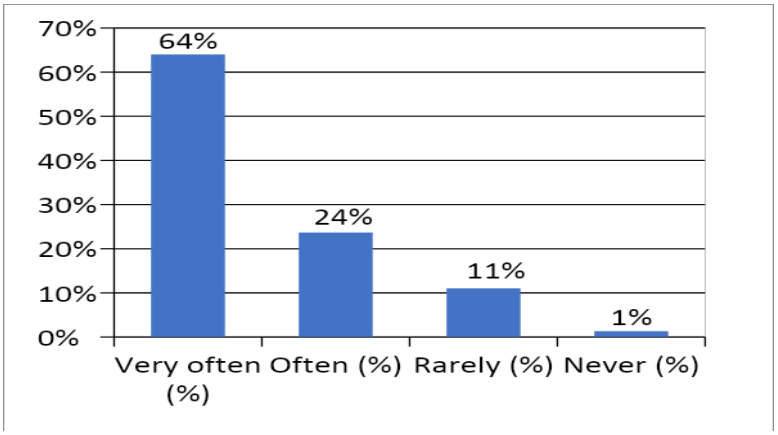
Satisfaction level for ready to wear garments: The study sought, through question 2, to determine the satisfaction level of respondents for ready-made garments in terms of sizing. As shown in table 2, the study established that 53% of women were rarely satisfied, 30% women were never satisfied, 13% women were often satisfied and 4% women were very often satisfied. It was interpreted that majority of the respondents (83%) were either never satisfied or rarely satisfied with ready-made garments available in the market.

Graph-1 Respondents' satisfaction level for ready to wear garments



3) Frequency of clothing alteration

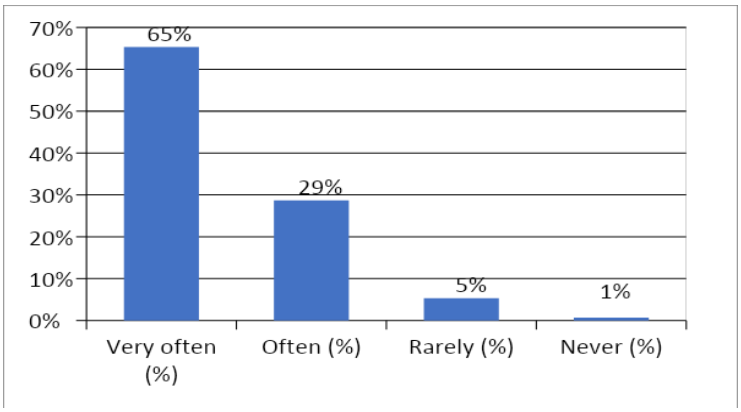
This study found the frequency of alterations of ready-to-wear garments made by the respondents to get the proper fit of dresses. Most of the time, available dresses do not fit properly to the customers. As shown in table 2 (question3), the study established that 64% of women were very often, 24% of women were often, 11% women were rarely, and 1% of women had never made clothing alterations to get proper fit. This study indicated that most of the respondents (88%) had either very often or often altered dresses to make them wearable.



Graph-2 Frequency of clothing alterations

4) Unfitting of garments on different body locations

Unfitting of garments on different body locations, suffered by the respondents, was found out through question 3.As shown in table 2 (question 4) the study established that 65% women very often, 29% women often, 5% women rarely and 1% women had never faced clothing unfitting on different body parts. It was interpreted that most of the respondents (94%) had either very often or often suffered ill-fitting of garments on different body locations.



Graph-3 Unfitting of garments on different body-locations

Problems faced by the respondents in different body locations:

Table-3: Fit problems encountered in different body locations

Fit Points	Frequency of respondents	Percentage (%) of respondents
Chest	89	27.6%
Shoulder, Armhole	56	18.6%
Waist, Abdomen, Hip	161	53.7%
Total	300	100%

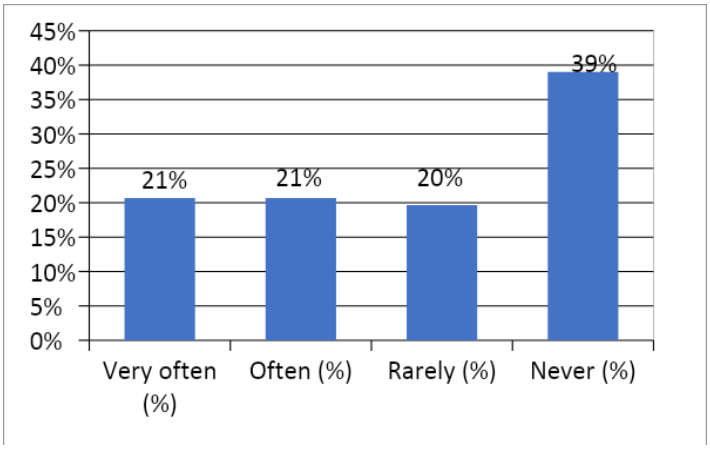
Graph-4Fit problems encountered in different body locations

As table 3 shows, 27.6% of women had suffered ill-fitting on the chest, 18.6% women on shoulder and armhole, and 53.7% women on waist, abdomen, and hip. This study indicated that the majority of the women had to suffer unfitting of garments on the waist, abdomen, and hip.

5) Satisfaction level for the length of the garments

The study sought through question 5, to determine the satisfaction level of respondents for hem length of ready-made garments. As shown in table 4 (question 5), the study established that 39% of women were never satisfied, 20% of women were rarely satisfied, 21% were very often satisfied, and 21% were often satisfied.

It was interpreted that most respondents (59%) were either never satisfied or rarely satisfied with the hem length of ready-made garments available in the market.



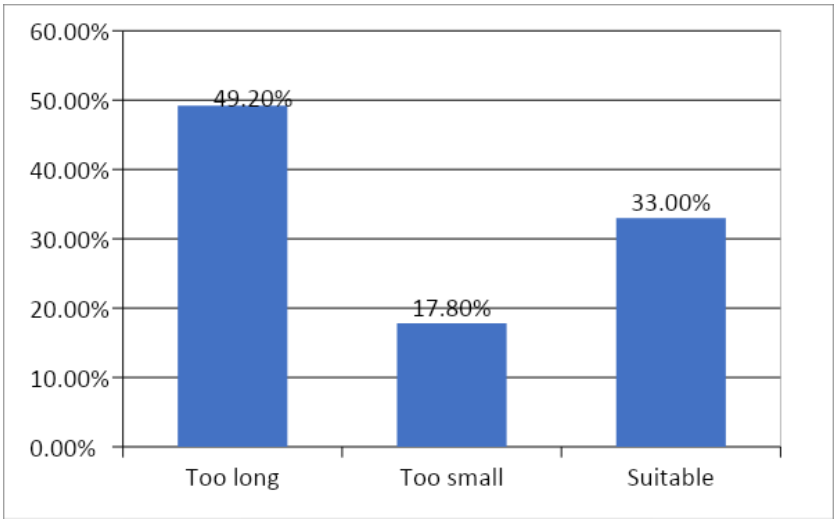
Graph-5 Respondents' satisfaction level for the length of the garments

Problems faced by the respondents regarding the length of the garments

Table-4: Respondents' opinion for the length of the garments

Respondents' view for the length of garments	Frequency of respondents	Percentage (%) of respondents
Length is too Long	148	49.2
Length is too Small	53	17.8
Length is Suitable	99	33.0
Total respondents	300	100

As table 4 showed, 49.2% of respondents said that the length of their dresses was too long to wear without alterations whereas, 17.8% of women said that the length of their dresses was too short to wear. According to 33% of women, the length of their ready-to-wear dresses was suitable. This study indicated that most of the women (67%) had problems with the length of the garment.



Graph-6 Issues regarding hem length of the garments

SUMMARY AND CONCLUSION

This study sought to investigate apparel fitting issues experienced by Indian females aged 16-80 years through a four-point Likert scale survey. The prepared questionnaire includes: respondents' demographics, satisfaction with the fit of ready-made clothes, fit problems experienced at critical points, and frequency of clothing alterations.

From this study, it is concluded that most women (83%) were either never satisfied or rarely satisfied with ready-made garments available in the market. Most of the time, available dresses do not fit properly to the customers. This study indicates that 88% of women had either very often or often altered dresses for making them wearable; also, the majority of the women (94%) had either very often or often suffered ill-fitting of garments on different body locations. It was pointed out that 27.6% of women suffer ill-fitting on the chest, 18.6% women on the shoulder and armhole, and 53.7% women on the waist, abdomen, and hip. This study also indicated that 67% of women had problems with the length of the garment.

For 49.2% of women, the length of the dresses was too long to wear without any alterations whereas, 17.8% of women were getting the length of their dresses too short to wear.

It is consequently concluded that most women were not satisfied with ready–to–wear clothing, and there is a need to establish a standard sizing system for Indian women for making ready-made garments based on the original database of anthropometric measurements of Indian women females.

REFERENCES

- Alexander, M., Connell, L. J., & Presley, A. B. (2005). Clothing fit preferences of young female adult consumers. *International Journal of Clothing Science and Technology, 17*(1), 52-64.
- Burns, L. D., & Bryant, N. O. (2000). The business of fashion: Designing, marketing, and manufacturing. *Fairchild, USA*.
- Fan, J., Yu, W. and Hunter, L. (2004), Clothing Appearance and Fit: Science and Technology, *Woodhead, Cambridge*.

- Gupta, D. (2007). Indian body dimensions. https://www.fibre2fashion.com/industry-article/2650/indian-body-dimensions
- Hsu, C. H., & Wang, M. J. J. (2005). Using decision tree-based data mining to establish a sizing system for the manufacture of garments. *The International Journal of Advanced Manufacturing Technology*, *26*(5-6), 669-674.
- Kausher, H. (2021). *Clothing sizes for Indians in clustered classification. University of Allahabad, Prayagraj.*
- Petrova, A. (2007). Creating sizing systems. *Sizing in clothing: Developing effective sizing systems for ready-to-wear clothing*, 57-87.
- Smathers, D. G., & Horridge, P. E. (1979). The effects of physical changes on clothing preferences of elderly women. *The International Journal of Aging and human development*, *9*(3), 273-278.
- Vuruskan, A., &Bulgun, E. (2011). Identification of female body shapes based on numerical evaluations. *International Journal of Clothing Science and Technology*, *23*(1), 46-60.
- Zakaria, N., & Gupta, D. (2014). Apparel sizing: existing sizing systems and the development of new sizing systems. In *Anthropometry, Apparel Sizing and Design* (pp. 3-33). Woodhead Publishing.

The Indian Journal of Home Science 2022: 34(1)

A COMPARATIVE STUDY ON THE ANTIMICROBIAL PROPERTIES OF SERICIN AND FISH SCALE COLLAGEN APPLIED ON VISCOSE RAYON FABRIC

Ms. M. Vithya Lakshmi[1] and Mrs.M.Nazeem Banu[2]

[1]P.G Student, [2]Assistant Professor

Department of P.G. Studies and Research in Home Science,

JBAS College for women, Chennai-600018.

E-mail:nazeembanu84@gmail.com

ABSTRACT

The antibacterial fabrics for medical and hygienic use have become prominence to avoid cross infection by pathogenic microorganisms, especially bacteria such as Staphylococcus aureus, Escherichia coli. Unpleasant odor can arise from the acquisition of a variety of compounds produced in bodily fluids, such as perspiration, which leads to development of microbes in the fabrics. Antimicrobial microbial treated fabrics are increasing its preference in the choice of consumers who are looking for solutions to odor and microbial problem and the unique benefits provided by antimicrobial treated textile products for clothing and home furnishings. The antibacterial properties of sericin and fish scale collagen applied on viscose rayon fabric, which is commonly used regenerated cellulosic fiber material in clothing and hygiene products, is studied for bacteria with Parallel Steak Method for Staphylococcus aureus and Escherichia coli. It was observed that the antibacterial property of the unwashed and washed (5 cycle) rayon fabric showed better results on comparison with control samples.

Keywords: Antibacterial fabrics, Staphylococcus Aureus, Escherichia coli, Viscose Rayon

INTRODUCTION

Clothing is a major aspect of human life. From earliest times, people have used textiles of various types.Viscose rayon is one of the most absorbent of all textiles. It is more absorbent than cotton or linen, but less than wool and silk. It is also known as regenerated cellulosic fiber or artificial silk as it has luster and better tenacity than cotton. Rayon is used in industrial wipes, medical supplies, including bandages, diapers, Sanitary napkin, and tampons in non-woven fabrics. The consumers are now increasingly aware of the hygienic life style and there is a necessity and expectation for a wide range of textile products finished with antimicrobial properties.

Health and hygiene are the primary requirements for human beings to live comfortably and work with maximum and to avoid cross infection; a special finish like antimicrobial finish has become necessary. With the advent of new technologies the growing needs of consumer in the wake of health and hygiene can be fulfilled without compromising the issues related to safety, human health. Tapping new potential antimicrobial substance such as chitosan from nature can considerably minimize the and undesirable activities of the antimicrobial Products writes (Shanmugasundaram A,2007).

Regenerated cellulose fibre is a type of manufactured or man-made fibre that uses cellulose (mainly from wood or plant fibres) as a raw material. Regenerated cellulose fibre was the first man-made fibre applied in the textile and apparel industry and in the early days of its development, during the 1850s, had the popular name "artificial silk" as manufacturers hoped to produce an artificial fibre to replace silk (Woodings, 2001).

Uses of Viscose Rayon:

1. Accessories, blouses, dresses, jackets, sportswear, shirt, suits, ties, work clothes.
2. Bedspreads, blankets, curtains, tablecloths.
3. Medical surgical products, nonwoven products.
4. Feminine hygiene products.

(www.fibersource.com/f-tutpr/rayon.htm)

The application of antibacterial textile finish includes a wide range of textile products for medical technical industrial, home furnishing and apparel sectors. Even though such finishes have been available since many years, but in earlier years there were two major problems with them, the scope of the a antibacterial activity was very limited and the finishing effect was not durable. The antimicrobial impregnation of textile is deodorization to provide of textile against microbial corrosion prevention of malodor or prophylaxis and therapy of infections describes (Menezes, 2002).

Regenerated cellulosic fibres have physical and chemical properties similar to cotton, and so, find uses where water absorbency and close to skin comfort is desirable. Key applications for regenerated cellulosic fibres are in the hygiene, wipes and incontinence sector. The technical applications for these products include fluid filters, automotive interior components and medical swabs and wound dressings. These products are typically spun laced but are also processed using needle-punching and chemical bonding (Google Scholar,1998)

Commonly used natural fibres are cotton and silk, but also included are the regenerated cellulosic fibres (viscose rayon); these are widely used in non-implantable materials and healthcare/hygiene products.

Fabrics made from viscose fibres containing polysilicic acid (Visil®) and aluminium silicate (Visil AP®) have been given urea peroxide treatment to make them antibacterial as well as deodorant(Google Scholar,1998).

Staphylococcus Aureus:

The staphylococcus aureus is the bacteria responsible for many of the common human diseases seen today, including mild skin infections and sore throats. The bacterium is spherical shaped, growing in chains and existing in the human body where the temperature is right for its growth. The staphylococcus aureus is responsible for serious condition such as multiple sepses, otherwise known as toxic shock syndrome, where the body reacts severely to a protein produced by the bacteria. This type of bacteria responds to penicillin treatment, and is relatively easy to treat in cases where the infection is minor.

Escherichia Coli:

Commonly known as E.coli, this bacterium is the cause of gastrointestinal diseases, diarrhoea and symptoms associated with food poisoning. This bacterium exists in various

strains, and naturally exists in the body's intestines. The harmful strain releases a protein that causes the body to react negatively, and the body's attempt to purge the toxin produced by the bacteria, it reacts by vomiting and diarrhoea. The best way to prevent the condition is to avoid undercooked and raw food.

Antimicrobial properties were evaluated by the standard ASTM E2149 method, whilst anti oxidative properties were determined by 2,2'-azino-bis (3-ethylbenzothiazoline-6-sulphonic acid) radical cation decolorization assay. It was found that the oxidation of viscose fabrics further modified by chitosan–iodine nanoparticles dispersion was a very promising functionalization process, providing good coating stability along with antimicrobial and antioxidant properties (Rodie,2010)

Silk was discovered at nearly 2500 B.C. the interesting story about discovery of silk is that a Chinese princess accidentally came across a "cocoon" which fell into her tea cup. When she took out the cocoon, she observed it was full of silk filaments in the form of continuous length. It was later discovered that fine fabrics can be woven out of these filaments (Voegeli R,1993).

The chief constituents are fibroin, the protein substance and sericin, the silk gum. The average composition of raw silk is 70-75% of fibroin, 25-30% of sericin, 0.5-0.6% of substance extracted by alcohol, 1-17% of mineral matter. The natural colour of silk thread differs depending on the type of silkworm and its feeding habits (Sonwalkar, 1990).

Silk fiber is made of two types of proteins—silk fibroin and sericin. Sericin contributes about 20-30 percent of total cocoon weight. It is characterized by its high content of serine and 18 amino acids, including essential amino acids. There are different methods of isolation of sericin from silk filament. Solubility, molecular weight and gelling properties of sericin depend on the method of isolation. (Padamwar, M.N, 2004).

Usually sericin is recovered by using hot water. But it can be also recovered by three different processes- high temperature high pressure (HTHP), alkaline and soap plus alkali (SPA), using membrane filtration technology. It has been found that sericin recovered from different methods has different- color, ash content, protein content and different molecular wt. range. The secondary structure of sericin recovered from HTHP degumming has random coil conformation with some β-sheet structure. The sericin recovered from alkaline and SPA degumming liquors has denatured secondary structure with some random coil, β-sheet, and α-helix conformation (Gulrajani, M. L 2009).

In recent years sericin having many important, valuable properties like gelling, moisture absorption, antioxidant, anti-bacterial etc. sericin has also been found to be useful as a degradable biomaterial and to be used as polymer for forming articles and functional membranes. Environment friendly biodegradable polymers can be produced by blending sericin with other resins (Padamwar M.N, 2005).

Collagen is a general term of structural proteins of the extracellular matrix, organized in a fribillar arrangement (Vanderrest, and Garrone ,1991)

Marine collagens can be obtained from different sources. Several studies have been focusing on marine collagens, namely on its extraction from different sources, such as fishes, or invertebrate marine animals, such as marine sponges or jellyfish. A considerable amount of fish weight (about 75%) is discarded, in the form of skins, bones, fins, heads, guts and scales. From these residues, it is possible to obtain collagen, with an important

increase of the economic value of the by-products (Senaratne, L.S., **2006**).
Preparation of fish parts involves cleaning, separation of animal parts, and size reduction by cutting or mincing the samples and a chemical pre-treatment to remove non-collagenous proteins, pigments or fats (Bayon B, et.al, 2018).

In the case of fish, they are split up in skins, scales, fins and fish bones, because its composition is different (e.g., mineralization in fish bones and scales) and so the applied methodology to extract collagen must have other preparation steps. Size reduction of these compounds is also important to facilitate acid action. The common method to remove non-collagenous proteins is the use of sodium hydroxide (NaHO). The effectiveness of the removal is dependent on time, temperature and on the concentration of NaHO solution. (Sadowska, **2003**).

Collagen of Aquatic origin has proven its use an alternative material in the manufacture of medical dressings such as sponges and membranes for the treatment of wounds. It is also included in biomaterials of medical uses for ophthalmology, bone substitute, gel for the administration of drugs (Sionkoswska, 2017).

Collagen matrices have the ability to absorb large amounts of extrudates from wounds. This favours the formation of biodegradable or sheet on the surface of the wound that maintains a humid environment, promotes healing and provides protection against external mechanical forces (Albu M,2001). Collagen sponge possesses adequate characteristic for tissue regeneration due to their high porosity, permeability, allow toxicity, cell adhesion, and biocompatibility (Bayon B, 2018).

The present study was designed with the following objective.

OBJECTIVE

To study the antibacterial effect on 100% viscose rayon using a sericin and fish scale collagen.

METHODOLOGY

The main objective of this research project was to conduct a comparative study on the antibacterial finish on rayon using sericin and fish scale collagen.

a. Selection of Fabric:

Viscose Rayon: 100% viscose rayon fabric was selected for this study.

b. Selection of Agents:

The antibacterial agents like sericin, fish scale collagens were selected for this study, and the sericin is collected from TANSILK state government office in Kanchipuram.

c. Preparation of Fabric

The fabric samples were made into the open width and then 100% viscose rayon samples were treated with sericin and fish scale collagen.

d. Laboratory Tests

Laboratory tests were conducted to determine the antibacterial effects

against bacteria of the samples.

e. Selected Bacteria:

Staphylococcus aureus
Escherichia coli

f. PREPARATION OF AGENTS:

a. EXTRACTION OF SERICIN:

Approximately 15 g of Bombyxmori cocoons were weighed into a 2000mL Erlenmeyer flask, added with 1000mL of ultrapure water, and autoclaved at 120 °C during 60 min. After autoclaving, sericin was extracted via precipitation according to the procedure described by Aguiar, with slight modifications. The autoclaved cocoon mass was then withdrawn from the shell as thin fibres. The resulting solution with fibred structures of silk sericin was kept frozen at −20 °C for 24h. Following the freezing period, the frozen solution was thawed at room temperature and dried. The dried sericin particles were then grinded and powdered. The resultant crude sericin extract powder was dissolved in a minimum volume of 0.5 M acetic acid and dried at room temperature and stored for finishing the fabrics.

b. COLLAGEN EXTRACTION FROM FISH SCALE:

Fish scales were taken from commonly available fish species like Catla (*Gibelioncatla*) and rohu (*Labeorohita*. All the preparation procedures were carried out at 4 °C. To remove non-collagenous proteins, the prepared scales were mixed with 0.1 M NaOH at a solid to alkali solution ratio of 1:10 (w/v) and continuously stirred for 6hr using a Magnetic Stirrer at a speed of 300 rpm. The alkali solution was changed every 3hr. Then, the pretreated scales were washed with cold water until the neutral or faintly basic pH of wash water was obtained. The pretreated scales were further dematerialized with 0.5 M EDTA-2Na (pH 7.4) using a solid to solution ratio of 1:10 (w/v) for 48 h with a continuous stirring, and the solution was changed every 12 h. Then, the dematerialized scales were continuously stirred with 20 volumes of cold tap water for 10 min and the washing was performed for 3 times. Pretreated scales were soaked in 0.5 M acetic acid with a solid to solvent ratio of 1:15 (w/v) for 48 h with a continuous stirring. The mixtures were filtered with two layers of cheese cloth. The collagen in the filtrate was precipitated by adding NaCl to a final concentration of 2.5 M in the presence of 0.05 M (hydroxyl methyl) amino methane, pH 7.0. The resultant precipitate was collected by centrifugation at 20,000× g at 4 °C for 60 min using a refrigerated centrifuge. The pellet was dissolved in a minimum volume of 0.5 M acetic acid and dried at room temperature and stored for finishing the fabrics.

Preparation For Finishing The Fabrics By Drying And Curing:

The rayon fabrics were finished with extracted collagen and sericin separately using the required size and length (100 X 100cm^2.The recipes of finishing solutions composed of Glutaraldihyde and Sericin were prepared using standard concentration of 20 g/L Sericin. The fabrics were padded through the finishing solutions in a laboratory padder. The samples were then dried in a laboratory dryer at 100°C for 2

minutes and cured at 160°C for 2 minutes. Instead of sericin, the collagen solutions were prepared and the fabrics were finished using the similar standard conditions. All the finished samples were further subjected to evaluate for their antibacterial activity.

Antibacterial Activity (Parallel Streak Method (Aatcc 147 Test Method)

The rayon fabrics (finished with sericin and finished with collagen separately) was analyzed for their antibacterial activity using the standard AATCC – 147 test methods (Parallel streak method).

Briefly, test specimens (finished fabrics) were cut into pieces (25mm x 50mm). A 50mm length permits the specimen to lay across 5 parallel inoculums streaks each of diminishing width from both 8mm to 4mm wide. Sterile AATCC bacteria stasis agar plates were prepared. Using sterile 4mm inoculating loop, one loop full of culture was loaded and transferred to the surface of the agar plate by making five parallel inoculums streaks spaced 10mm covering the central area of the Petridis without refilling the loop. The test specimen was gently pressed transversely, across the five inoculums of streaks to ensure intimate contact with agar surface. The plates were incubated at 37˚C for 18-24 hours. The inoculated plates were examined for the interruption of growth along the streaks of inoculums beneath the fabric and for a clear zone of inhibition beyond the fabric edge. The average width of the zone of inhibition around the test specimen calculated in mm.

Wash Durability Of Sericin Finished And Collagen Finished Rayon Fabrics (Aatcc - 124)

The Antibacterial activity of the sericin finished fabrics and collagen finished fabrics was analyzed for the durability. The fabrics were washed as per AATCC-124 wash fastness method. All the samples were washed for 5 times and subjected for antibacterial activity according AATCC-147 test method.

RESULTS AND DISCUSSION

The main purpose of the study was to compare the antibacterial effect of 100% viscose rayon using sericin and fish scale collagen. The results were compared, tabulated and discussed with the help of appropriate tables and figures.

I. Antibacterial Activity (Parallel Steak Method Aatcc (147 Test Method)

Evaluating the antibacterial activity of sericin and fish scale collagen treated 100%viscose rayon fabric as treated by parallel steak method a clear zone of inhibition was observed for both the test organisms. The results of antibacterial activity of finished fabric were tabulated in Table - 1 and graphically represent in Figure - 1.

In the case of antibacterial activity of sericin and fish scale collagen finished 100%viscose rayon fabric by parallel steak method, the zone of inhibition was observed to be 33mm, 36mm for Escherichia coli. For Staphylococcus aureus, the zone of inhibition for sericin and fish scale collagen treated fabric was observed to be 34mm and 35mm. The antibacterial activity was high for Escherichia coli in fish scale collagen

finished sample than to Staphylococcus aureus when compare to that of sericin finished sample for Escherichia coli and Staphylococcus aureus.

Table –1: Anti-bacterial Activity (Parallel Steak Method Aatcc 147 Test Method)

	Antibacterial Activity				
	Zone Of Inhibition (Mm)				
Test Sample		**Mean**	**SD**	**t**	**P (p<0.05)**
Sericin Sample	Escherichia Coli	33	10	-1	.173297 **
	Staphylococcus Auerus	34	10		
Fishscale Collagen	Escherichia Coli	36	26	0.69007	.254836 **
	Staphylococcus Auerus	35	16		

*- significant, **- non significant

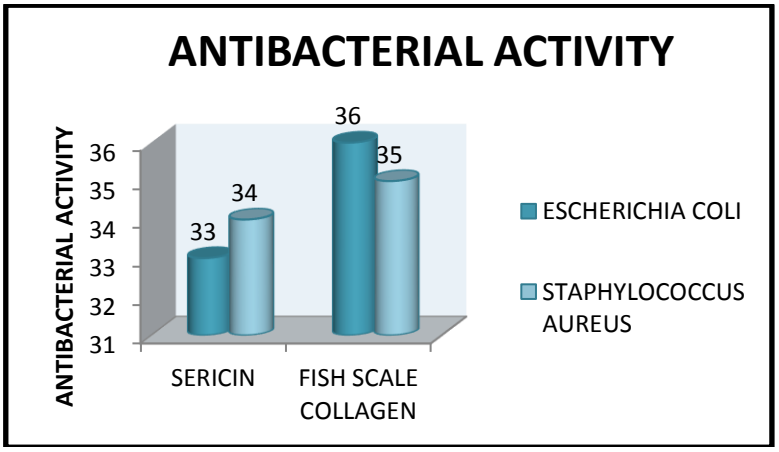


Figure –1 Antibacterial Activity Parallel Steak Method (Aatcc147 Test Method)

I

I. Antibacterial Activity of The Washed Fabric Aatcc (124 Test Method)

Evaluating the antibacterial activity of sericin and fish scale collagen treated 100%viscose rayon fabric after 5 washes was tested by parallel steak method a clear zone of inhibition was observed for both the test organisms. The results of antibacterial activity of washed sericin and fish scale collagen treated fabric were tabulated in Table - 2 and graphically represent in Figure - 2.

In the case of antibacterial activity of sericin and fish scale collagen finished 100%viscose rayon fabric after 5 washes, the zone of inhibition was observed to be 30mm and 31mm for Escherichia coli. For Staphylococcus aureus the zone of inhibition was observed to be 31mm, 31mm. The wash durability of the antibacterial

finish showed a little decrease in the zone of inhibition for both Escherichia coli and Staphylococcus aureus after 5 washes, When compare to that of the unwashed fish scale collagen and sericin treated samples. The antibacterial activity of fish scale collagen and sericin finished sample after five washes was found to be same.

Table – 2: Wash Durability of Antibacterial Activity (Parallel Steak Method Aatcc 124 Method)

	Antibacterial Activity				
	Zone Of Inhibition (Mm)				
Test Sample		**Mean**	**SD**	**t**	**P (p<0.05)**
Sericin Sample	Escherichia Coli	30	10	-0.57735	>.289792**
	Staphylococcus Auerus	31	50		
Fishscale Collagen	Escherichia Coli	31	26	0	**>.5****
	Staphylococcus Auerus	31	16		

*- significant **- non significant

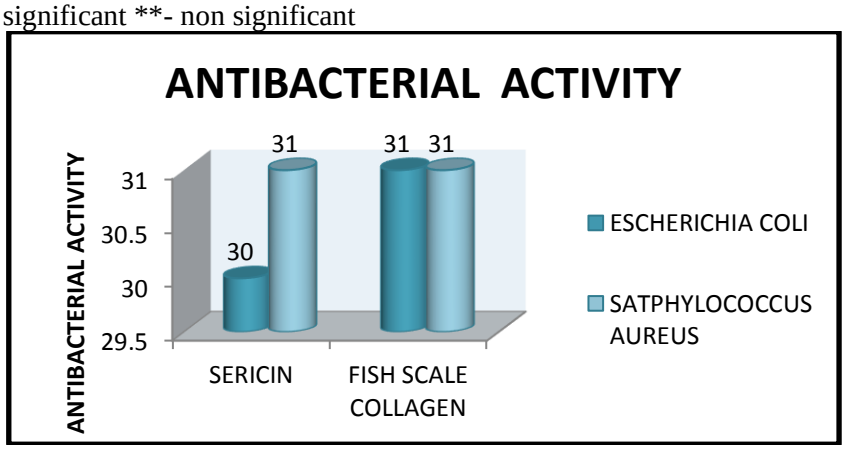


Figure – 2: Antibacterial Activity of The Washed Fabric (Aatcc 124 Test Method)

CONCLUSION

The zone of inhibition i.e. the anti-bacterial activity for Escherichia coli and Staphylococcus aureus in fish scale collagen treated samples was good than sericin treated samples.

The zone of inhibition i.e. the anti-bacterial activity for Escherichia coli and Staphylococcus aureus in fish scale collagen treated samples was good than sericin treated samples after 5 washes also.

Hence, it was an evident that both were good in antibacterial action but fish scale collagen is slightly higher than sericin and can be effectively used in home textiles and medical textiles.

REFERENCES

- Anon Fibrous structure containing urea peroxide. Medical Text. 1998 October 3-4. [Google Scholar]
- Bayón B, Berti I, Gagneten A, Castro G.(2018), Biopolymers from Wastes to High-Value Products in Biomedicine Springer;. p. 1-44.DOI: 10.1007/978-981-10-7431-8_1
- Gulrajani, M. L., Purwar, Roli, Prasad, R. Kamal, and Joshi, M.(2009), Studies on Structural and functional Properties of Sericin Recovered from Silk Degumming Liquor by Membrane Technology, Journal of Applied Polymer Science, Vol. 113, 2796–2804.
- Menezes (2002) antimicrobial finish of textile, the textile industry and trade journal pp 35-38.
- Padamwar M. N., Pawar A. P. (2004), Silk sericin and its applications: a review. Journal of Scientific and Industrial Research.;63(4):323–329.
- Rajendran, S., Anand, S. C., & Rigby, A. J. (2016). Textiles for healthcare and medical applications. Handbook of Technical Textiles, 135–168.
- Rodie JB;(2010) Fibers for Nonwovens, United States: Textile World.
- Sadowska, M.; Kolodziejska, I.; Niecikowska, C. (2003); Isolation of collagen from the skins of baltic cod (*Gadusmorhua*). *Food Chem., 81*,257–262.
- Senaratne, L.S.; Park, P.J.; Kim, S.K.(2006) Isolation and characterization of collagen from brown backed toadfish (Lagocephalusgloveri) skin. Bioresour. Technol., 97, 191–197.
- Shanmugasundarama A, (2007) Antimicrobial finish in textiles; The Indian textile journal pp-53-58.
- Sionkowska A, Skrzyński S, Śmiechowski K, Kołodziejczak A.(2017); The review of versatile application of collagen; Polymers for Advanced Technologies.;28:4-9.DOI: doi. org/10.1002/pat.3842.
- Vanderrest, M.; Garrone, R.(1991); Collagen family of proteins. FASEB J.,VOL-5, 2814–2823.

WEB REFERENCE

a. www.fibersource.com

The Indian Journal of Home Science 2022: 34(1)

EFFECT OF MANJISTHA DYE ON ABUTILON INDICUM FABRIC

Ms.S.Umamageshwari [1] and Dr.G.Manonmani [2]

[1]Ph.D Research Scholar, Department of Home Science - Textiles and Clothing,
Mother Teresa Women's University, Kodaikanal 624101, Tamilnadu, India
[2]Assistant Professor, Department of Home Science,
Mother Teresa Women's University, Research and Extension Centre, Coimbatore,
Tamilnadu, India.
email: umamahes7@srmist.edu.in

ABSTRACT

The word color does not offer just color. It has the influence to change the sensation of human's mind. The properties of colors have the control to offer a good texture, look, aesthetic, durability and fastness. Colors in fabric can be attained by the process of dyeing. In recent times, natural dyes have a good fondness among customers and designers. The present study was undertaken to extract dye source from Manjistha (Rubia cordifolia) and to discover dyeing possibilities on Abutilon indicum fabric. The effect of fastness properties such as washing, lighting, crocking and pressing had been studied. By applying the pre and post mordanting technique pleasant shade was developed by using manjistha dye powder. The color strength was improved by increasing the mordant used and dye absorbance. The natural dye extracted from various plant sources had virtuous properties in washing fastness, lighting fastness and it also had many applications in sports textiles, agro textiles, geo textiles, and auto mobile textiles. Likewise, this dyed sample also showed better results in the fastness property. Lastly, in this study, the natural fabric which was developed from the plant Abutilon indicum, processed for dyeing by using natural dye had produced excellent shade.

Keywords: Natural dye, Mordant, Colours, Abutilon indicum fabric, manjistha dye

INTRODUCTION

In recent days, the environmental protection movement has developed a mission for the apparel industry, as, it uses an equally large number of chemicals for dyeing and printing. These chemicals are injurious for people in addition to the atmosphere. Dyes with chemical base grieve from numerous drawbacks. Some of the chemical-based dyes which were mutagenic and hazardous were excluded. In this era of green customer's intent towards natural dyes had grown up primarily for the reason that a natural dye has shown to own endorsing the health and also nature responsive properties.

Likewise, recently, the customers have developed plentiful awareness on the atmosphere renaissance of biodegradable products and process like dyeing by means of natural dyes, thus, it has become important now, says, Padma Vankar (2017). India possesses a wealth of various leaves full of colours. Natural dyes are not as much of toxic, are less polluting and have lesser amount of health risk, non-carcinogenic and poison-free. They are consistent mild, subtle, soft which results in a restful effect. It is conceivable to recycle once it has been used.

Natural dyes have several benefits, however, there are certain margins as well. The application of natural dyes is classified into many ways as shown in the figure:1. It is difficult to take out colour from colouring module from the natural resource. It has less colour rate and extended time generates high price of dyeing by using natural dyes than with chemical-based dyes. Uncommon natural dyes are deserter and also in requisite of a mordant for enrichment of their fastness possessions. Roughly the metal based mordants are dangerous.

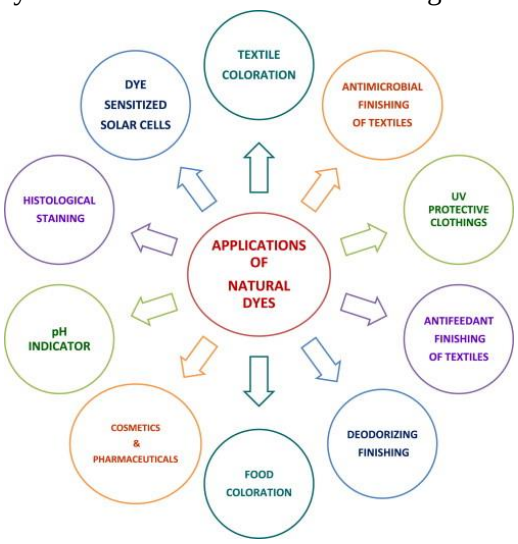


Fig: 1 Application of Natural Dyes

Justification of the Study

In recent days, people wish for organic products in order to use. In this study the fabric and the dye were used from natural source therefore satisfying the organic purpose.

The plant is widely available, since the developed fabric from the plant fibre can be used as commercial one. Similar, the plant manjistha (Rubia cordifolia) has anti-bacterial activity and skin friendly. Abutilon indicum plant was selected as dye source. The plant Abutilon indicum had been selected for this study because of its medicinal property in both internal and external way.

OBJECTIVES

The present research was conducted to attain the following objectives:

- To apply the Manjistha (Rubia cordifolia) dye on the Abutilon indicum fabric
- To evaluate the results of natural dye on Abutilon indicum fabric
- To evaluate the washing fastness of the dyed Abutilon indicum fabric

METHODOLOGY

Materials and Methods: Dye Source- Rubia cordifolia (Manjistha), Mordant-Alum, Fabric Source-Woven fabric constructed by the plant, Indian Mallow (Abutilon indicum) shown in Plate: 1. By hand loom production method. The constructed fabric has shown in the Plate: 2.

***PlateI: Indian mallow Plant (*Abutilon indicum)**

***Plate2:Indian mallow Fabric(*Abutilon indicum)**

The dyeing of Abutilon indicum fabric with Manjistha dye was carried out in the sequence of process as shown in the flow chart here.

COLLECTION OF PLANTS

↓

SEPERATING BARKS

↓

EXTRACTION OF DYES

↓

MORDANTING

↓

PRE-MORDANTING

SIMULTANEOUS MORDANTING

POST MORDANTING

DYEING

COLOUR FASTNESS

Flowchart: 1 Sequence Process of the Study

Collection of the Barks and Extraction of the Dye: The Manjistha (Rubia cordifolia) is a type of flowering plant and it grows up to 10 m. The bark of the plant was long, thick, cylindrical shape with red colour. The barks from various plants were collected and washed thoroughly in soft water to remove the dirt particles. After complete drying, the barks were converted into fine powder using grinder (Plate 4). The Material liquor ratio is 1:10 was followed.

Mordanting: The process of mordanting was carried out in three different stages, Pre-mordanting, Simultaneous mordanting and post-mordanting. **Pre-Mordanting:** In this stage, the fabric was treated with the alum powder as mordant. The material liquor ratio was followed properly and frequently as 1:10 for 50 minutes at 4^{o} C. The Alum mordant is shown in the Plate: 3. The fabric which was processed for mordanting was then dyed by means of Manjistha dye powder. **Simultaneous Mordanting:** In this stage, the natural fabric was mixed with the alum mordant along with the manjistha dye powder**.** The material liquor ratio was followed properly and frequently as 1:10 for 50 minutes at 4^{o}C. After the process of mordanting the fabric was dipped for cold wash and then it was dried.

Post-Mordanting: This stage has been done as follows. Once the natural fabric was dyed , then the fabric was treated with the alum mordant at 4^{o}C with same material liquor ratio. Temperature was controlled by maintaining the same at 4 ^{o}C

Plate: 3 Alum (Mordant)

Fabric Sample: The Abutilon indicum fabric was taken for the natural dyeing process. **Dyeing:** Experiment was performed for the Abutilon indicum fabric sample done at 3^{o}C for 45 minutes. The dyed fabric has shown in the Plate: 5.

Plate: 4 Manjistha Dye Powder

Plate: 5 Natural dyed Sample on Abutilon indicum

Colour Fastness: Fastness property of textile materials particularly for fabric that too for natural dyed fabric is very essential for processing and for utilizing purpose. It is the property to endure colour falling from the surface of textile materials for the duration of experiencing various process and treatment. If the colour fastness property of the fabric is not better it directs that the fabric was not dyed pleasingly. Moreover, colour bleeding may arise more for the period of rubbing, washing, crocking and perspiration.

Washing Fastness: The dyed fabric samples were placed between two pieces of white fabric sample, which is control fabric. All the fabric samples were placed together by using basic running stitch. The hot solution which includes soap powder had the ratio of 1:40, which denotes 0.4 g for 30 litres of water. It was taken in a utensil. After 20 minutes all the samples were taken out from the solution and washed in cold water. **Rubbing Fastness**: The rub fastness of the tinted sample was done by using manual method to check the fading effects and it was also done in crock meter.

Light Fastness: The process was done by using the direct sunlight source method. The samples were placed in the direct sunlight area for 10 hours. Then, the samples were taken away and the fastness to light was evaluated by comparing the change of the colour in the sample, particularly on the exposed portion when compared to the unexposed fabric which is dyed. **Pressing Fastness:** The dyed fabric samples underwent for hot iron process. The samples were cooled after hot iron process. After that, the fabric was compared between the control and ironed fabric.

FINDINGS AND DISCUSSION

The evaluation of colour fastness was done in the above said method and the findings were evaluated by using the Gray Scale

I. Colour Fastness to Washing

The findings of washing fastness for the sample are given in the table-1.

Table – 1: Washing Fastness for The Natural Dyed Samples On Abutilon Indicum Fabric

Washing Fastness			
Sample	Stain	Colour Change	Bleeding In Water
1.	5	5	No bleed
2.	3	5	No bleed
3.	5	5	No bleed
4.	5	5	No bleed
5.	4	3	No bleed
6.	5	3	No bleed
7.	5	5	No bleed
8.	5	3	No bleed

NOTE: 1 – Very poor; 2 – Poor; 3 – Medium; 4 – Good; 5 – Excellent

From table-1, it is clear that, the samples 2 and 5 exhibited stain, whereas all the others showed no stain on the fabric. Samples 5, 6 and 8 showed medium in colour change, whereas all the others showed excellent in colour after washing.

Table-2: Washing Fastness after 5 and 10 washes for the natural dyed samples on Abutilon indicum fabric

After 5 Washes		After 10 Washes	
Sample	**Colour Change**	**Sample**	**Colour Change**
1.	4	1.	4
2.	4	2.	4
3.	4	3.	4
4.	4	4.	4
5.	3	5.	3
6.	3	6.	3
7.	4	7.	4
8.	3	8.	3

NOTE: 1 – Very poor; 2 – Poor; 3 – Medium; 4 – Good; 5 – Excellent

5 Washed samples - The fabric samples 1,2,3,4, & 7 after 5 washes showed good for their colour and the samples 5, 6 & 8 showed medium in colour. **10 Washed samples -** All the 10 washed fabric samples showed similar results of 5 washed samples.

II. Colour Fastness to Crocking

The findings for the crocking fastness of the sample are given in the table-3.

Table- 3: Crocking fastness for the natural dyed samples on Abutilon indicum fabric

Crocking Fastness				
Wet			Dry	
Sample	**Colour Change**	**Stain**	**Colour Change**	**Stain**
1.	5	3	4	4
2.	5	3	5	5
3.	4	3	5	4
4.	5	3	4	5
5.	5	3	5	4

6.	5	4	5	5
7.	5	3	4	5
8.	4	3	5	4

NOTE: 1 – Very poor; 2 – Poor; 3 – Medium; 4 – Good; 5 – Excellent

From the table-3, it is clear that all the samples showed excellent in colour in wet condition and the samples 3 and 8 showed good. For all the samples the stain in wet condition showed medium level and the sample 6 showed it good. In dry condition all the samples showed excellent and the samples 1, 4 and 7 showed good. Samples 2, 4, 6 and 7 showed excellent in stain in dry condition whereas samples 1, 3, 5 and 8 showed good in stain in dry condition.

III. Colour Fastness to Lighting

The findings for the lighting fastness of the sample are given in the table-4.

Table -4: Lighting fastness for the natural dyed samples on Abutilon indicum fabric

Lighting Fastness	
Sample	**After 7 Days**
1.	5
2.	5
3.	4
4.	4
5.	5
6.	5
7.	4
8.	4

NOTE: 1 **–** Very poor; 2 – Poor; 3 – Medium; 4 – Good; 5 – Excellent

For the samples 3, 4, 7 and 8 showed good for their colour and all the other samples showed excellent.

IV. Colour Fastness to Pressing

The findings for the lighting fastness of the sample are given in the table-5

Table – 5: Pressing fastness for the natural dyed samples on Abutilon indicum fabric

Pressing Fastness				
Wet			**Dry**	
Sample	**Colour Change**	**Stain**	**Colour Change**	**Stain**
1.	4	3	5	5

2.	5	3	5	5
3.	4	3	5	5
4.	5	5	5	5
5.	4	3	5	5
6.	4	5	5	5
7.	4	5	5	5
8.	4	5	5	5

NOTE: 1 – Very poor; 2 – Poor; 3 – Medium; 4 – Good; 5 – Excellent

From table-5, it is clear that the samples 2 and 4 showed good for their colour in wet condition and all the other samples were excellent in their colour. The samples 4, 6, 7 and 8 showed excellent for their stain and all the other samples showed medium level for their stain. In dry condition, all the samples showed excellent in both colour and stain.

SUMMARY AND CONCLUSION

The application of natural dyes has reduced over groups due to nonexistence of certification. There is not abundant data existing about dye-yielding plants or their products. Natural dyes generate the most beautiful colours, while producing no harm to the earth and all of life. Working along with natural dyes and the dyestuffs offer creativity and inspiration to the practice. If we have a sight at a skein of yarn or fabric that dyed in natural method, the eyes do not weary of gazing upon colours from nature. Natural dyes are the most ecologically wide-ranging for the planet. Chemical dyeing industries are also manufacturing pesticides, toxins, nerve gas and so on. The source for these dyes is completely natural and has the properties of healing and vitality of their own. They are healthy to wear.

In recent days, claim for natural dyes has been budding speedily owing to improved mindfulness on unsafe, allergies, toxic responses connected with chemical-based dyes. Natural dyes are attained from natural bases such as plants, insects and minerals. At present, opportunely, there is collective consciousness amongst public on natural products. Due to their low pollution, non-toxic properties, fewer side effects natural dyes are second-hand in everyday textile products. Also, there are issues like trouble in the gathering of plants, absence of regulation, absence of ease of use of exact technical information of take out and colouring system and classes obtainability.

In the present study Natural fabric produced from Indian mallow was dyed with manjistha dye along with Alum as mordant which produced a good result. The lustre of the sample and its excellence demonstrated the fabric property towards its end-use. The approach of the natural dye and mordant produced dyeing without staining of other portions. By this study, it can be concluded that, the natural dyes and mordants produce good shades while using in optimum ratio. So, the natural dyes and mordants can be used as substitution for synthetic dyes and chemicals for dyeing and printing. The process was done on the natural fabric which made the entire wet processing more eco-friendly. This would save our mother nature.

SUGGESTION FOR FUTURE RESEARCH

The Plant Abutilon indicum has many medicinal properties; hence the fabric can be used for medical textile purpose. Manjistha dyed products showed results as good. So, the same fabric can be tried also with some other natural dyes.

ACKNOWLEDGEMENTS

The authors are grateful to the Indian Handloom workers and labours for their dedicative work and care on our nature. The authors also would like to express heartiest gratitude to the textile based small scale workers who have supported during the field work and product development work.

REFERENCES

- Amar K.Mohanty, Manjusri Misra, Lawrence T.Drzal (2005), Natural Fibres, Biopolymers and Bio composites, CRC Press, Pp:137
- Dabero Amarjeet, Agarkar Santhosh (2014), Natural Dyes-Extraction, Dyeing & Quality assurance Tests paperback, LAP Lambert Academic Publishing, Pp:32
- Fangueiro, Raul, Sohel (2018), Advances in Science and Technology towards Industrial Applications, eBook, Pp; 38
- Franziska Ebner, Romana Hasenohri (2018), Natural Dyeing with Plants: Glorius Colors from Roots, Leaves & Flowers Hardcover, Schiffer Publication, Pp:78
- Jeyakodi Moses (1999), Application of some natural dyes, "Convention on Natural Dyes", Pp-190.
- Kharbade (1999), Extraction, purification and characterization of some Indian natural dyes, Convention on Natural dyes, Pp-29.
- Padma Vankar (2017), Natural Dyes for Textiles, 1st edition, Wood head Publishing, Pp:213
- Ryszard Kozlowski Maria Amckiewicz-Talarczyk (2020), Handbook of Natural Fibers, Wood head Publishing, Pp:42
- Saville B.P (2000), Physical Testing of Textiles, Woodhead Publishing Limited, Cambridge, England, Pp-293.

The Indian Journal of Home Science 2022: 34(1)

ROLE OF SOCIAL MEDIA FOR AWARENESS REGARDING PREVENTION AND CONTROL OF COVID-19 PANDEMIC

Dr.Madhulika Gautam[1], Binita Kumari Singh[2] and Pooja[3]

[1]Associate Professor, [2]Research Scholar and [3]M.Sc. Student,
Dayalbagh Educational Institute, Dayalbagh, Agra,
Uttar Pradesh, 282005
Email: malika1204@gmail.com, binita.moran2@gmail.com

ABSTRACT

The present study was conducted during 2020 when COVID-19 affected the population globally. The relative importance, speed, ease and freedom of access have added quality and dependability on social media for trustworthy and relevant information. In order to understand the role of social media for awareness regarding prevention and control of COVID-19 pandemic as perceived by the natives of one of the most famous tourist places of historical importance, the present study was carried on 110 respondents of Agra city. Quota sampling technique was followed to select the respondents. Self-prepared questionnaire was used to collect the data. It was revealed from the finding of the study that out of various sources of information, most (40.90 %) of the respondents used social media as a source of information. It was also revealed from the study that majority (80 %) of the respondents agreed to the important role of social media for awareness regarding prevention and control of COVID-19 pandemic. The finding also revealed that the respondents below 30 years of age had higher mean score (12.85) as compared to the respondents of above 30 years of age (6.66) and the obtained 't' value of 9.05 indicated significant association of age with the role of social media for awareness regarding prevention and control of COVID 19 pandemic. It is also to be noted that the female respondent had higher mean score (12.40) as compared to male respondents (9.60) and the obtained 't' value of 7.11 indicated significant association of gender regarding role of social media for awareness regarding prevention and control of COVID 19 pandemic.

Key words*:* Awareness, COVID-19 Pandemic, Role of Social Media, Agra

INTRODUCTION

The outbreak of COVID 19 pandemic has adversely affected the lives of almost all the humans irrespective of their caste, creed, and gender. It has changed the way one used to communicate with others. Now, maintaining physical distance, even with our close ones, has become new norm of the society to control the further spread of this deadly virus. Correct and timely availability of relevant information related to control and prevention of COVID 19 pandemic is seen as the only way to save the lives of people. In such an unprecedent situation, electronic media has emerged as a potential tool to meet the communicational and informational need of the society. It is not as the electronic media is new to us but their relative importance has gain strength in this COVID 19 situation. Social media is one of the several means of access to information, but with a comparatively higher speed and relatively more freedom of accessibility, now a days, the use of social media has become very handy. People easily access the desired and required information using social media apps on their smart-phones or tablets, which were initially a communication tool of computer origin. Social media not only have the potential to provide access to relevant information but also have the ability to influence good number of social media users at a faster rate than traditional one by means of sharing and connecting with ideas, emotions, experiences etc. (Hussain, 2020; Gora & Sisodia ,2021). Its relative importance is more as it has

the capacity to meet the information need of the society at a speed equivalent to the speed of infestation of pandemic. But every technology has both good and bad sides. Emergence of fake information and ensuring authentic information is also very critical and deciding factor in determining socio-beneficial role of social media. The magical applicability of information technology (mix texts, pictures, videos etc.) can be attributed to the importance of technology in education (Khandave & Shaik ,2020; Sahani & Sharma, 2020). One such attempt to use the potentials of social media to benefit the society in such a hard time of pandemic prevalence was from Hua & Shaw (2020) who developed infographic of management for patients suspected or infected with COVID-19, which were circulated using social media like Twitter and WeChat. This helped in the timely and efficient management in controlling the contagious disease in its initial stage.

Today, social media i.e. Twitter, Facebook, and Instagram, have become primary sources of information. They are also vehicles for fake news and disinformation. During a crisis like the COVID-19 pandemic, social media should be mastered and employed in a responsible way.

Present research on "The role of social media for awareness regarding prevention and control of covid-19" has been undertaken to understand the how social media can be effectively used to deal such a critical situation by way of timely access to important information.

OBJECTIVES OF THE STUDY

The present study was undertaken with specific objectives-

i) To Assess the use of source of information related to prevention and control of COVID-19

ii) To Assess the perception of the respondents regarding the role of social media for awareness regarding prevention and control of covid-19

MATERIAL AND METHODS

(I). Research design:

Ex-post facto research design was used for the present study as the phenomenon had already occurred.

(II). Sampling procedure:

- Locale of study:

The present study was conducted in the year 2020 in the purposively selected city, Agra, of Uttar Pradesh as the city were regularly reporting high number of COVID-19 cases affecting, like others, students belonging to different educational institutes of the locality.

- Selection of respondents:

A total of 110 respondents, who were using social media, (Twitter, Facebook, and Instagram), were selected using quota sampling techniques. The selected respondents were in the age group of 15 to 45 years.

Steps followed for the sample selection:

- Out of the large population, the researcher divided sample in to two groups according to socio-economic status.
- Willing sample was approached and then selected through social media applications.
- On the basis of the process, 110 respondents were selected & data was collected through social media applications.

(III). Tool used:

- Data collection tool

Awell-structured self-prepared questionnaire was applied to gather the required information through social media. The tool had eleven items related to awareness regarding prevention and control of the Covid-19 pandemic.

- Statistical tools

Mean, frequency, percentage, SD and t -test were used in the present study to support the finding scientifically.

RESULTS AND DISCUSSION

Table:1: Use of Sources of information for preventing and controlling COVID-19:

Information source	**Number:** (n=110)	**Percentage**
Social media	45	40.90
Radio	0	0.00
Newspaper	20	18.18
T.V.	25	22.72
Other	20	18.18

It is clear from Table 1 that the most (40.90 %) of the respondents used social media (Twitter, Facebook, and Instagram) as a source of information for preventing and controlling COVID-19, followed by T.V. (22.72 %) and Newspaper (18.18 %)and media other than social, T.V., Newspaper and Radio (18.18 %). None of the respondents considered radio as source of information for the same. This may be due to the reason that nowadays social media has become handier and timelier source of information, where the individuals have greater flexibility and options to access, tally, gather and share information.

Table:2: Perception of respondents regarding the usefulness of social media as for preventing and controlling COVID-19:

Response	**Number (n=110)**	**Percentage**
Social media is helpful	88	80.00
Social media is not helpful	22	20.00

It is obvious from Table 2 that majority (80 %) of the respondents agreed to the usefulness of social media for getting information regarding prevention and control of COVID 19. This may be due to the reason that the respondents were using the social media platform and were getting in touch with the relevant information through different sub-sets of social media platform.

Table:3: Perception of respondents regarding Role of social media for awareness about prevention and control of COVID- 19 according to their age, gender, occupation and monthly income

		No. (N=110)	Mean	SD	t	P
Age in year	Below 30	90	12.85	2.19	9.05	<0.01
	Above 30	20	6.66	2.88		
Gender	Male	48	9.6	1.34	7.11	<0.01
	Female	62	12.4	2.70		
Occupation	Employed	50	12.5	2.08	1.14	NS
	Non-Employed	60	12	2.54		
Monthly Income	Below Rs 25,000	70	11.66	3.01	2.40	>0.05
	AboveRs 25,000	40	10	3.74		

It is evident from Table 3 that there was significant difference between the two age groups regarding perception about the role of social media for awareness regarding prevention and control of COVID-19 at 1 % level of significance. This may be due to the reason that the young population is comparatively more tech-savvy and contribute more time on social media. Also, the association between the two gender was found to be significant similar result was found in Hong Kong by Almotawa & Aljabri in 2020. There was no significant association between the occupation type and role of social media for awareness regarding prevention and control of COVID-19. This may be due to the reason that nowadays, access to social media is not just a leisure time activity. People have to access social media for purposes other than their entertainment and interaction as well. Lastly, the difference between the respondents from 2 income groups and their perception about role of social media for awareness regarding prevention and control of COVID-19 was found to be insignificant as the t value does not meet the requirement of significance at 5 % level of significance. This may be due to the reason that access to social media is not a luxury thing. The availability of cheap gadgets has made it possible to be in reach of ordinary low-income people also.

CONCLUSION

Social media has emerged as a relevant and impactful source of information for different purposes. In COVID-19 situation, when physical movement was restricted, the online sources, especially social media, played an important role for preventing and controlling COVID-19 situation as majority of the respondents agreed to its ability to be useful in such situations. Also, the age and gender revealed to be significant factors while monthly income occupation revealed to be non-significant regarding their perception about role of social media for awareness and control of COVID-19 pandemic. There is a need to make the social media more useful and trustworthy source of information by way of proper training, exposure and access to different social media means irrespective of caste, sex, occupation, age and level of education.

REFERENCES

- Almotawa,T. &Aljabri,D.(2020).Role of Social Media in Creating Awareness during COVID-19Pandemic . Retrieved December, 2020 from https://www.researchgate.net/publication/348760651
- .Gora,A.D. &Sisodia,S.S. (2021). Utilization Pattern of Social Media among the Postgraduate Students. *Indian Res.J. Ext.Edu*. 21(2&3.):24-25. Retrieved April and July ,2021 From https://www.seea.org.in
- Hua, J. and Shaw, R. (2020). Corona Virus (COVID-19) "Infodemic" and Emerging Issues through a Data Lens: TheCase of China. *Int. J. Environ. Res. Public Health 2020*, 17 (7): 2-6. Retrieved from https://www.mdpi.com/1660-4601/17/7/2309
- Hussain, W. (2020). Role of social media in covid-19 pandemic. *The International Journal of Frontier Science*, 4 (2): 59-60.
- Khandave, S. & Shaik, M.S.R. (2020). Knowledge and Awareness of PG Students of CoA, Pune about Information Technology Tools. Indian Res.J. Ext.Edu. 20 (4):75 Retrieved October ,2020 From https://www.seea.org.in
- Sahani, H. and Sharma, H. (2020). Role of social media during the COVID-19 pandemic: Beneficial, destructive, or reconstructive,*International Journal of Academic Medicine*. 6: 70-75. 10.4103/IJAM.IJAM_50_20.

The Indian Journal of Home Science 2022: 34(1)

SERVICES FOR MATERNAL HEALTH IN HARYANA: PERCEPTION OF HUMAN RESOURCES FOR HEALTH

Dr.Sunaina Batra[1], Dr.Sarita Anand[2] & Ms.Arti Verma[3]
[1]Assistant Professor, [2]Associate Professor [3]Ex-Student, M.Sc
Dept of Development Communication & Extension,
Lady Irwin College, Delhi University
Email: batra.sunaina@gmail.com: sa_anand2007@yahoo.com

ABSTRACT

Mother and child health have continually been a primacy for health planning in India. With a series of schemes in action by the Government at the Central level and many innovation schemes at the state level under the umbrella of National Health Mission, maternal health does gets it due. One such scheme that promises safe and secure maternal health is the "Delivery Hut" scheme in Haryana. The aim of the latter is to bring services of delivery, ante-natal care and post-natal care closer to the women at the village level. A crucial element in this is the role of Human Resources for Health who do all possible mobilization to motivate women to access these services. It is against this background that this study was undertaken to understand the perspective of the strongest stakeholders in the maternal health delivery system in the state of Haryana. This qualitative study sought the perception of Human Resources for Health (HRH) via a case study method in six delivery huts two districts of Palwal and Gurgaon respectively. Beneficiary Women's perception about health workers role was also taken. Purposive sampling was used for the study. The study found that the health workers were instrumental in apprising the clientele about the facilities at the Delivery Hut. A key role of Behaviour Change Communication was being played by them as they were able to strike a connection via interpersonal communication and convince the women to prioritize maternal health. All HRH asserted that mobilization, free of cost services and interpersonal communication worked together to motivate women. In order to provide better services at the Delivery Huts, HRH, in particular the ASHA workers demand better infrastructure, frequent health camps, structured pay, regularity of medical staff at these huts so that more women can establish trust in the services provided by these huts. The HRH stated that upscaling of the SC attached DH must be prioritized as the primary mandate of the DH was to provide delivery service within the village. The study reaffirms that to ensure a seamless service delivery related to maternal health at the grassroots, a proper infrastructure and a dedicated health workforce must co-exist, only then can beneficieries have faith in the system.

Key words: Health, Mother & Child, Behaviour Change Communication, Human Resources for Health, public health services

INTRODUCTION

Importance of Maternal Health

Health is the basic right for every individual. It is also articulated in the Sustainable Development Goal 3, (2016) which clearly mentions that "Good Health and Well-being" is the foundation of Development. World-wide many development indicators thrive on the components of health and well-being as pre-requisites to measure development. Mother and child health has always been a priority for health planning in India. The latest data shows the reduced Maternal Mortality Ratio

(MMR) by 77%, from 556 per 100 000 live births in 1990 to 130 per 100 000 live births, (WHO 2016). The Infant mortality rate of India presently stands at 34 percent and has improved from 2015 (37 per 1000 birth).

Determinants of maternal death

A study by Kumar & Gupta in 2015 found "a significant difference in the utilization of maternal health care services by caste, women' age at first birth, educational attainment, place of residence, economic status and region". In addition, the research evidence indicates that a young and poor woman reports more complications during pregnancy and lesser use of any health care services (Mousumi, 2014). Lack of information and lack of access to health services due to poverty and social cultural norms exacerbate the poor health outcomes. Sluggish referral system, increased dominance of household deliveries along with untrained birth attendants taking up deliveries have been the key triggers that have led indirectly to higher maternal mortality, especially in communities with dismal health gauges.

Role of Human Resource for health in promoting safe motherhood

Human resources for health studies have found that human resource for health can be an instrumental source in channelizing and mobilizing these women to take action related to safe motherhood It is also to be noted that incentives and human health resources act as modifying agents in improving the access to health services, with the provision of ASHA, compliance to health seeking behavior comes ascertain. ASHA plays the key role in handholding, mustering the women within the locale not just to approach the health centers, but also to cement the cracks of health service imbalance by particularly taking care of the at-risk punters. She ensures timely intimation about pledged incentives for the women and thus, motivating them to access the services. The Health Belief Model, that addresses four quadrants for compliance to endorsed health action: perceived barriers of recommended health action, perceived benefits of the recommended health action, perceived susceptibility of a disease and perceived severity of the disease also suggests modifying factors that affect behavior compliance. Transforming aspects here could be mass-media, community health workforce, rapport formation, enticements (cash or services) and self-efficiency of the endorsed behaviour (Turner et.al, 2004).Encouragingly, a few midterm evaluations of the NRHM's progress mention the successes of increased numbers of community-based Accredited Social Health Activists (ASHAs) and of institutional deliveries linked to Janani Suraksha Yojana (JSY), as well as the use, usually for facility maintenance, of financial support not tied to specific projects or activities (Singh, et.al, 2009). Batra& Anand, (2008), found that ASHAs have been successful as a facilitator and mobiliser ensuring better access to healthcare services by creating a favorable climate through inter-personal communication.

Addressing Maternal Mortality in Haryana

Among the various innovation schemes under NRHM, one such scheme is the Delivery Hut scheme of Haryana launched in 2005-2006 with an aim to contribute to the reduction of infant mortality rate (IMR) and maternal mortality rate (MMR). It also aimed to ensure 100% regulation for ANC and encourage institutional and safe delivery. Delivery hut scheme that was initiated for the facilitation of pregnant women has been implemented in all the areas of Haryana. Many studies and reports show that women feel secure and safe in their own vicinity. An appraisal of the scheme done by Batra & Anand, (2015), also pointed out that the state government had come up with

unique schemes Delivery Hut to promote safe motherhood which were acknowledged by these stakeholders.

Provisions under Delivery Hut Scheme

Delivery Huts in Haryana also provide a platform to implement a nationwide Janani suraksha Yojana programme is a safe a motherhood intervention under the NRHM, implemented with the objective of reducing maternal and neonatal mortality by promoting institutional Delivery among the poor pregnant Women. The scheme has identified ASHA, the (Accredited. Social- Health Activist) as an effective link between the government and the poor pregnant women. The main role is to facilitate pregnant women to avail service of maternal care and arrange referral transport. Beside the maternal care, the scheme provides cash assistance to all eligible mothers for Delivery care. Cash incentive are providing for the health worker and the accredited private institution providing maternity care to the underprivileged women to promote institutional deliveries (Ramarajan,2011). Findings of the research by Batra and Anand (2015) also revealed that the health Workers played a pivotal role in mobilizing women to access these services

Justification of the study

Considering Delivery Huts as a platform to provide a mechanism for institutional delivery and hence promoting safe motherhood, the present study aims to assess its efficacy in achieving the same. Hence the appraisal of the scheme through seeking perception of Human Resources for Health (HRH) and beneficiary women about role of HRH was undertaken.

OBJECTIVES

1.To assess efficacy of Delivery Huts in promoting safe motherhood

2.To seek appraisal of the scheme of DH through perception of Human Resources for Health (HRH) and beneficiary women about role of HRH

MATERIALS & METHODS

Since the Delivery Hut scheme is a state specific innovation scheme under NRHM valid in Haryana only, hence an effort was made to incorporate locales with varied degree of institutional delivery that were implementing the Delivery Hut (DH)Scheme. Gurgaon, and Palwal were the two districts chosen as the locale of the study based on the percentage of institutional deliveries as per the CRS Report (Govt of Haryana, 2012) ranging from high to low percentages respectively.

To understand the perception of women about the services of Delivery Hut (DH) women who were in pre and post pregnancy period (5 pregnant and 5 mothers with child born at respective DH and less than 12 months of age) and two HRH were approached to seek their perceptions about the role of HRH at DHs.

To know the perception of Human Resources for Health (HRH) about the Delivery Hut (DH) services, 12 HRH from both the districts (2 HRH from each DH) were selected. Along with the HRH perception of 60 women having availed or availing services from DH was also taken with respect to the role of HRH in promoting safe motherhood at DHs.

RESULTS & DISCUSSION

Findings are reported below:

Demographic profile of Human Resources for Health (HRH)

Age of the respondent

The sample included a total of 12 HRH each from two districts of Gurgaon and Palwal. Amongst them,8.33% of HRH were in the age group of 18-25 years, 16.67% were in the age of 26-34years and 25% of HRH were falling in the age group of 35-45 years in the district of Gurgaon.Whereas in Palwal 16.67%of HRH were in the age group of 18-25 and 33.33%were in the age group 26-34 years. Overall majority of the respondents were in the age group of 35-45 years. This indicates that most of those HRH were experienced and may have worked for longer time.

Family Type of Respondents

A mixed trend was observed in terms of family types for the HRH. It was seen that about 58.33%of the HRH belonged to a joint family,whilst 41.67% belonged to a nuclear family.

Distribution of Respondent by Reservation Category

Majority of the HRH from both Gurgaon and Palwal belonged to the OBC categories followed by SC/ST categories. This shows that the above mentined categories were dominant in the study lacale.

Work profile of HRH

Information regarding the nature of work of HRH was gathered. It was found that the respondents from Palwal asserted that they were doing supervisory, assistive and supportive roles at their DH (refer table 1). In Gurgaon, however, of the total 53.33% of the respondents indicated that they were doing supportive work while 16.67 % of the total were doing all kinds of work (Supervisory assitive and supportive). Probably the latter were experienced HRH and had been working for years in different capacities.

Table 1: Distribution of HRH by nature of work

nature of the work	Gurgaon		Palwal		Total	
	n1 (f)	n1(%)	n2(f)	n2(%)	N(f)	N(%)
Supervisory	0	0	0	0	0	0
Assistance	0	0	0	0	0	0
Supportive	4	33.33	0	0	4	33.33
All of the above	2	16.67	6	50	8	66.67
Total	6	50%	6	50	12	100%

Tasks at Delivery Hut

The primary task at Delivery Hut is that of conducting a delivery.When probed it was found that in the case of a complicated delivery in 83.33% of the case a senior obstretion or Medical Officer conducted the delivery, whilist only in 16.66% of the cases the delivery was conducted by a staff nurse.

Further,when it was probed that who conducted deliveries at night, hundered percent of the respondents at both the districts confirmed that it was the staff nurse who conducted the delivery at night.Since a staff nurse is fully trained to conduct a delivery, she was considered an appropriate resource for conducting deliveries at night.

Services at a Delivery Hut

Operationality of Delivery Hut

Almost all the Delivery Huts under the present study were functional 24X7 (refer figure 1). Only the HRH at the Delivery Hut (attached to SC)in Palwal informed that this DH did not function 24X7.This DH was also ranked below average as it did not have all the items of the DH checklist as well.

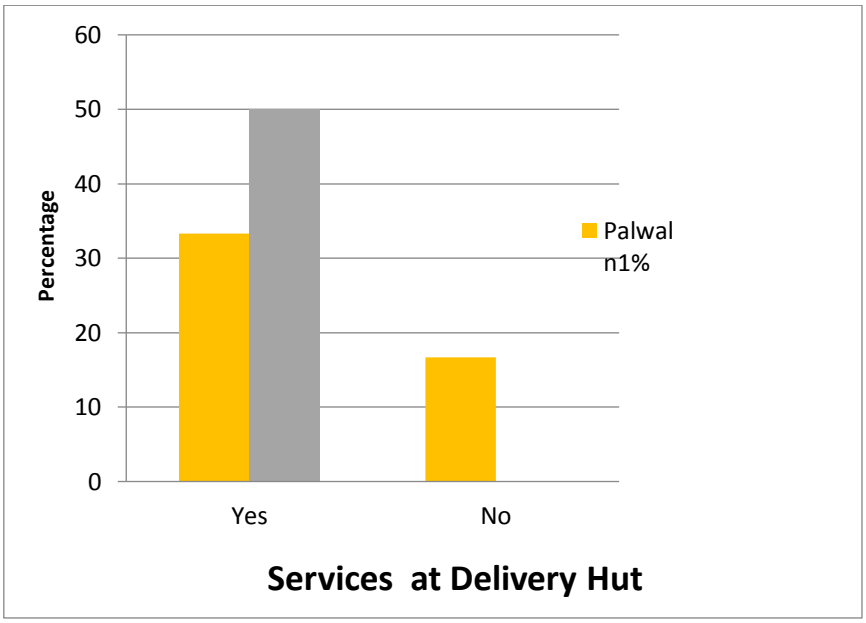


Fig 1:Operationality of Delivery Hut

Provision of C –section facility at Delivery Hut

It was found that in both districts the C-section facility was available at Delivery Huts attached to a PHC and a CHC structure,but for the DHs attached to SC structure,C-Section facility was not there. At the Palwal DH (SC attached) infact, no deliveries were also conducted.

Ambulance and transport facility at Delivery Hut.

All the HRH from the 6 Delivery Huts under the study confirmed the presence of ambulance at all time (Figure 2).At the SC and one of the PHC centres, however ambulance was available on call for any transport to the hospital/referals. All the HRH also confirmed thatthis transport was provided free of cost.

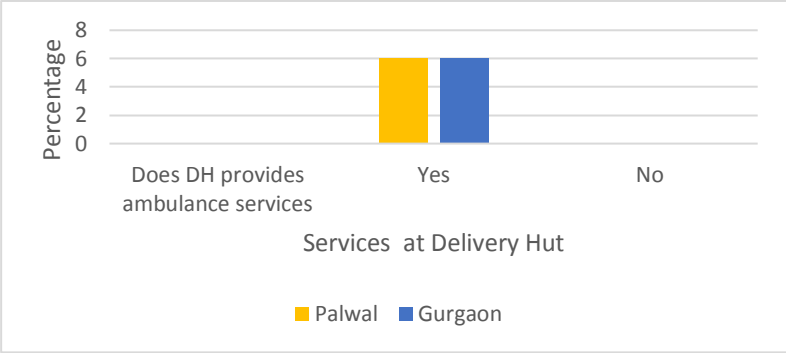


Figure 2: Availability of ambulance Service at Delivery Hut

Ante Natal Checkup (*ANC) facilities*:

All (100%) of the HRH confirmed that the ANC facilities were available at their respective Delivery Huts.

Ante Natal Checkup (ANC) facility at Delivery Hut

Most of the HRH asserted that they recommended women to avail 5-10 ANC sittings during the entire term of their pregnancy. As per the responses from the HRH, half of the women attended the recommended number of ANC sittings, while one third of them attended less than 5. Probably they were not too pro-active or got to know about their pregency in latter trimester. Just about 16.67% of the women (as per responses from HRH) attended more than 10 sittings. These may be more pro- active about their pregnancy or could be the ones with some complications that they required frequent attention by the HRH.

All the HRH also confirmed that the highest frequencyof women coming for ANC sittings was in 3rd trimester. Probably, beacause they were approaching their due date and hence wanted to be sure and made multiple visits to DH for ANC sitting.Within ANC, all the HRH at various Delivery Huts were providing the following facilities:

- Weight Monitoring
- BP check up
- Immunization
- Internal check up
- IFA supplemenatation
- Nutrition during Pregnancy
- Counseling.

Motivating factors for women During ANC sitting

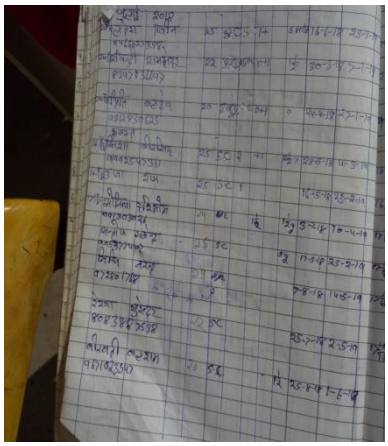
One third of the HRH (33.33%) felt that moblization by them to avail the services from DH along with free of cost services (33.33%) at DH were the most motivating factors for the women respectively (See table 2).About 16.61% of the HRH felt that strong interpersonal communication by them made them convince women to change behaviour and access services for ANC and delivery huts.A similiar percentage of HRH indicated that all of these (mobilization, free of cost services and interpersonal communication) worked together to motivate women.

Table 2: Most motivating factor for women during ANC

Most motivating factor for women during ANC	Palwal		Gurgaon		Total	
	n1 (f)	n1(%)	n2(f)	n2(%)	N(f)	%
Inter-personal communication at the time of visit	2	16.67	0	0	2	16.67
Mobilization	2	16.67	2	16.67	4	33.34
Free of cost services	2	16.67	2	16.67	4	33.34
All of above	0	50	2	16.67	2	16.67
Total	6	50%	6	50.10%	12	100.20%

Maintainance of record and forms

All of the HRH confirmed that they regulary maintained and updated the register and kept log of deliveries and cases along with ANC sittings for each patient.A physical check was also made and registers were observed (See Pic 1). They also ensured that they maintained ANC cards of the women and immunization cards of the children.



Pic 1: Register maintained by HRH at SC DH

HRH's Perception about Delivery Huts

All of the HRH asserted that the delivery huts had the potential to reduce the Mother's Mortality Rate (MMR) and Infant Mortality Rate (IMR) of their village. As it's a state specific scheme, that was incentive driven with amalgamation with JSY scheme, the hut being in the vicinity of the women were decently equipped to promote insituational deliveries.The HRH, thus, asserted that Delivery Huts did promote safe motherhood through insituational deliveries and had been able to bring a rise in the number of insitutional deliveries in their respective areas.

Improvement of Health facilities

When probed that how can health services related to self motherhood be improved, the HRH mentioned that better ANC services, free check-up and medicines like iron folic acid, Calcium etc, must be encouraged. Further they mentioned that frequent organization of health camps in the area can also promote safe motherhood.The HRH in particular stated that upscaling of the SC attached DH must be prioritized as the primary mandate of the DH was to provide delivery service within the village. Though the SC attached DH in Gurgaon was conducting deliveries, no deleveries were taking place in SC attached DH at Palwal,which was a major setback.

Beneficiaries' Awareness about the HRH

As seen from figure 3, nearly hundred percent of the respondents (60 beneficiary women) were aware about the community health workers like ASHA/ANM/LHV etc in both the districts of Gurgaon & Palwal. This positive figure is indicative of the efforts being put in by these health workers in making safe motherhood services accessible to the women beneficiaries of that area. Even though women were unaware of the Delivery Huts, the health workers were a famous name at most of the households.

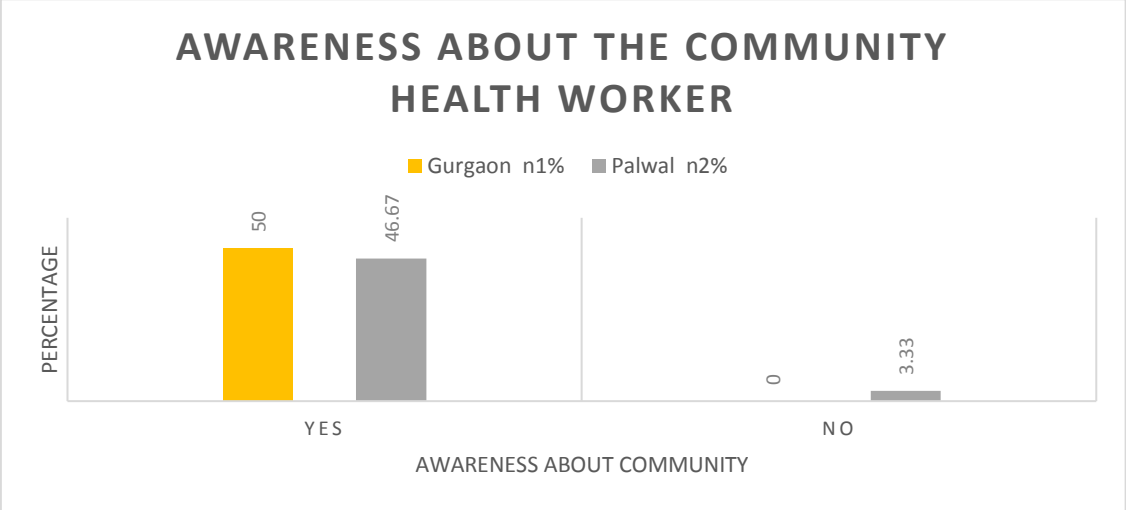


Fig 3: Distribution of Beneficiary Respondents by awareness about the HRH

Beneficiaries' sharing their health concerns/ pregnancy problems with the health workers

As seen from table 3, overall, 96.67% of the women beneficiaries mentioned that they share/shared their health concerns/pregnancy problems with the health workers. This clearly articulates that the health workers had been successful in their role as Behaviour Change Communication Agents and had been able to strike a chord with their target audience.

Table 3: Distribution of Respondents by sharing of health concerns/ pregnancy problems with the health worker

Do/Did you share your health concerns/ pregnancy problems with the health worker	Gurgaon		Palwal		Total	
	n1 (f)	n 1%	n2(f)	n2%	N(f)	N%
Yes	30	50	28	46.67	58	96.67
No	0	0	2	3.33	2	3.33
Total	30	50	30	50	60	100

CONCLUSION

The research was carried out with an objective to examine the role of HRH in catalysing safe motherhood behaviour in Haryana along with their perception about the Delivery Huts. Human Resources for Health were approached to understand the role of HRH in mobilizing women to access services from Delivery Hut. To seek perception of the beneficiary women (pregnant and those who had already delivered at the DH) at the DH a semi- structure interview was used.

The HRH in particular stated that upscaling of the SC attached DH must be prioritized as the primary mandate of the DH was to provide delivery service within the village. The beneficiaries were convinced that institutional delivery is important and ensures safety of both the mother and the child. Majority of the women were being treated well by HRH were being offered most of the services at DH and had a positive and satisfying experience at DH. Mobilization by HRH along with free-of cost services and incentives under JSY were the key motivating factors for women to access services from Delivery Huts. Strengthening of the infrastructure, better training of HRH and more client centric programmes under DH can go a long way in making this mechanism of safe motherhood services successful. Further, Safe motherhood services can be improved with better ANC services, free check-up and medicines like iron, folic acid, Calcium etc. must be encouraged. Further, they mentioned that frequent organization of health camps in the area can also promote safe motherhood. Similar study, if repeated at different locales and at time periods ,would provide a strong feedback to the Government.

REFERENCES

- Batra, S. & Anand, A. (2008). Efficacy of National Rural Health Mission (NRHM) in strategizing Health Communication: An Appraisal. Unpublished Master's Thesis. University of Delhi.
- Batra, S., &; Anand, S. (2018). Promoting safe motherhood: A narrative based analysis of positively deviant behaviours. The Indian Journal of Home Science, 30(1).
- Directory of Innovations Implemented in the Health Sector (2018). [eBook] New Delhi: Ministry of Health & Family Welfare.
- Govt of Haryana. (2012). CRS Report. Retrieved from http://nhmharyana.gov.in/page.aspx?id=214

- Kumar, P & Gupta, A. (2015). Determinants of Inter and Intra caste Differences in Utilization of Maternal Health Care Services in India: Evidence from DLHS-3 Survey. *Int. Res. J. Social Sci.*,**4(1),**27-36.
- Ministry of Health and Family Welfare. (2017). *National Family Health Survey-4, 2015-16, State Fact-Sheet Haryana.* Mumbai: International Institute of Population Sciences.
- Mousumi, G. (2014). Association of Maternal Age and Low Socio-Economic Status of Women on Birth Outcome. *Int. Res. J. Social Sci.*,**3(10),**21-27.
- Ramarajan, A. (2011). Severe acute maternal morbidity. New Delhi: Jaypee Bros. Medical
- Singh et al. (2009). Barriers to Safe Motherhood in India. New York: Guttmacher Institute.
- Turner, LW., Hunt, SB., DeBrezzo, R. & Jones, C. (2004). Design and implementation of an osteoporosis prevention programme using the health belief model. *American Journal of Health Studies, **(19)2**, pp 115-121.*
- United Nations (2016). Sustainable development goals. Retrieved United Nations (2016).
- WHO, UNICEF, UNFPA & The World Bank. (2014). *Trends in Maternal Mortality: 1990-2013.* Geneva: WHO. Retrieved from http://apps.who.int/iris/bitstream/10665/112682/2/9789241507226_eng.pdf?ua=1
- World Health Organization, (2018, June 10). India has achieved groundbreaking success in reducing maternal mortality. Retrieved fromhttp://www.searo.who.int/mediacentre/features/2018/india-groundbreaking-sucess-reducing-maternal-mortality-rate/en/

The Indian Journal of Home Science 2022: 34(1)

MENSTRUAL HYGIENE AWARENESS, PRACTICES AND PROBLEMS FACED BY ADOLESCENT GIRLS AND WOMEN; A STUDY IN RANAPUR BLOCK OF ODISHA

Dr. Swati Sucharita
Assistant Professor, Department of Extension and Communication,
Faculty of Family and Community Science,
Maharaja Sayajirao University of Baroda, Vadodara, 390002
swatisucharita646@gmail.com

ABSTRACT

According to Mahatma Gandhi, "The soul of India lives in its villages". As per the census 2011, India's rural population stands at 833 million, which is 68.8 percent of its total population. In rural population, 48 percent population constitutes of women. Women are the key factors of development in any country specially a developing country like India. Menstruation is a healthy physical process that every female goes through after attaining puberty. However, in India, particularly in rural areas, the menstruation topic is surrounded by taboos. Menstruation is often considered impure and dirty; therefore, women seldom talk about the problems and difficulties related to menstruation. Keeping these perspectives in mind the present study was conducted in Ranapur block of Odisha to understand the menstrual hygiene awareness among rural adolescent girls and women along with various problems faced by them. The major finding of the study reveals that 38 percent of the respondent had no idea about menstruation before attaining menarche, almost all the respondents (100%) were aware about the restrictions during menstruation. Very few respondents had knowledge about type of absorbent used (13%) and hygiene during menstruation (3 %) respectively. The result reveals that majority of the respondents (58%) use cloth as an absorbent during menstruation.

Keywords: Women, Menstruation, Hygiene, Health, Awareness

INTRODUCTION

Health and wellbeing of women is significantly related with women empowerment. In Indian scenario, it is gaining more attention. It is essential to provide women with required health services and environment so that various issues regarding their health can be addressed. Women form the backbone of the society and play multiple roles simultaneously to support their family. Despite this fact, they often face tyranny, disparity and affliction.

Menstruation is a natural, and essential, part of the reproductive cycle. Roughly, half the human population has or will experience it but too often, menstruation is shrouded in mystery, leading to exclusion, neglect and discrimination (UNFPA, 2019). Menstruation is a normal physiological process indicating beginning of reproductive life but sometimes it is considered as unclean phenomenon in the Indian society. Insufficient, incorrect information regarding menstruation is often a cause of unnecessary restrictions in the daily normal activities of the menstruating girls creating various psychological issues. Besides, the lack of knowledge and awareness also lead to some poor personal hygienic practices during menstruation leading to many reproductive tract infections (Thakre SB, 2011).

Menstruation and menstrual practices still face many social, cultural, and religious restrictions which are a big barrier in the path of menstrual hygiene management. In many parts of the country especially in rural areas girls are not prepared and aware about menstruation so they face many difficulties and challenges at home, schools, and work places. Girls and women have very less or no knowledge about

reproductive tract infections caused due to ignorance of personal hygiene during menstruation time. In rural areas, women do not have access to sanitary products or they know very little about the types and method of using them or are unable to afford such products due to high cost. Therefore, they mostly rely on reusable cloth pads, which they wash and use again (Kaur et al.,2018).

Menstrual hygiene and its related issues are becoming a major topic for discussion, which should be addressed sensitively and carefully. In rural areas where poverty is the main concern, people care least about hygiene. Lack of hygiene during menstruation causes various health issues among women. Therefore, this study was carried out to understand the problems, practices and awareness of women about menstruation.

OBJECTIVES

- To find out the awareness level of women about menstrual hygiene
- To find out the hygienic practices followed by women during menstruation
- To understand the types of problem women faced during menstruation

METHODOLOGY

The present study was conducted in Ranapur block in Nayagarh district of Odisha. This district consists of eight blocks out of which Ranapur block was selected purposively as it was having highest number rural population in the district (District census handbook, census 2011). Five villages from this block were selected randomly and from each village ten adolescent girls and ten women were selected randomly, thus forming 100 respondents for the study. The structured questionnaire was administered for the collection of the data. The statistical tools like frequency and percentages were used for analyzing the data.

DELIMITATION OF THE STUDY

As per the World Health Organization, 'Adolescents' are individuals in the age group 10-19 years. So, the girls in this age group were selected. WHO also defines the reproductive age of women is between 15 to 49 years. So, women only in this age group were selected.

RESULTS

1. Age of the respondents

The table 1 illustrates the distribution of age of the respondents. In adolescent girls' category, majority of the respondents (72%) belonged to the age group of 16-19 years, followed by girls in the age group 13-15 years (24%) and only 2 respondents (4%) in the age group 10-12 years.

In case of women, majority of the respondents (28%) belonged to the age group of 36-40 years, followed by women in the age group 21-25 years (24%), 26-30 years (22%) and 31-35 years (18%) respectively. Only one respondent belonged to the age group 15-20 years category.

Table 1: Distribution of respondents according to age

Adolescent girls		
Age group (In years)	**Number**	**Percentage (%)**
10-12	2	4
13-15	12	24
16-19	36	72
Total	**50**	**100**
Women (with in Reproductive age)		
Age group (In years)	**Number**	**Percentage (%)**
20-25	**13**	**26**
26-30	**11**	**22**
31-35	**9**	**18**
36-40	**14**	**28**
41-45	**3**	**6**
Total	**50**	**100**

2. Age of attaining menarche

Menarche is the first menstrual bleeding in females. The table 2 illustrates the age of the participants when they had their first period. As shown below it was found that majority (76%) of the adolescent girls attained menarche at the age of 13-15 years. Similarly, from women's category, majority (70%) of women attained menarche at the age of 13-15 years as well.

Table 2: Distribution of respondents based on the age of attaining menarche

Age of attaining menarche (In Years)	**Adolescent Girls**		**Women**		**Total**	
	Number	**Percentage (%)**	**Number**	**Percentage (%)**	**Number**	**Percentage (%)**
10-12	3	5	2	4	5	5
13-15	38	76	35	70	73	73
16-18	8	16	12	24	20	20

19-21	1	2	1	2	2	2
Total	**50**	**100 (%)**	**50**	**100 (%)**	**100**	**100**

3. Awareness about menstruation before menarche

The table 3 illustrates the respondents' awareness about menstruation before attaining menarche**.** As it is clearly shown, 38 percent of the respondent had no idea about menstruation before attaining menarche. In adolescent girls' category, majority (78%) of the respondents were aware about menstruation before attaining menarche whereas in women's category, majority (54%) of the respondents had no idea about menstruation before attaining menarche. This result shows that the adolescent girls got more exposure and knowledge about menstruation than the rural women had during their adolescence years. Thanks to education, many young girls are getting knowledge about menstruation in their schools. Peer group also plays a key role in disseminating information related to menstruation.

Table 3: Distribution of respondents based on awareness about menstruation before menarche

Awareness about menstruation before menarche	**Adolescent Girls**		**Women**		**Total**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Yes, Aware	39	78	23	46	62	62
No, Not Aware	11	22	27	54	38	38
Total	**50**	**100**	**50**	**100**	**100**	**100**

4. Source of awareness about menstruation

The table 4 depicts the source of awareness about menstruation the respondents had before attaining menarche. From total 100 respondents, only 62 respondents had awareness about menstruation before attaining menarche. When they were asked about the source of awareness or in other words from whom/ what they came to know about menstruation, most (42%) of the respondents reported that they came to know about menstruation from their friends, followed by neighbours (16%), family members (19%), Television (8%) and book/magazine (5%) respectively before attaining menarche.

Table 4 reveals that 20 percent respondent in adolescent girl's category got information about menstruation from books/magazine which is blank in women's category. This means education is playing a significant role in making young girls aware about menstruation. The source of information from family members (24%) remains low as compared to Friends (36%) both in adolescent girls and women's category which implies the females in the family are still not very comfortable to talk about menstruation to their younger generation.

Table 4: Distribution of respondents based on the source of awareness about menstruation before attaining menarche

Source	Adolescent Girls		Women		Total	
	Number	%	Number	%	Number	%
Family member	9	24	3	13	12	19
Neighbours	3	8	8	35	16	26
Friends	14	36	12	52	26	42
Book/magazine	8	20	-	-	3	5
Television	5	12	-	-	5	8
Radio	-	-	-	-	-	-
Total	**39**	**100**	**23**	**100**	**62**	**100**

5. Type of awareness the respondents had about menstruation before attaining menarche

The table 5 below illustrates the type of knowledge/ awareness the respondents had about menstruation before attaining menarche. There were 39 (out of 50) adolescent girls and 23 (out of 50) women had prior knowledge about menstruation before attaining menarche, making 62 respondents out of 100 respondents who had awareness about menstruation before attaining menarche. When they were asked what type of knowledge or information they had about menstruation, their responses were as given in table -5.

The respondents were free to tick more than one option for this question. As shown in the table 5, out of 62 respondents, 55 respondents (89%) knew about what is menstruation. Almost all the respondents (100%) were aware about the restrictions during menstruation. Only 17 respondents (27%) knew about the physical discomfort associated with menstruation. Very few respondents had knowledge about type of absorbent used (13%) and hygiene during menstruation (3 %) respectively. It is really saddening to know that all the respondents knew about the restrictions during menstruation but very few knew about the menstrual hygiene.

Table 5: Distribution of respondents based on the type of awareness about menstruation they had before menarche

Awareness about menstruation	Adolescent Girls (Total 39)		Women (Total 23)		Total (62)		
	YES	NO	YES	NO	YES	NO	Total
What is menstruation	39 (63%)	-	16 (26%)	07 (11%)	55 (89%)	7 (11%)	62 (100%)

Physical discomfort associated with menstruation	6 (10%)	33 (53%)	11 (17%)	12 (20%)	17 (27%)	45 (73%)	62(100 %)
Types of absorbent used	8 (13%)	31 (50%)	-	23 (37%)	8 (13%)	54 (87%)	62(100 %)
Hygiene during menstruation	2 (3%)	37 (60%)	-	23 (37%)	2 (3%)	60 (97%)	62(100 %)
Restrictions during menstruation	39 (63%)	-	23 (37%)		62 (100%)	-	62(100 %)

6. Type of absorbent used by them during menstruation

Type of absorbent used by women during menstruation plays a key role in menstrual hygiene and comfort. Keeping this in mind, the respondents were asked the type of absorbent they use during menstruation. The **table 6** shows the finding of this question.

The result reveals that majority of the respondents (58%) use cloth as an absorbent during menstruation, from which majority 48 percent were women whereas 10 percent were adolescent girls. It was also found that out of 42 respondents (42%) who use sanitary napkins, only 2 percent respondents were women and 40 percent respondent were adolescent girls. This shows the adolescent girls are using sanitary napkins more than the rural women. None of the respondents were found to be using tampons or menstrual cups. None of the respondents had any idea about what those products are.

Table 6: Distribution of respondents based on the type of absorbent used by them during menstruation

Type of absorbent used	**Adolescent Girls**		**Women**		**Total**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Sanitary napkins	40	40%	2	2%	42	42%
Cloth	10	10%	48	48%	58	58%
Tampon	-	-	-	-	-	-
Menstrual cups	-	-	-	-	-	-
Total					**100**	**100%**

7. Restrictions faced by respondents during menstruation

The table 7 illustrates the restrictions faced by women and adolescent girls in rural areas during menstruation. The respondents were free to choose more than one option if applicable. It can be clearly seen that all most all the respondents (100%) were not allowed in temples/ religious places during their periods and doing so was considered inauspicious. Followed by that, majority (91%) of the respondents reported that they were not allowed in religious family functions during their periods. Other restriction faced by women were not allowed in the kitchen (27%) and not allowed to sleep on bed (21%). The restrictions were almost equal for adolescent girls and women. None of the respondent faced restriction for going out during periods. None of the respondents were free from any restrictions during periods. All of them had some kind of restriction during their periods.

Table 7: Distribution of the respondents based on the restrictions they face during menstruation

Source	Adolescent Girls		Women		Total	
	Number	%	Number	%	Number	%
Not allowed in kitchen	12	12%	15	15%	27	27%
Not allowed to sleep on bed	10	10%	11	11%	21	21%
Not allowed in temples/ religious places	50	50%	50	50%	100	100%
Not allowed in religious family functions	48	48%	43	43%	91	91%
Not allowed to go out side	-	-	-	-	-	-
No restrictions	-	-	-	-	-	-

8. Discomfort faced by the respondents during menstruation

Many women face discomfort during their periods and many do not. The type of discomfort faced by women during their periods depends on a good number of factors such as nutrition, gene, illness, hygienic practice followed etc. The table 8 illustrates the discomfort faced by the respondents. The respondents were free to choose more than one option if applicable.

The results clearly show that majority of the respondents (65%) suffered from dizziness followed by lack of appetite (24%), vomiting (20%), severe cramps (17%), infection in genital area (17%) and excessive bleeding (14%) respectively. Very few respondents (2%) suffered from fever during menstruation. Whereas 13 percent respondent reported, they did not face any discomfort during their periods.

Table 8: Distribution of respondents based on the discomfort they face during menstruation

Discomfort faced during periods	Adolescent Girls		Women		Total	
	Number	%	Number	%	Number	%
Dizziness	38	38%	27	27%	65	65%
Vomiting	12	12%	8	8%	20	20%
Severe Cramps in abdomen/lower back	15	15%	2	2%	17	17%
Fever	2	2%	-	-	2	2%
Lack of appetite	19	19%	5	5%	24	24%
Excessive bleeding	8	8%	6	6%	14	14%
Infection and discomfort in Genital area	6	6%	11	11%	17	17%
No discomfort faced	5	5%	8	8%	13	13%

9. Dealing with menstrual discomfort

The table 9 shows the ways the respondents dealt with their menstrual discomfort. As shown in the table, it can be clearly seen that majority of the respondents (70%) reported that they use home remedies to deal with the discomfort, followed by 56 percent of the respondents who ignored the discomfort until it is over. 26 percent of the respondents took advice of local Ayurveda practitioner (Vaidya) to ease their discomfort. Very few respondents (16%) used any drugstore medication to ease their discomfort. None of the respondents reported going to the hospital to take advice or checkup.

Table 9: Distribution of respondents based on how they deal with the menstrual discomfort

Dealing with discomfort during menstruation						
Way of dealing with the discomfort	**Adolescent girls**		**Women**		**Total**	
	Number	**%**	**Number**	**%**	**Number**	**%**
Drugstore medicines	11	11%	5	5%	16	16%
Local Ayurveda practitioner (Vaidya)	14	14%	12	12%	26	26%
Home remedies	32	32%	38	38%	70	70%
Ignoring it until it is over	21	21%	35	35%	56	56%
Going to hospital	-	-	-	-	-	-

SUMMARY AND CONCLUSION

- The findings of the study reveal that in adolescent girls' category, majority of the respondents (72%) belonged to the age group of 16-19 years, whereas in case of women, most of the respondents (28%) belonged to the age group of 36-40 years.
- It was found that majority (76%) of the adolescent girls attained menarche at the age of 13-15 years. Similarly, from women's category, majority (70%) of women attained menarche at the age of 13-15 years as well.
- It was found that, 38 percent of the respondent had no idea about menstruation before attaining menarche. In adolescent girls' category, majority (78%) of the respondents were aware about menstruation before attaining menarche whereas in women's category, majority (54%) of the respondents had no idea about menstruation before attaining menarche. This result shows that the adolescent girls got more exposure and knowledge about menstruation than the rural women had during their adolescence years.
- From total 100 respondents, 62 respondents had awareness about menstruation before attaining menarche. When they were asked about the source of awareness or in other words from whom/ what they came to know about menstruation, majority (42%) respondents reported that they came to know about menstruation from their friends.
- Almost all the respondents (100%) were aware about the restrictions during menstruation. Very few respondents had knowledge about type of absorbent used (13%) and hygiene during menstruation (3 %) respectively. It is disheartening to know that all the respondents knew about the restrictions during menstruation but very few knew about the menstrual hygiene.
- The result reveals that majority of the respondents (58%) used cloth as an absorbent during menstruation.

- Majority of the respondents faced restrictions such as not allowed to temple(100%) and religious functions(91%). None of them reported any restriction on going out during menstruation.
- Majority of the respondents (65%) suffered from dizziness followed by lack of appetite (24%), vomiting (20%), severe cramps (17%), infection in genital area (17%) and excessive bleeding (14%) respectively. Very few respondents (2%) suffered from fever during menstruation. Whereas 13 percent respondent reported, they did not face any discomfort during their periods.
- Majority of the respondents (70%) reported that they used home remedies to deal with the discomfort. Very few respondents (16%) used any drugstore medication to ease their discomfort. None of the respondents reported going to the hospital to take advice or checkup.
- From these results, it can be concluded that though the times are changing for rural women slowly, issues such as menstrual hygiene, menstrual education and reproductive health of women especially in rural areas still needs many efforts. Especially menstrual hygiene remains a chief concern, as women in rural area are not so much aware about menstrual hygiene. Menstruation is still considered as impure and dirty. Poor knowledge, misconceptions, poor hygiene, ignoring health issues associated with menstruation is still common in the study area.

RECOMMENDATIONS

- The Government and Non-Government Organizations should work in synchronization to promote awareness regarding menstrual health, menstrual hygiene and their importance.
- ASHA and Anganwadi workers can be mobilized to promote menstrual awareness among young girls and monitor menstrual health of women and adolescent girls.
- In Government schools, early education regarding menstruation should be given in a friendly and understandable manner.
- Regular campaigns should be organized to promote menstrual awareness among rural areas.

REFERENCES

- "Adolescent health in the South-East Asia Region", World Health Organization, URL:https://www.who.int/southeastasia/health-topics/adolescent-health, Retrieved on: 21/05/2021, 11:15 P.M.
- Census of India, 2011
- Kaur R, Kaur K, Kaur R., "Menstrual Hygiene, Management, and Waste Disposal: Practices and Challenges Faced by Girls/Women of Developing Countries", website: Pubmed.gov.in, URL: https://pubmed.ncbi.nlm.nih.gov/29675047/, Retrieved on: 21/05/2021, 11:00 P.M
- "MATERNAL, NEWBORN, CHILD AND ADOLESCENT HEALTH AND AGEING", World Health Organization, www.who.int, URL: https://www.who.int/data/maternal-newborn-child-adolescent-ageing/indicator-explorer-new/mca/women-of-reproductive-age-(15-49-years)-population-(thousands), Retrieved on: 21/05/2021, 11:25 P.M.

- S. Kuruvila, 2018, "Knowledge attitude and practices regarding menstrual hygiene and their determinants among tribal school girls Kerala", Shodhganga, URL:http://hdl.handle.net/10603/218923, Retrieved on: 21/05/2021, 11:00 P.M
- Thakre SB, Thakre SS, Reddy M, Rathi N, Pathak K, Ughade S. Menstrual hygiene: Knowledge and practice among adolescent school girls of Saoner, Nagpur district. J Clin Diagn Res. 2011;5:1027–33. [Google Scholar]
- United Nations Population Fund (2019, May 28), "Menstruation is not a girls' or women's issue – it's a human rights issue, URL: https://www.unfpa.org/news/menstruation-not-girls-or-womens-issue-%E2%80%93-its-human-rights-issue, retrieved on :17/01/2021, 10:00 P.M

The Indian Journal of Home Science 2022: 34(1)

SOCIAL AND ECONOMIC IMPEDIMENTS EXPERIENCED BY MANUAL SCAVENGING COMMUNITIES: A STUDY IN SAGAR DISTRICT OF MADHYA PRADESH

Dr Ruchi Gaur[1] Aakanksha Gautam[2]
[1]Assistant Professor, [2]Research Scholar
Department of Development Communication & Extension,
Lady Irwin College, University of Delhi
Email – ruchigaur1983@gmail.com

ABSTRACT

Manual Scavenging represents some of the worst surviving forms of both caste-based discrimination and dehumanising forms of work. The status of scavengers has been so degraded socially that they are made untouchables among the untouchables. They are voiceless with no political attention as they are small in numbers and socio-economically backward. According to Census of India (2011), manual scavenging is prevalent in parts of India without proper sewage systems. It is thought to be most prevalent in Gujarat, Madhya Pradesh, Uttar Pradesh, and Rajasthan. The study was carried out with an objective of understanding the socio-economic impediments experienced by manual scavengers in Sagar district of Madhya Pradesh. An attempt was made to understand the issues and challenges of the scavenging community. The study was conducted with a sample of 40 respondents (20 females and 20 males), data was collected using in-depth interview. The findings reveal that all the respondents belong to Balmiki community and were engaged in cleaning of roads, open drains, sewer lines, septic tanks and railway tracks. It is their traditional occupation. They are trapped in the vicious circle of poverty with low wages and are exploited by their contractors. The awareness about programmes and campaigns was found to be extremely low reinforcing the lack of political will in highlighting the problems faced by manual scavengers as a human rights issue. They are not provided with safety gears and other equipments and have hardly received any trainings for cleaning of septic tanks and sewers. They do not have alternative employment opportunities to renounce the scavenging practices. Also, the laws and policies have failed to acknowledge the presence of strong caste-based discrimination and their limited access to education and health services.

KEYWORDS: manual scavengers, discrimination

INTRODUCTION

Manual scavenging is a practice that involves cleaning, carrying and dealing with human excreta with bare hands. The fragmentation of Indian society has been done along the intersections of caste, gender and religion. The most excluded sections of the society are Dalit, Adivasi and Women which are subjected to be victimised in the society since years with unequal approach to the social, economic and political opportunities and entitlements. Rights of these people are not recognised, their socio-economy status and dignity are at stake since years. According to India Exclusion Report (2016), Manual scavenging is, in absolute terms, a caste-based occupation, gendered in nature, and finds its roots within the aspect of Hindu philosophy and religious practice. The Employment of Manual Scavenging and Construction of Dry Latrines (Prohibition) Act was passed in 1993 with an aim to end this practice. The reality remains that the dehumanising practice of manual scavenging arising from the continuous existence of insanitary latrines and a highly iniquitous caste system, still persists in various parts of the country. The Prohibition of Employment as Manual Scavengers and their Rehabilitation Act was promulgated in the year 2013. The Safai Karamchari Andolan (SKA)

claims that more than 1200 people died from manual scavenging related activities between 2014 and 2016 (The Wire, 2017), which clearly shows that the law is not being implemented by the authorities even after the amendment in the act.

According to the Census of India (2011), there are 794,390 dry latrines in the country, where the human excreta is cleaned up by humans. The data reveals that 73% of the dry latrines are in rural areas and 27% in urban areas. Apart from these there are 1,314,652 toilets where the human excreta are flushed in open drains. The Census data shows that in states of Madhya Pradesh, Gujarat, Chhattisgarh, Maharashtra, Andhra Pradesh, Haryana, Delhi NCR, Rajasthan and Jharkhand there are very few dry latrines. However, this is far from being true as surveys conducted by Safai Karamchari Andolan's Garima Abhiyan and other organisations have brought out that even in these states dry latrines exist and the practice of manual scavenging continues at a large scale. The Andolan also claims that the government agencies themselves employ manual scavengers and do not give them even the most basic protective gear like masks, leaving them at risk of loss of vision, respiratory problems and other severe medical complications. Existence of manual scavengers across India despite enactment of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act in 1993 is indeed a disgrace for the Nation. There are hundreds of people involved in this inhuman practice of manual scavenging in several forms, and there exist many issues within the community which need to be highlighted and brought to the attention of government and policy makers.

Manual scavenging represents some of the worst surviving forms of both caste-based discrimination and dehumanising forms of work. The eradication of manual scavenging would mark the beginning of the end of the practice of untouchability and caste-based discrimination, as well as the reclamation of the right of every human being, to access decent and dignified work. The status of these scavengers has come to be so degraded socially, that they are made untouchables among the untouchables. They are voiceless and do not get political attention because of their small numbers and socio-economic backwardness. With this backdrop, the present study was carried out to analyse the social and economic impediments of people born in scavenging community.

GENERAL OBJECTIVE

To study the social and economic impediments experienced by people engaged in manual scavenging

Specific Objectives:

1. To find out the forms of manual scavenging practiced in the selected district of Madhya Pradesh.
2. To assess the division of work between men and women scavengers.
3. To study the issues and challenges of scavengers and their families involved in practice of Manual Scavenging.
4. To ascertain the awareness about the laws and campaigns addressing the issues of manual scavengers.

Limitations of the study

- This study is restricted to only one district of Madhya Pradesh due to time contraint.
- Only a sample of 40 respondents was included in the study because of limited time and other resources.

METHODOLOGY

Research design

The study was qualitative in nature, aimed at gathering insights about social and economic impediments experienced by the manual scavengers. The study endeavours to find out the forms of manual scavenging practices, issues and challenges faced by manual scavengers and their awareness about the laws and campaign addressing the issues of manual scavengers. The qualitative research is a systematic subjective approach used to describe life experiences and give them meaning. The goal of the qualitative research is to gain insight; explore the depth, richness, and complexity inherent in the phenomenon.

Locale of the study

The study was conducted in Sagar district of Madhya Pradesh. According to the Census of India (2011), Madhya Pradesh is one of the states in India where all six types of manual scavenging practices exist. It has 23105 numbers of manual scavenger. Sagar is one of the city in Madhya Pradesh which has been shortlisted as an aspirant in the smart cities challenges by Ministry of Urban Development Government of India. A major road and agricultural trade centre, it has industries such as oil and flour milling, saw-milling, ghee processing, handloom cotton weaving, bidi manufacture and railway and engineering works. However, there exist 225 manual scavengers in the district.

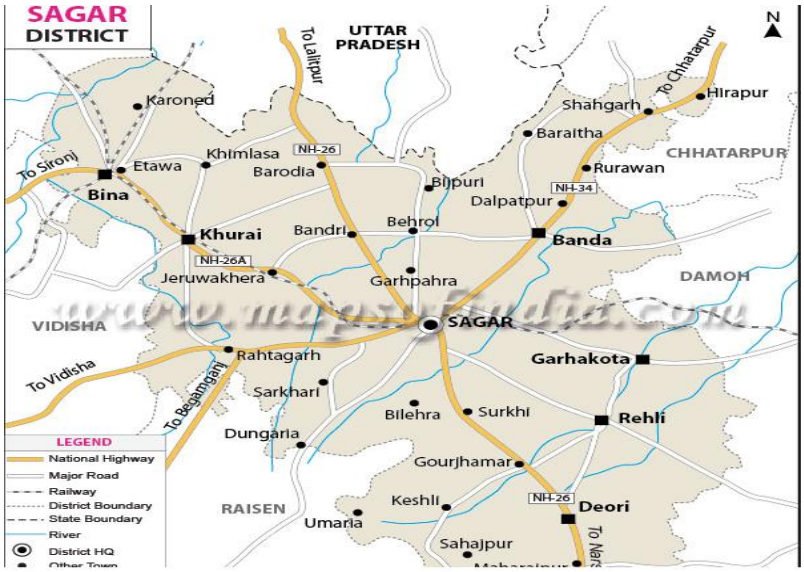


Figure 1: Map of Sagar District, Madhya Pradesh
Source:https://www.mapsofindia.com/maps/madhyapradesh/districts/sagar.htm

Sample of the study

The following steps were adopted for the selection of respondents.

Selection of wards

- Wards with people involved in the practice of manual scavenging are selected. The selection was done from the data available with Safai Karamchari Andolan. Since there

are many Wards in Sagar district of Madhya Pradesh which have people involved in the practice of manual scavenging, the Sagar district were selected purposively using non probability purposive sampling for the following reason:

1. Sagar is one of the main districts of Madhya Pradesh which is also selected under the SMART city projects.
2. Both semi-urban and rural communities are there in Sagar.
3. Availability of people involved in the practice of manual scavenging.

Selection of respondents

- A total of 40 respondents with 20 males and 20 females are selected for equal representation of men and women practicing manual scavenging as occupation.
- Non-probability sampling was used for selection of respondents as they were selected on the basis of their accessibility or by purposive judgement by the researcher.

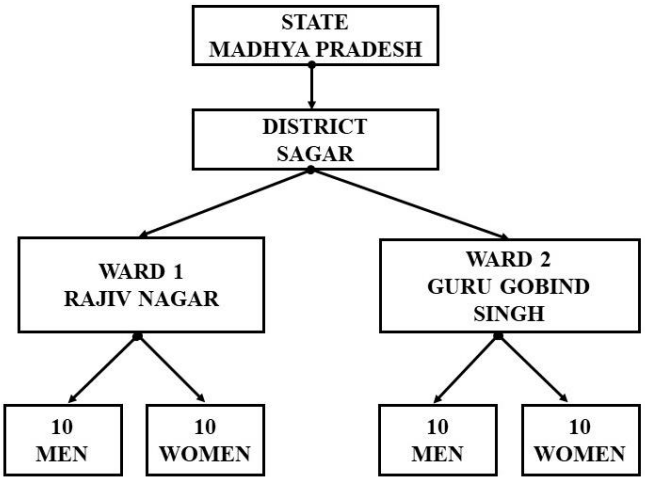


Figure 2: Selection of respondents in Sagar District of Madhya Pradesh

Tools for data collection

An in-depth interview guide was constructed based on the review of literature and the objectives of the study. Open ended questions were developed to gain an insight about the social and economic impediments of people engaged in manual scavenging with emphasis on: socio – economical profile of the manual scavengers, family details, various scavenging work the manual scavengers are engaged in, working conditions, the attitude of the society towards the manual scavengers, forced labour and menial practices and social discrimination in the living as well as working area, awareness about the legislations and suggestions for eliminating the manual scavenging and improving the socio-economic conditions of the manual scavengers. The developed interview schedule in English was then translated into Hindi for collecting the primary data from the manual scavengers.

Data collection process

Two wards were selected with respect to their existing number of people involved in the practice of manual scavenging. An introduction was given by the researcher in each village through community meetings to form a rapport between the respondents. The researcher made home visits to discuss about the purpose of the study in detail with the people involved in the manual scavenging and obtain their consent for participation in the study.

Analysis of data

The data obtained was analysed mostly qualitatively. The demographic data was analysed using Microsoft Excel keeping in mind the objectives of the study. The qualitative data in terms of explanations and reasons given by the respondents were used to strengthen the data. The data was analysed and interpreted for discussion; and inferences were made in the context of the objective of the study.

FINDINGS AND DISCUSSION

Age of the respondents

It was found that 15% of the respondents were in the age group of 20-25 years of which 12.5% were males, 7.5% of the respondents were in the age group of 26-30 years of which all were males. 35% of the respondents were in the age group of 31-35 years of which 20% were females followed by 42.5% of the respondents in the age group of 36-40 years of which 27.5% were females.

Educational qualification

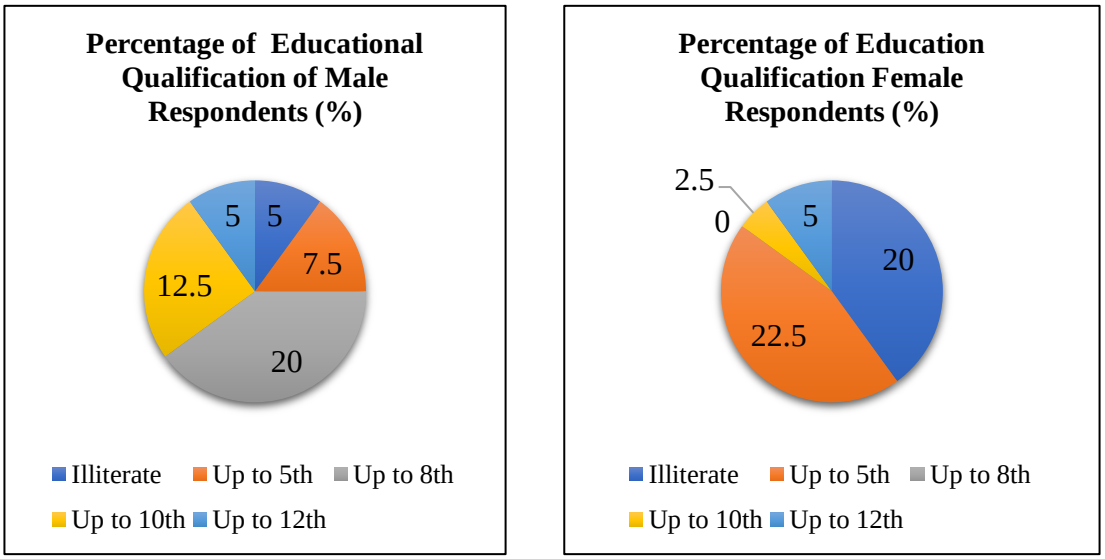


Figure 3: Educational Qualification of the Respondents

It was found that 25% of the respondents were illiterate of which 20% were females. 30% of the respondents had acquired primary education (22.5% females and 7.5% males). 20% of the respondents had studied till class 8th of which all were males. 15% of the respondents had completed education till secondary school, of which only 2.5% were females. Only 10% of respondents had acquired education till higher secondary (5% male and 5% females). The data reveals inequality in education as out of 44.5% females, 20% were illiterate and 22.2% had studied up to primary level only.

Religion, caste & sub-caste

It was found that all the respondents were Hindus. Several researches on manual scavengers have indicated that most of the people involved in this occupation are Hindus. (Praxis, 2014). It was found that all the respondents belonged to Schedule caste with Balmiki as their sub-caste. Several studies have indicated that within the caste structure, Dalits who work as manual scavengers are usually from the Hindu Balmiki sub-caste, which is further subdivided into regionally named groups such as Chuhada, Rokhi, Mehatar, Malkana, Halalkhor (HRW, 2014).

Number of household members

It was found that 65% of the respondents had upto four family members in household. Also,14 respondents had more than four members. It was also found that the maximum respondents were living in nuclear families.

Forms of manual scavenging:
Type of work done by manual scavengers

The data reveals that the manual scavengers do all types of scavenging work including cleaning of railway tracks, open drains, sewer lines, septic tanks and streets which includes cleaning of excreta of humans and animals. It was found that though they used to clean dry toilets earlier but they had discontinued with the same since 2008, i.e. after the implementation of The Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993.

Some of the respondents had also carried the dead bodies from the railway tracks whenever accidents happened. Also, they carried dead animals. These kinds of work were given to the manual scavengers only.

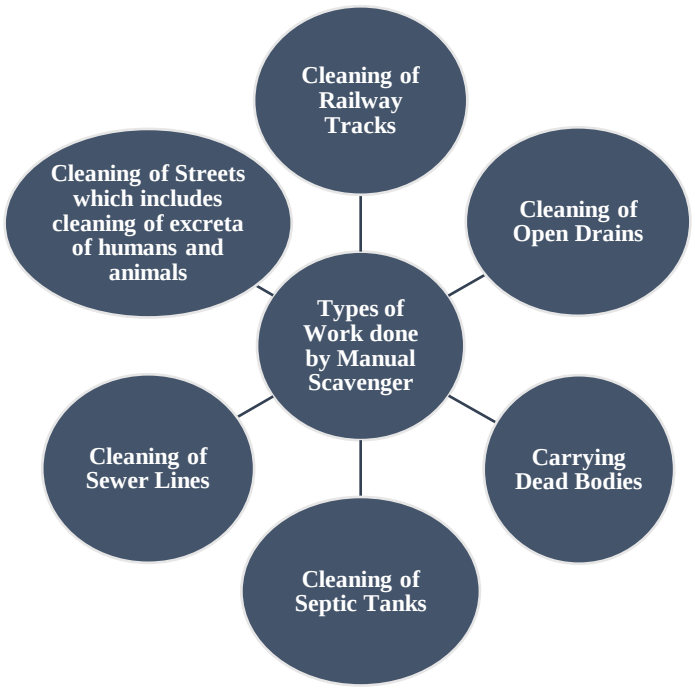


Figure 4: Types of work done by manual scavengers

Number of years of experience in the current occupation

Figure-5 indicates the number of years of experience in the current occupation. It was found that 22% of the respondents were in this occupation since 0-5 years, these were the youngsters who did not get any other job and had to take up this work. 15% of the respondents were in this profession since 6-10 years, 10% were in this occupation since 11-15 years. 27% of the respondents were in this occupation since last 16-20 years. 13% each were in this occupation since 21-25 and 26-30 years. The data indicates that the respondents were denied of other jobs to perform and had no other opportunities. Few of them remained unemployed for years because they did not want to take up manual scavenging as their occupation but later on, they took it up to earn their livings.

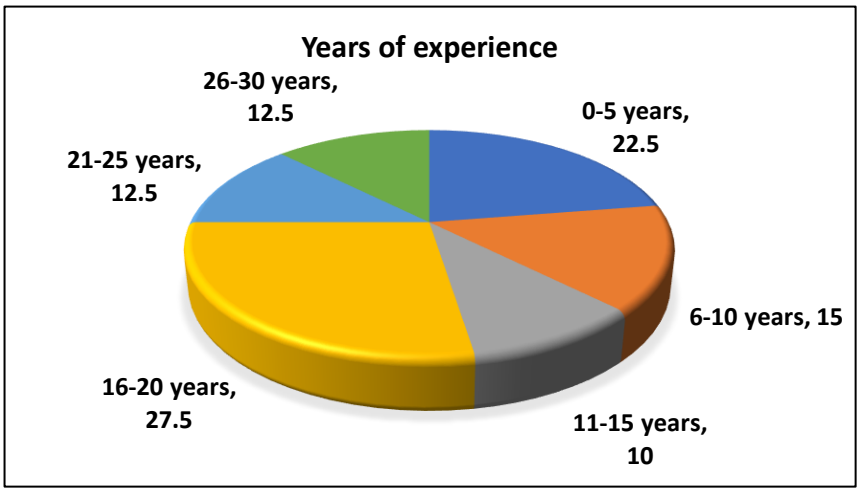


Figure 5: Percentage of Number of years' experience in the current occupation

.

Changes in type of work done

The data reveals that a few changes have occurred over a period of time with respect to the work done by manual scavengers. Earlier, female workers used to clean dry toilets and carried the waste in baskets on their heads. This work has been discontinued since 2008 after the implementation of The Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993. But they clean human excreta from roads and open drains.

Reasons for working as a manual scavenger

According to 23 respondents, this has been their traditional occupation. Their ancestors worked as manual scavengers and they are doing the same. The other reason was lack of opportunity as they belong to the lowest strata in the society and no other alternate work is available. People are not ready to accept them for other jobs. Hence, this is the only option of work they are left with. Also, with lack of education they do not have the skill set for other jobs, they end up taking manual scavenging as their occupation. Their poor economic conditions enable them to choose this occupation at low wages.

Number of generations engaged in scavenging

It was found that 57.5% of respondents were in this occupation since 4-7 generations. For 42.5% of the respondents this occupation was practiced by 1-3 generations. Hence it can be said that it is their traditional occupation. Respondents have accepted that the society would not allow them to do other jobs.

Division of work between men and women

The data indicates that women are mostly cleaning streets and open drains as they were considered physically less strong as compared to men. As discussed under section 3.2.3 before the year 2008, they were involved in cleaning of dry latrines but after the implementation of The Employment of Manual Scavengers and Construction of Dry Latrines (Prohibition) Act, 1993 they are not involved in cleaning of dry latrines. They are involved in cleaning of roads, open drains. However, male scavengers were involved in the cleaning of sewer lines, septic tanks as it requires a lot of physical strength and involves high risk. They also complained about the deaths that have happened in the past at their work site because of unavailability of proper safety gears and other equipments. Apart of this, few of the respondents carry dead bodies of human and animals.

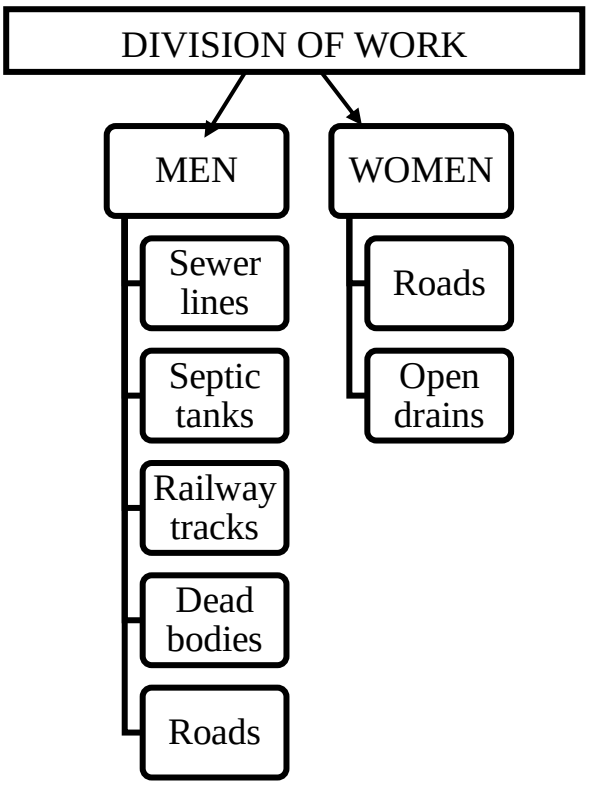


Figure 6: Division of work between men and women

Issues and challenges

The respondents highlighted their issues and challenges. Among all, discrimination was their pressing issue, because they are born in Balmiki community, they have no scope to revel, occupational mobility is not possible as they are stigmatized as dirty and impure. They do not have support from local government agencies. Also, because of poverty they are unable to afford education and medical facilities for their family members. They are exposed to several health risks

as they are neither aware nor provided with safety equipments. It was also found that their awareness about laws and policies addressing their issues was very low.

Role in Swacch Bharat Abhiyan

Swacch Bharat Abhiyan (SBA) a campaign in India aims to clean up the streets, roads and infrastructure of India's cities, smaller towns, and rural areas. The objectives of Swacch Bharat include eliminating open defecation through the construction of household-owned and community-owned toilets and establishing an accountable mechanism of monitoring toilet use. During the launch of the campaign the respondents were made to work in double shifts but were not paid for the same. Their efforts were not recognised by the local government and other agencies.

Awareness about laws and campaigns addressing the issue

It was found that the awareness about the laws and campaigns addressing the issues of Manual Scavengers was very low. Only few (12) respondents were aware that manual scavenging has been banned by the government. The respondents were not aware about the provisions for rehabilitation of the people engaged in manual scavenging and their children. They were not getting any benefits from the authorities. Though several campaigns have been run for addressing the issue of Manual Scavenging but the awareness level was found be very low.

Future aspirations of the respondents

The respondents were inquired about their future aspirations. It was found that all aspire to do some other work which would let them earn more and live their life with respect and dignity. They want their children to get good education and jobs in the future. They do not want their next generation to work in the same field. Respondents also gave reasons for existence of the manual scavenging practice in the society. The main reasons were lack of education and awareness amongst the people of Balmiki community, gaps in policies and laws made by

The respondents also gave the following suggestions for addressing the issues:

- Provide educational opportunities to the children of Balmiki community. They believed that the next generations should be well educated.
- Generate awareness about the laws and campaigns for manual scavengers and their families.
- Eradicate caste-based discrimination.
- Advocate the issues of Manual Scavenger community for better enforcement of laws and policies and sensitizing the civil society about the same.

CONCLUSION

Manual scavenging practices exist in many forms and the people belonging to schedule caste communities are engaged in such practices. The manual scavengers do not have alternatives employment to renounce the scavenging practices. Though in the modern times, the occupational mobility has increased for the rural caste suppressed masses to find out alternative employment to have dignified life. Scavengers remain marginalised despite the constitutional provisions which direct the state to promote their educational and economic interests. They remain marginalised because their communities are still predominantly employed to carry out the country’s basic sanitary services. Inspite of reservation policies and other legislative measures they have not been able to participate in the job mobility associated with living in a rapidly growing urban environment.

The Civil societies need to strengthen the organisations of the manual scavengers to emancipate themselves from domination and oppression of the manual scavenging practices. The issue of manual scavenging has not been framed as a political issue. The burden of bringing about any change rests on the shoulders of the manual scavenging community. Issue lacks political will and is hardly seen on party's agendas. The laws and policies fail to acknowledge the presence of strong caste-based discrimination. Also, the Swacch Bharat Abhiyan has ignored the problem of 'caste' as the root cause of the issue. Providing dignified livelihood opportunities which are free of scavenging should be highlighted in the government agendas for formulating effective programs and policies.

BIBLIOGRAPHY

- Census of India. (2011). Retrieved, from :http://www.censusindia.gov.in/2011-Common/CensusData2011.html on 21.08.2017
- Gatade, S. (2015), Silencing caste, sanitising oppression understanding swachhbharatabhiyan. *Economic & Political Weekly*,*50*(44), 29-35.
- HRW. (2014). *Cleaning Human Waste; Manual Scavenging, Caste, and Discrimination in India*. Human Rights Watch. Retrieved, from: https://www.hrw.org/sites/default/files/reports/india0814_ForUpload_0.pdf on 25.12.2017
- ILO. (2014). *Resource Handbook for Ending Manual Scavenging.* Retrieved, from: http://www.dalits.nl/pdf/ResourceHandbookForEndingManualScavenging.pdf on 22.12.2017
- International Labour Organization, *Equality at work: The continuing challenge* (Geneva: ILO, 2011), http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_166583.pdf on 23.12.2017 paras. 24, 25, 170.
- Karthikeyan, P., Gayathri, N., &Dheepa, T. (2014), An untold miseries of manual scavengers in India with reference to their socio-economic status. *Intercontinental Journal of Human Resource Research Review*,*2*(12), 38-44.
- Ministry of Social Justice and Empowerment, (2013). *The Prohibition of Employment as Manual Scavengers and Their Rehabilitation Act, 2013*. Retrieved, from: http://socialjustice.nic.in/writereaddata/UploadFile/manualscaact19913635738516382444610.pdf on 18.07.2017
- Nigam, DD. (2014), I, a manual scavenger, not your vote bank. *Economic & Political Weekly*,*49*(41), 12-13.
- Rashtriya Garima Abhiyan. (2011). *Eradication of* I*nhuman Practice of Manual Scavenging and Comprehensive Rehabilitation of Manual Scavengers in India* (First Edition). Dewas, Madhya Pradesh.
- Sachchidananda. (2001), *People at the Bottom: A Portrait of the Scavengers*. New Delhi: Concept Publishing Company.
- Singh, B. (2014). *Unseen: The Truth about India's Manual Scavengers.* New Delhi: Penguin Books.
- Singh, B. W. (2016). *India Exclusion Report.* Delhi: YodaPress.
- Socio Economic Caste Census. (2011). Retrieved from: http://secc.gov.in/statewiseDistrictPTGLRBLMSReport on 22.08.2017

The Indian Journal of Home Science 2022: 34(1)

MODULAR KITCHEN DESIGN – AN ANALYSIS

B. Haritha[1] and Dr. R. Jeyagowri[2]

[1]PG Student, [2]Professor

Department of Resource Management, School of Home Science,

Avinashilingam Institute for Home Science and Higher Education for Women,

Coimbatore-43

Email: harithabaskaran11@gmail.com

ABSTRACT

Indian homemakers spend most of their time in kitchen since their cooking is elaborate and time consuming. In order to reduce their time in kitchen and to save energy one has to use the best type of kitchen among all type to suit to their need and to conserve time and energy. To add more comfort, the modular kitchen plays an important role in making the homemakers kitchen as heaven. Each day there is a change in modular kitchen designs, materials, countertops, chimneys, wooden cabinets, internal accessories and pull-out baskets. There is a necessity to understand and gain knowledge about each day development and trends in modular kitchen and to create a ready reckoner for homemakers.

Keywords: Conserve, Modular, Chimney, Countertop, Accessory,

INTRODUCTION

Every homemaker dreams of a beautiful and comfortable kitchen, where she can express her choices of individuality. The interior arrangement of the kitchen should be functional as well as aesthetically beautiful to the user. The kitchen should be designed based on the work triangle, work-centers and other mechanisms which are involved in designing the kitchen.

A beautiful home articulates positive energy; tranquility and aesthetic that make the user feel comfortable in spending their time in (Inside Outside, 2019). Mullick (2004) presents that a kitchen is made up of a combination of many different things like functional and decorative.

Neelima (2009) proposes that the remodeling and rearrangement of the kitchen can help to maximize the use of the space, and make the workflow more efficient. The work triangle layout is to make the kitchen layout easier for the user in the kitchen to get from one place to another. Modern kitchen is usually well-planned, with lot of useable spaces; it is attractive and appealing as well. The trend is to use the kitchen partially as a family room, or a place together with friends to chat.

Lee (2005) asserts that the kitchen is increasingly recognized as the heart of the home. It is no longer recognized as place for cooking food and storage provisions, it is also in many cases the room where meals are served and where family and friends congregate. So, it should be stylish, comfortable and functional as any other room.

Modular kitchen is the only solution which provides a luxurious, comfortable and friendly environment to the user. Modular kitchen makes use of all the optimal spaces in the kitchen. No space is left alone while installing modular kitchen. Modular kitchen come in variety of colours, shapes, sizes.

Justification: Though modular kitchen is not a new concept but each day there is a change in design, materials, style and workmanship in designing modular kitchen which pave way for further research to make life much more comfortable in the kitchen to suit to the

modern era. The study entitled "Modular Kitchen Design – An Analysis" was chosen with this background. It explores the availability of modular kitchen in the selected households.

OBJECTIVES OF THE STUDY

The investigator had taken up the study entitled **"Modular Kitchen Design – An Analysis"** with a view to understand the availability of modular kitchen elements in the selected households. The main objectives of the study were

- To compare the preferences of the materials and design used for modular kitchen in the selected households during last ten years
- To examine the care and maintenance required for modular kitchen
- To assess the problems faced by the households using modular kitchen
- To evaluate the level of satisfaction derived from the uses of modular kitchen.

METHODOLOGY

Thanulingom (2000) conveys that the survey provides information for the formulation of hypotheses. The survey was carried out on 50 households who had installed modular kitchen in the last ten years. The areas selected for the study were namely Saibaba Colony, R S Puram, Saravanampatti, Ramanna Layout, Ramalingam Colony, New Weaver's Colony and Singanallur in the Coimbatore city. The information on the various aspects of modular kitchen such as design, type, brand, materials used, fittings, countertop, storage unit, chimney, cabinet and their finishes, their satisfaction, care and maintenance in using modular kitchen were gathered. The purposive sampling method was adopted for the survey. An interview schedule was designed to collect the needed data regarding the general information about the interviewee details on housing, information about the kitchen, installation charges for modular kitchen, sources of information for installing modular kitchen, maintenance and care needed for modular kitchen. Sharma (2011) claims that analysis of data refers to seeing the data in the light of hypotheses or research questions and the prevailing theories and drawing conclusions that are as amenable to theory formation as possible. The data collected were consolidated, analyzed, tabulated and presented.

FINDINGS AND DISCUSSION

The findings of the study were analyzed and presented under the following headings.

A. Details of Modular Kitchen in the Selected Households

1. Type and style of kitchen

A majority of 96 percent of the households were having closed kitchen while only four per cent have open kitchen. Among them each two per cent have closed cabinets below and above working platform in their kitchen. A majority 74 percent of them chose contemporary style,18 percent opted modern style and 8 per cent had traditional style of kitchen.

2. Specification and layout of the modular kitchen

Forty-four per cent of the households were having modular kitchen with the size of 9.1-11squaremeters, whereas 26 percent of them have 11.1 – 13 square meters and only six percent

had 7.4–9 square meters.

A maximum of 46 per cent of them were having L-shape modular kitchen layout, U-shape was found in 34 per cent, Parallel shape in 14 per cent, G-shape kitchen in four per cent and Island shape in two percent of the households.

3. Re modeling of kitchen among the selected households

To sum up only14 percent of the households remodeled their kitchen after construction of their houses and remaining 86 per cent have constructed modular kitchen during construction. Out of 14 per cent of the remodeled kitchen, a majority of 12 per cent of the kitchens were remodeled in the year 2019 and two percent in the year 2018.

4. Implementation of work triangle in the kitchen

Work triangle is the main principle followed in designing the kitchen and helpful in promoting and increasing the work efficiency of the homemaker and conserves her time and energy. The findings of the survey revealed that all the 50 selected households were well aware about the work triangle. Hence a total of 100 per cent of the houses had implemented work triangle principle in their kitchen.

5. Expenditure on installation of modular kitchen

About 42 per cent of the households spent Rs.2,00,001 to Rs.3,00,000 on designing their modular kitchen. Thirty - eight per cent of the households spent Rs.1,00,001 toRs.2,00,000 and Rs.3,00,001to Rs.4,00,000 was spent by 14 per cent of them. A meager two per cent of the households spent within Rs.1,00,000. The money spent for modular kitchen varied based on their income, tastes and needs of the households.

6. Selection and designing of modular kitchen

a. Persons involved in designing modular kitchen

A vast majority of 74 percent of the kitchen were designed by the households with the help of the carpenters. The idea, design, type and colour of materials and different modular kitchen accessories were selected by the family members and the workmanship was done by the carpenter.

On the other hand, 14 per cent employed kitchen specialist and 10 per cent used interior designer. Both the interior designer and kitchen specialist explained the different designs, types, colours and fittings to the households and helped the households in choosing them. A meager two percent of the kitchen was designed by the carpenter. The carpenter did the designing, selection and purchasing of materials for modular kitchen and no family members involved in any of these activities.

b. Preferences and methods adopted for the construction of modular kitchen

All the selected kitchens were designed based on the needs and preferences of the homemakers. A vast majority of 98 per cent preferred manual made or carpenter made modular kitchen. Machine-made modular kitchen was not common among the households. It is proved that a meager only two per cent of the kitchens were machine made.

c. Method of charging for the construction of Modular Kitchen

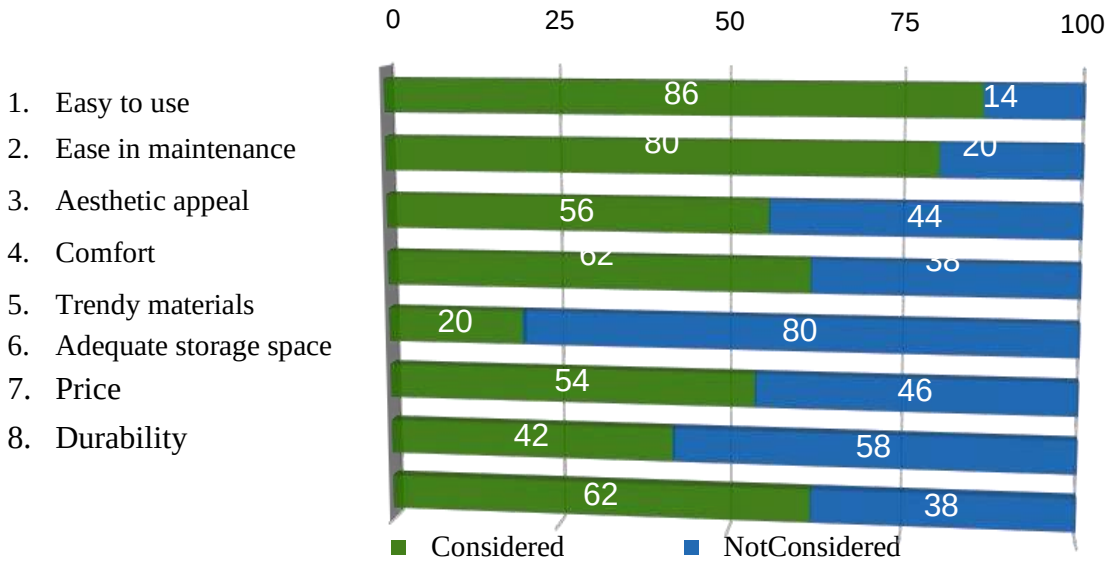
A majority of (62 per cent) preferred to give the construction of modular kitchen on total contract basis whereas 38 percent offered on labour contract. Out of 38 percent of the households who chose the labour contract method, 36 per cent paid daily wages and two per cent paid square feet charges.

d. Source of information for designing modular kitchen

A majority (94percent) used social networking apps to find out the ideas for designing such as Pinterest, Homify and Houzz. Eighty-six per cent of the households discussed with their family members for designing and 82 per cent of the kitchen were designed with the ideas of homemakers. Homemakers who have vast experience in kitchen were able to design their kitchen efficiently.

Magazines and websites were used by 28 percent of the households in designing; neighbours, exhibitions and referring other houses were opted by two per cent of the households each. Friends and relatives have given ideas for 14 percent of the households.

e. Factors considered for the installation of modular kitchen



*** Multiple Responses**

Graph1: Factors considered for the Installation of Modular Kitchen

A maximum 86 per cent of the households considered use and needs of the family, easy maintenance (80 per cent), comfort and durability (62 per cent), aesthetic appeal (56 per cent) ,adequate storage space (54 per cent), price (42 per cent) and trendy materials (20 per cent) for designing the modular kitchen.

f. Persons in-charge for designing modular kitchen

Sixty-two per cent of the households hired vendors referred by their builders and 34 per cent of them consulted friends and family members for hiring designers and remaining four

percent have reached out to the known modular kitchen brands.

7. Modular Kitchen Fittings Installed in the Kitchen

a. Brands opted for modular kitchen

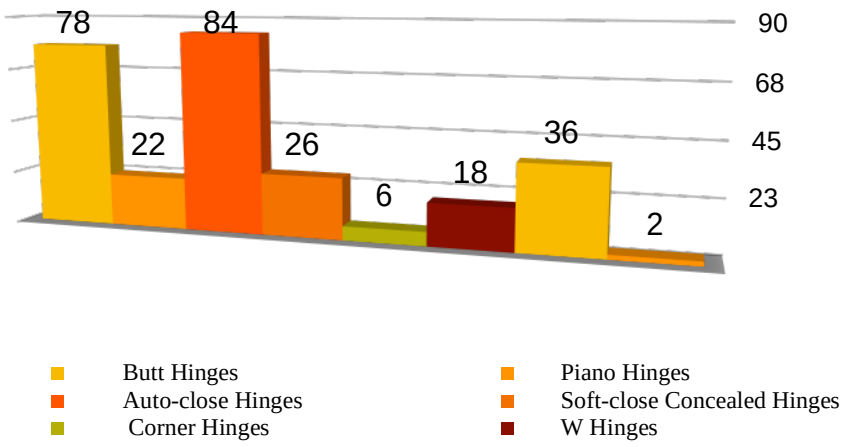
Table1: Brands Opted for Modular Kitchen Fittings

Name of the Company	Percentage*(N=50)
Local Brand	70
Ebco	66
Sleek	48
Hettich	42
Hafele	34
Johnson Kitchen	26
Haecker	4
Godrej Interio	4

***Multiple Responses**

A majority of 70 percent of the households purchased fittings from local brands. Local brands included Ever shine Appliances, Kanox, DLIFE, Sunbird Kitchen, Slim Lime, Olive, Dominate, Liberal, V and J in Coimbatore. Sixty-six per cent of them purchased modular kitchen fittings from the brand Ebco, followed by Sleek (48 per cent), Hettich (42 per cent), Hafele (34 per cent) and Johnson Kitchen (26 per cent). Minimum of four per cent each picked Haecker and Godrej Interio fittings.

b. Hinges used in the selected modular kitchen



*** Multiple Responses**

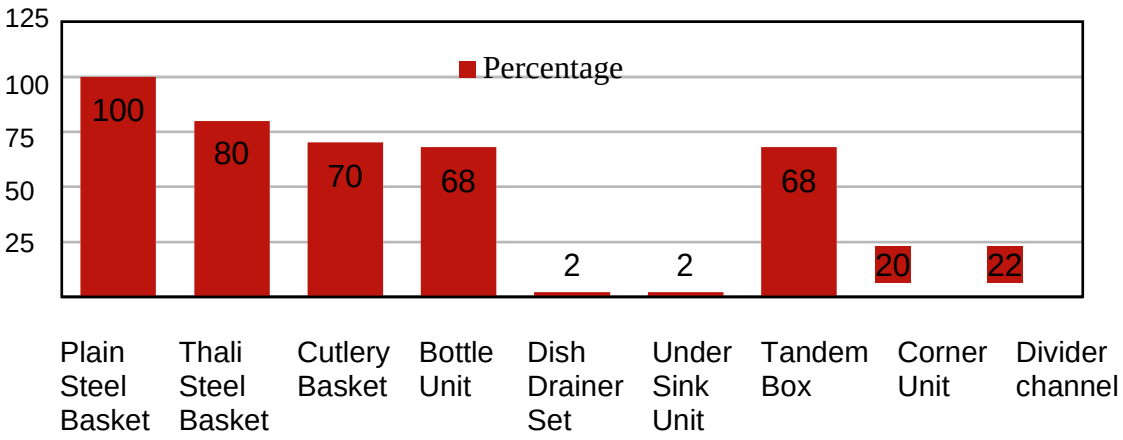
Graph2: Hinges Used in Modular Kitchen

The most commonly used hinges were auto close hinges (84 per cent) and butt hinges (78per cent) in the surveyed kitchens. They are used in both upper and lower cabinets of the kitchen. L-hinges were used in 36 per cent of the selected modular kitchen. L hinges can be opened at 130 degree to get a wide view of the cabinet. About 26 per cent used soft close concealed hinges. This type of hinges is helpful in easy operation of the kitchen cabinets. It is normally preferred to the cabinets which are not used frequently.

c. Type of drawer channels used

Drawer channels are normally installed in the lower cabinets of the kitchen. A majority of 82 per cent had used SS Telescopic drawer slide for the kitchen and 18 percent used side mount drawer slide. Lift-up gas spring (22 per cent) used in the upper section of the kitchen cabinets. They enhanced the appeal of the kitchen.

d. Storage baskets found in the selected houses



*** Multiple Responses**

Graph3: Storage Baskets Found in the Selected Houses

Plain steel basket was installed in all the selected kitchen. To make their kitchen more organized a majority of 80 per cent of the selected kitchen had Thali steel baskets to store their vessels. A maximum of 70 per cent of the households have installed Cutlery trays to store knives, forks and spoons. Tandem boxes and bottle units were preferred by 68 per cent of the households. About 22 per cent used Movable lateral divider channel to make the efficient use of the storage space. It is one of the beneficiary tools for the kitchen. A minority of two per cent preferred dish drainer sets and under sink units for their modular kitchen.

e. Counter top materials used in the selected kitchen

The counter top materials chosen for kitchen should be easy to clean, resistant to heat, water, etc. Considering the factors, a majority of the households (64 per cent) preferred Black granite for kitchen counter top, followed by Italian granite (18 per cent), Nano white marble (10 per cent) and least percentage of households preferred Corian (8percent).

f. Installation of chimney in the selected kitchen

Eighty -six per cent of the households have installed electric chimney in the kitchen.

Only14 per cent did not install chimney due to the following reasons.

- Exhaust fan is placed
- Households found it unnecessary for their kitchen since less fried cooking is done
- Stove is placed near the window

A majority (86 per cent) of the households found chimney is useful and listed the benefits as

Follows:

- Chimneys avoid grease from the counter top and kitchen wall tiles
- Removes excess heat from the kitchen
- Helps in removing bad odour from the kitchen
- Acts as an aesthetic element to the kitchen.

g. Nosing done to the counter top of the kitchen

There are numerous choices of edging available for modular kitchen. Since nosing are inexpensive, safety oriented and prevents damage to the counter top a maximum of 90 percent of the kitchen had nosing. Only 10 percent were without nosing and those households were unknown about the nosing. Among the nosing installed countertop, 58 per cent faced problems like spilling of water on the lower section of the cabinets and 38 percent of the households noticed the food particle in the nosing joints. Sixteen per cent of the kitchen lower cabinets were affected just within a year especially the cabinet which were below the sink.

h. Cabinet materials used in modular kitchen

The method of cabinet construction is done either framed or frameless. A majority of 68 percent of the households picked frame less cabinets for their kitchen and remaining 32 per cent were framed cabinets.

Full overlay door type was installed by 48 per cent of the households. Next in line 46 percent used inset overlay doors to their kitchen cabinets and remaining six per cent preferred partial overlay type cabinets.

Plywood was most commonly used by majority of 80 per cent of the households. Only 12 percent of them preferred MDF for their kitchen cabinets and minority of eight per cent used wood for their kitchen cabinets.

Laminate finish was preferred by a majority 42 per cent of the selected households as they are heat resistant and free from moisture. Lacquer paint was durable and waterproof. About 30 per

cent of the kitchen was painted with lacquer paint for their cabinets. Acrylic finish was used in 10 percent of the kitchen and it was easy to clean and enhances the elegant look of the kitchen. All the surveyed houses have installed waterproof kitchen cabinet to increase the life span of the cabinets.

Table2: Details of Modular Kitchen Cabinets

Details	Types	Upper Section and Platform Section
		Percentage(N=50)
Construction	Framed	32
	Frameless	68
Door Type	Full Overlay	48
	Inset Overlay	46
	Partial Overlay	6
Materials	Plywood	80
	MDF	12
	Wood	8
Finishes	Laminates	42
	Lacquer Paint	30
	Acrylic Finish	10
	PUF inish	8
	Membrane	4
	Veneer	4
	Rose wood Finish	2
Water Proof	Yes	100

i. Type of sink used in the kitchen

About 72 per cent have used Stainless steel sink and granite coated sink were used in 20 per cent in the selected kitchen. Households prefer stainless steel sink because it is easy to maintain. A majority of 64 per cent of the selected kitchen sinks were having matte finish and glossy finish in 36 percent of the kitchen.

Considering the functionality of the kitchen, the homemakers preferred the number of sink bowls as per their requirements. One bowl sink was found in 66 per cent and two bowl sinks were found in 34 per cent of the selected kitchen.

Among the selected kitchen top mount sink were found in 76 per cent which is commonly installed than the integrated sink found in 24 percent of the kitchen. Top mount sink can be easily installed whereas integrated sink is high in aesthetic appeal.

B. Care and Maintenance of Modular Kitchen

A majority of (70 per cent) of the homemakers spent their time in cleaning the kitchen. Among them 46 per cent of them cleaned their kitchen when the house helpers were not present and remaining 24 per cent did not have house helpers. About 40 per cent of the homemakers were depending on maids to clean.

A vast majority of (84 per cent) of the homemakers found it was convenient to clean their kitchen once the cooking is done, whereas 16 per cent were cleaning one time in a day. All the selected homemakers cleaned the inner and outer layer of the cabinets thoroughly once in a month. The regular monthly cleaning was done to maintain hygiene and cleanliness. About 86 per cent of the homemakers did not find it hard to maintain modular kitchen whereas 14 per cent found it hard to clean.

Methods adopted for cleaning the cabinets in clued dusting and wiping. About 98 per cent of the homemakers were comfortable with dusting method and two per cent preferred wiping with damp cloth. Among 98 per cent, 86 per cent found dusting was easy and rest felt it was tough. However, two per cent of the homemakers who used to wipe the cabinet felt this task was tough.

All the selected homemakers used wet cloth for wiping the countertop and they all felt this task was easy. About 88 per cent of the surveyed homemakers spent less time to clean the counter top and remaining 12 per cent required more time to clean.

A majority of (68 per cent) of the homemakers found dusting was convenient to clean, 20 per cent used stain removal technique, whereas a minority of (12 per cent) cleaned their cabinet finishes by wiping with damp cloth. Stain removal method was normally done in areas where the homemakers found stain.

About 58 percent of the homemakers felt dusting method was easy and the rest found it was tedious to clean. A majority of (18per cent) who used to follow stain removal was hard and rest (2per cent) felt it was easy. Also 12 per cent of the homemakers felt wiping was the easiest method to clean and this method helped the homemakers in conserving their time and energy.

C. Satisfaction Derived and Challenges Faced by the Households Using the Modular Kitchen

A majority of (78 per cent) of the selected households were extremely satisfied in using the modular kitchen and remaining 22 per cent were moderately satisfied.

Table 3: Challenges Faced by the Households in Using Modular Kitchen Cabinets

ChallengesFaced	Percentage*(N=50)
Pest Issues	68
Loosening of Drawer Channels andCabinets	64
Inadequate Storage Spaces	56
Postural Problems	56
Improper Closing of Cabinets	44
Lack of Counter Spaces	32

Water Leakage damage the laminated sheets	18
Improper Ventilations	14

*** Multiple Responses**

A majority of (56 per cent) of the kitchen did not have adequate base and wall cabinets storage space. This forced the households to store only the essential grocery items, vessels, storage containers and kitchen equipment. It is not welcoming aspect to know that 64 per cent of the homemakers noticed the loosening of drawer channels and cabinets in their kitchen. This happens

when the kitchen is used for longer period of time. The households had to tight the screws of the drawer channels and cabinets to retain their functionality.

A maximum 68 per cent of the homemakers faced pest like cockroach, spider and ant in their modular kitchen. It is one of the biggest challenges faced by the households especially during night time. A minority 14 per cent of the kitchen were devoid of ventilation. Good ventilation is essential to improve the mood of the households. Installation of chimney or large windows aided for good ventilation in the kitchen.

Improper counter top height and upper cabinets up to ceiling level result in fatigue among the households. About 56 per cent of the households faced postural problems while using kitchen. It is important to design kitchen based on the working heights and needs of the households.

SUMMARY AND CONCLUSION

Awareness on the recent trends in modular kitchen made the homemakers life easy and comfortable. From the survey it was summarized that all the homemakers were very happy with their modular kitchen as it provides a comfortable and aesthetically pleasing environment. It has also reduced the physical effort and stress level of the homemakers when they cook in the modern kitchen. It was clearly observed that the homemakers used latest components of modular kitchen which made their life easy, stress free, time and energy conserving and in turn it was a boon for gainfully employed homemakers. With the development of modular kitchen industry, the modern homemakers were experiencing the user friendly, comfortable kitchen and satisfactory cooking experience.

REFERENCES

- *Inside Outside The Indian Design Magazine*,2019, Aesthetic Makeover of Spaces with Hettich Fittings, issue 409, P. 109.
- Lee,V.,2005,"Kitchens: A Design Source Book", Ryland Peters and Small, London, pp. 7,8,13,239, cover page.
- Mullick,P.,2004,"Text Book of Home Science", Kalyani Publishers,Calcutta,pp.73-77.
- Neelima, Dr.,2009,"Home Management", Sonali Publications, New Delhi, pp.76,87,94,95.
- Sharma,J.N.,2011,"Research Methodology: The Discipline and its Dimensions", Deep and Deep Publications ,NewDelhi, pp. 111, 155,257.
- Thanulingom,N.,2000,"Research Methodology" ,Himalaya Publishing House,Mumbai,P.47

The Indian Journal of Home Science 2022: 34(1)

UNDERSTANDING THE KNOWLEDGE ON RESEARCH AMONG THE ACADEMIC FRATERNITY IN THE FIELD OF HOME SCIENCE

Dr. K. Manimozhi[1], Gayathri M[2], Pavithra D[3], Vinothini R[4]
Professor and Project Coordinator (UGC STRIDE Component - 1)[1],
Project Fellow (UGC STRIDE Component - 1)[2, 3, 4],
Department of Resource Management, School of Home Science
AvinashilingamInstitute for Home Science and
Higher Education for Women, Coimbatore – 641043
Email: manidurai1962@gmail.com

ABSTRACT

Research is a process of "a systematic investigation, including research developments, testing and evaluation, designed to develop or contribute to generalizable knowledge". It intends to establish facts and attain a new conclusion (Ahmad, 2015). The power of knowledge can confront the implication of a particular phenomenon. This study aimed to analyze the knowledge of academicians in the field of Home Science on various aspects of research. To carry out the study, Faculty, Research Scholars and Post-Graduate students were selected using the purposive sampling method. A questionnaire was used to assess the knowledge of the samples before and after the Training Programme. The results showed that the participants had gained knowledge on various aspects of research.

Key Words: Research, Knowledge, Academicians, Training Programme

INTRODUCTION

"Research has been defined as the process of steps used to collect and analyze information to increase our understanding of a topic or an issue" (Snyder, 2019). The purpose of research is, therefore, to find out what is known what is not and what one can develop further (Mohajan, 2018). Research could also be a development on the work already done in the specific area. The validity of instruments, procedures, experiments and research may be tested by imitating the elements of preceding studies or the whole project.

In the modern complex world, every society today is faced with serious social, economic and political problems. These problems need systematic, intelligent and practical solutions, which is a technical process and requires the accumulation of new knowledge through research. In other words, research is a systematic effort of gathering, analysis and interpretation of problems confronted by humanity. It is a thinking process and scientific method of studying a problem and finding the solution. It is an in-depth analysis based on reflective thinking, and in common parlance, research refers to a search for knowledge. Research can also be defined as a scientific and systematic search for pertinent information on a specific topic. Research is an academic activity, and the term should be used in a technical sense (Ørngreen and Levinsen, 2017).

Knowledge gained by research is the origin of sustainable development, which needs that knowledge be placed at the point of development, is transformed into applications, and be shared to ensure widespread benefits. Faculties must engage in research to come out with the latest and original information, but when they expect students to be research-oriented, they must have familiarity with various aspects of the concept. Also, educators familiar with research-based teaching can help students with the necessary inputs for doing quality research. When the students are involved in research-based learning, they are bound to learn more and better than they would

without integrating research. Students start as consumers of knowledge and move as knowledge producers.

OBJECTIVES OF THE STUDY

1. To analyse the level of knowledge among the Faculties, Scholars and Post-Graduate students on different aspects of research.
2. To promote and strengthen the academic and research ethics and integrity among Faculties, Scholars and Post-Graduate students.

HYPOTHESIS

There is no significant difference on research knowledge among the participants before and after the Training Programme.

METHODOLOGY

The design of the study included the Training Programme, which was planned to organize under the School of Home Science, Avinashilingam Institution for Home Science and Higher Education for Women. Thus, the five departments that come under the School of Home Science were involved in the present study to organize an Online Training Programme on "Environmental Sustainability and Research Ethics" to enhance and upgrade the research knowledge. The programme was conducted over nine days, totally 834 participants from 197 institutions all over the country participated in the Training Programme. The questionnaire was prepared to measure the participants' knowledge before and after the Training Programme on various aspects of research.

Background Information of the Resource Persons and the Participants of the Training Programme

Designation and Locality of the Resource Persons

School of Home Science invited a total of 61 resource persons for the Training Programme to share their expertise among the participants. Table 1 indicates the designation and locality of the resource persons departments wise in the School of Home Science.

Table 1: Designation and Locality of the Resource Persons

S. No	Particulars	N	%
Designation of the Resource Persons			
1.	Professor	34	56
2.	Associate Professor	4	7
3.	Assistant Professor	10	16
4.	Other (Industrial People)	13	21
	Total	**61**	**100**
Locality of the Resource Persons			
1.	Regional	44	72
2.	National	12	20
3.	International	5	8
	Total	**61**	**100**

* N – Number of Resource Person

Among the total resource persons, 56 per cent were Professors, followed by 21 per cent of Industrial People. Sixteen per cent of resource persons were Assistant Professors and the remaining seven percent were Associate Professors.

Table-1 shows that a total of 61 resource persons were invited from different parts of the world for the Online Training Programme organized by the School of Home Science. Majority(72 per cent) of the resource persons were from Tamilnadu and the remaining 20 per cent and 8 per cent were from other states in India and from Canada, Malaysia and Vietnam.

Participants Profile of the Training Programme

The aspects discussed under the heading were details of the participants consisting of Faculty, Scholars and Post-Graduate Students. The designation and the institution representation of the participants were given in Table 2

Table 2: Participants Designation and Institution Representation

No	Designation	Institution(n=834)					
		Avinashilingam Institution		Others		Total	
		N	%	N	%	N	%
1	Professor	5	0.6	7	0.8	12	1
2	Associate Professor	14	2	91	11	105	13
3	Assistant Professor	77	9	176	21	253	30
4	Research Scholar	23	3	157	19	180	22
5	P.G. Student	56	7	228	27	284	34
Total						**834**	**100**

* N – Number of Participants

The above table shows the total number of participants from Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore and Other Institutions from all over India. Among the total participants, 34 per cent were Post-Graduate Students, 30 per cent were Assistant Professors and 22 per cent were Research Scholars, participated in the Training Programme.

RESULTS AND DISCUSSION

The findings of the study were analyzed and presented under the following headings.

A. Knowledge on Research Before and After the Training Programme

The participants' knowledge on different aspects of research such as Research Culture, Ethics and Process, Tool Construction, Statistical Analysis, Proposal Writing, Article publication, Patent Development, Funding Agencies and Plagiarism was identified before the Training Programme. After this, the Training Programme was organized by each department to enhance the knowledge on research. The respondents were then analyzed with the same questionnaire to identify their knowledge after the Training Programme.

Table 3: Knowledge Inventory of the Respondents

S. No	Knowledge on Research	Respondents (n = 834) LEVEL OF KNOWLEDGE (in percentage)					
		Low		Moderate		High	
		BF	AF	BF	AF	BF	AF
1	Research Culture and Research Ethics	47	17	26	31	27	52
2	Research Process	36	6	40	27	24	67
3	Tool Construction	59	11	31	30	6	63
4	Statistical Analysis	36	13	61	23	3	64
5	Proposal Writing	47	6	45	22	8	72
6	Article publication	46	0	38	44	17	56
7	Patent Development	27	10	69	20	4	70
8	Funding Agencies	32	15	49	31	19	54
9	Plagiarism	57	0	38	22	5	78

*BF – Before * AF – After* N – Number of Participants

After the Training Programme, it was found that the level of knowledge among the respondents improved drastically. The level of knowledge for Plagiarism (78 per cent) has improved compared to the responses before the Training Programme only four per cent. The other factors showed an increase in the level of their knowledge were Proposal Writing (72 per cent), Patent development (70 per cent), and Research Process (67 per cent). The other factors also depicted considerable increase thus showing that the Training Programme conducted by the School of Home Science was successful, as per the results obtained from the respondents.

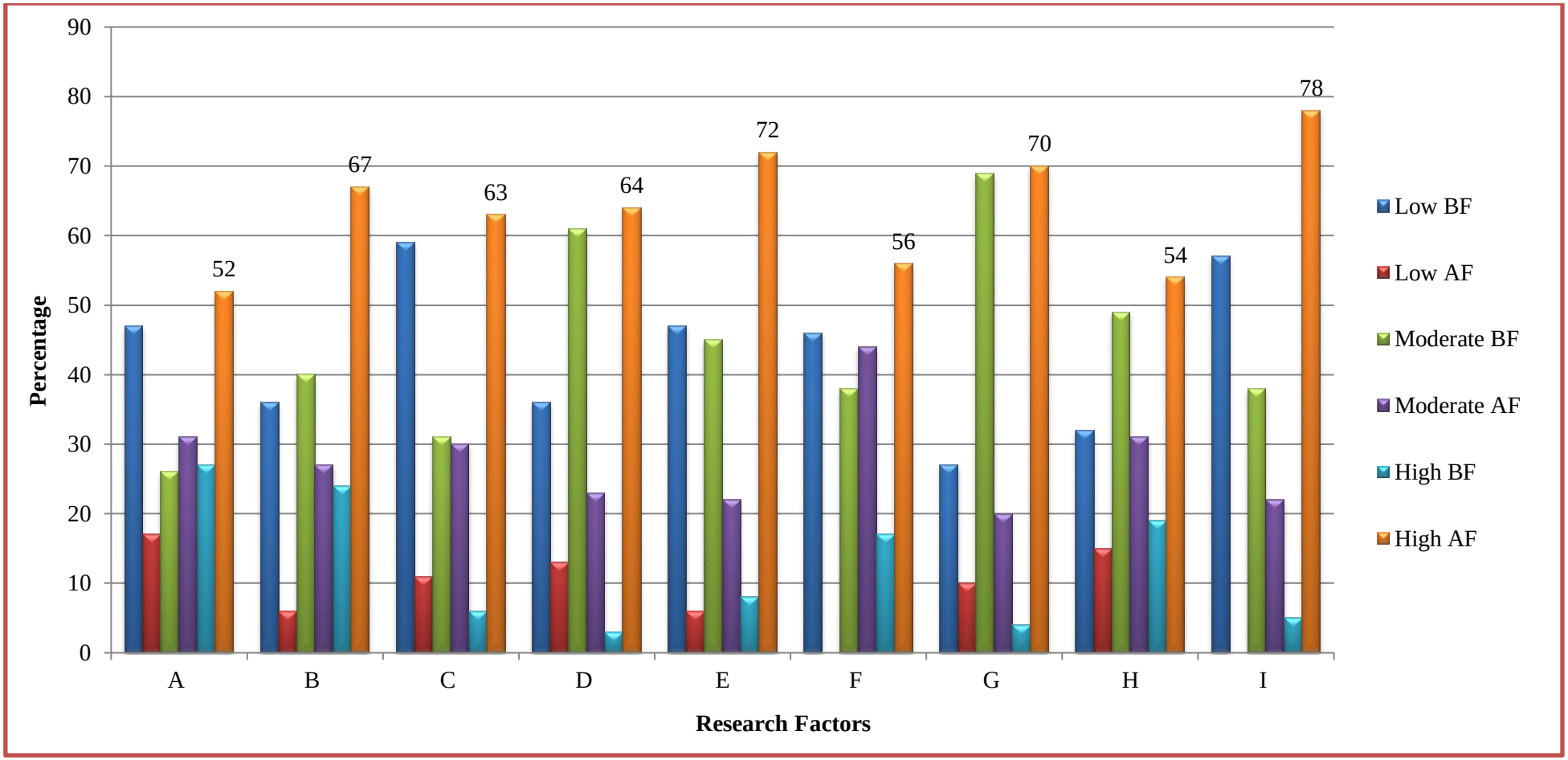


Figure 1: Knowledge Inventory of the Respondents

B. Comparative Analysis of Research Knowledge Among the Participants Before and After Training Programme

The paired-samples t-test can be used to determine whether two means are significantly different from each other or not when the two values for each sample are collected from the same individuals. Descriptive Analysis was done before and after the Training Programme, the scores were analysed before applying a parametric test, and the t-test was performed to measure the difference between the level of knowledge among the participants from School of Home Science and the statistical analysis explained in Table 4.

H_0: There is no significant difference on research knowledge among the participants before and after the Training Programme.

Table 4: Statistical Analysis of Research Knowledge Before and After Training Programme

S. No	Knowledge on Research	Respondents (N = 834) Difference in Mean score on knowledge before and after training programme					
		Before		After		t value	Sig.
		Mean	SD	Mean	SD		
1	Research Culture and Research Ethics	20.88	1.93	39.77	4.75	22.88	.000
2	Research Process	29.19	3.12	39.30	3.82	66.27	.000
3	Tool Construction	16.66	1.97	20.15	2.79	45.59	.000
4	Statistical Analysis	19.86	1.93	20.76	2.70	10.69	.000
5	Proposal Writing	26.01	3.32	19.24	1.95	68.43	.000
6	Article publication	16.92	1.83	16.56	2.12	4.46	.000
7	Patent Development	15.64	2.31	17.01	1.98	21.39	.000
8	Funding Agencies	12.92	1.16	19.90	1.74	33.86	.000
9	Plagiarism	21.91	5.22	26.67	10.23	15.20	.000

*N- Number of participants *SD - Standard Deviation

The highest mean value found among the participants in the pre-test from the School of Home Science was for the aspect Research Process with the mean value of 29.19, and the standard deviation was 3.12. The highest mean of the post-test was found for Research Culture and Research Ethics with the mean value of 39.77, and the standard deviation was 4.75.

The t-value found from the analysis of the mean scores before and after the Training Programme among the School of Home Science is 22.88 for the aspect Research Culture and Research Ethics. The t-value of the other aspects of the research such as for Research Process ($t = 66.27$, $p < 0.05$), Tool Construction ($t = 45.59$, $p < 0.05$), Statistical Analysis ($t = 10.69$, $p < 0.05$), Proposal Writing ($t = 68.43$, $p < 0.05$), Article Publication ($t = 4.46$, $p < 0.05$), Patent Development ($t = 21.39$, $p < 0.05$), Funding Agencies ($t = 33.86$, $p < 0.05$) and Plagiarism ($t = 15.20$, $p < 0.05$). It was also found that the "p" value or significance value is 0.000 ($p< 0.05$) for the participants towards different aspects of research.

The results of hypothesis regarding different research aspects revealed a significant difference between the means of before and after Training Programme in School of Home Science. It was found that irrespective of the different aspects of research, the participants show significant growth in acquiring knowledge on research after the Training Programme. The analysis projects a significant difference between the mean scores of before and after the Training Programme at a 5 per cent level of significance, rejecting the first null hypothesis: There is no difference between the research knowledge among the participants. Hence the alternate hypothesis is accepted: There is a significant difference between the mean research knowledge before and after the Training Programme among the participants.

CONCLUSION

Higher education is a centre of knowledge-creating, delivering, and learning for society. On an international level too, knowledge sharing policies between two and more countries are going on, for the development of the nation. Discussion and exchange of information are prevalent among Faculties, Scholars and Students nowadays, which lead to the generation of innovative concepts. In the present technology world, everyone can access information through the open access movement on the internet. However, efforts are required to capture the tacit knowledge of individuals and share new ideas at the local and institutional levels. Thus, this study increased the knowledge and understanding of various aspects of research among Faculties, Scholars and Students.

ACKNOWLEDGEMENT

The researchers thank UGC for providing financial assistance to carry out this research work under UGC STRIDE Component – 1.

REFERENCES

- Ahmad, S. S. (2015). Research and its importance. Ophthalmol Open J, 1(1), e1-e2.
- Mohajan, H. K. (2018). Qualitative research methodology in social Sciences and related subjects. Journal of Economic Development, Environment and People, 7(1), 23-48.
- Ørngreen, R., andLevinsen, K. (2017). Workshops as a Research Methodology. Electronic Journal of E-learning, 15(1), 70-81.
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. Journal of business research, 104, 333-339.

The Indian Journal of Home Science 2022: 34(1)

PROFESSIONAL PRACTICES BY ARCHITECTS AND INTERIOR DESIGNERS DURING COVID-19 PANDEMIC 2020-2021

Prof. Neerja Jaiswal[1] and Ms. Nidhi Chirag Desai[2]
Head [1,] Research Scholar[2]
Department of Family and Community Resource Management,
Faculty of Family and Community Science,
The Maharaja Sayajirao University of Vadodara, Vadodara
nidhigupte91@gmail.com, neerja_jaiswal@rediffmail.com

ABSTRACT

The current study focuses on the impact of COVID-19 Pandemic on the profession of Architects and Interior Designers during various periods of Pandemic namely, before Lock- down (before 24th March 2020), during complete Lock- down (before 24th March 2020 to 4th May 2020), during partial Lock- down (5th May to 31st May), during Unlock Phase (June onwards). Sample of the study was 30 respondents from 4 cities of Gujarat state, India viz. Surat, Vadodara, Gandhinagar and Ahmedabad. The findings of the study highlighted on the Nature of Projects undertaken by the respondents, type & number of projects related to Architecture and Interior Designing, Agencies with whom the Architects and Interior Designers worked, Market from where the material was purchased and delay observed in execution/completion of Projects due to COVID-19 pandemic. Findings of this study will be useful to the students of Interior Designing and Architecture Department. The study was designed focusing on understanding the current market situation and the problems faced by the professionals in COVID-19 Pandemic, and so will be useful for the architects and interior designing professionals as well.

Key words: professional practices, architects, interior designers, covid-19 pandemic

INTRODUCTION

In this difficult phase of the pandemic, due to the spread of COVID-19 virus all over the world, people are striving hard to settle their basic necessities like food, clothing and shelter. People are less inclined towards spending on luxuries and comfort; rather most of the people are unable to afford the same. It is rightly said that; the Architect/ Interior Designer take care of the artistic as well as functional aspects of the construction. And so the researcher was interested to find out the Professional Practices adopted by Architects and Interior Designers during COVID-19 Pandemic 2020-2021. The present study focused on the problems faced by the architects and Interior Designers along with the coping strategies adopted by them during this Pandemic time. The study was conducted with sample size of 30 respondents consisting of architects and Interior Designers, from all over Gujarat state, India (India beats other nations in Covid response: Study, 2020). The research involved the effect of various periods of COVID-19 Pandemic, namely; before Lock-down (before 24th March 2020), during complete Lock- down; from 24th March 2020 to 4th May 2020. (Bureau, 2020) during partial Lock- down; 5th May to 31st May, (https://www.newindianexpress.com/, 2020) during Unlock Phase (1st June onwards) on professional practices adopted by Architects and Interior designers.

Significance of the Study

The researcher was interested to find out the impact of COVID-19 Pandemic on the profession of Architects and Interior Designers because, Architects and Interior Designers are considered as professional and are consulted to attain comfort and add luxury in one's residential space. These people are generally not approached unless a person has an additional capital to invest in designing cost apart from construction cost. If considered from their point of view; this is their source of income and if the number of projects decreases or becomes nil in these pandemic times, the researcher thought that this sector of the society might face a severe decline and loss in this difficult time.

OBJECTIVES OF THE STUDY

1. To study the nature of projects undertaken by the respondents during 4 stages of lockdown namely, before lock- down, during complete lock- down, during partial lock- down and during unlock phase.
2. To review the type & number of projects related to architecture and interior designing during 4 stages of lockdown namely, before lock- down, during complete lock- down, during partial lock- down and during unlock phase.
3. To understand the agencies with whom the architects and interior designers worked during 4 stages of lockdown namely, before lock- down, during complete lock- down, during partial lock- down and during unlock phase.
4. To know the market from where the material was purchased during 4 stages of lockdown namely, before lock- down, during complete lock- down, during partial lock- down and during unlock phase.
5. To study the delay observed in execution/completion of Projects due to COVID-19 pandemic during 4 stages of Lockdown namely, before Lock- down, during complete Lock- down, during partial Lock- down and during Unlock Phase.

METHODOLOGY

For the present research, snow-ball sampling method was adopted to collect the data and the study was limited to 30 respondents, who were willing to co-operate. The respondents of the study were practicing Interior Designers and/or Architects, and were limited to 4 cities of Gujarat state, India viz. Surat, Vadodara, Gandhinagar and Ahmedabad. The research was conducted using questionnaires as a tool for data collection. The questionnaire consisted of 5 sections each designed with structured questions in it. The data was collected using online Google forms. Descriptive analysis was used in interpreting the information collected. The procedure of analysis of the data consisted of categorization, coding, tabulation and descriptive statistical analysis. The findings of the study were categorized in four sub heads of various stages of lock-down, namely before Lock-down, during complete Lock- down, during partial Lock- down and during Unlock Phase.

FINDINGS OF THE STUDY

Following are the research findings for the present study:

1. The respondents for the present study dealt in following nature of projects

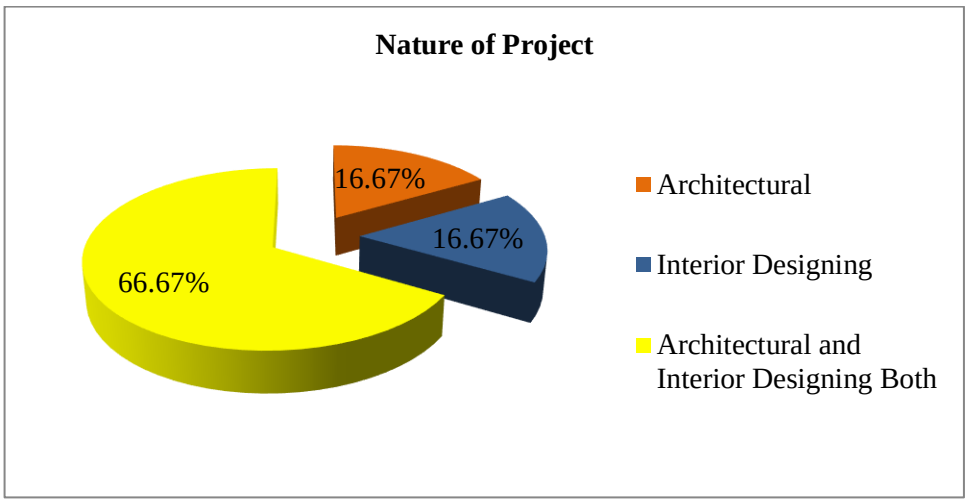


Figure 1: Nature of Projects undertaken by the respondents

It was observed that two third of the respondents dealt with both Architectural and Interior Designing projects, while from the other one third of the respondents; half dealt in Architecture and the other half in Interior Designing project work. So, it can be stated that the current study reflected that professionals majorly dealt in architectural and Interior Designing projects.

2. Type and Number of Projects undertaken during various phases of Covid 19 Pandemic

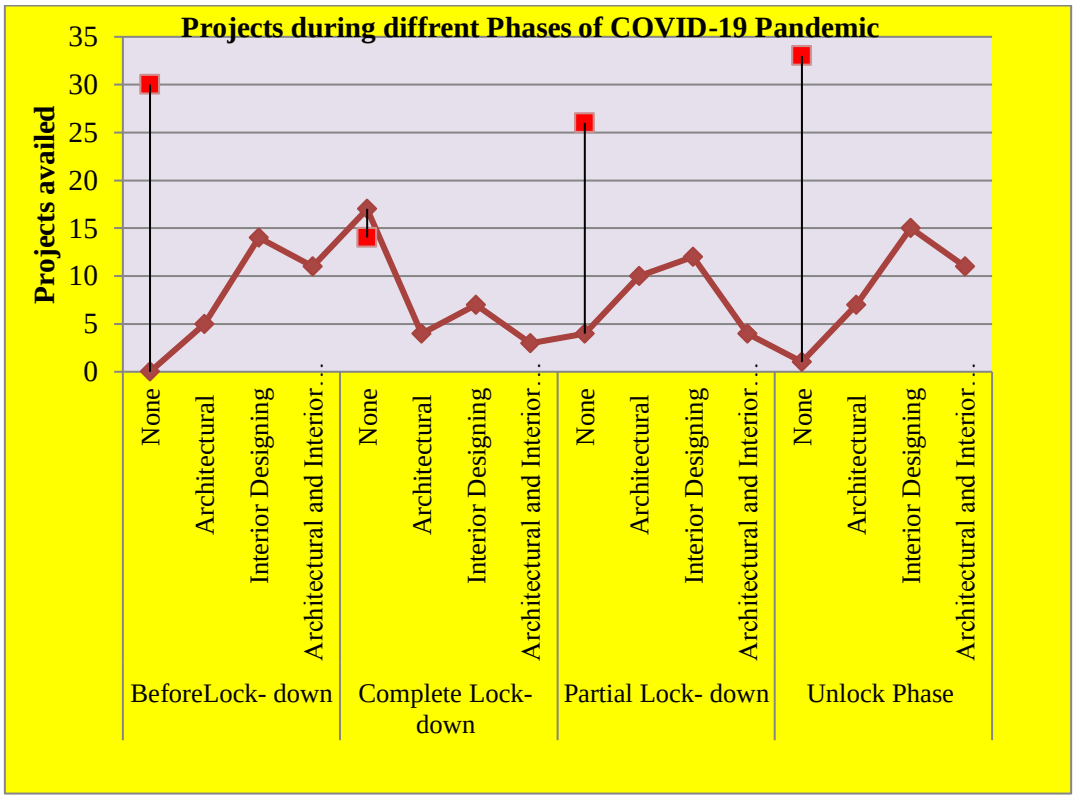


Figure 2: Type & Number of Projects related to Architecture and Interior Designing

Fig.2 represents the trend of projects availed in different stages of Lockdown. From the graph it can be observed that there was rapid decline in number of projects during complete lockdown phase on the other hand it has increased during partial lock down and almost reached equivalent to projects before lock down phase, in unlock phase. Specifically seen; it was 30 before lockdown which declined to 14 projects during complete lockdown and again reached to 33 projects during unlock phase. So, it can be said that though there was much loss suffered during the lock-down phase, the unlock phase might start compensating the loss observed by the professionals.

3. Supporting agencies in carrying/ completion of the projects for Architects and Interior Designers dealt with during different stages of COVID-19 Pandemic

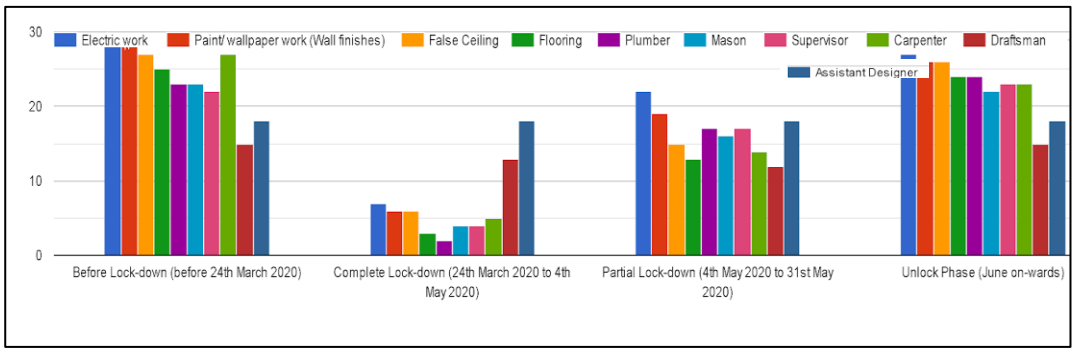


Figure 3: Agencies with whom the Architects and Interior Designers worked

From the graph in Fig.3, it can be seen that, Plumber work had suffered the most during complete lock down phase; followed by Mason, Supervision and Carpentry work; which is followed by Electrical work, wall finish and False ceiling work has suffered a lot during complete lock down. There was an increase in the working of all the agencies in Partial lock down and Unlock phase. A noteworthy thing is, that though there was downfall of agencies working with architects and interior designers during complete lockdown phase, services of Draftsman and Assistant Designer continued throughout the four phases. So, it can be observed that though the execution of the work had suffered due to pandemic but designing part of the project was not hindered during any of the phases.

4. Market from where the material was purchased during different stages of COVID-19 Pandemic

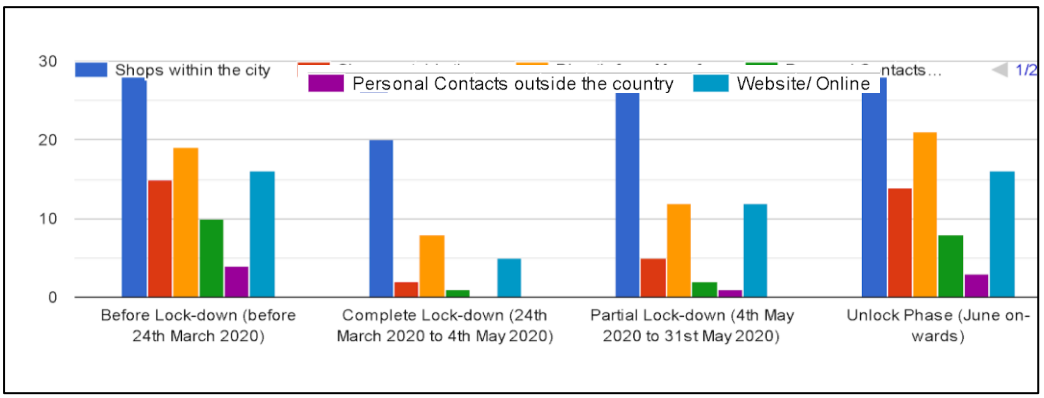


Figure 4: Market from where the material was purchased

It can be observed that there was a consistency in availing material from local vendors, whereas material procurement from the shops outside the cities had been reduced during complete lockdown but increased in partial lockdown and unlock phase. Availing material directly from the manufacturers has also a similar trend pattern, i.e. reduction in complete lockdown and increase in partial lockdown and unlock phase. Availing materials through personal contacts had reduced to a great extent in lockdown phase, and had increased gradually in partial and unlock phase. A noteworthy impact is observed on availing materials from outside India, as it was nil during complete lockdown phase; but had started gradually increasing in next two phases. Ordering from website and online sources had very less decline during complete lockdown phase and had also started increasing in the partial and unlock phase.

5. Delay in completion/execution of projects due to COVID-19 Pandemic

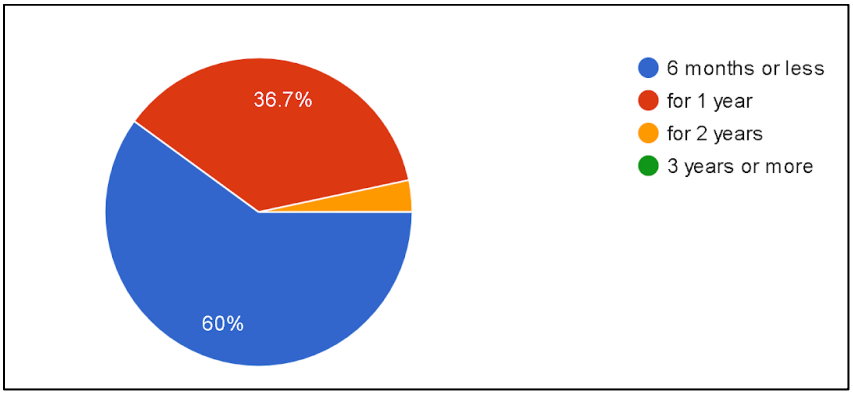


Figure 5: Delay in execution/completion of Projects Due to COVID-19 pandemic

It was observed in fig.5 that all the respondents had a delay in their execution and completion of projects by different time periods; from among them most of the projects were delayed by 6 months or less duration, and little more than one third of the projects were affected for a year. Only a negligible number of projects were affected for nearly 2 years.

6. Coping Strategies adopted by the respondents/their firm to carry out the project work during COVID-19 Pandemic

It was observed that various coping strategies such as involving 20 % of the staff for working or involving 50 % of the staff for working were adopted. Most of them had either decelerated the project work or had extended their completion dates. But very few had completely stopped their work, except in complete lockdown period where most of the architects and Interior designers worked from home with draftsman and assistant designers and on field work was completely stopped.

SUMMARY, CONCLUSION AND IMPLICATIONS

As COVID-19 Pandemic has affected the World's economy cycle, there are lots of changes in professional dealings and trades. Architects and Interior Designers are not the essential part of society like other professions like lawyer, doctors and chartered accountants. People generally contact them only when they are in good economic status. But though there was sudden change in routine work, this sector of the society did not completely stop working and used this period as an opportunity where Continuous realignment of concerns and priorities on a weekly basis, detailed planning and micromanagement of projects on site was done by most of the Architects and Interior Designers. Re prioritizing projects in the planning stage to counter financial uncertainties was also done. Apart from that most of them were trying to maintain 100% client satisfaction in this pandemic time.

As it is reflected in the findings of the present study that Nature of Projects undertaken by the respondents were not much affected by the pandemic, Type & Number of Projects related to Architecture and Interior Designing were reduced to a great extent during complete lock-down phase, but started increasing during partial lockdown and unlock phase, Agencies with whom the Architects and Interior Designers worked suffered a major downfall during complete lock-down phase except draftsman and assistant interior designers, Market from where the material was purchased was majorly limited to local market and online shopping during complete lockdown phase, and dependency on all types of markets was gradually observed during partial lockdown and unlock phase. A delay was observed in execution/completion of Projects due to COVID-19 pandemic.

Findings of this study will be useful to the students of Family and Community Resource Management department where Interior Designing is offered as a Degree Programme at Under-Graduate and Postgraduate Level. Apart from that, these findings will also be useful for the students of the Architecture Department to understand the current market situation and the problems faced by the professionals in COVID-19 Pandemic.

It was observed that there is an increase in the number of new projects. As per the extra inputs from the respondents, they were struggling for payments to survive in current market situations. And so, the financial crises faced by the architects and the clients remain uncovered in this research and might be considered as a scope for further study.

REFERENCES

- Banerjea, A. (2020, May 17). *Coronavirus lockdown extended till 31 May, says NDMA*. Retrieved August 29, 2020, from https://www.livemint.com/: https://www.livemint.com/news/india/covid-19-lockdown-4-0-coronavirus-lockdown-extended-till-31-may-says-ndma-11589715203633.html
- Bureau, I. T. (2020, April 10). *India scores high on Covid-19 response tracker made by Oxford University*. Retrieved September 23, 2020, from https://www.indiatoday.in/: https://www.indiatoday.in/india/story/india-scores-high-on-covid-19-response-tracker-made-by-oxford-university-1665573-2020-04-10
- *https://www.newindianexpress.com/*. (2020, March 25). Retrieved September 22, 2020, from COVID-19: WHO calls India's lockdown 'comprehensive and robust', UN expresses

solidarity: https://www.newindianexpress.com/world/2020/mar/25/covid-19-who-calls-indias-lockdown-comprehensive-and-robust-un-expresses-solidarity-2121361.html

- *Importance of Architectural Consultancy during Building Construction or Construction of a House*. (n.d.). Retrieved September 17, 2020, from https://architects4design.com/: https://architects4design.com/importance-of-architectural-consultancy-during-building-construction-or-construction-of-a-house/
- *India beats other nations in Covid response: Study*. (2020, April 11). Retrieved September 23, 2020, from https://timesofindia.indiatimes.com/: https://timesofindia.indiatimes.com/india/india-beats-other-nations-in-covid-response-study/articleshow/75089755.cms
- *Lockdown extended to Phase 4: Here is looking into the dates of all the lockdowns uptil now*. (2020, May 17). Retrieved september 15, 2020, from https://www.timesnownews.com/: https://www.timesnownews.com/india/article/india-coronavirus-lockdown-extended-to-phase-4-here-is-looking-into-the-dates-of-all-the-lockdowns-uptil-now/585837

The Indian Journal of Home Science 2022: 34(1)

EXTENT OF USE OF CONTEMPORARY DESIGN BY ARCHITECTS AND INTERIOR DESIGNERS IN HOTEL INTERIORS

Ms. Rakhi Dasgupta[1] and Dr. Sarjoo Patel[2]

[1]Ph.D. Research Scholar and Teaching Assistant

[2]Assistant Professor, Department of Family and Community Resource Management,
Associate Director, Post Graduate Diploma in Hotel Interiors,
Department of Family and Community Resource Management,
Faculty of Family and Community Science,
The Maharaja Sayajirao University of Baroda, Vadodara
Email ID: rakhidasgupta2@gmail.com,sarjoo_patel@yahoo.com

ABSTRACT

Contemporary style became popular in the 1970s, about the same time as post-modernism's rise in popularity. It was originally a blend of styles before it became recognizable on its own. Contemporary design borrowed elements from modernism and post-modernism. It also gathered ideas from many other styles such as art- deco, de-constructivism, futurism, and more. And yet, "contemporary" style is always changing. As each decade passes, the decor trends of the day will always be considered contemporary. It is an ever-evolving style that reflects what is happening today. It has been observed that architect and interior designer are taking interest in using contemporary style in the interiors of Hotels. The present study was conducted to find out the extent of use of contemporary style in the Hotel interiors by the Architects and Interior Designers. The study was conducted in Vadodara city. The sample for the present study comprised of 60 renowned architects and interior designers of Vadodara city. Purposive Sampling technique was adopted for selecting the sample. Google form was used for data collection. The findings revealed that the architects and interior designers mostly were fond of white, blue, brown colors used for contemporary design in the interiors of hotel. Majority of the respondents used contemporary design in areas like presidential suite, restaurant area, banquet hall, suite, deluxe room. The study was done to find out the extent of use of materials interiors of hotels where contemporary design was incorporated.

Keywords: Contemporary design, hotel interiors, interiors designers, architects

INTRODUCTION

Contemporary design can be assorted by simplicity, subtle sophistication, deliberate use of texture and clean lines. Contemporary history is a subset of modern history which portrays a historical period to the present. It incorporates large windows, unique or odd shapes, harmony with the surrounding landscape. The finishing details and furniture are in ornate and use clean lines. It holds minimalistic elements highlighting grays, beiges and shades of white. Sleek, thoughtful, concealed details accentuate Contemporary design. Contemporary design is about the architectural trends that are popular today. Contemporary design often sticks to a stricter palate of black, white and grey. If color is added, the color is often the pure, saturated tone like true red, indigo or orange. (1)

Most of the people prefer modern design that displays luxury in its surrounding although the design industry is observing a great shift in people's interest as more and more people are intrigued by Contemporary Interior design. The trend is getting a good response from people all over India.

The review of literature reflected a dearth of researches on extent of use of contemporary design in the hotels. Hence, the need for present study was strongly felt. It has been observed that architects and interior designers are taking interest and using contemporary style in the interiors of Hotels. Hence, the present study was undertaken to know about the reasons and extent to use of Contemporary style in the interiors of Hotel. The findings of this study would be helpful to all students of interior Design to know the materials used for each of the component of interiors- like flooring, wall, ceiling, furniture and furnishings etc. The study would also be beneficial for the upcoming architects and interior designers to learn about the art of contemporary style for implementation in their design project. This study would also be helpful for the hotel owners to incorporate this style to attract the customer to their hotels.

Objectives of the Study

1. To study the demographic characteristics of the architects and interior designers.
2. To find out the reasons for using contemporary design in the interiors of the hotel.
3. To find out the extent of use of contemporary design in the interiors of Hotels.

METHODOLOGY

The research design of the present study was descriptive in nature. The sample of the present study comprised of 60 architects and interior designers working in Vadodara City selected purposively through snow ball technique. Online Google form was used to collect data. It was divided into two sections. Section –I covered the information regarding background information of respondents namely; name, firm name and address, age, gender, education, years of experience, reason for using contemporary style, number of projects undertaken, use of contemporary design in hotel etc. Section –II included the scale to find out extent of use of materials in Contemporary design in different areas of Hotel. The respondents were asked to respond on a 3 point continuum in terms of "Always", "Sometimes", "Never" and the scores from 3 through 1 were ascribed to the responses respectively. To obtain the extent of use of contemporary design in hotels the possible range of scores was divided on equal interval basis. Descriptive statistics was used to analyze the data.

MAJOR FINDINGS OF THE STUDY

The findings are presented under various heads as follows.

Background Information: Less than one half (43.33 per cent) of the respondents were found in the age group between 25-31 and 32-38. Majority i.e.80.33 per cent of the respondents were post graduate. It was found that more than one-half (55 per cent) of the respondents were female.

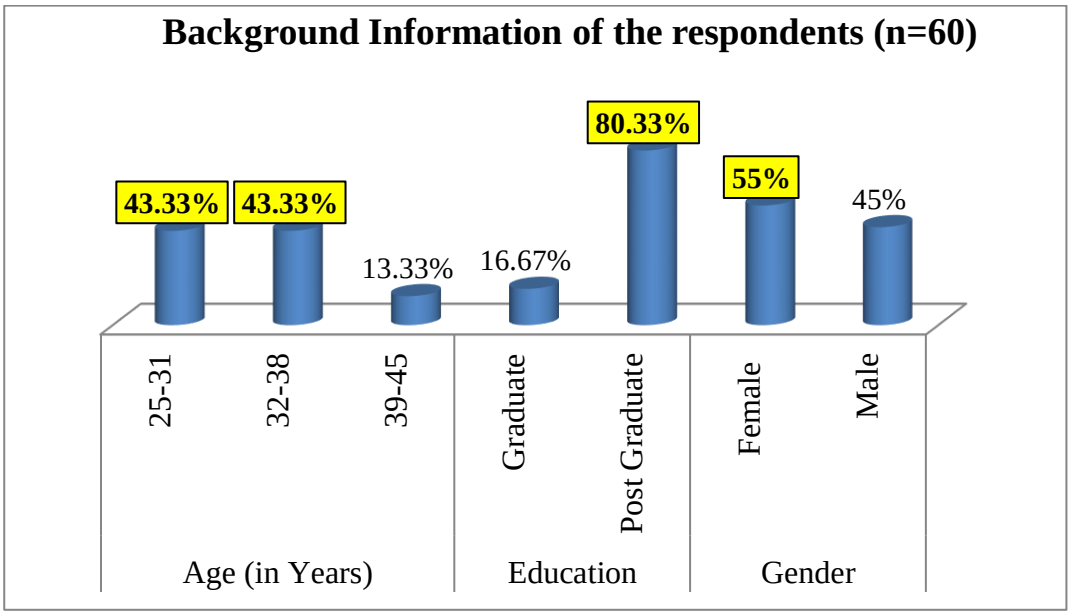


Fig 1: Distribution of the respondents according to background information of the respondents

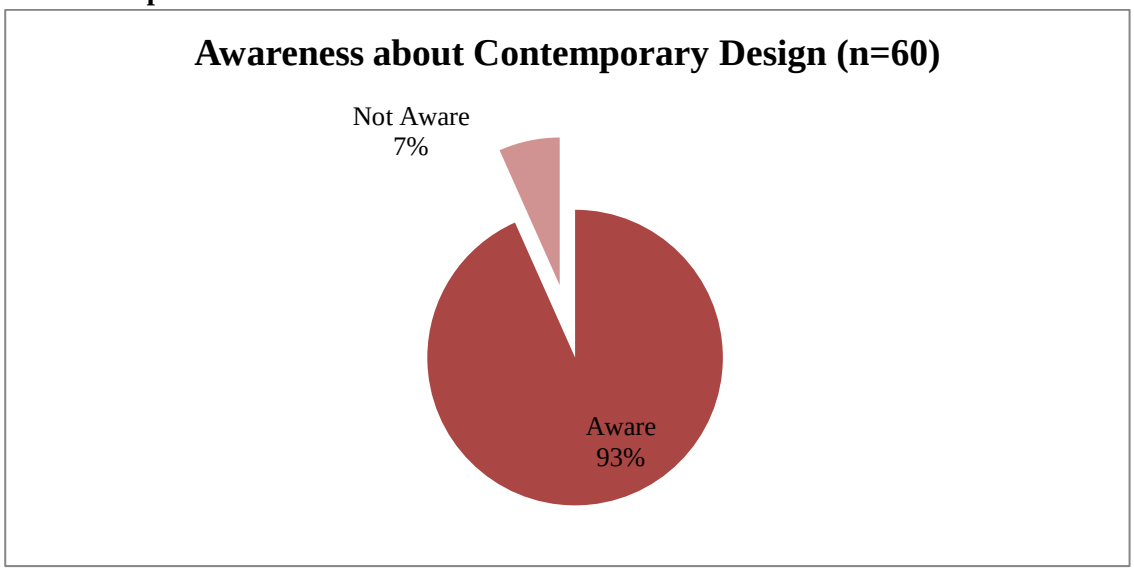


Fig 2: Distribution of the respondents according to awareness about Contemporary design

Majority (93 per cent) of the respondents were aware of Contemporary design.

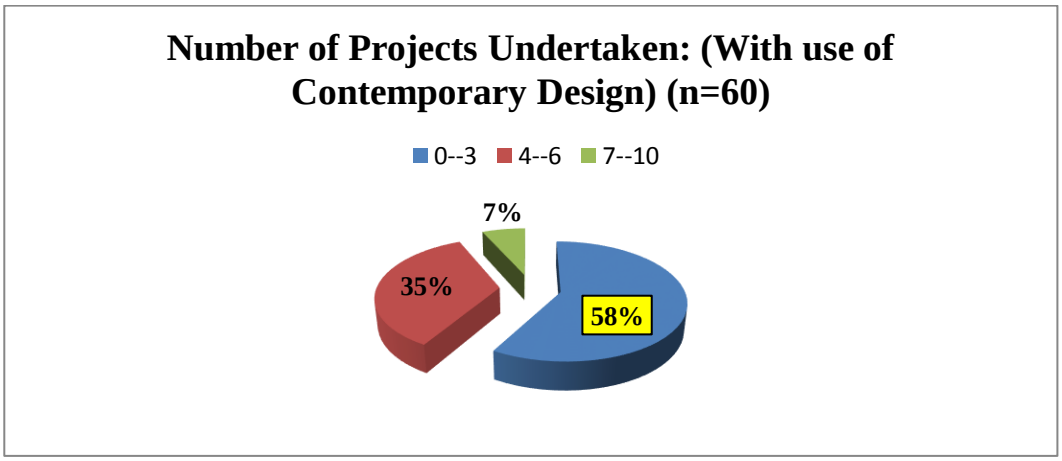


Fig 3: Distribution of the respondents according to number of projects Under taken with the use of contemporary design

More than one half (58 per cent) of the respondents had undertaken less than 3 Projects and little less than one half (35 per cent) of the respondents had undertaken between 4 to 6 projects incorporating Contemporary Design.

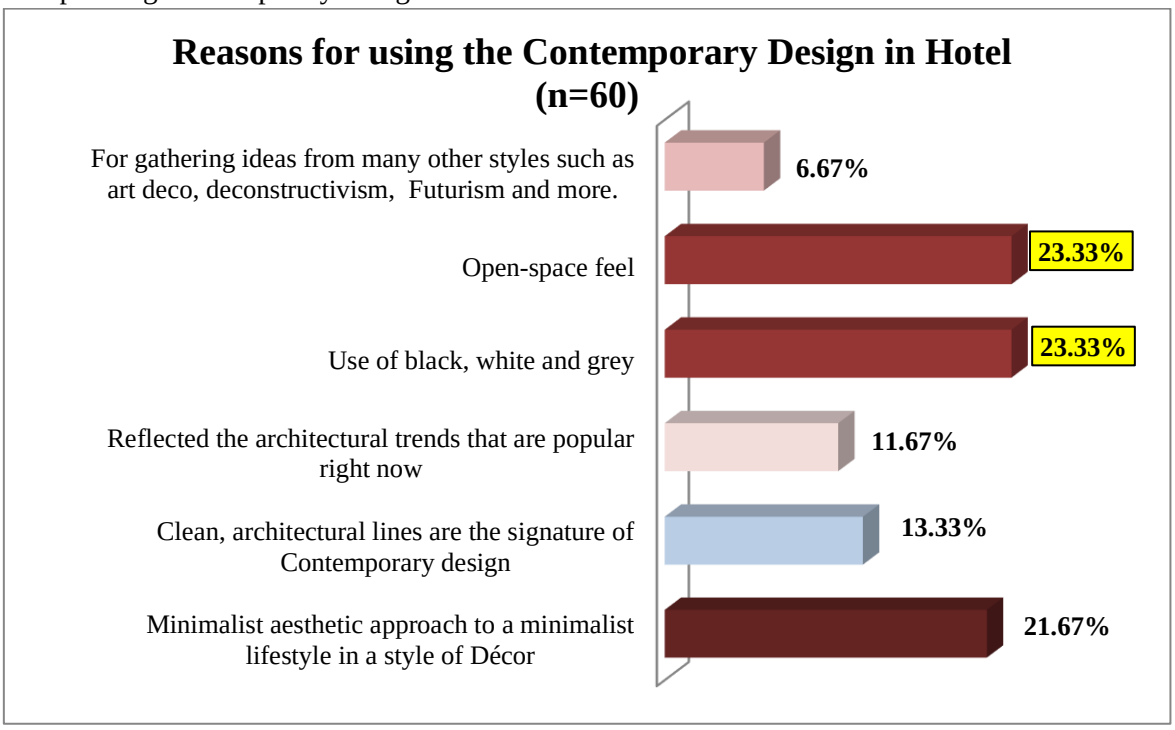


Fig 4: Distribution of the respondents according to reasons for using Contemporary design

Less than one fourth (23.33 per cent) of the respondents were using Contemporary design' to have a feel of open space' and ' to use of Black, White and Grey.'

Extent of use of Contemporary Design in Hotels: The section dealt with the extent of use of Contemporary design in Hotel interiors by the architects and interior Designers. The scale included different areas of hotels in which different materials mentioned were used for the interior components like flooring, ceiling, wall, furniture, furnishings and lighting with the three point continuum response pattern. The respondents were asked to state whether they were using materials for contemporary design for different area of hotels.

Extent of use of various materials for different interior components while incorporating contemporary design

1. Reception area of hotel.

On analyzing the data regarding the use of materials in Reception area, it was found that for flooring more than one half (60.00) of the respondents had used stone flooring to a high extent and resin (93.33), cork (88.33), and Carpet (83.33) were used at moderate extent. For wall majority (93.33) of the respondents had used brick material to a high extent. Majority of the respondents used gypsum (93.33) and wood (93.33) in ceiling. For Furniture, steel (93.33) and wood (93.33) was used by majority of the respondents. Recessed lights (93.33) were preferred by majority of the respondents.

2. Bedroom-Suite/Double room of Hotel.

In Bedroom suite/ double room, the data analyzed regarding the use of materials depicted that for flooring majority (93.33per cent) of the respondents had used hard flooring at high extent and more than one half of the respondents had used resin (68.33per cent), cork (61.67per cent), and Vinyl (61.67per cent) for flooring at moderate extent. For wall majority (93.33per cent) of the respondents had use wood to a high extent and bamboo at moderate extent. Majority of the respondents used wood (93.33) in ceiling at high extent and more than one half of the respondents used glass fibers (66.67) and mineral fibers (66.67) at low extent. For furniture, majority (93.33per cent) of the respondents used wood. Majority (93.33 per cent) of the respondents used bed sheets in furnishings. Spotlights (86.66) were preferred by majority of the respondents.

3. Club room of hotel

In club room, the data analyzed regarding the use of materials depicted that for flooring, majority (93.33 per cent) of the respondents had used tile at high extent. For wall majority (86.66 per cent) of the respondents had use stone material to high extent and concrete (91.67 per cent) at low extent. Majority (93.33 per cent) of the respondents used gypsum and wood material in ceiling at high extent and more than one half of the respondents used plastic (66.67per cent), stone (66.67per cent) and coco tiles (66.67per cent) at low extent. For furniture, majority (93.33per cent) of the respondents used wood. Majority (93.33per cent) of the respondents used curtains, cushion and upholstery in furnishings. Majority (93.33 per cent) of the respondents used recessed lights, track lights and hanging lights at higher extent.

4. Banquet hall of hotel

The data analyzed regarding the use of materials in banquet hall depicted that majority (93.33 per cent) of the respondents had used tile, stone and carpet at high extent. For wall, majority (86.66 per cent) of the respondents had used concrete and brick material to high extent and more than one third of the respondents used glass (38.33per cent) and metal panels (38.33per cent) at low extent. Majority (93.33 per cent) of the respondents used gypsum and wood in ceiling at high extent and more than one third of the respondents used mineral fibers (38.33per cent) at low extent. For furniture, majority (93.33 per cent) of the respondents used wood and stainless steel (93.33per cent) at moderate extent. Majority (93.33 per cent) of the respondents used curtains (93.33per

cent), cushion (93.33per cent) and upholstery (93.33per cent) in furnishings. Majority (93.33per cent) of the respondents used recessed lights, spots lights, track lights and hanging lights at high extent.

5. Restaurant area of hotel

In restaurant area, the data revealed that for flooring majority (93.33 per cent)of the respondents had used tile, stone and resin at high extent and less than one half of the respondents preferred hardwood(45.00per cent) flooring at low extent. For wall, majority (93.33per cent) of the respondents had use wood, stone and brick material to high extent and more than one half (60.00per cent)of the respondents preferred bamboo and metals at moderate extent. Majority of the respondents used wood (93.33per cent) in ceiling at high extent and glass fibers (66.67per cent) and mineral fibers (66.67) at low extent. For furniture, majority (93.33) of the respondents used wood. Majority (93.33per cent) of the respondents used curtains, cushion covers and upholstery in furnishings at high extent. Recessed lights (93.33per cent) and hanging lights (93.33per cent) were preferred by majority of the respondents.

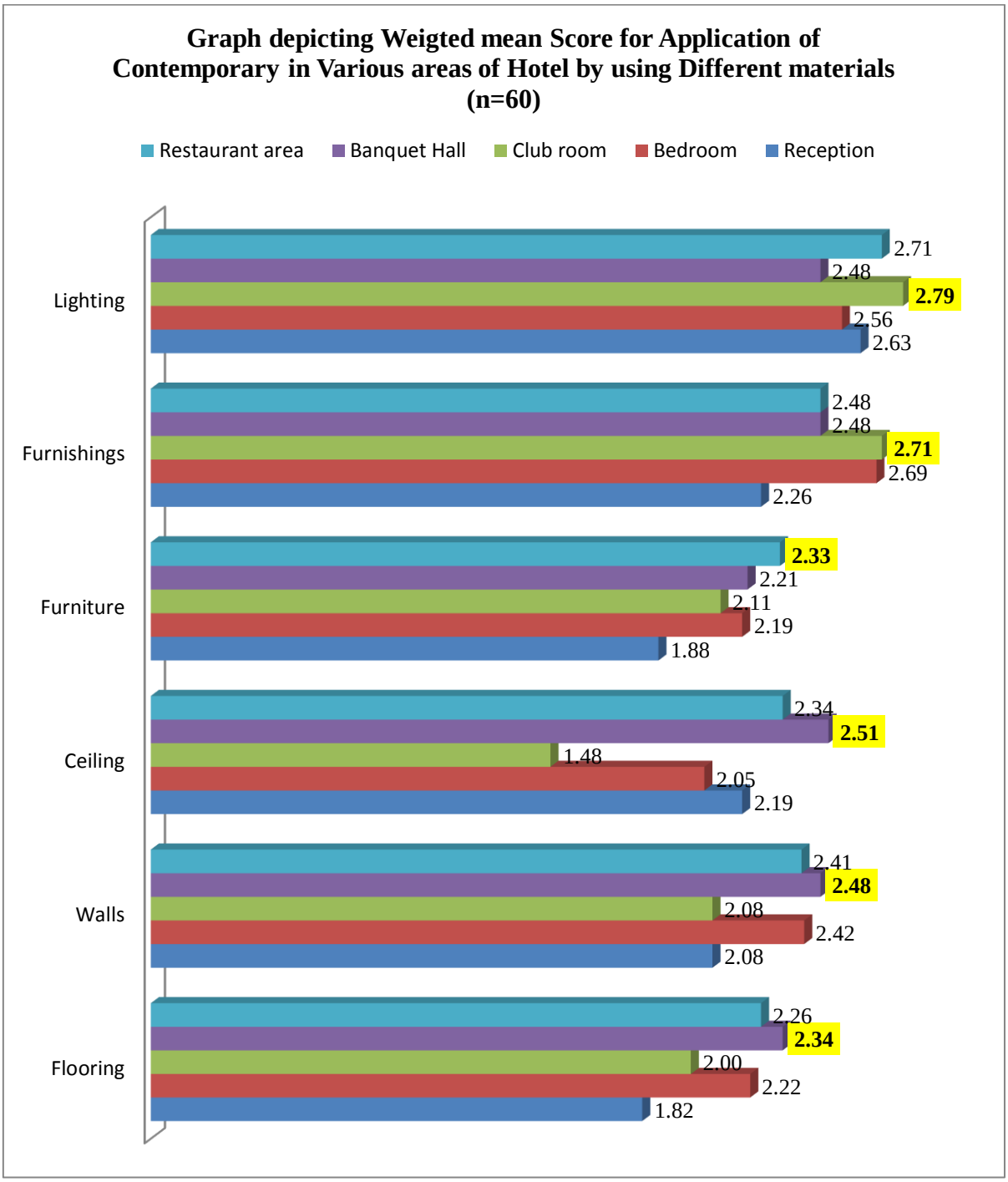


Fig 5: Weighted mean scores for application of contemporary design in various areas of hotels by using different materials

The findings revealed that the application of Contemporary design in Flooring was highest for Banquet Hall followed by Restaurant, Bedroom, Club room and Reception which was reflected through weighted mean scores. For wall, the findings revealed that the application of contemporary design was highest for banquet hall followed by restaurant, bedroom, club room and reception which was reflected through weighted mean scores. In ceiling the findings revealed that the

application of contemporary design was highest for banquet hall followed by restaurant, reception, bedroom, club room reflected through weighted mean scores. The findings revealed that the application of contemporary design in furniture was highest for restaurant area followed by banquet hall, bedroom, club room and reception. In furnishing it was revealed that application of contemporary design in club room was highest followed by bedroom, restaurant area, banquet hall and reception area. For lighting component findings revealed that the application of contemporary design was highest for banquet hall followed by club room, restaurant, reception and bedroom reflected through weighted mean scores.

From overall data it was found through the weighted mean scores that the application of contemporary design was highest in banquet hall, restaurant area and club room of hotel by using different materials.

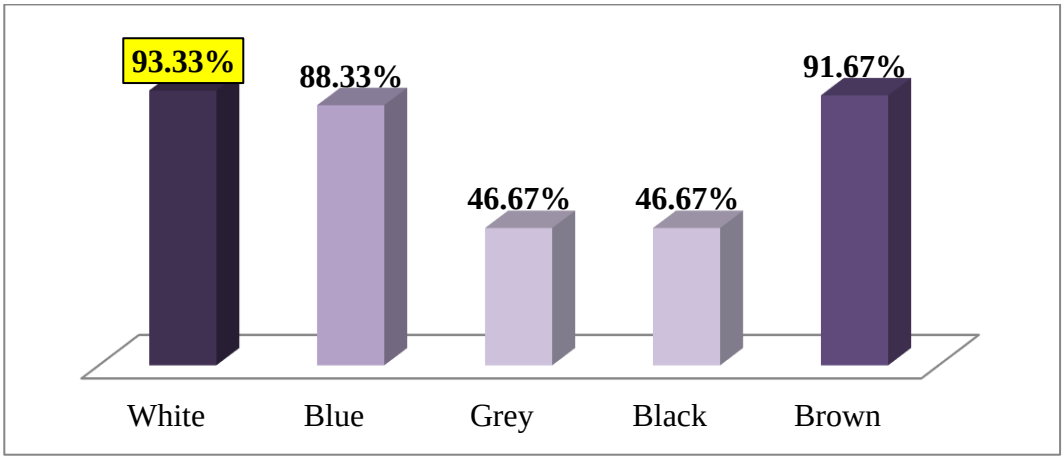


Fig 6: Distribution of the respondents according to use of colour in Contemporary design in hotels

It was found that majority of the respondents preferred white, blue and brown colour in contemporary design in the interiors of hotels whereas less than one half(46.67 percent) of the respondents preferred grey and black in contemporary design.

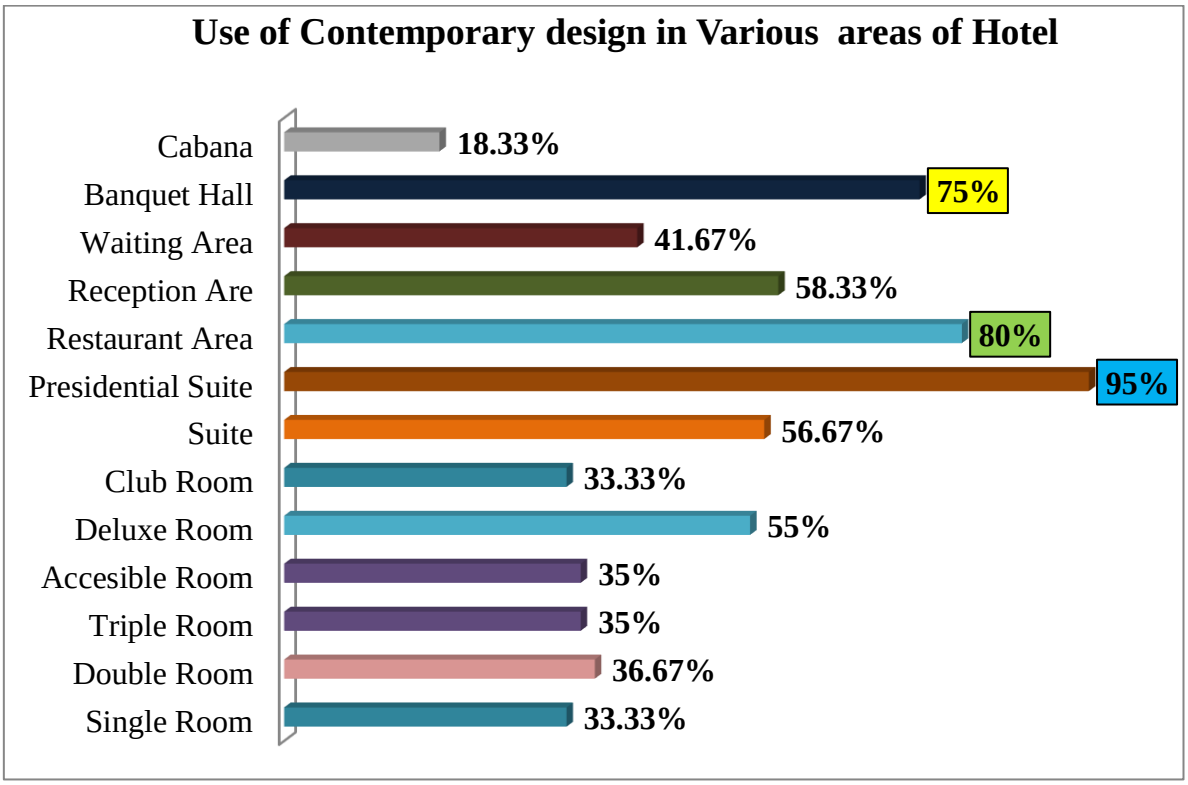


Fig 7: Distribution of the respondents according to use of Contemporary design in various areas of hotel

Majority of the respondents used contemporary design in areas like Presidential Suite (95 per cent), restaurant area (80 per cent), whereas little more than one half of the respondents used contemporary design in banquet hall (75.00per cent), suite (56.67per cent), deluxe room (55.00per cent).

Implications of the study: The findings of the present study will prove beneficial to various people concerned with the relevant field. The students will be able to know the materials used for each interior component like flooring, wall, ceiling, furniture and furnishings etc. while incorporating contemporary design. It would help the hotel owner to get an idea regarding the most prominent contemporary style and to incorporate this style in the interiors of hotel to attract the customers. The study would boost the motivation of upcoming architects and interior designers in application of contemporary style in their projects as it is still a popular design for the people.

CONCLUSION

On the basis of the findings of the present study following conclusions can be drawn. The findings revealed that most of the respondents preferred white, blue and brown colour in contemporary design in the interiors of hotels and applied contemporary design in areas like presidential suite, restaurant area, banquet hall, suite and deluxe room. Lighting was preferred by majority in the interiors of room. The study would be helpful to students and will enhance knowledge regarding the materials used for each interior component like flooring, wall, ceiling, furniture and furnishings and lighting etc. in application of contemporary design.

REFERENCES

- Cletus, O., Okechukwu &Nkemdilim, A.E., (2019).Interior Design of Hotel Rooms as a Factor Affecting Customer Satisfaction in Hotel. International Journal of Advanced Studies In Ecology, Development And Sustainability, 6 (1), 34-46. http://www.internationalpolicybrief.org/images/2019/FEBRUARY/IJASEDS/ARTICLE4. pdfKim,N.(2009).Interior Archi types: Contemporary Apartment Interior Design Unpublished Masters Dissertation. Cornell University.
- Pavlatos,O. and Paggios,I.,(2009). A survey of factors influencing the cost system design in hotels. International Journal of Hospitality Management, 28(2), 263–271. https://www.academia.edu/2450895/A_survey_of_factors_influencing_the_cost_system_design_in_hotels
- Rutkin. K., (2005). User preference of interior design elements in hotel lobby spaces. Unpublished Masters Dissertation. University of Florida.
- What is Contemporary Design .https://www.mymove.com/home-inspiration/decoration-design-ideas/modern-vs-contemporary-design-whats difference/#:~:text=Modern%20design%20refers%20to%20an,of%20the%201950s%20and%201960s.
- Contemporary interior design is the new modern design. https://www.slideshare.net/kuntisharma/contemporary-interior-design-is-the-new-modern-design
- Modern vs Contemporary Design Style: What's the Difference https://www.thespruce.com/modern-vs-contemporary-style-452465

The Indian Journal of Home Science 2022: 34(1)

ANALYZING THE UTILIZATION AND SATISFACTION OF CONSUMERS WITH DIGITAL MARKETS DURING PANDEMIC PERIOD

Dr. Shilpi Saraswat[1] and Nisha Arya[2]
[1]Assistant Professor, [2] Ph.D.Scholar
Department of Family and Community Resource Management
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda,
Vadodara-390002
saraswat.shilpi@gmail.com;nancyarya24s@gmail.com

ABSTRACT

Marketing has always been about connecting with audience in the right place and at the right time. In recent years, digital marketing has transformed a lot but in past one year it transmuted extremely due to the global pandemic Covid-19. At present, digital platforms help to meet more consumers at a lower cost with a far more special attention. Digital marketing is any form of marketing that exists online. Like in every market, consumers are the drivers of the digital market competitiveness, growth and economic integration. Therefore, this research was undertaken to find out the extent of utilization of digital market by consumers and extent of satisfaction. The present research was descriptive in nature. A Questionnaire was prepared to collect data from 334 consumers who were selected randomly.The findings revealed that 53 per cent of consumers liked digital markets to purchase products and services. Results showed that the consumers using digital market for educational coaching (35.32%), books (56.28%) and cosmetics (51.40%) before lockdown. After lockdown the consumers were found using digital platforms for purchasing groceries (74.25 %), books (73.05%), online payments (71.26%) and educational coaching (70.66 %). It was observed that there was increased use of digital platforms by consumers for various products and services after lockdown period.The respondents were highly satisfied with the digital platforms because it has ease in ordering system. The element which influenced the consumer to purchase products and services from digital market was its fast and convenient delivery system (67.1%). This study will be helpful to develop and promote new sustainable strategies and acquaint consumers about such promotions activities.

Keywords: digital marketing, extent of utilization, extent of satisfaction, sustainability

INTRODUCTION

The outbreak of covid-19 crises led a drastic revolution in digital marketing which impacted on both, business as well as consumers. Digital marketing is any form of marketing that exists online. People spend their maximum time on internet. Mostly consumers had shifted to digital platforms to shop or purchase the products and services drastically. Digital marketing appears to be the flawless alternate for firms who use the 'people, planet, profit' (The Triple Ps) for their valuation of products and services. At present, digital platforms help to meet more consumers at a minimum cost with a far more special attention. Digital platforms have been influencing the way of using the internet and evolved as a tool for reaching out to the general public.Marketing strategists are no longer limited to conventional communication methods; the internet has proved to be a superior

means for reaching targeted populations due to its speed and widespread coverage (Dar and Lakha, 2018).

The Covid-19 pandemic certainly represents a significant environmental change in contemporary marketing history and will impact corporate social responsibility (CSR), consumer ethics and the fundamental marketing theory (Khaled*et al*., 2020). Digital marketing in India is spread to almost all the sectors- for example, shopping and order tracking, online payment, banking and content management. Through digital marketing organizations can approach potential customers to overcome the geographical barriers as well (Kumar, 2020). The pandemic has pushed workplace processes to go virtually and several companies have effectively completed the transformation in a short time. Yet it has attracted relatively little exposure to how the pandemic impacts people and the markets. Covid-19 pandemic has acted as an accelerator of the essential change in consumption and the digital transformation in the marketplace (Kim, 2020). The customer base and their assess purchases of items in tough times minimize the risk areas, redefine and push value and trust to buy products digitally (Seligman, 2020). Like in every market, consumers are the drivers of the digital market competitiveness, growth and economic integration. A vital purpose of any business plan and goal is customer satisfaction, since the customer is the apparent justification for survival of a company. In order to succeed and expand, the organization needs to grasp this idea. It is enough to conclude that consumer loyalty has an effect on corporate profitability (Onobrakpeya et al. 2017). Also, it has been analyzed and it has become apparent that digital marketing has a huge effect on consumers and is an effective form of marketing instrument that web pages or businesses cannot disregard (Khandelwal et al. 2018). The often-cited term consumer gratification means how well a product result corresponds to the expectations of the customer (Kotler & Keller, 2012). Therefore, it was thought to find out theextent of satisfaction with digital platforms to purchase products and services. With this background of the study was conducted to assess the sustainability of digital marketing through extent of utilization and satisfaction by the consumers.

Statement of the problem: The present study was conducted with the aim to ascertain extent of utilization of digital market by consumers and extent of satisfaction with the digital marketing platforms.

OBJECTIVES OF THE STUDY

1. To ascertain the extent of utilization of digital market by consumers before and after lockdown.
2. To find out the extent of satisfaction of consumers with digital platforms.

METHODOLOGY

The present research was descriptive in nature. The data was gathered from consumers of digital marketing selected through random sampling method. A questionnaire was prepared to collect data from 334 consumers residing in Vadodara city. The questionnaire was distributed via Google form. The questionnaire was divided into four sections. The first section was designed to find the background information of the respondents (age, gender, occupation, education qualification and their income). The second section included questions to elicit the information related to likeness for digital and traditional markets, frequency of buying through digital marketing, utilization of digital markets for purchasing products and services before and after lockdown period, and digital platforms or websites used for purchasing product and services. The third section contained Likert

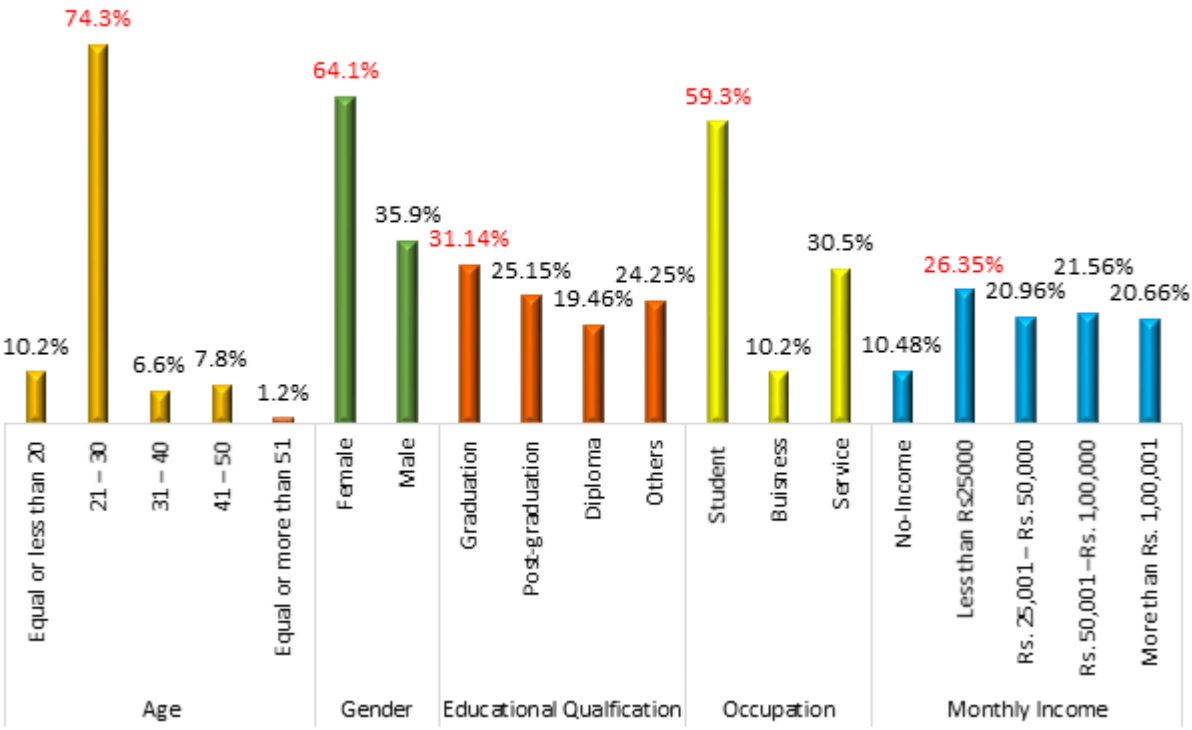
type scale to find out the extent of satisfaction of consumers with digital marketing. It contained 18 statements where the response structure was "To High Extent", "To Some Extent" and "To Low Extent". The fourth section enclosed elements that influenced consumers to purchase from digital markets were classified as "The product's brand reputation", "The reputation of digital brand", "Fast and convenient delivery", "Website's user-friendliness", "Price", "Friends opinions", and "Return and refund service".The respondents were asked to choose the element/s that has influenced them to purchase from digital markets.

RESULTS AND DISCUSSION

The findings of the study obtained through the analysis of the data and their interpretations supported with discussion are presented here.

i. **Background information**: This section deals with information regarding the respondents. The results regarding age, gender, educational qualification, occupation and their income of the respondents are presented here.

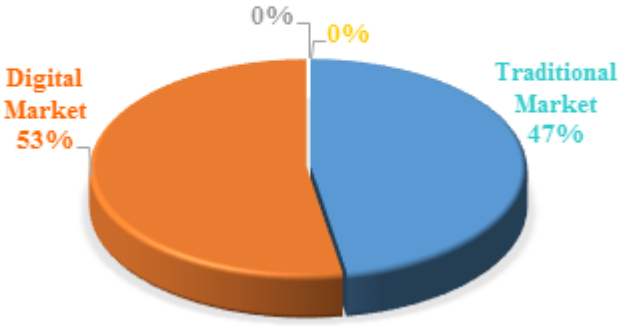
Figure-1: Background Information of Respondents (n=334)



Almost three-fourth (74.3%) of the respondents were in the age group of 21-30 years. Less than two third (64.1 %) of the respondents were female. Less than one third (31.14%) of the respondents were graduate (Fig. 1). Almost three fifth (59.3%) of respondents were students. More than one fourth (26.35%) of respondents had income less than Rs. 25000.

ii. **Likeness to purchase from Digital or Traditiona Market:** This section included the consumer's likeness to purchase from digital or traditional markets.

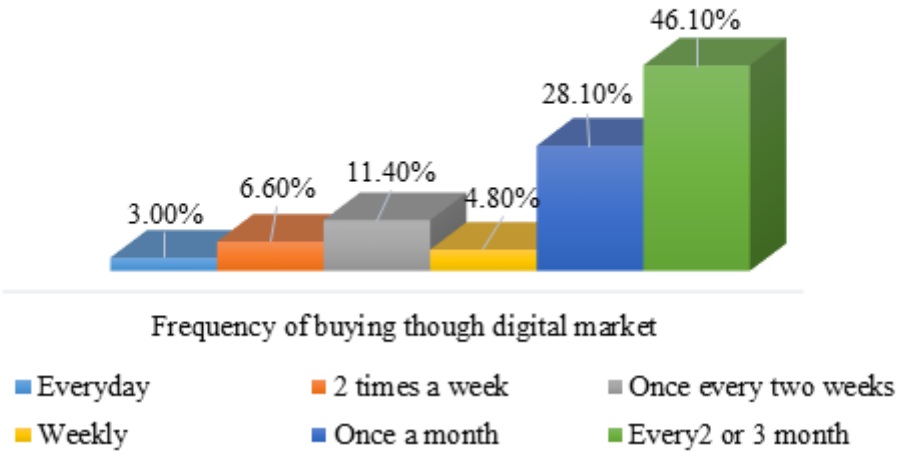
Figure-2: Likness to purchase from Digital and Traditional Market (n=334)



Data in figure 2 depicted that more than one half (53%) of the respondents like to purchase from digital platforms as compared to traditional marketing (47%).

iii. **Frequency of buying through digital marketing:** In this section an attempt was made to find out the frequency of purchase of products and services from digital platforms by the respondents.

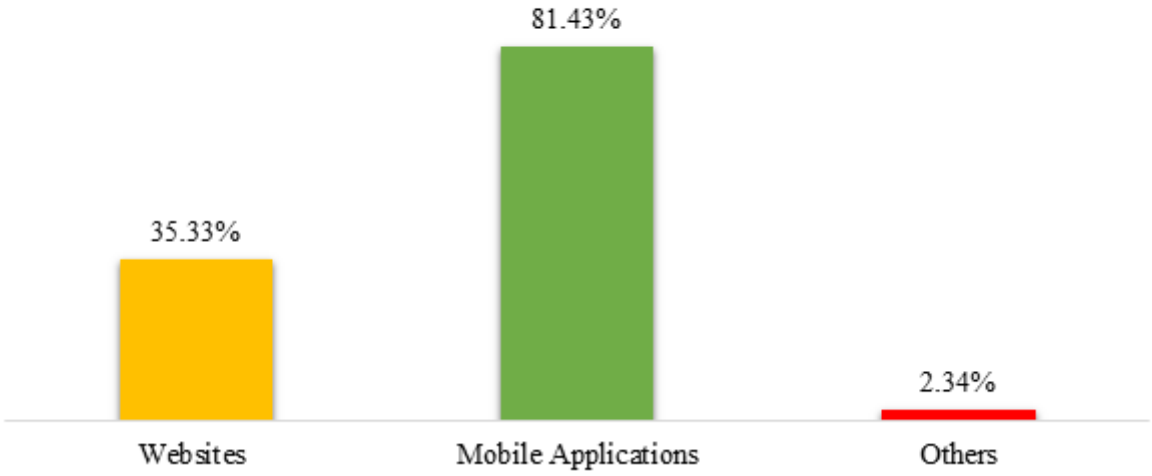
Figure-3: Frequency of Buying through Digital Marketing (n=334)



Data from the figure 3 illustrated that less than one half (46.10%) of the respondents were buying products and services through digital platforms every 2-3 month. More than one fourth (28.10 %) of respondents were buying products and services through digital markets once in amonth. The respondents were buying products and services from digital markets once every two weeks (11.40 %), two times a week (6.60 %) and everyday (3 %).

iv. **Digital platforms or websites used for purchasing product and services**: This section comprised list of websites, mobile applications from where products and services can be purchased or ordered.

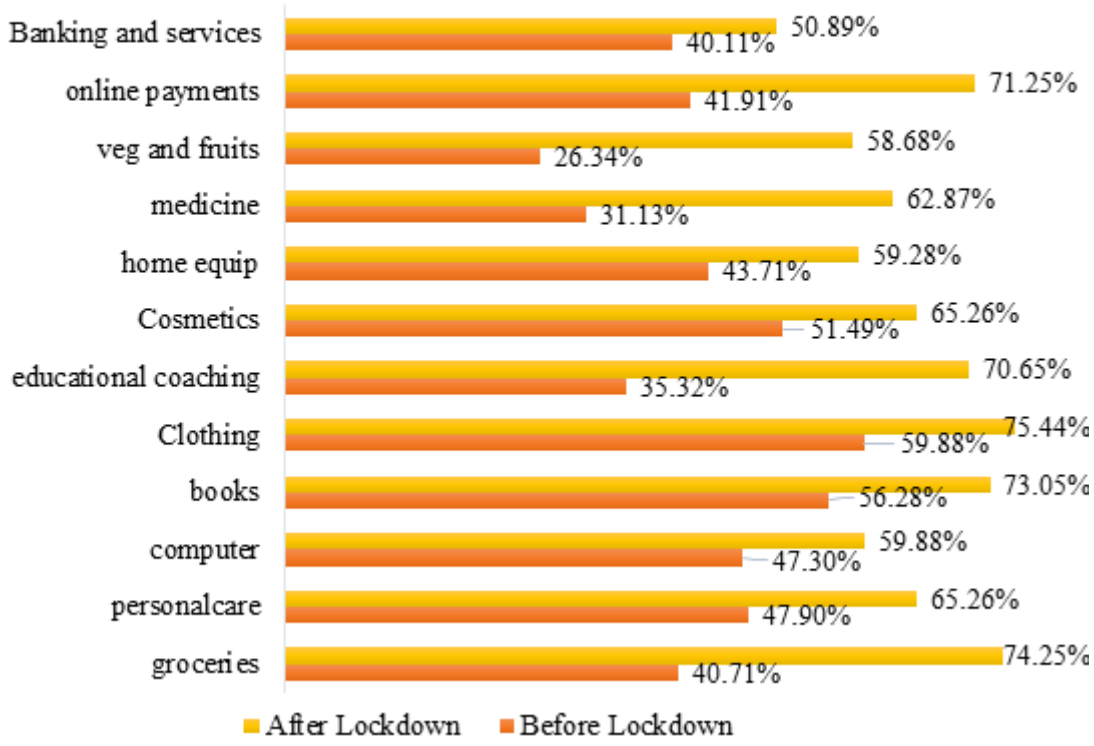
Figure-4: Digital platforms or websites used for purchasing product and services (n=334)



The figure 4 represented that majority (81.44%) of the respondents preferred using mobile applications for purchasing products and services. More than one third (35.33 %) of the respondents used websites available on mobile and PCsfor purchasing various products from digital markets. Only 2.40 per cent of the respondents were using other digital platforms i.e. social media platforms like Facebook, Instagram, Whatsapp etc. to purchase products and services.

v. **Utilization of digital markets for purchasing products and services before and after lockdown period:** In this section a probe was made to find out the utilization of digital markets for purchasing various products and services before and after Covid -19 pandemic period.

Figure-5: Utilization of digital markets for purchasing products and services before and after lockdown period (n=334)

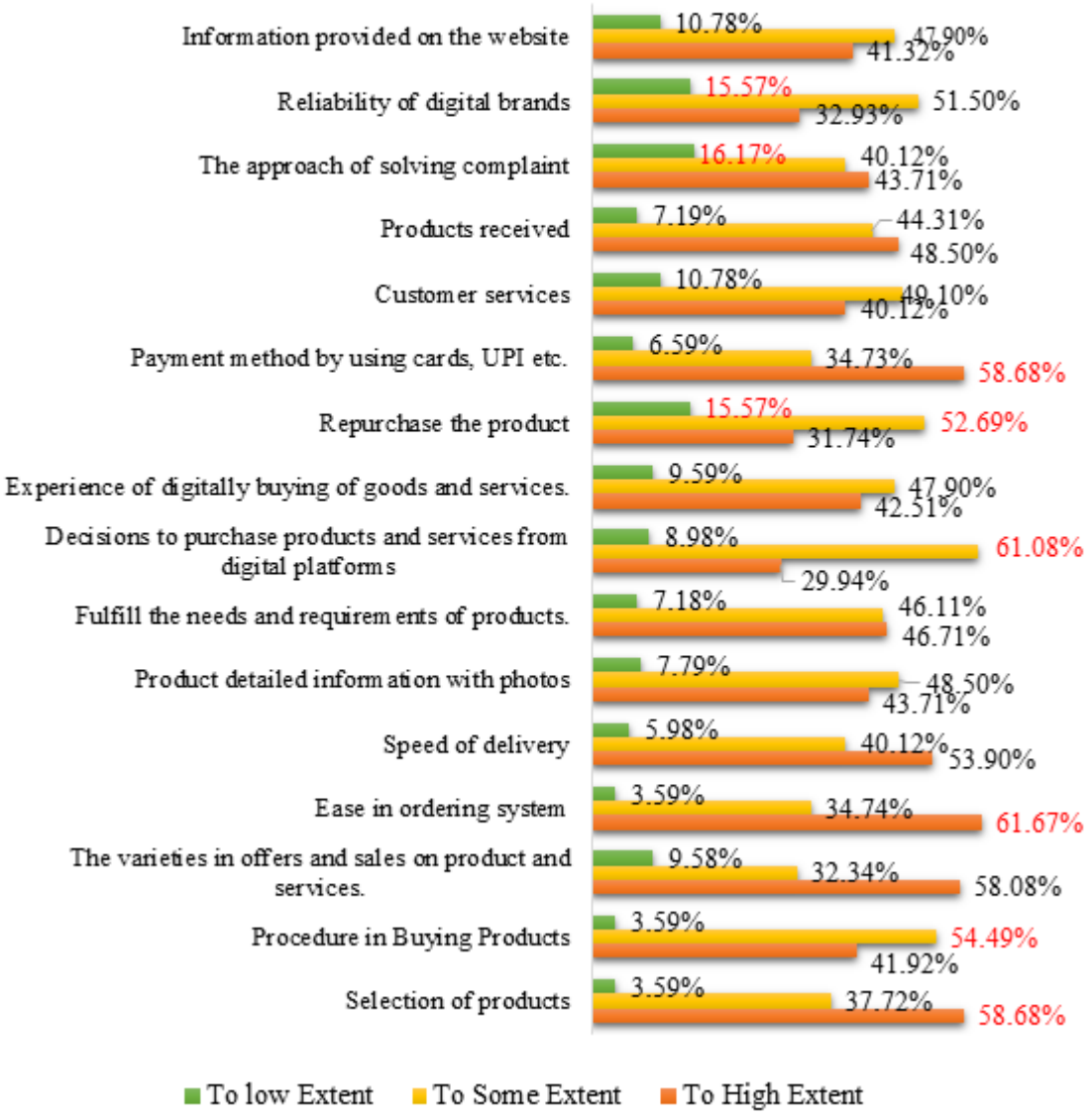


Lucid examination of datafrom the figure 5 revealed that before lockdown period, more than one-half (59.88%) oftheconsumers used digital markets to purchase clothes, books (56.28%) and cosmetics (51.40%). It was observed that after lockdown period, almost three-fourth (75.44%) of the consumers were purchasing clothing from digital market. Less than three fourth of the consumers reported the purchase of groceries (74.25 %), books (73.05%) and used digital platforms for online payments (71.25%) and educational coaching (70.66 %).

Although the increased use of digital markets was observed after lockdown period for all of the products and services listed. It was also found that the use of digital markets for educational coaching increased by 35.33 per cent after lockdown period. There was increase in use of digital markets by 33.53 per cent for the purchase of groceries after lockdown. Furthermore, consumers' use of digital markets increased by 32.4per cent for purchasing fruits and vegetables after lockdown. The purchase of medicines from digital markets also increased by 31.14 per cent after lockdown period.

vi. Extent of Satisfaction of consumers with digital marketing: This section included 18 statements to elicit the extent of satisfaction of consumer's with digital market where the responses were "To High Extent", To Some Extent" and "To Low Extent".

Figure-6: Extent of Satisfaction of Consumers with Digital Marketing (n=334)



The scrutiny of the data from the figure 6 revealed that the respondents were satisfied to a high extent with digital markets due to ease in ordering system of the products from the digital market (61.67 %), selection of products (58.68 %), payment methods by using cards (debit, credit, visa etc.), UPI etc. (58.68 %), varieties in offers and sales on product and services (58.68 %). The respondents were satisfied to some extent with their decision to purchase product and services from digital market (61.08%), procedure in buying products from digital sources (54.49%) and repurchase of the products (52.69%). Moreover, consumers (16.17%) were satisfied to a low extent with the digital marketing because of approach of solving complaints and nearly 15.57 per cent of the consumers were less satisfied with repurchase of the products and the reliability of digital brands in digital market.

vii. Elements that influenced consumers to purchase from digital markets: This section consisted of elements that have influenced consumers to purchase products from digital market. The elements were classified as "The product's brand reputation", "The reputation of digital brand", "Fast and convenient delivery", "Website's user-friendliness", "Price", "Friends opinions", and "Return and refund service".

Figure-7: Elements that Influenced Consumer to Purchase Products from Digital Market (n=334)

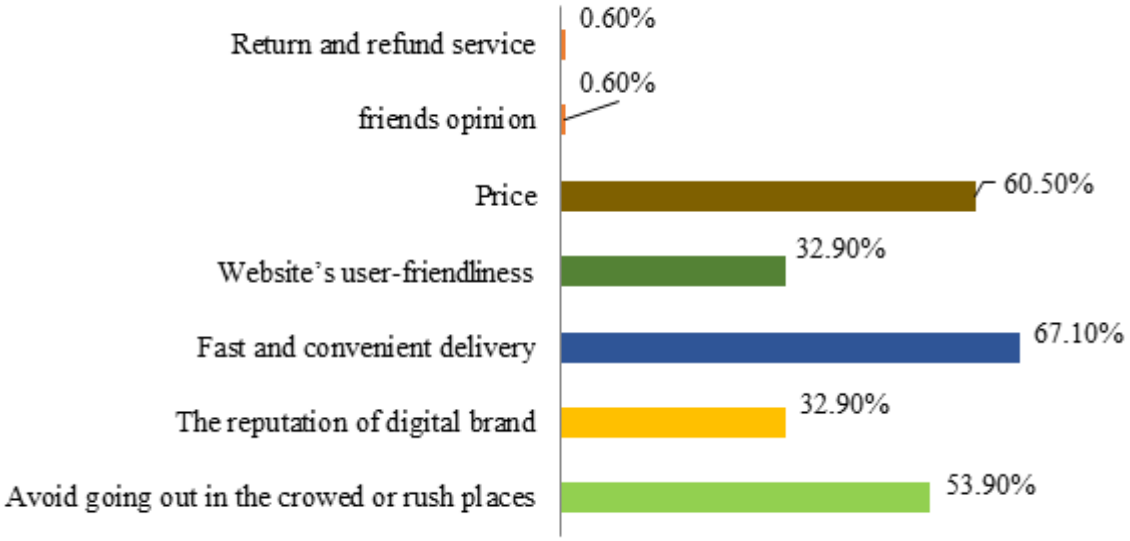


Figure 7 elucidated that, fastand convenient delivery element of digital markets influenced more than two third (67.1 %) of the respondent. Various offers, sells and discounts affect the price of productson digital market influenced 60.50pent cent of the respondents to purchase from digital market.More than one-half (53.90%) of the respondents were influenced by the fact that digital market helps them to avoid going out in the crowed areas.Almost one third (32.90 %) of the respondents were influenced by the reputation of digital brands and user friendliness of the websites to purchase products from the digital market.

CONCLUSION AND IMPLICATIONS

People spend their maximum time on internet. It is evident that consumers had shifted to digital platforms to shop or purchase the products and services drastically. It was observed from the data that there was increase in purchase of products like groceries, personal care products, medicine, educational coaching, vegetables and fruits after lockdown period which showed that consumers developed trust and relevance towards digital market as compared before Covid-19 pandemic. Elements like fast and convenient deliveries, offer prices and reputation of brands influenced the consumers to use digital markets to purchase the products. Data revealed that consumers were highly satisfied with the ease in ordering system of the products from the digital market and online payment method. This showed that consumer's positive experience and their comfort, satisfaction and support to the products and brands available in digital markets. Consumers are the drivers of the digital market competitiveness, growth and economic integration. Digital market can grow community and create revenue online by developing ethics and morals to satisfy the consumers' needs and demand and remarked as sustainable.

Moreover, consumers were least satisfied with the digital marketing because of approach of solving complaints, repurchase of the products and the reliability of digital brands in digital market. Therefore, the vendors of digital platforms need to address these issues in order to satisfy the consumer expectations.

The current situation of Covid-19 pandemic is very uncertain, therefore the consumers are switching towards digital markets in order to avoid crowed markets protect them from Corona virus. Considering this there is a need to motivate small business and large business to not only develop the products but add quality contents and improve the communication in a personalized and interactive way to solve the consumer's problems. Through this way firms can maintain standard to promote ethical way and aligned with the values and standards. So, those firms can sustain in competitive environment by retaining consumers satisfaction which can boost interest of consumers and lead to more sales.In terms of managerial implication, the potential of digital platforms need change in business management, which can promote a smarter and wider use of products and services aiming to improve the gap between the markets and consumers to combine the digital market need for efficiency, effectiveness and sustainability.

REFERENCES

- Dar,I.A. &Lakha,R. (2018). Digital marketing in India: An overview. *AHRW International Journal of Social Sciences Review*, 6(**1**): 176-179
- Khaled, M.K., Alshaketheep, I., Salah,A.A., Alomari, K.M., Khaled, A.S.D. and Jray.A.A.A. (2020), Digital Marketing DuringCovid 19: Consumer's Perspective. *Wseas Transactions on Business and Economics*, 17: 831-841
- Khandelwal,M., Sharma,A., Varshney,D., &Dagur,A. (2018). To analyze Consumer Satisfaction level in Digital Content Marketing with Emphasis on Shopping.*International Journal of Engineering & Technology*, 7 (**3**): 637-642.
- Kim, R. Y. (2020). The Impact of COVID-19 on Consumers: Preparing for Digital Sales. *IEEE Engineering Management Review*, 48(**3**): 1–1.
- Kotler, P. & Keller, K. L. (2012). Marketing Management (14th Ed.)Pearson Education.
- Kumar,R. (2020). Impact of Covid-19 on Digital Marketing in India: Opportunity and Challenges. Peer Reviewed And Refereed Journal: *International Journal Of Multidisciplinary Educational Research*, Volume:9, Issue:12(**7**), December:2020
- Onobrakpeya, Stanley,A., Mac-Attama&Chinelo, A. (2017). Improving Customer Satisfaction through Digital Marketing in the Nigerian Deposit Money Banks. *Open Access International Journal of Science and Engineering*, 2 (**7**): 15-24
- Patel,J. &Malpani, A. (2020). Impact of Covid-19 on e-marketing: An Early stage review. International Journal of Advanced Science and Technology.29(**12**):1774-1779
- Seligman, J. (2020). Marketing Implications and Response to the Covid-19 Virus, (Conference Paper). Retrieved on March 04 from Link: https://www.researchgate.net/publication/339948474_MARKETING_AND_RESPONSE_TO_THE_COVID_19_VIRUS
- Solene.2020. What is Sustainable Marketing? Retrieved on March 04 from Link:https://www.solenerauturier.com/blog/sustainable-digital-marketing

The Indian Journal of Home Science 2022: 34(1)

COMPARISON OF EATING BEHAVIOUR, DIETARY PATTERN AND ACTIVITY PATTERN AMONG NORMAL, UNDERWEIGHT AND OBESE WOMEN AGED 19-30 YEARS IN DELHI-NCR

Chandhini. S[1] and Dr. Pulkit Mathur[2]
[1]M.Sc., [2]Assistant Professor
Department of Food and Nutrition, Lady Irwin College
University of Delhi, Delhi -110001
Email: chandhini22@gmail.com; pulkit36@yahoo.co.in

ABSTRACT

The present study compared eating behavior, dietary pattern and physical activity pattern of women aged 19- 30 years according to weight status. The study was divided into 2 phases. Phase-I included an online survey on eating behavior using the Three factor Eating questionnaire. Self- reported height and weight was used to classify women (n= 350) according to their Body Mass Index (BMI). About 12.6% of the participants were underweight, 49.7% were normal, 11.4% were overweight and 26.3% were obese. A weak, positive, significant correlation of BMI with cognitive restraint (r= 0.20), uncontrolled eating (r= 0.14) and emotional eating (r= 0.18) was seen. Phase-II was conducted on a sub- sample of participants, where underweight, normal and obese women (35 in each category) were selected. Their height, weight, waist circumference and body fat were measured using standardized methods. A pretested questionnaire was used to assess dietary pattern, physical activity pattern along with a food frequency questionnaire and a 24- hour dietary recall. Emotional eating showed a weak, positive correlation with BMI (r= 0.20, p= 0.03) and body fat percentage (r= 0.21, p= 0.03). Breakfast consumption showed a significant association with body fat percentage ($p< 0.05$). Number of meals showed a weak, negative correlation with all the anthropometric indices. No significant difference was observed in mean energy, protein and carbohydrate intake of underweight, normal and obese women ($p>0.05$). Percent calories provided by fat in underweight women was significantly lower than normal women (p= 0.04). Only 23.8% women met the WHO recommendation of physical activity during the week. Behavior change interventions are needed to reduce sitting time and increase physical activity levels among women.

Key Words: Body Mass Index, Emotional eating, Body fat

INTRODUCTION

The phenomenon of double burden of malnutrition has a huge impact on health status of the nation (De Silva 2018). Obesity and associated co-morbidities affect a significant proportion of the population. Having a low body mass is also linked to high mortality and ill health (Lorem, Schirmer & Emaus 2017). Hence it is necessary to study factors affecting weight status of individuals.

Various lifestyle factors including diet and physical activity affect weight status. Eating behaviors are behaviors related to food intake that have an influence on eating frequency, size of meal, content of meal, and attitude towards meal. They may affect the energy intake of an individual thus influencing weight status (Abdella et al. 2019).

Eating behavior is defined as cognitive restraint, uncontrolled eating and emotional eating shown by respondents. *Cognitive restraint (CR),* is described as conscious restriction of food intake aimed to control body weight and/or to promote weight loss. *Uncontrolled eating (UE),* is described as the tendency to eat more than usual due to a loss of control over intake with a subjective feeling of hunger. *Emotional eating (EE),* is described as the inability to resist emotional cues, and eating as a response to different negative emotions (Lobera et al. 2014).

Sitting time of long duration and physical inactivity have been associated with higher rates of obesity, metabolic syndrome, type 2 diabetes, and cardiovascular diseases in epidemiological studies (Hamilton, Hamilton and Zderic 2007). Hence the present study was undertaken with the following objectives.

OBJECTIVES

1. To study the relationship of eating behaviour with weight status.
2. To assess theassociation of activity pattern and dietary pattern with weight status.

Hypothesis: Eating behavior, dietary pattern and activity pattern differs between normal, under and overweight individuals.

METHODOLOGY

Research Design

The present study had an observational, cross-sectional study design. The study was conducted in two phases: Phase I –was an online survey which included 350 women aged 19-30 years residing in Delhi- National Capital Region (NCR). Phase II was done on a sub- sample of Phase I population, with 35 willing participants selected purposively from each category, i.e. underweight, normal and obese. Pregnant or lactating women and those suffering from health problems that required them to change dietary habits were not included in the study. The data was collected from December 2019- February 2020.

Assessment of weight status

In Phase I, the self- reported weight and height of respondents were used to calculate BMI and classify them based on cut-offs recommended for Asians (WHO, IASO & IOTF 2000). In Phase II, the height was measured using a stadiometer, weight and body fat percentage using bioelectrical impedance analyser (TANITA BC-420MA), and waist circumference using a non-stretchable tape. The cut-off of >80 cm was used for abdominal obesity (WHO, 2008). According to the cut-offs given by TANITA for women aged 21- 39 years, 'healthy' body fat percent range was taken as 20-33%. lower than 21% was referred to as 'under-fat', 33- 39.5% as 'over fat' and 39.5- 50% as 'obese'.

Assessment of eating behavior and dietary pattern

The Three-Factor Eating Questionnaire- Revised 21-Item (TFEQ-R21) was used in Phase I to assess three cognitive and behavioral domains of eating- cognitive restraint (CR), uncontrolled eating (UE) and emotional eating (EE) (Cappelleri et al 2009). In Phase II, A pretested questionnaire was used to assess the food habits and activity pattern. Food frequency questionnaire

(FFQ) and 24- hour dietary recall method (one day's intake) were also used to collect dietary intake data.

Ethical approval

Approval was taken from Institutional Ethics Committee of Lady Irwin College before data collection. Informed written consent was taken from all participants.

Statistical analysis

Statistical analysis was done using IBM SPSS version 23. Diet Cal software was used to calculate the nutrient intake. The differences between groups were assessed using analysis of variance (ANOVA) for continuous variables. Chi-square test was used to test association between categorical variables. Pearson correlation was used to see relation of anthropometric indices and body fat percentage with eating behavior and sitting time.

FINDINGS AND DISCUSSION

Phase I: The participants were classified as underweight, normal weight, overweight and obese as per WHO, IASO & IOTF (2000) cut-offs. Distribution of participants by BMI category is presented in Figure 1.

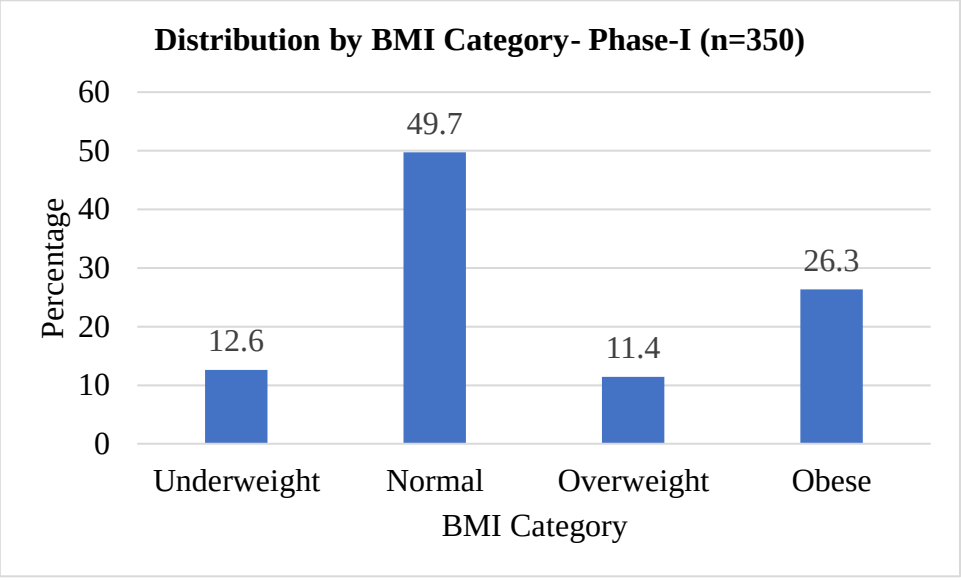


Figure 1: Distribution of participants by BMI category

Majority (82.9%) of the women were between 19- 24 years of age and most (94%) were single/ unmarried. Majority (73.7%) of the participants were students. About 25% were working, as shown in Table 1.

Table 1: General characteristics of participants in Phase I

	Underweight (n=44)	Normal (n=174)	Overweight (n=40)	Obese (n=92)	Total (n=350)
Age					
19- 24years	41 (93.2)	152 (87.4)	32 (80)	66 (71.7)	290 (82.9)
25- 30 years	3 (6.8)	22 (12.6)	8 (20)	26 (28.3)	60 (17.1)
Occupation					
Student	33 (75)	131 (75.3)	29 (72.5)	65 (70.7)	258 (73.7)
Working	10 (22.7)	40 (23)	8 (20)	26 (28.3)	84 (24)
Housewife	1 (2.3)	3 (1.7)	3 (7.5)	1 (1.1)	8 (2.3)
Marital status					
Married	3 (6.8)	10 (5.7)	3 (7.5)	5 (5.4)	21 (6)
Single	41 (93.2)	164 (94.3)	37 (92.5)	87 (94.6)	329 (94)

Figures in parentheses are percent values.

Difference in eating behavior among various BMI categories: A comparison of scores of eating behavior across the BMI categories is presented in Table 2. The difference in mean CR, UE and EE scores between groups were found to be statistically significant at $p<0.05$ as shown by one-way ANOVA. A Tukey post hoc test showed significantly lower CR scores in underweight women than obese women ($p= 0.006$) implying that obese women restrict their food intake consciously. Post hoc test showed significantly lower UE scores in underweight women than obese women ($p= 0.009$). Post hoc test showed significantly lower EE scores in overweight women than obese women ($p= 0.026$).

Table 2: Comparison of scores of eating behavior according to weight status (n= 350)

	Cognitive restraint	Uncontrolled eating	Emotional eating
Underweight (n=43)	39.4± 23.99	34± 17.63	27.7± 19.49
Normal (n=175)	45.9± 20.11	41.5± 18.28	30.6± 22.71
Overweight (n=40)	46.1± 16.75	38.6± 17.91	25.4± 20.24
Obese (n=92)	51.3± 19.28	44.9± 20.32	37.8± 26.19

Correlation was seen between eating behavior and BMI. There was a positive correlation of BMI with CR ($r= 0.20$), UE ($r= 0.14$) and EE ($r= 0.18$). All the correlations were statistically significant at $p<0.01$. These results are similar to a study by Anglé et al. (2009), where there was a positive, statistically significant correlation ($p <0.001$) between BMI and all the domains of eating behaviors in young women.

Phase II

Majority (81%) of the participants were in the age group of 19- 24 years. Most (72%) of the participants were students. Most of the participants (93.3%) were unmarried, as shown in Table 3. Self- reported and measured BMI showed a strong positive correlation ($r=0.96$).

Table 3: General characteristics of Phase II participants

	Underweight (n=35)	**Normal (n=35)**	**Obese (n=35)**	**Total (n=105)**
Age				
19- 24years	31 (88.6)	28 (80)	26 (74.3)	85 (81)
25- 30 years	4 (11.4)	7 (20)	9 (25.7)	20 (19)
Occupation				
Student	25 (71.4)	25 (71.4)	26 (74.3)	76 (72.4)
Working	9 (25.7)	9 (25.7)	8 (22.9)	26 (24.8)
Housewife	1 (2.9)	1 (2.9)	1 (2.9)	3 (2.9)
Marital status				
Married	4 (11.4)	1 (2.9)	2 (5.7)	7 (6.7)
Single	31 (88.6)	34 (97.1)	33 (94.3)	98 (93.3)

Figures in parentheses are percent values

Anthropometric measurements: There was significant difference in mean weight, height, waist circumference and body fat percentage across the BMI categories ($p<0.05$). One- fifth of the participants had abdominal obesity (waist circumference >80 cm). Out of the women who had abdominal obesity, 9.5% were with normal BMI, while the rest were obese. About 5% (n= 2) underweight women had body fat percent <21%. About 17% (n= 6) of normal BMI women had a body fat percent >33% and 8.5% (n= 3) of obese women had body fat percent in the healthy fat range of 21-33% (Table 4). These findings highlight that BMI cannot be used as the only indicator of obesity.

Table 4: Comparison of anthropometric measurements of participants (n=105)

Parameters (Mean ± SD)	**Underweight (n=35)**	**Normal (n=35)**	**Obese (n=35)**	**P value**
Weight (in kg)	44.4± 3.77	53.5± 5.20	65.8± 6.21	0.000**
Height (in cm)	158.5± 4.80	159.6± 6.06	155.1± 4.54	0.001**
BMI (Kg/m^2)	17.6± 0.84	21.0± 1.23	27.4± 2.65	0.000**
Waist circumference(cm)	62.4± 3.13	72.0± 5.42	82.1± 6.78	0.000**
Body fat %	23.5± 2.28	30.5± 2.34	37.6± 3.55	0.000**

**= statistical significance level of $p<0.01$

Correlation between anthropometric indices and eating behavior: The correlation between anthropometric indices and eating behaviors are presented in Table 5. No statistically significant correlation was seen for CR and UE with any of the anthropometric indices. A weak positive correlation was found between EE with BMI ($r= 0.20$, $p= 0.03$) and body fat percentage ($r= 0.21$, $p= 0.03$). Likewise, Cappelleri et al. (2009) found a weak positive relationship between CR, UE and EE with BMI. Waist circumference and body fat percentage did not show significant correlation with CR, UE and EE.

Table 5: Correlation between anthropometric indices and eating behaviors

	Cognitive restraint	Uncontrolled eating	Emotional eating
BMI	0.17	0.16	0.20*
Waist circumference	0.13	0.18	0.19
Body fat percentage	0.16	0.19	0.21*

*- $p<0.05$ level of significance

Association of dietary habits with BMI: Dietary habit (vegetarian, ovo- vegetarian and non-vegetarian) did not show any association with BMI, waist circumference and body fat percentage. More obese women (37.1%) skipped breakfast than normal (20%) and underweight (20%) women. No significant association was found between frequency of breakfast consumption and BMI and waist circumference ($p> 0.05$). But there was a significant association between breakfast consumption and body fat percentage ($p< 0.05$). Similarly, Sakurai et al. (2017) found no association between frequency of skipping breakfast and changes in BMI or waist circumference in women. Breakfast skipping may aggravate obesity by increasing food intake during the day due to hunger. This, in turn, might cause the body to store energy rather than burn it, thereby causing weight gain (Huang et al. 2010).Longitudinal studies are warranted to study this further.

About 30% of all the women regularly consumed meals outside home. No association was found between BMI, waist circumference and body fat percentage and consumption of meals outside home ($p> 0.05$). The reason for lack of association was probably because most women (70.5%) ate out rarely or occasionally. Moreover, the present study did not enquire about the kind of foods eaten outside to judge whether these were high calorie.

An *eating occasion* is defined as an occasion that provides a minimum of 210 kJ and is separated in time from a preceding or following eating occasion by a minimum of 15 minutes (Leech et al. 2015). A majority of the participants (67.6%) had ≤4 meals in a day in this study. Number of meals a day showed an inverse correlation with BMI ($r= -0.259$, $p= 0.008$), waist circumference ($r= -0.236$, $p= 0.016$) and body fat percentage ($r= -0.293$, $p = 0.002$). Likewise, Duval et al. (2008) found an inverse association between number of meals a day with BMI, waist circumference and body fat percentage. However, Murakami and Livingstone (2015) observed a positive association between number of eating occasions per day and probability of having increased BMI and waist circumference in US adults. A study on premenopausal women showed no correlation between number of meals and obesity (Yannakoulia et al. 2007). Studies have found inconsistent results which may be due to lack of a standardized definition for an eating occasion and differences in composition and energy density of the meals.

About one- fourth of all the participants never skipped meals. There was a significant association between meal skipping and waist circumference ($p< 0.05$). Meal skipping however did not show any significant association with BMI and body fat percentage.

The frequency of consumption of various food items was grouped into three categories: regular, occasional and rare consumers. People who consumed food items at least 2-3 times a week were classified as ‘regular consumers’. People who consumed these foods once a week and 1-2 times a month were called as ‘occasional consumers’. People who did not consume the food item even once a month came under the category of ‘rare consumers’.

There was a significant difference (p=0.02) in frequency of intake of vitamin A rich fruits and vegetables among the women from various BMI categories. Underweight women (82.9%) consumed vitamin A rich fruits and vegetables more frequently than normal (51.4%) and obese women (68.6%). Intake of other vegetables, other fruits and white roots and tubers were similar across the BMI categories (p>0.05). Ranjit and Bains (2014) did not observe significant difference in the consumption of fruits between normal and obese Indian college girls. There was a significant difference (p=0.01) in frequency of intake of bakery items among the women from various BMI categories. Frequency of intake of bakery items was higher in underweight (82.9%) than normal (54.3%) and obese women (51.4%). Intake of sweets/ chocolates/ ice-cream was similar among the BMI categories (p>0.05). Whereas, Ranjit and Bains (2014) observed that obese girls consumed chocolates, biscuits and fried snacks more often than normal girls. Frequency of intake of chips/ namkeen and aerated beverages did not show a statistically significant difference.

Table 6: Proportion of Consumers based on frequency of consumption of various food items by different categories of Body Mass Index (BMI)

Food Items	**Regular Consumers**			**Occasional Consumers**			**Rare Consumers**		
	Underweight	Normal	Obese	Underweight	Normal	Obese	Underweight	Normal	Obese
Green leafy vegetables	16 (45.7)	22 (62.9)	19 (54.3)	18 (51.4)	12 (34.3)	14 (40)	1 (2.9)	1 (2.9)	2 (5.7)
Vitamin A rich fruits & vegetables	29 (82.9)	18 (51.4)	24 (68.6)	5 (14.3)	15 (42.9)	11 (31.4)	1 (2.9)	2 (5.7)	0
Other vegetables	34 (97.1)	33 (94.3)	33 (94.3)	1 (2.9)	2 (5.7)	2 (5.7)	0	0	0
Other fruits	28 (80)	29 (82.9)	29 (82.9)	7 (20)	6 (17.1)	5 (14.3)	0	0	1 (2.9)
White roots & tubers	34 (97.1)	32 (91.4)	32 (91.4)	1 (2.9)	3 (8.6)	2 (5.7)	0	0	1 (2.9)
Dairy	32 (91.4)	30 (85.7)	30 (85.7)	2 (5.7)	4 (11.4)	5 (14.3)	1 (2.9)	1 (2.9)	0
Eggs	18 (51.4)	13 (37.1)	13 (37.1)	3 (8.6)	13 (37.1)	8 (22.9)	14 (40)	9 (25.7)	14 (40)
Meat, poultry & fish	8 (22.9)	6 (17.1)	4 (11.4)	6 (17.1)	13 (37.1)	13 (37.1)	21 (60)	16 (45.7)	18 (51.4)
Nuts & seeds	28 (80)	19 (54.3)	21 (60)	6 (17.1)	8 (22.9)	7 (20)	1 (2.9)	8 (22.9)	7 (20)
Chips/ namkeen	22 (62.9)	23 (65.7)	18 (51.4)	11 (31.4)	10 (28.6)	14 (40)	2 (5.7)	2 (5.7)	3 (8.6)
Bakery items (cakes, biscuits)	29 (82.90	19 (54.3)	18 (51.4)	6 (17.1)	12 (34.3)	15 (42.9)	0	4 (11.4)	2 (5.7)

Fried items	20 (57.1)	19 (54.3)	14 (40)	15 (42.9)	12 (34.3)	19 (54.3)	0	4 (11.4)	2 (5.7)
Sweets/ chocolates/ ice cream	12 (34.3)	13 (37.1)	12 (34.3)	23 (65.7)	19 (54.3)	21 (60)	0	3 (8.6)	2 (5.7)
Aerated/ sweetened beverages	6 (17.1)	9 (25.7)	6 (17.1)	18 (51.4)	18 (51.4)	19 (54.3)	11 (31.4)	8 (22.9)	10 (28.6)

Figures in parentheses are percent values.

Macronutrient intake among the BMI categories: One- day 24-hour dietary recall was used to assess the food intake of the participants. There was no significant difference in mean energy intake of underweight, normal and obese women, as presented in Table 7. This may be due to under- reporting or recall bias by the participants. The recall was conducted for a single day only and it probably did not reflect habitual intake. There was no significant difference in mean protein, fat and carbohydrate intake among the women ($p > 0.05$).

Table 7: Comparison of intake of energy and other macronutrients among participants of different weight status

	Underweight (n=35)	**Normal (n=35)**	**Obese (n=35)**	**Total (n=105)**
Energy (in kcal)	1482.3± 326.51	1493.4± 336.16	1504± 289.58	1493.3± 315.1
Protein(in gms)	43.9± 11.74	42.9± 11.07	44± 9.33	43.6± 10.67
Fat(in gms)	46.4± 12.39	52.2± 14.41	50.4± 11.92	49.7± 13.06
Carbohydrates(in gram)	216.4± 51.40	208.1± 48.77	213.5± 51.86	212.7± 50.32

Activity pattern in different BMI categories: In this study, less underweight (51.4%) women engaged in exercise than normal (68.6%) and obese (62.9%) women. There was no significant difference in duration of exercise in a week among underweight, normal and obese women ($p > 0.05$). In present study, 39% women were physically inactive. WHO (2010) recommends adults to engage in at least 150 minutes of moderate-intensity or 75 minutes of vigorous- intensity aerobic physical activity throughout the week. Only 11.4% underweight women engaged in 150 minutes or more of physical activity per week, compared to 25.7% normal women and 34.2% obese women. Overall, only 23.8% women met the recommendations. Table 8 shows comparison of physical activity among women from various BMI categories.

Table 8: Comparison of physical activity among women from different weight categories

	Underweight (n=35)	**Normal (n=35)**	**Obese (n=35)**
Exercise			
Yes	18 (51.4)	24 (68.6)	22 (62.9)
Duration of exercise (in a week)			
1-149 minutes	14 (40)	16 (45.7)	8 (22.9)
150- 299 minutes	1 (2.9)	4 (11.4)	5 (14.3)
≥300 minutes	3 (8.6)	4 (11.4)	9 (25.7)

Figures in parentheses are percent values.

Comparison of frequency of physical activity among women from different weight categories is shown in Figure 2.

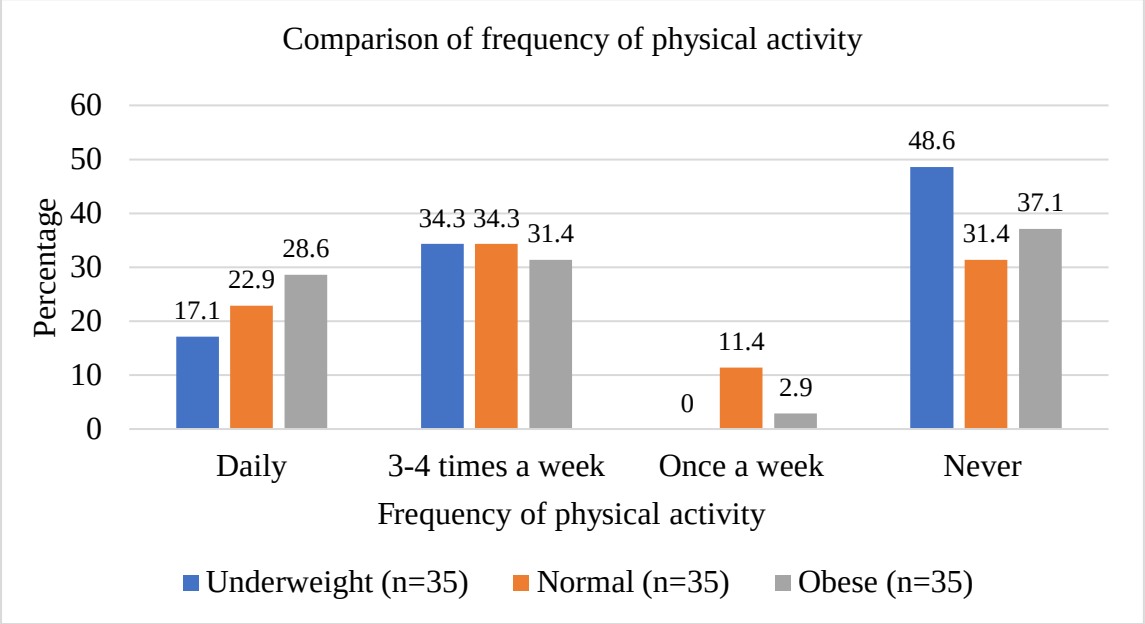


Figure 2: Comparison of frequency of physical activity among women from different weight categories

Table 9 presents correlation of exercise duration and sitting time with anthropometric indices.

Table 9: Correlation of activity and anthropometric indices

	BMI	**Waist circumference**	**Body fat percentage**
Exercise duration in a week (in minutes)	0.203*	0.17	0.14
Sitting time (in hours)	0.16	0.13	0.13

* $p<0.05$ level of significance

A positive correlation was seen between exercise duration in a week and BMI. This is interesting since exercise increases energy expenditure. This may suggest that obese women engage in exercise in an attempt to lose weight. Bowen et al. (2015) did not observe association between physical activity and BMI or abdominal adiposity.

No significant difference was seen in sitting time among underweight, normal and obese women ($p> 0.05$). The high level of sitting duration seen in the present study may be the result of a majority (about 70%) of the sample being students, who sit for about 5- 6 hours in classroom.

Limitations

As the present study was cross- sectional in nature, causality cannot be inferred. As the study was conducted on women aged 19-30 years, results cannot be generalized for all age-groups. In Phase-II, the sample size was small due to time and resource constraints; this could explain lack of

statistically significant results. A single question was asked for sitting duration, which may have led to under-estimation or over-estimation.

CONCLUSION

There was a positive, significant correlation between BMI and all the domains of eating behaviors in young women. The intake of macronutrients was not different between different BMI categories. Being vegetarian had no influence on BMI, waist circumference and body fat percentage. Breakfast consumption had no influence on BMI and waist circumference.Consumption of high calorie snacks and beverages was not higher among the obese. However, number of meals a day showed an inverse correlation with BMI, waist circumference and body fat percentage.Exercise duration in a week showed a positive, statistically significant correlation with BMI. This is interesting since exercise increases energy expenditure. This may indicate that obese women in this study engaged in more exercise in order to lose weight.

Suggestion for future research

There is a need to further explore how eating behavior can influence weight status and health in a wider sample. A standardized definition should be used for defining an eating occasion to ensure clarity in studying its relationship with other factors. Future studies should collect detailed information on sitting time to help formulate recommendations on reducing prolonged sitting duration at specific tasks.

REFERENCES

- Abdella, H. M., Farssi, H. O. E., Broom, D. R., Hadden, D. A., & Dalton, C. F. (2019). Eating behaviours and food cravings; influence of age, sex, BMI and FTO genotype. *Nutrients*, 11(2) 377. https://doi.org/10.3390/nu11020377
- Anglé, S., Engblom, J., Eriksson, T., Kautiainen, S., Saha, M. T., Lindfors, P., Lehtinen, M., &Rimpelä, A. (2009). Three factor eating questionnaire-R18 as a measure of cognitive restraint, uncontrolled eating and emotional eating in a sample of young Finnish females. *International Journal of Behavioral Nutrition and Physical Activity*, 6, 41. https://doi.org/10.1186/1479-5868-6-41
- Bowen, L., Taylor., A. E., Sullivan, R., Ebrahim, S., Kinra, S., Krishna, K. V. R., Kulkarni, B., Ben-Shlomo, Y., Ekelund, U., Wells, J. C. K., &Kuper., H. (2015). Associations between diet, physical activity and body fat distribution: a cross sectional study in an Indian population. *Bio Med Central*, 15, 281. https://doi.org/10.1186/s12889-015-1550-7
- Cappelleri, J. C., Bushmakin, A. G., Gerber, R. A., Leidy, N. K., Sexton, C. C., Lowe, M. R., & Karlsson, J. (2009). Psychometric analysis of the Three-Factor Eating Questionnaire-R21: results from a large diverse sample of obese and non-obese participants. *International Journal of Obesity*, 33, 611–620. https://doi.org/10.1038/ijo.2009.74
- De Silva, A. (2018). *Promote healthy diets to reduce the double burden of malnutrition in India*, Nutrition Foundation of India, 39(3). https://drive.google.com/file/d/1soUk5N70JA7pSVwAqQl3dug6k4OT7AGI/view
- Duval, K., Strychar, I., Cyr, M. J., Prud'homme, D., Rabasa-Lhoret, R., & Doucet, E. (2008). Physical activity is a confounding factor of the relation between eating frequency and body composition. *American Journal of Clinical Nutrition*, 88, 1200-5. https://doi.org/10.3945/ajcn.2008.26220

- Hamilton, M. T., Hamilton, D. G., &Zderic, T. W. (2007). Role of low energy expenditure and sitting in obesity, metabolic syndrome, type 2 diabetes, and cardiovascular disease. *Diabetes*, 56, 2655-67. https://doi.org/10.2337/db07-0882
- Huang, C. J., Hu, H. T., Fan, Y. C., Liao, Y. M.,& Tsai, P. S (2010). Associations of breakfast skipping with obesity and health-related quality of life: evidence from a national survey in Taiwan. *International Journal of Obesity*, 34, 720-5.https://doi.org/10.1038/ijo.2009.285
- Leech, R. M., Worsley, A., Timperio, A., & McNaughton, S. A. (2015) Characterizing eating patterns: a comparison of eating occasion definitions. *American Journal of Clinical Nutrition*, 102, 1229-37. https://doi.org/10.3945/ajcn.115.114660
- Lobera, I. J., Cruz, P. G., Carreño, R. C., Magallares, A., & Prieto, I. R. (2014). Psychometric properties of Spanish version of the Three-Factor Eating Questionnaire-R18 (Tfeq-Sp) and its relationship with some eating- and body image-related variables. *Nutrients*, 6(12), 5619-35. https://doi.org/10.3390/nu6125619
- Lorem, G. F., Schirmer, H., &Emaus, N. (2017). What is the impact of underweight on self-reported health trajectories and mortality rates: a cohort study.*Health and Quality of Life Outcomes*, 15, 191. https://doi.org/10.1186/s12955-017-0766-x
- Murakami, K., & Livingstone, M. B. E. (2015). Eating frequency is positively associated with overweight and central obesity in US adults. *The Journal of Nutrition*, 145(12), 2715-24. https://doi.org/10.3945/jn.115.219808
- Ranjit, A., & Bains, K. (2014). A comparison of food and nutrient intake of normal and obese college girls. *Studies on Home and Community Science*. https://doi.org/10.1080/09737189.2014.11885422
- Sakurai, M., Yoshita, K., Nakamura, K., Miura, K., Takamura, T., Nagasawa, S. Y., Morikawa, Y., Kido, T., Naruse, Y., Nogawa, K., Suwazono, Y., Sasaki, S., Ishizaki, M., & Nakagawa, H. (2017). Skipping breakfast and 5-year changes in body mass index and waist circumference in Japanese men and women. *Obesity Science &Practice*.https://doi.org/10.1002/osp4.106
- World Health Organization, International Association for the Study of Obesity & International Obesity Task Force. (2000). *The Asia- Pacific perspective: Redefining obesity and its treatment*. https://apps.who.int/iris/handle/10665/206936
- Yannakoulia, M., Melistas, L., Solomou, E., &Yiannakouris, N. (2007). Association of eating frequency with body fatness in pre- and postmenopausal women. *Obesity*, 15(1), 100-6. https://doi.org/10.1038/oby.2007.503

The Indian Journal of Home Science 2022: 34(1)

LIFESTYLE HABITS AND ITS INFLUENCE ON NUTRITIONAL STATUS OF TYPE II DIABETES PATIENTS

Dr. Gayathry. C. P
Assistant Professor, Department of Home Science
HHMSPB NSS College for Women,
University of Kerala
Neeramankara, Thiruvananthapuram.
E mail: drcpgayathry@gmail.com

ABSTRACT

Diabetes patients suffer from poor nutritional status due to unhealthy lifestyle practices including faulty diets; over the time they develop serious diabetes related complications. Most of the patients are unaware of such practices, until it strikes them hard. Thus, the present study is an attempt to assess the lifestyle habits and its influence on the nutritional status of selected type II diabetes patients. A total of 500 outpatient type II diabetics were selected based on purposive non-random sampling method. Nutritional profile was assessed using standard tools adopting standardized methods through direct Interview and Nutritional Status Index (NSI) was formulated. A Lifestyle Score (LSS) was developed from selected lifestyle variables such as habit of drinking, smoking, betel chewing, exercising and type of activity category the patients belong to and their sleeping pattern and the patients were categorized based on the scores. The LSS results were then correlated with NSI to study the influence of lifestyle habits on nutritional status (SPSS 21.0). The results show that 40.8 per cent of the patients had low LSS, where the male patients were the determining factor due to their high representation (51.6%). The exercise pattern of the patients indicated that 69.2 percent of the patients abstained from any exercise and worse in the case of the female patients (78.3%) than the male patients (62.2%). The correlation study revealed that the lifestyle habits had positive correlation (not significant) with the nutritional status of the patients. The findings suggest that healthy lifestyle habits including regular moderate exercise would improve the nutritional status and thereby the health status of type II diabetes patients

Keywords- Type II diabetes mellitus, Nutritional status, Lifestyle habits, Exercise

INTRODUCTION

Individuals with type II diabetes are at a high risk of developing a range of debilitating complications such as cardiovascular disease, peripheral vascular disease, nephropathy, changes to the retina and blindness that can lead to disability and premature death. It also imposes important medical and economic burdens (Asif, 2014). Genetic susceptibility and environmental influences along with unhealthy lifestyle practices including faulty diets seem to be the most important factors responsible for the development as well as the progression of this condition. Most of the patients are unaware of such practices, until it strikes them hard. Exercise also forms an important part of lifestyle modification for people with diabetes. Exercise improves the Quality of Life and helps in better management of life, family, societal and work stress. Positive effect of exercise in improving glycaemic control by reducing insulin resistance and promoting glucose utilization has been demonstrated in animal models (NIN annual report, 2007-2008). Most people who have diabetes overlook the importance of lifestyle habits and exercise in their life until it strikes them hard (Mehta, 2015). Fortunately, because these environmental factors are modifiable, disease manifestation from these factors is largely preventable and controllable. Thus, the present study

was an attempt to assess the lifestyle habits and its influence on the nutritional status of selected type II diabetes patients.

OBJECTIVES

- To find out the lifestyle pattern of type II diabetes patients.
- To assess the nutritional status of the patients
- To develop a Lifestyle Score and Nutritional Status Index for the patients
- To assess the influence of lifestyle factors on the nutritional status of type II diabetes patients.

H0 **– The lifestyle factors have no significant influence on the nutritional status of type II diabetes patients.**

MATERIALS AND METHODS

A) Area and sample - 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 selected for the study using Purposive non-random sampling method.

B) Tools used – Details on demographic parameters, nutritional status indicators (ABCD analysis) as well disease profile of the patients was elicited using standard tools through direct Interview.

C) Computation of Scores and Indices

i) Nutritional Status Index (NSI): Nutritional status of all patients was interpreted by calculating the NSI. The anthropometric (Waist Circumference, Waist Hip Ratio (WHR) and Body Mass Index), biochemical (Blood Glucose profile, lipid profile, serum creatinine and urea and Glycosylated Haemoglobin), clinical and dietary factors (Dietary Nutrition Index (DNI)) were taken into consideration to calculate the index. The selected parameters were scored by assigning the highest score of 3 for the most positive response and 1 for the most negative response, except for WHR, serum urea and creatinine and for DNI. The maximum score possible was 44 and minimum score was 16 and the NSI was worked out using the formula.

$$NSI \quad \sum_{k} wi \times ij$$

Where N = number of respondents $i = 1, 2, 3, \ldots\ldots n$

$j = 1, 2, 3, \ldots\ldots k$ k = number of variables

$wi = 1/si^2$ where si^2 = variance of the i^{th} variable based on sample of N size or the weight assigned to the observation corresponding to the i^{th} variable.

ii) Dietary Nutrition Index (DNI): In this study an attempt was made to compute Dietary Nutrition Index, applying slight modifications in the method (Barigidad et al., 1996). The data pertaining to calculate the index was derived from food intake values collected using a 24-hour recall method for one day. The quality of the diet in turn is assessed by the adequacy of nutrients which are computed based on the dietary data and the existing nutrient recommendation principles. Here in this study for macro nutrients such as calories, protein and fat the nutrient recommendation by ICMR (Raghuram et al, 2003) was followed, whereas for micronutrients revised RDA for

Indians by ICMR (2010) was used as the benchmark. The raw food equivalent of cooked foods was extracted and the nutrient intake for calories, protein, fat, calcium, iron, retinol, thiamine, riboflavin and ascorbic acid were computed from the values furnished in the Nutritive Value of Indian Foods by Gopalan et al (2010).

Thus, an index for each selected nutrient was computed for each patient using the formula given below:

Index of the Nutrient (IN)= Nutrient intake by the patient – Corresponding nutrient recommendations for the age and sex group ÷ Standard Deviation of the nutrient

Where standard deviation of the nutrient is the Standard Deviation obtained by clubbing the nutrient intake values of all selected patients. The DNI was obtained by totaling the IN values of all the nine nutrients for each patient. The DNI between +9 - -9 was considered desirable whereas DNI >+9 and <-9 were decided as undesirable for nutrient intake.

iii) Lifestyle Score (LSS): Rather than considering each lifestyle factor individually, it would be much more significant if the factors are clustered to a single score. Thus, a Lifestyle Score was computed with an intention to assess the overall lifestyle pattern of the patients, instead of examining each factor individually. Hence the variables included were, their smoking, drinking and betel chewing habits, exercise frequency, general type of activity and duration of sleep. The best possible response/status was given a score of 3, whereas the worst response /status was awarded the score 1. Here the maximum total score was 18 and least score was 6.

D) Research Analysis: The computed NSI was correlated with LSS to assess its influence on nutritional status using statistical analysis (SPSS 21.0)**.**

The study design is depicted in Fig.-1.

Fig.-1. Study design

RESULTS AND DISCUSSION

1. Socio economic profile of the patients

The sample pool consisted of 283 male and 217 female patients, and more than half (52%) of the patients belonged to the age group of 45-60 years category. Among the patients 56.6 per cent were males and 43.4 per cent were females; belonging to urban (46.2%) and rural (48.4%) settings. Many patients were from nuclear families (63.6%), with moderate education (50.5-51%) and female patients mostly unemployed. Similar trend was observed in the case of spouses also. Physical Quality of Life Score (PQLS) as indicated by the basic details of the patients expressed that close to one fifth of the patients (19.20%) had good scores. The socio-economic profile of the patients has been reported in Table 1.

Table-1: Socioeconomic Profile of the Patients

Particulars	Gender				Total(N=500)		χ^2	
	Male patients (n=283)		Female patients (n=217)					
	N	%	N	%	N	%	Value	p-value
Age of the patients (in years)								
30-45	62	21.9	38	17.5	100	20.0	9.819[a]	0.007 (S)
45-60	130	45.9	130	59.9	260	52.0		
Above 60 years	91	32.2	49	22.6	140	28.0		
Marital status								
Married	257	90.8	177	81.6	434	86.8	20.129[a]	0.000 (S)
Unmarried	7	2.5	2	0.9	9	1.8		
Separated	5	1.8	2	0.9	7	1.4		
Widow (er)	14	4.9	36	16.6	50	10		
Type of family								
Nuclear	189	66.8	129	59.4	318	63.6	4.953[a]	0.084 (NS)
Extended	93	32.9	84	38.7	177	35.4		
Joint	1	0.4	4	1.8	5	1.0		
Location of housing								
Urban	141	49.8	90	41.5	231	46.2	11.074[a]	0.004 (S)
Rural	121	42.8	121	55.8	242	48.4		
Remote	21	7.4	6	2.8	27	5.4		
Monthly income								
Upto 15000	137	48.4	128	59.0	265	53.0	5.787 [a]	0.122 (NS)
15000-30000	124	43.8	76	35.0	200	40.0		
30000-45000	17	6.0	9	4.1	26	5.2		
Above 45000	5	1.8	4	1.8	9	1.8		
a. 1 cells (12.5%) have expected count less than 5. The minimum expected count is 3.91.								

2. Dietary Nutrition Index of the patients

The mean nutrient intake of the patients and the percentage of the Recommended Nutrient Intake (RNI) were critically studied and the details are presented in Table-2.

Table-2 Mean Actual Nutrient Intake and Percentage of Recommended Nutrient Intake of the Patients

Nutrients	Sex	Actual nutrients		% of RNI	Robust Tests of Equality of Means (p-value)
		Mean	S.D		
Energy (Kcal)	M	1591.96	281.13	107.25	0.000 (S)
	F	1405.49	258.57	121.19	
Protein (g)	M	56.81	15.33	88.12	0.000 (S)
	F	47.53	11.27	90.37	
Fat (g)	M	42.36	11.11	128.56	0.017 (S)
	F	39.84	12.10	153.79	
Carbohy-drate (g)	M	242.00	47.14	100.22	0.000 (S)
	F	208.32	44.81	110.94	
Calcium (mg)	M	681.56	188.48	113.59	0.000 (S)
	F	582.15	171.26	97.02	
Iron (mg)	M	14.62	5.55	85.99	0.000 (S)
	F	12.37	4.63	58.89	
B-Carotene (µg)	M	1141.30	1174.41	23.78	0.028 (S)
	F	924.90	1021.96	19.27	
Vitamin A (µg)	M	138.78	111.06	22.80	0.000 (S)
	F	103.68	87.81	16.96	
Thiamine (mg)	M	1.17	0.33	85.98	0.000 (S)
	F	0.97	0.30	87.04	
Riboflavin (mg)	M	0.88	0.24	55.39	0.000 (S)
	F	0.71	0.26	55.18	
Niacin (mg)	M	10.99	3.49	62.16	0.000 (S)
	F	9.45	2.78	69.07	
Vitamin C (mg)	M	50.80	34.11	127.01	0.161(NS)
	F	46.59	32.70	116.47	
Vitamin B12 (µg)	M	0.42	0.47	41.19	0.023 (S)
	F	0.33	0.41	31.79	

Table-2 illustrates that the intake of calories, protein and vitamin C of the patients went beyond the recommended intake by 7 to 54 per cent for both the gender. In the case of carbohydrate and calcium, the mean intakes were more or less equivalent to the recommended intake. The mean values of protein and thiamine intake were found to be around 20 per cent less

than the standard set for this group. Iron intake was found to be better in male patients (85%) when compared to only half of the recommended intake by the female patients (58%). The intake of all micronutrients were seemed to be very poor especially in the case of beta carotene and vitamin A, that only around 20 per cent of the RDA was met by the patients selected for this study. The intake distribution of all the nutrients except vitamin C was statistically significant.

From this data, the Dietary Nutrition Index (DNI) was worked out considering the nutrient such as calories, protein, fat, calcium, iron, retinol, thiamine, riboflavin and vitamin C available from the 24-hour dietary recall data. The cut-off values for desirable and undesirable intake stipulated by Barigidad et al (1996), was slightly modified for the terms to desirable (+9 to -9) instead of normal and undesirable (<-9 and >+9) instead of poor intakes. The distribution of patients under each category is portrayed in 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). Even the distribution of male and female patients under both the categories were also comparable, that is neither male nor female patients were having any priority in the intake of nutrients as per the 24 hour dietary recall data. But still the observation was not successful in establishing statistical significance in the present distribution criteria. Further the DNI scores were also incorporated in the computation of NSI of the patients.

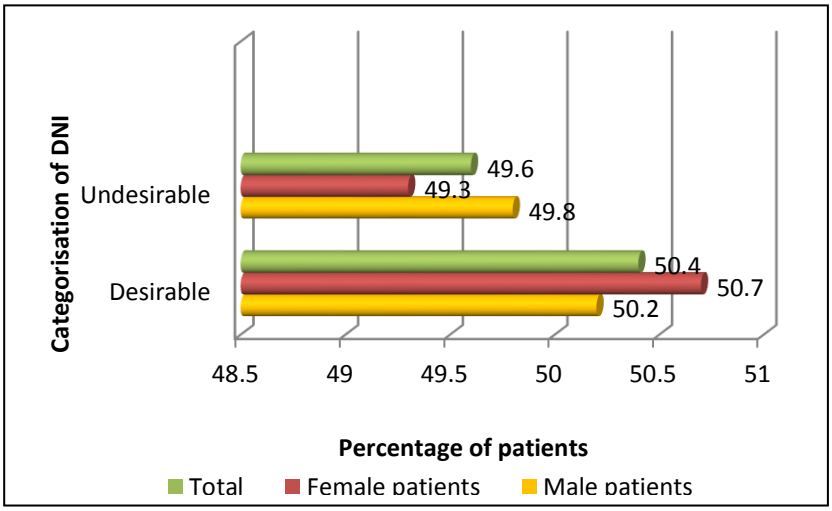


Fig.-2. Distribution of the patients based on DNI

3. Nutritional Status of the patients

The nutritional status of the patients was determined by calculating Nutritional Status Index (NSI) for each patient, for which the ABCD data were the input variables. The statistical analysis using One-sample test showed the mean NSI value of 29.02 ±3.67 is significant.

The patients were distributed based on their NSI according to statistically derived cut-off values fixed for each category namely good (>30), satisfactory (27-30) and poor (<27), the results of which are shown in Fig.-3.

The overall nutritional status of the patients was 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 category. Anyhow the nutritional status of the male patients was inferior to the female patients in the present study. The observation was statistically significant.

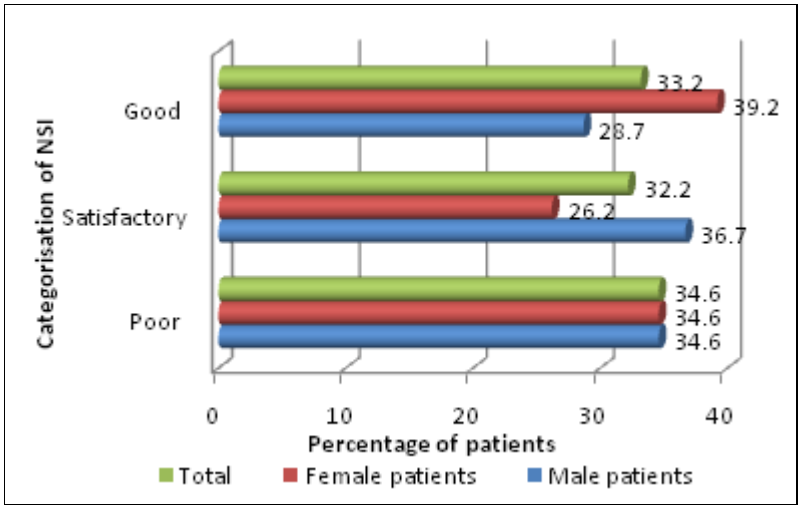


Fig.-3. Distribution of Patients Based on NSI

4. Life style pattern of the patients

Instead of considering each lifestyle factor individually, the important factors were clustered to a single score called Life Style Score, which was developed from selected lifestyle variables such as habit of drinking, smoking, betel chewing, exercising, and type of activity group the patients belong to and their sleeping pattern as reported by the patients. The categorisation of patients under LSS is portrayed in Fig.-4., which illustrates that 40.8 per cent of the patients had low LSS, where male patients were the determining factor due to their heightened representation (51.6%). Habit of drinking and smoking is not common among Indian women and this may be the reason for male patients overtaking female patients in this category. However, 31.2 per cent of the patients were successful in upholding good LSS. The distribution of LSS based on gender was found to be statistically significant.

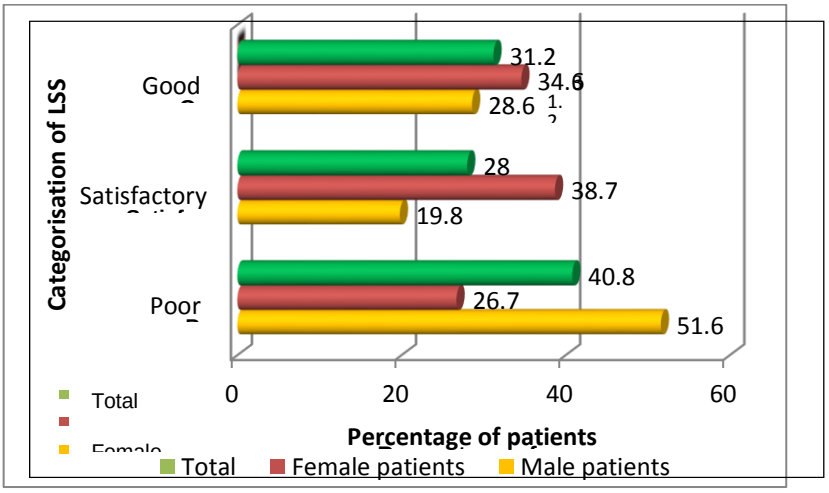


Fig.-4. Distribution of the Patients Based on LSS

a) Alcohol drinking habits of the patients

When the lifestyle habits like alcohol drinking was separately analysed, the study identified 79 male patients as alcohol drinkers. When statistically analysed it was observed that there were no much difference observed in the quantity of consumption of alcohol between the drinkers of varying frequencies, throwing light to the fact that irrespective of the frequencies of consumption, the identified drinkers consumed on an average more than 200ml per drinking session., which is not at all a healthy situation. Heavy alcohol consumption may cause transient hypoglycaemia (Arky, 1989), also regular moderate drinkers are more insulin sensitive than non-drinkers (Facchini et al, 1994).

As the study progressed through various dimensions of lifestyle habits of the patients who were drinkers, one important factor that caught attention was their habit of skipping meals or medicines following the drinking sessions.

It was noticed that out of the 79 patients who were drinkers, 24 patients neither skipped medicines nor meals. Three fourth of the drinkers either skipped the adjacent meals or medicines (74.55%) after a drinking session, in which meals alone was skipped by 34.55 per cent of the patients and medicine alone by 25.45 per cent of patients. Remaining 40 per cent of the patients were reported to skip meals as well as medicines after drinking.

b) Exercise pattern of the patients

The frequency of exercise by the patients revealed that 69.2 percent of the patients abstained from any exercise and female patients were much more unconscious (78.3%) about the need for exercise when compared to male patients (62.2%). The augmented volume of the female patients who were exercise abstainers may be due to tight household work schedule, decreased family support, lack of self-motivation and social stigma.

Regarding the duration of exercise, three fourth of the female patients and 66.5 per cent of the male patients did exercise for 30-45 minutes/ exercise session. But, overall, one fourth of the patients exercised for 45-60 minutes.

During the study it was attempted to analyse the incidence of fatigue or feeling weakness

due to exercise among the patients. The results suggest that 37.7 per cent of the patients never felt fatigue, while less percentage of the patients complained of having fatigue during exercise (28.6%) or within a few hours after exercise (27.3%). However, these observations were not statistically significant within the selected distribution pattern.

In addition to the general information regarding exercise, a few specific details especially regarding the need for consuming a snack before or after exercise were also derived during the course of the study. It was not strange to find that by and large, 87.7 per cent of the patients were unaware of taking any snack before exercise. The pre-exercise snacking habit was particularly worse with female patients (91.5) when compared to male patients (86.0%). In turn, when it was attempted to study the habit of post exercise snacking, an equal percentage (61.7) of male and female patients consumed some snack soon after the exercise in order to curb the signs of post-exercise fatigue. The findings were not statistically significant.

c) Sleep pattern of the patients

In the present study, the mean self-reported usual sleep duration of the patients was found to be more or less the same among male (6.205±1.46) and female (6.253±1.369) patients. This data showed that irrespective of gender both male and female patients in this study had slept less than the standard sleep duration recommended as 7 hours for adults, age ranging between 26-64 years by National Sleep Foundation (NSF).

An attempt was made to specifically examine the relation between the duration of sleep and weight change pattern among the patients. It was observed that patients who gained weight slept for a shorter duration (6.207±1.42 hours) when compared to those who lost weight (6.259±1.36 hours). Overall, the cross-sectional data of the patients suggested that short sleepers were heavier.

5. Influence of Lifestyle habits on Nutritional status of the patients

In order to establish the relationship between the lifestyle pattern of the patients with the nutritional status the computed NSI was correlated with LSS and the result is presented in Table- 3.

Table- 3: Correlation of NSI with Lifestyle score

Variables	Value
Life Style Score	0.008 (NS)
Critical value 0.05 (Sig.2-tailed)	± .088

The relation was established based on the critical value ±0.088. It was statistically assumed that those values that happen to occur above+0.088 and below -0.088 had statistical significance in this study.

The computed NSI was correlated with the Lifestyle Score and found a positive correlation with the nutritional status of the patients. The relation was established based on the critical value ±0.088, but the observation was **not statistically significant**. Thus the Null Hypothesis is rejected and accepted

the Alternative Hypothesis that is **"the lifestyle factors have significant influence on the nutritional status of type II diabetes patients".**

SUMMARY AND CONCLUSION

Thus, the salient findings of the study are

- Physical Quality of Life Score (PQLS) as indicated by the basic details of the patients expressed that close to one fifth of the patients (19.20%) had only good socio-economic status.
- The intake of all micronutrients were very poor especially in the case of beta carotene and vitamin A
- Exact half of the patients were found to have undesirable nutrient intake (DNI).
- One third of the patients had poor nutritional status
- Close to one third of the patients only had good lifestyle score
- The correlation study showed that the lifestyle factors have significant influence on the nutritional status of type II diabetes patients**.**

Conclusively, the findings suggest that diabetes patients generally have unhealthy lifestyle habits and the lifestyle habits have a greater influence on the nutritional status of type II diabetes patients.

Scope and Suggestions for Future Research

This study has found that the lifestyle habit of the diabetes patients is a crucial factor in determining a good nutritional status and thus successful diabetes self-management. When this understanding is positive, it can create a conducive environment to initiate and/or maintain adherence to healthy lifestyle habits. Extending this, it may be useful to educate diabetes patients and their families with a focus on changing or eliminating faulty habits thus increasing family/community level support for patients with the illness. This may be achieved through a variety of methods such as education and awareness camps/seminars/workshops within households and communities which illustrate the short- and long-term benefits of a healthy lifestyle on good nutritional status and successful disease management.

Financial support and sponsorship

This study was funded through the Junior Research Fellowship from the University Grants Commission, Government of India provided to the author (GCP).

REFERENCES

- Arky, R.A. (1989). Hypoglycaemia associated with liver disease and Ethanol. *Endocrinology Metabolism Clinics of North America*, 18, 75–90.
- Asif M. (2014). The prevention and control the type-2 diabetes by changing lifestyle and dietary pattern. *Journal of education and health promotion*, *3,* 1. https://doi.org/10.4103/2277-9531.127541
- Barigidad, P.M., Adwani, M.R., Naik, K.R. Dietary Nutrition Index- A New Approach to the Quality Assessment of the Diet, The Indian Journal of Nutrition and Dietetics, 1996;33:29-30.

- Facchini, F., Chen, Y.D. I., and Reaven, G. (1994). Light-to-moderate alcohol intake is associated with enhanced insulin sensitivity. *Diabetes Care*, 17, 115–119.
- Gopalan, C., Rama Sastri, B.V., and Balasubramanian, S.C. (2010). Nutritive Value of Indian Foods. Revised and updated by Narasinga Rao, B.S., Deosthale, Y.G., and Pant, K.C. National Institute of Nutrition, Hyderabad.
- ICMR. (2010). Revised RDA for Indians 2010. Report of the Expert Group of ICMR. (Online). Available:http://nutritionfoundationofindia.res.in/PPT-2011/Seven17-18teen/Dr-B-Sesikeran.pdf
- Mehta, M. (2015, March-April). Tenets for a diabetic life. *Diabetic Living*, 5(2), 56-59.
- NIN annual report 2007-2008. Effect of long term exercise in WNIN obese rats. NCLAS Research activities. Article number 1.
- Raghuram, T.C., Pasricha, S., and Sharma, R. D. (2003). Diet and diabetes. *Nutrient requirements and Recommended Dietary Allowances for Indians, ICMR, 1989*. Hyderabad: ICMR. pp.13-51.

The Indian Journal of Home Science 2022: 34(1)

IMPACT EVALUATION OF SUBSTITUTING VIRGIN COCONUT OIL (VCO) TO TYPE 2DIABETES MELLITUSELDERLY SUBJECTS WITH MILD TO MODERATE ALZHEIMER'S DISEASE

Mini Sheth[1] and Arpi Shah[2]

[1]Professor, Department of Foods and Nutrition Faculty of Family and Community Sciences, The Maharaja University of Baroda, Vadodara 390002
Email: shethmini@gmail.com

[2]Assistant Professor, Department of Nutrition and Dietetics, Parul Institute of Applied Sciences, Parul University. Vadodara
E-mail – arpishah096@gmail.com,

ABSTRACT

Alzheimer's disease (AD) which is currently called type 3 diabetes is increasing rampantly at global and national level yet a very few studies are available on means to manage it. Currently several novel means are being applied to bring about improvement in AD symptoms. The present research was conducted to study the role of VCO intake on SAGE score, lipid profile, FBS levels and anthropometric measurements.Using quasi experimental study design 30 type 2 diabetic subjects aged 60 years and above with mild – moderate AD who voluntarily agreed to participate in the study were enrolled using SAGE scale. Pre and post data was collected on serum lipid levels, FBS levels and anthropometric data to see the effect of daily substitution of regular fat intake with 20ml VCO for a period of 45 days. Out of 796 forms (SAGE) filled 47(5.9%) were in severe AD range and 32(4.02%) were in mild – moderate range. Substitution with VCO resulted in improvement of 12.37% ($p<0.05$) in total SAGE score in terms of naming the pictures, calculation A component and clock construction by 45.6% ($p<0.05$), 20.48% ($p<0.05$) and 20% ($p<0.05$) respectively. There was improvement in HDL – C by 16.68% ($p<0.05$) and reduction in triglycerides, VLDL – C, TC/ HDL ratio, LDL/ HDL ratio and Non – HDL levels by 21.19% ($p<0.05$), 24.76% ($p<0.05$), 21.89% ($p<0.05$), 27.86% ($p<0.05$) and 10.47% ($p<0.05$). A non - significant improvement in FBS levels was 9.64%. There was 3.16% ($p<0.05$) reduction in the mean weight and 3.51% ($p<0.05$) in Body Mass Index (BMI). VCO paved a way for improvement in SAGE scores and HDL- C, TG, VLDL – C, TC / HDL ratio, LDL / HDL ratio and Non – HDL components of lipid profile along with statistically significant reduction in BMI and weight of the subjects.

Keywords: Alzheimer's, Coconut oil, Lipid profile, FBS, type 2 DM

INTRODUCTION

Alzheimer's disease (AD) is a type of dementia which causes problems with thinking, memory and behaviour. Symptoms develop slowly and worsen over a time severe enough to interfere with day to day tasks. AD is not the normal part of aging, but age is just a risk factor for it. In AD, high levels of certain protein inside and outside the brain cells damages the cell and make it difficult for them to stay healthy and communicate with each other. The area of the damage in case of AD is hippocampus which is for learning and memory causing memory loss to be the first symptom of

AD. In case of dementia these are the first regions of cell damage hence AD is the earliest stage of dementia. (Alzheimer's Association, www.alz.org)

According to World Alzheimer's Report (2015), 46.8 million people are living with dementia all around the world. This number is projected to double up every 20 years. The report also concluded that there were more than 9.9 million new cases of dementia every year worldwide. The report showed that in 2015, East Asia was the region with most of the people living with dementia (9.8 million) followed by Western Europe (7.4 million), South Asia (5.1 million) and North America (4.8 million). 4.1 million people in India are living with dementia (Martin, 2015).

A study conducted in Vadodara, India on 250 elderly (age: 60 - 85 years) subjects using MMSE and Cognitive impairment scale concluded that 40% of subjects were found at borderline score for mild cognitive impairment and 26% of subjects were found towards moderate MMSE score. Lower MMSE scores were positively correlated with advancement in age. When MMSE scores were compared the data indicated that severity of dementia was found higher in females as compared to males (Chauhan, 2013).

Virgin Coconut Oil (VCO) is made up of medium chain triglycerides (MCT) which are metabolized differently (provide quick source for energy and less likely to be stored as fat) and are beneficial for health (Julie Murray, 2013).

There is an increasing prevalence of Alzheimer's worldwide and not many studies are available on the means to manage it. VCO has been proved beneficial for prevention of many diseases including Alzheimer's disease; hence the present study was conducted to view the impact of VCO on AD score on subjects who had mild – moderate AD as per their SAGE score on prevention of further deterioration of the disease. Also, the studies have reflected role of VCO in diabetes control and regulating lipid profile, so the study further aimed to review the impact of VCO on diabetes and lipid parameters

OBJECTIVE

To study the impact of VCO substitution with normal fat intake in type 2 diabetes subjects with mild – moderate AD.

HYPOTHESIS

Null Hypothesis: Consumption of virgin coconut oil by adults aged 60 years and above, having type 2 diabetes mellitus, having mild – moderate Alzheimer's disease of urban Vadodara will show no improvement in their SAGE score, lipid profile and FBS levels.
Alternate Hypothesis: Consumption of virgin coconut oil by adults aged 60 years and above, having type 2 diabetes mellitus, having mild – moderate Alzheimer's disease of urban Vadodara will show improvement in their SAGE score, lipid profile and FBS levels

METHODOLOGY

Study Design: Quasi experimental study design

Sample size calculation: Assuming 50% of the subjects might have mild to moderate AD, and expecting a reduction of 20% in mean SAGE score, the required sample size is based on the following calculations:
$N = (Z\alpha)^2 * pq/d^2$
Where, p=50, q= 100-50, Thus, q=50, Confidence interval at 95%
d= 100 - β error,= 100 – 80, = 20
Therefore, sample size = $(1.96)^2$ 50 * 50 / $(20)^2$, Thus, the required n is 24

Selection of subjects: 30 type 2 diabetic subjects aged 60 years and above with mild – moderate AD who voluntarily agreed to participate in the study were enrolled using SAGE scale using exclusion and inclusion criteria. The inclusion criteria were subjects of either sex of age 60 years and above, suffering from mild – moderate AD according to SAGE Score, suffering from type 2 diabetes with BMI < 30, knew how to read and write and willing to consume VCO and the exclusion criteria were subjects who had undergone any major surgery within a period of 2 months, those who suffered from any chronic disease (cancer, bronchitis, stroke), did not know how to read and write, severe depression, were non-diabetic, had severe AD or dementia, and had BMI greater than 30. Blood samples were collected for lipid profile and FBS levels was measured both pre and post interventional trial. Subjects were advised not to alter their usual calorie intakes and were asked to document any unusual symptoms or side effects. The subjects were followed up every day using the compliance card and phone calls every week to report for side effects if any.

Trial monitoring plan:

- Daily substitution of VCO with normal fat intake for a period of 45 days and monitoring was done using compliance card and weekly phone calls.
- VCO was provided in bottle along with 10 ml standard spoons.
- Subjects could withdraw from the study in case of any adverse effect observed during the intervention.

Study food and mode of intervention: VCO was procured from COCO GURU Pvt. Ltd. Karnataka, for the intervention trial. VCO was given in bottles along with 10 ml spoon. Subjects were asked to substitute their normal fat intake with 20 ml (2 spoons of 10 ml) VCO daily for a period of 45 days. A compliance card was given and phone calls were made weekly to monitor their regularity.

Statutory clearances: The medical Ethics committee of the Foods and Nutrition Department, The M.S. University of Baroda approved the study proposal and provided the Medical ethics approval number IECHR/2018/1. Written informed consent was obtained from the subjects who agreed to participate in the study.

Collection of information:

SAGE Scale: SAGE is a brief self-administered cognitive screening instrument to identify Mild Cognitive Impairment (MCI) and early dementia. Average time to complete the test is 15 minutes. The maximum score is 22. A score of 17 and above is considered normal (Scharre, 2012).

SAGE Scale consists of various applicatory questions which test the cognitive ability of a person like orientation, naming, similarities, calculation, memory, 3- D construction, clock test, verbal fluency, executive modified trails and problem-solving ability. Scores between12 – 16 identifies mild – moderate AD and score below 12 identifies severe AD. A study conducted on 254 adults above 59 years with sufficient vision and English literacy were screened using SAGE Scale after which 63 subjects (21 normal, 21 MCI and 21 dementia subjects) were randomly selected for a clinical evaluation, neurological examination, neuropsychological battery, functional assessment and MMSE. Subjects were identified with dementia, MCI or normal based on standard clinical criteria and neuropsychological testing. SAGE receiver operating characteristics on the basis of clinical diagnosis showed 95% specificity and 79% sensitivity in detecting those with cognitive impairment from normal subjects. It suggests that SAGE is a reliable instrument and compares favourably with the MMSE. Hence, it can be used to diagnose subjects with mild and moderate AD (Scharre DW, 2010).

Anthropometric measurements: Anthropometry is the study of human body measurements and proportions. They are used to assess level of wellbeing of the body measured. In anthropometric measurements height and weight was taken for subjects and BMI was calculated.

Height: It is the linear measurement made up of sum of four compartments i.e. Leg, Pelvis, Spine and Skull. Technique: A non – stretchable tape was used to measure height of the subjects. A convenient flat wall was identified to measure height. The subjects were made to stand straight with arms hanging freely. The back, head, buttocks, calves and heels should be touching the wall. Height was recorded to nearest 0.1cm. In this position, a mark was made on the wall and height was measured using a measuring tape.

Weight: It is a key anthropometric measurement of body mass. It was measured using bathroom weighing scale. Calibration: Weighing balance was calibrated regularly using weights of 5kg, 3kg and 1kg.Technique: Before the weight was taken it was assured that the pointer is on zero. The weighing balance was placed on a smooth hard surface. The subjects were asked to remove heavy jewellery, jackets or other heavy clothing material if was worn on. Then the subjects were asked to stand straight on the weighing balance, stand in the centre putting body weight on both the feet and look straight ahead standing relaxed. The weight was then recorded to the nearest 0.1 kg and this was repeated thrice and average value was taken as weight.

Body Mass Index (BMI): BMI is defined as weigh in kg per height in meter square. BMI indicates the current nutritional status. It also defines the degree of nutrition from obesity to under nutrition.

BMI was calculated using the following formula: BMI = Weight (kg) / Height (m^2)

Table 1: BMI cut offs

Nutritional Status	**BMI**
Underweight	<18.5
Normal	18.5 – 22.9
Overweight	23 – 24.9
Pre obesity	25 – 29.9
Obese	≥ 30
Obesity Type 1 (obese)	30 – 40
Obesity Type 2 (morbid obesity)	40.1 – 50
Obesity Type 3 (super obesity)	>50

(Asia Pacific Classification), 2009

Biochemical investigation: Lipid profile was measured by Thyrocare agency and technician visited at a predetermined location. Venus blood samples were collected after overnight fast. Fasting blood sugar was estimated using Accucheck machine.

Statistical analysis: The obtained data was subjected to statistical analysis using Microsoft excel to calculate mean, standard deviation and paired t – test.

FINDINGS AND DISCUSSION

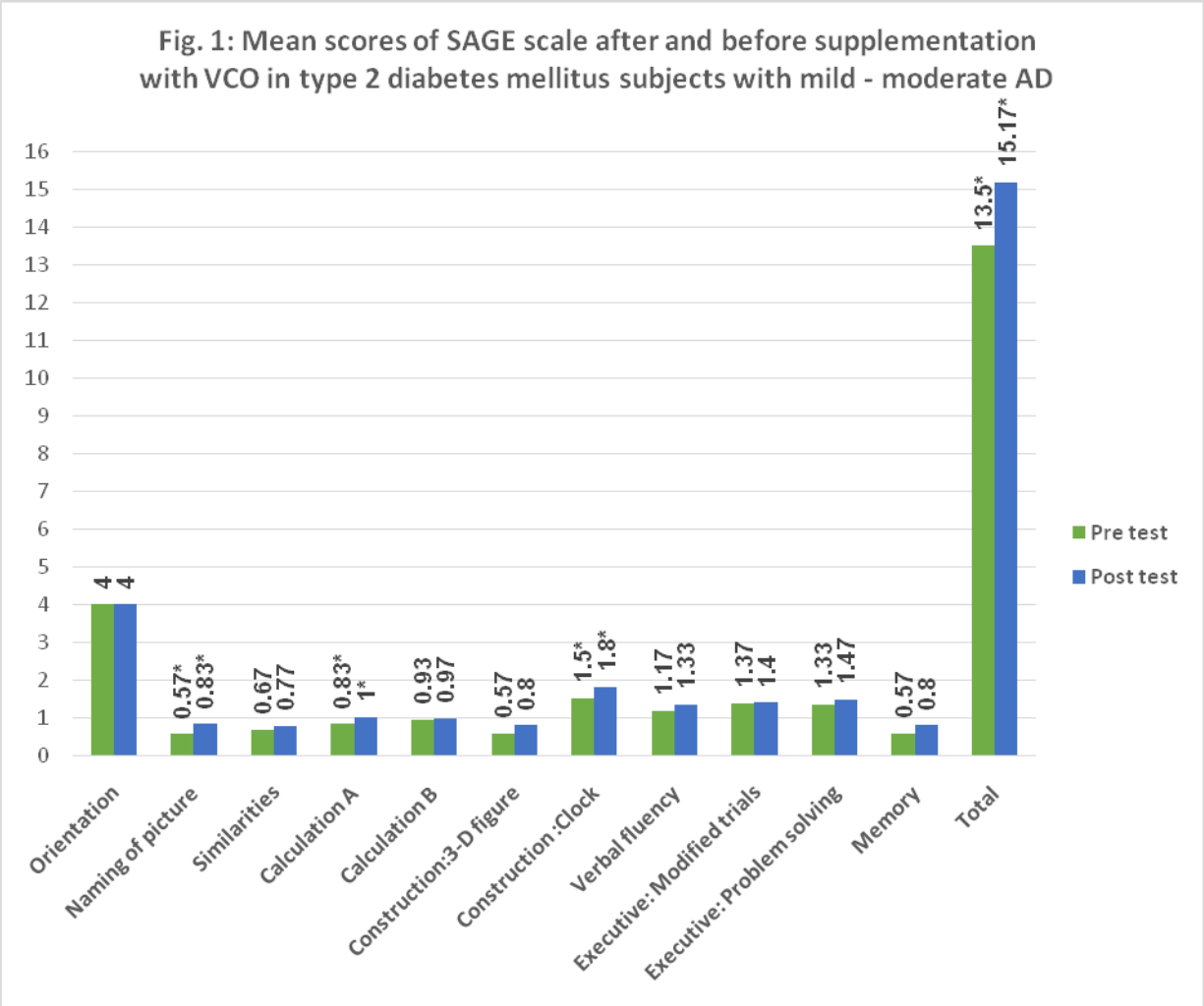
Table 2 shows that substitution of normal fat with VCO resulted in improvement of 12.37% ($p<0.05$), 45.6% ($p<0.05$), 20.48% ($p<0.05$) and 20% ($p<0.05$) in total SAGE score, naming the pictures, calculation A component and clock construction respectively. However, there was no statistically significant difference was observed in remaining eight components of SAGE scale such as: orientation, similarities, calculation B, construction of 3 - D figure, verbal fluency, executive modified trails, executive problem solving and memory.

Table 2: Changes in SAGE score of type 2 diabetes mellitus subjects with mild - moderate AD before and after substitution by VCO with normal fat.

Components of SAGE Scale	Maximum Score				Paired t – test t Critical two-tail: 2.05
Orientation	4	Pretest	Mean ±SD	4 ±0	0^{NS}
		Post test	Mean ±SD	4 ±0	
Naming the pictures	2	Pretest	Mean ±SD	0.57 ±0.49	2.5^{*}
		Post test	Mean ±SD	0.83 ±0.64	
		Difference		↑ 0.26	
		% difference		↑ 45.6%	
Similarities	2	Pretest	Mean ±SD	0.67 ±0.75	0.9^{NS}
		Post test	Mean ±SD	0.77 ±0.80	
		Difference		↑ 0.1	
		% difference		↑ 14.93%	
Calculation A	1	Pretest	Mean ±SD	0.83 ±0.37	2.41^{*}
		Post test	Mean ±SD	1 ±0	
		Difference		↑ 0.17	
		% difference		↑ 20.48%	
Calculation B	1	Pretest	Mean ±SD	0.93 ±0.25	1^{NS}
		Post test	Mean ±SD	0.97 ±0.18	
		Difference		↑ 0.04	
		% difference		↑ 4.3%	
Construction:3-D figure	2	Pretest	Mean ±SD	0.57 ±0.62	1.88^{NS}
		Post test	Mean ±SD	0.8 ±0.70	
		Difference		↑ 0.23	
		% difference		↑ 40.35%	
Construction :Clock	2	Pretest	Mean ±SD	1.5 ±0.56	2.52^{*}
		Post test	Mean ±SD	1.8 ±0.4	
		Difference		↑ 0.3	
		% difference		↑ 20%	
Verbal fluency	2	Pretest	Mean ±SD	1.17 ±0.89	1.04^{NS}
		Post test	Mean ±SD	1.33 ±0.87	
		Difference		↑ 0.16	
		% difference		↑ 13.68%	
Executive: Modified trials	2	Pretest	Mean ±SD	1.37 ±0.91	0.33^{NS}
		Post test	Mean ±SD	1.4 ±0.92	
		Difference		↑ 0.03	
		% difference		↑ 2.19%	
Executive: Problem solving	2	Pretest	Mean ±SD	1.33 ±0.75	1.07^{NS}
		Post test	Mean ±SD	1.47 ±0.72	
		Difference		↑ 0.14	
		% difference		↑ 10.53%	
Memory	2	Pretest	Mean ±SD	0.57 ±0.72	1.56^{NS}

		Post test	Mean ±SD	0.8 ±0.79	
		Difference		↑ 0.23	
		% difference		↑ 40.35%	
Total SAGE Score	22	Pretest	Mean ±SD	13.5 ±1.23	10.81*
		Post test	Mean ±SD	15.17 ±1.37	
		Difference		↑ 1.67	
		% difference		↑ 12.37%	

Note:
1) Dissimilar superscripts within the rows indicate significant difference amongst the values.
2) NS is non-significant
3) *significant at 0.05
**Significant at 0.01
***Significant at 0.001



In AD, there appears to be a pathological decrease in the brain's ability to use glucose. Neurobiological evidences suggest that ketone bodies are effective alternate substrate for the brain. Elevation in plasma ketone body through oral supplementation of MCT improves cognitive function in elderly and possibly has therapeutic benefits in patients with AD (Mark A, 2004).

Unlike most other dietary fats that are high in long-chain fatty acids, coconut oil comprises medium-chain fatty acids (MCFA). MCFA are unique in that they are easily absorbed and metabolized by the liver, and can be converted to ketones. Ketone bodies are an important alternative energy source in the brain, and may be beneficial to people developing or already with memory impairment, as in AD. In addition, phenolic compounds and hormones (cytokinins) found in coconut may assist in preventing the aggregation of amyloid-β peptide, potentially inhibiting a key step in the pathogenesis of AD (Fernando WM, 2015).

A prospective study conducted in Spain on 44 subjects aged between 65 to 85 years who received 40ml of EVCO for a period of 21 days and the improvement observed in parameters evaluated (mini test score and LOBOcognitive test) was by 38.42% (Ivan Hu Yang, 2015).

A prospective, longitudinal, qualitative, analytical, experimental study through a clinical trial was conducted in Nutricion Hospital, Spain, where 44 subjects with AD were enrolled. 22 subjects in the experimental group received supplementation of 40ml of coconut oil daily which resulted in significant improvement in the areas of orientation and language construction (Alma Maria, 2017).

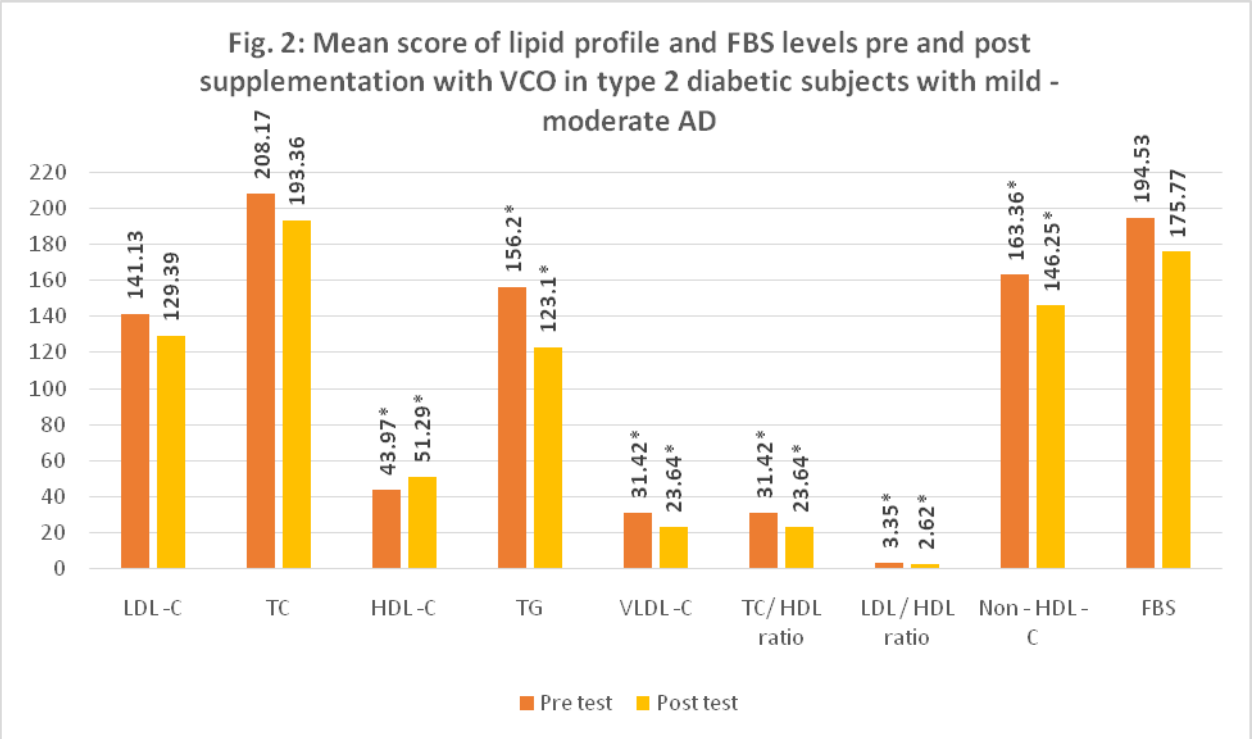
A prospective, longitudinal, qualitative, analytical, experimental study was carried out in Spain which enrolled 44 subjects with AD. The experimental group received a coconut oil enriched Mediterranean diet for 21 days which revealed that the subjects after following the intervention had improved episodic, temporal orientation and semantic memory. More positive response was obtained in women with mild - moderate AD, although other improvements in males and severe state were shown (Drehmer E, 2018).

Impact evaluation of substitution of normal fat with VCO on lipid profile and FBS levels

As shown in table 3 statistically no significant difference was observed in LDL – C, total cholesterol and FBS levels however there was improvement in HDL – C by 16.68% ($p<0.05$) and reduction in triglycerides,VLDL – C, TC/ HDL ratio, LDL/ HDL ratio and Non – HDL levels by 21.19% ($p<0.05$), 24.76% ($p<0.05$), 21.89% ($p<0.05$), 27.86% ($p<0.05$) and 10.47% ($p<0.05$) after substitution of normal fat with VCO to type 2 diabetic subjects with mild – moderate Alzheimer's disease over a period of 45 days. The improvement in FBS levels was not statistically significant yet the levels reduced by 9.64%.

Table 3: Mean values of lipid profile and fasting blood sugar (FBS) levels of type 2 diabetic subjects with mild – moderate AD before and after substitution of VCO with normal fat

Components				Paired t – test t Critical two-tail: 2.05
LDL – C (mg/dl)	Pretest	Mean ±SD	141.13 ±37.09	1.84^{NS}
	Post test	Mean ±SD	129.39 ±37.39	
	Difference		↓ 11.74	
	% difference		↓ 8.31%	
Total Cholesterol (mg/dl)	Pretest	Mean ±SD	208.17 ±45.29	2.03^{NS}
	Post test	Mean ±SD	193.36 ±44.78	
	Difference		↓ 14.81	
	% difference		↓ 7.11%	
HDL – C (mg/dl)	Pretest	Mean ±SD	43.97 ±12.96	3.53^{*}
	Post test	Mean ±SD	51.29 ±11.54	
	Difference		↑ 7.32	
	% difference		↑ 16.68%	
Triglycerides (mg/dl)	Pretest	Mean ±SD	156.2 ±66.74	3.21^{*}
	Post test	Mean ±SD	123.1 ±51.85	
	Difference		↓ 33.1	
	% difference		↓ 21.19%	
VLDL – C (mg/dl)	Pretest	Mean ±SD	31.42 ±13.08	3.75^{*}
	Post test	Mean ±SD	23.64 ±8.96	
	Difference		↓ 7.78	
	% difference		↓ 24.76%	
TC/ HDL ratio	Pretest	Mean ±SD	4.98 ±1.02	4.94^{*}
	Post test	Mean ±SD	3.89 ±0.69	
	Difference		↓ 1.09	
	% difference		↓ 21.89%	
LDL/ HDL ratio	Pretest	Mean ±SD	3.35 ±0.97	3.76^{*}
	Post test	Mean ±SD	2.62 ±0.63	
	Difference		↓ 0.73	
	% difference		↓ 27.86%	
Non – HDL cholesterol (mg/dl)	Pretest	Mean ±SD	163.36 ±42.79	2.58^{*}
	Post test	Mean ±SD	146.25 ±37.67	
	Difference		↓ 17.11	
	% difference		↓ 10.47 %	
FBS (mg/dl)	Pretest	Mean ±SD	194.53 ±80.54	1.86^{NS}
	Post test	Mean ±SD	175.77 ±61.46	
	Difference		↓ 18.76	
	% difference		↓ 9.64%	



A longitudinal study was conducted on 116 adults suffering from CAD revealed that the group which received VCO significantly showed decrease in BMI, WC as compared to controls also there was notable increase in HDL - C (Cardoso A, 2015).

A study conducted in Thailand to assess the effect of VCO consumption on plasma lipoprotein levels of 35 healthy individuals aged 18 - 25 years revealed that intake of VCO significantly increased HDL levels with a non – significant improvement in TC, TG and LDL levels (Chinwong S, 2017).

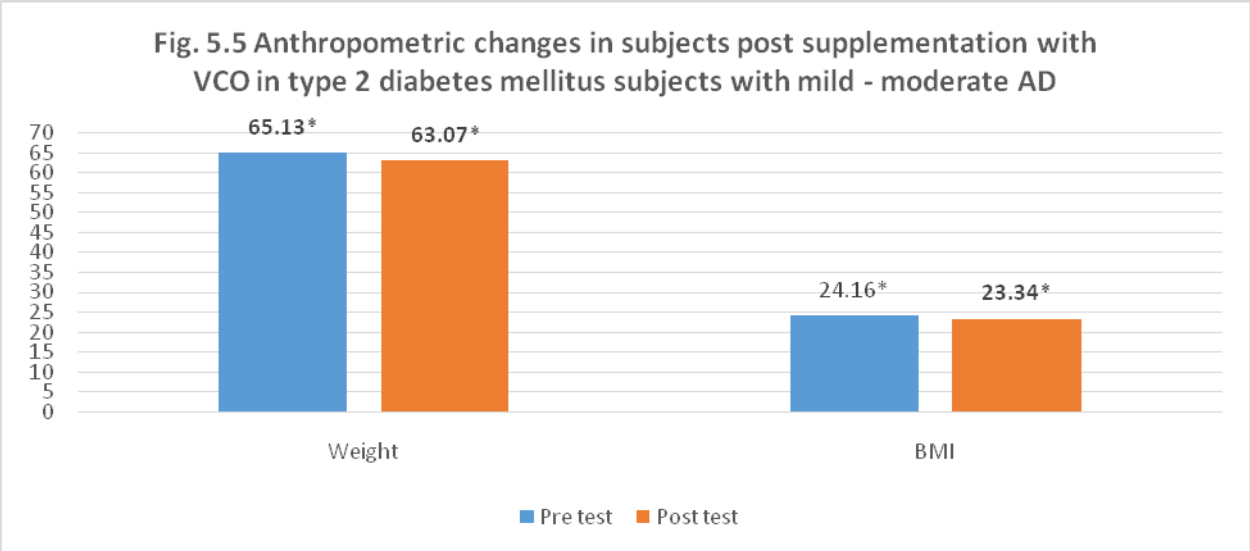
A randomized crossover study was carried out on 12 menopausal women who received 30ml of VCO or safflower oil (SO) for 28 days showed a significant rise TC and HDL levels in VCO receiving group as compared to SO without any adverse side effects (Harris M, 2017).

Changes in anthropometric measurements pre and post interventional trial

As observed in table 4 there was 3.16% ($p<0.05$) reduction in the mean weight and 3.51% ($p<0.05$) reduction in Body Mass Index (BMI).

Table 4: Changes in anthropometric measurements of type 2 diabetic subjects with mild – moderate AD before and after substitution of VCO

Components				Paired t – test t Critical two-tail: 2.05
Mean Weight	Pre test	Mean	65.13	6.82*
		SD	±11.51	
	Post test	Mean	63.07	
		SD	±10.89	
	Difference		↓ 2.06	
	% difference		↓ 3.16%	
Mean BMI	Pre test	Mean	24.16	6.74*
		SD	±2.89	
	Post test	Mean	23.34	
		SD	±2.77	
	Difference		↓ 0.82	
	% difference		↓ 3.51%	



A randomized, double - blind, clinical trial enrolled 40 women of age 20 - 40 years and was divided in two groups of 20 each who received 30ml of soy bean oil and 30ml of coconut oil respectively. Both groups showed reduction in BMI but significant waist circumference was reduced in group of subjects who received coconut oil (Assuncao ML, 2013).

CONCLUSION

- Substitution of normal fat with VCO resulted in improvement of 12.37% ($p<0.05$) in total SAGE score in terms of naming the pictures, calculation A component and clock construction by 45.6% ($p<0.05$), 20.48% ($p<0.05$) and 20% ($p<0.05$) respectively. Although improvement was seen in remaining eight components of SAGE scale such as: orientation, similarities, calculation B, construction of 3 - D figure, verbal fluency,

executive modified trails, executive problem solving and memory however the improvement was not statistically significant.

- ❖ There was improvement in HDL – C by 16.68% ($p<0.05$) and reduction in triglycerides, VLDL – C, TC/ HDL ratio, LDL/ HDL ratio and Non – HDL levels by 21.19%($p<0.05$), 24.76%($p<0.05$), 21.89% ($p<0.05$), 27.86% ($p<0.05$) and 10.47% ($p<0.05$).However no statistically significant difference was observed in LDL – C and total cholesterol
- ❖ There was non - statistical improvement in FBS levels by 9.64%.
- ❖ There was 3.16% ($p<0.05$) reduction in the mean weight and 3.51% ($p<0.05$) reduction in Body Mass Index (BMI).

The present study clearly depicts that VCO paved a way for improvement in SAGE scores and HDL – C, TG, VLDL – C, TC/ HDL ratio, LDL/ HDL ratio and Non – HDL components of lipid profile along with statistically significant reduction in BMI and weight of the subjects.

SUGGESTION FOR FUTURE RESEARCH

Virgin coconut oil can be substituted in the diets of elderly for a longer duration i.e. 3 months to study the additional impact on SAGE score, weight profile, lipid profile and diabetes. Also, supplementation of VCO to subjects with severe AD can also be undertaken to study its impact on various parameters.

REFERENCES

- Alzheimer's Association, www.alz.org
- Alma Maria Bueno Cayo, De la RubiaOrti, Sanchez Alvarez C, SelviSabater P, Sancho Castillo, Rochina, and Hu Yang I (2017). *How does coconut oil affect cognitive performance in Alzheimer patient?* NutricoinHospitalaria, Spain, 30(2), 352-356.
- Assuncao ML, Ferreira HS, dos Santos AF, Cabral CR, and Florencio TM (2013). *Effects of dietary coconut oil on the biochemical and anthropometric profiles of women presenting abdominal obesity.*American Oil Chemists Society, 44(7), 593-601.
- Cardoso A, Rosa G, Moreira AS, de Oliveira GM, Raggio, and Luiz R (2015). *A coconut extra virgin oil rich diet increases HDL cholesterol and decreases waist circumference and body mass in coronary artery disease patients.*Nutricoin hospital, Spain, 32(5), 2144-2155.
- Chauhan Komal, Aditika Agrawal, and Riddhi Thakkar (2013). *Assessment of Nutritional Status of elderly with mild dementia in urban Vadodara*. Asian Resonance/ Volume II, 194-200.
- Chinwong S, Chinwong D, andMangklabruks A (2017). *Daily consumption of virgin coconut oil increases High - density lipoprotein cholesterol levels in healthy volunteers: A randomized crossover trial*. Journal of Evidence based complementary alternate medicine, Volume 2017.
- D. Scharre, Ohio State University, 2012
- Drehmer E, Aguilar, RubiaOrti, Garcia Pardo, Sancho Cantus, Julian Rochina, andHu Yang (2018). *Improvement of main cognitive functions in patients with Alzheimer's disease*

after treatment with coconut oil enriched Mediterranean diet: A pilot study. Journal of Alzheimer's disease, 65(2), 577-587.

- Fernando WM, Martins IJ, Goozee KG, Brennan CS, Jayasena V, & Martins RN (2015). *The role of dietary coconut for the prevention and treatment of Alzheimer's disease: potential mechanism of action.* British Journal of Nutrition, 114(1), 1-14.
- Harris M, Fryda L, and Hutchins A (2017). *The impact of virgin coconut oil and high - oleic safflower oil on body composition, lipid and inflammatory markers in post-menopausal women.* Journal of Medicinal Food, 20(4), 345-351.
- Ivan Hu Yang, PalboSelviSabater, De la Rubia, Sancho Castillo, Rochina, and Manresa Ramon (2015). *Coconut oil: Non - alternating drug treatment against Alzheimer's disease.* NutricionHospitalaria, Spain, 32(6), 2822-2827.
- Julie Murray (2017) Benefits of Organic coconut oil. www.xpnworld.com
- Mark A Reger, Samuel T Henderson, Cathy Hale, Brenna Cholerton, Laura D Baker, GS Watson, Karen Hyde, Darla Chapman and Suzanne Craft, (2004), *Effect of beta - hydroxybutyrate on cognition in memory - impaired adults.* Neurobiological Aging: 25(3):311- 4.
- Martin Prince, Anders Wimo, Dr. MaelennGurechet, Gemma - Claire Ali, Dr. Yu – Tzu – Wu, and Dr. Mathew Prina. World Alzheimer's Report 2015: The global impact of Dementia.
- Scharre DW (2010). *Self-administered Gerocognitive Examination (SAGE): a brief cognitive assessment Instrument for mild cognitive impairment (MCI) and early dementia.* Alzheimer's disease Association

The Indian Journal of Home Science 2022: 34(1)

AWARENESS AND KNOWLEDGE OF NUTRITION LABELS ON PRE-PACKAGED FOOD ITEMS AMONG URBAN ADOLESCENTS OF DELHI, INDIA

Preeti Kamboj[1], Neena Bhatia[2], G.S. Toteja[3]

[1]Ph.D. Scholar, [2]Associate Professor
Department of Food and Nutrition,
Lady Irwin College, University of Delhi, Sikandra Road, New Delhi-110001
Email : preetikamboj@ymail.com, drneenabhatia.lic@gmail.com
[3]Former Additional Director General (Scientist H),
Indian Council of Medical Research, V. Ramalingaswami Bhawan,
P.O. Box No. 4911, Ansari Nagar, New Delhi - 110029
Email: drgstoteja2021@gmail.com

ABSTRACT

An increasing trend in body mass index of adolescents has been reported in South Asia. Nutrition information in front-of-pack labeling formats is one of the several actions recommended for reducing childhood obesity. The objective of the present study was to assess awareness and knowledge of nutrition labels on pre-packaged food items among adolescents aged 11-18 years residing in urban areas of Delhi. The factors associated with information read by adolescents on nutrition labels were also assessed. A community-based cross-sectional study was conducted among urban Delhi-based adolescent girls and boys (n=570). Information on awareness of nutrition labels; practice of reading nutrition labels and its contents; knowledge on serving size, amount of pre-packaged food items consumed at one time and helpfulness of nutrition labels was assessed. Appropriate statistical tests were used to assess factors associated with information read. Seventy four percent adolescents were aware that pre-packaged food items contain nutrition labels and, of these,80% reported reading information given on the same. Most read information included best before date (70.4%), name (45.1%), ingredients (32.5%) and nutrition information (32.2%). Total fat was the most read nutrition information (66.7%). Only 7.2% could identify that calories provided by one serving could be different from calories provided by one full packet, and of these, majority (42.0%) did not measure the amount before consuming. Early adolescence and having a television in bedroom were significantly associated with information read on pre-packaged food items ($p<.05$). However, mother's educational level was inversely associated with the same ($p<.05$). A lack of understanding of nutrition labels on pre-packaged food items (including serving size) was observed. This was despite the fact that almost three-quarter (74%) of the adolescents assessed were aware and, of these, 80% reported reading this information. Evidence from large-scale, nationally representative studies can help in planning school health programmes to educate adolescents on nutrition labels and use of aggressive marketing strategies and health claims by manufacturers to promote high fat, salt, and sugar food items.

KEY WORDS: Knowledge; urban adolescents; nutrition labels; pre-packaged food items; high fat, salt, and sugar food items

INTRODUCTION

In 2016, around 340 million children and adolescents in the age-group 5-19 years were overweight/ obese world over (WHO, 2020). Globally, an increase in the mean body mass index and obesity among children and adolescents aged 5-19 years was reported between 1975 and 2016. From year 2000 onwards, an increase in trend in mean body mass index was observed in South Asia (NCD Risk Factor Collaboration NCD-RisC, 2017). India is home to 14.4 million obese children aged 2-19 years, which is the second highest in the world (The GBD 2015 Obesity Collaborators, 2017). Data from Comprehensive National Nutrition Survey shows adolescents (10-19 years) from Delhi reporting a higher prevalence of overweight (12.3% vs. 4.8%) and obesity (3.3% vs. 1.1%) compared to the national prevalence (Ministry of Health and Family Welfare & UNICEF, 2019a, 2019b).

Food labeling can help consumers in food selection and choosing healthy diets (Thavorncharoensap, 2017). It is one of the population-level (Campos, et al, 2011), cost-effective multi component strategies for reducing health and economic burden of obesity(Thavorncharoensap, 2017).Along with nutrition labels, consistent information on serving size based on national dietary guidelines has also gained attention as a strategy for weight reduction (Kerr, et al, 2015). Nutrition and menu labeling can guide consumers to make healthful food choices, watch their energy intakes and maintain an ideal body weight (Storcksdieck genannt Bonsmann & Wills, 2012).Nutrition information in front-of-pack labeling formats is one of the several actions recommended for reducing childhood obesity (WHO, 2018). Governments of United States, Canada, Mexico, Australia, New Zealand and Northern Ireland (United Kingdom) have taken actions specific to food labeling in the form of policies/ recommendations/ mandatory or voluntary front-of-pack labeling regulations to tackle childhood obesity (Musuwo, 2019). India should also adopt effective strategies/ positive examples as a measure to reduce childhood obesity. Examples of different front-of-pack labeling systems being followed by different countries across the globe include the following (Storcksdieck, et al , 2020):

- Reference Intakes and similar schemes
- Color-coded nutrient-based schemes- includes traffic light labeling (United Kingdom, Ecuador)
- Endorsement schemes (‘positive logos’)- includes Nordic Keyhole (Sweden, Denmark, Norway, Lithuania, and Iceland) and Choices logo (Netherlands, Belgium, Poland, Czech Republic, and Mexico)
- Warning signs- includes warning label (Chile)

Studies have confirmed that price, taste, convenience, shopping habits and time have been reported as the factors affecting the decision to purchase food (Storcksdieck genannt Bonsmann & Wills, 2012). This states that the use of food labels for selecting/ shopping for health food items is still not being followed by larger parts of the populations using pre-packaged food items. Evidence from various countries shows use of labels is not satisfactory among adolescent population(Campos et al., 2011; Talagala & Arambepola, 2016). There is a paucity of systematic reviews and meta-analyses on the impact of food labeling on body mass index (Thavorncharoensap, 2017).

World Health Organization and the Food and Agriculture Organization of the United Nations established the Codex Alimentarius Commission to develop international food labeling standards for protecting consumer health and ensuring fair practices in the food trade (FAO, 2016). Food Safety and Standards Authority of India has recently released Food Safety and Standards (Labelling and Display) Regulations,(FSSAI, 2020). As per the new regulations, it is mandatory for pre-packaged food items to display nutritional information per 100 grams/ 100 milliliters/ single consumption pack along with per serve percentage contribution to Recommended Dietary Allowance (based on energy-2000 Kcal, total fat- 67 g saturated fat-22 g, trans fat-2 g, added sugar-50 g and sodium- 2000 mg (salt-5 g) along with serving measure (g/ ml) and number of servings/ pack. In addition, all information under these regulations should be provided on the principal display panel, i.e., the part of the package which is presented or visible to the consumer at the time of purchase of food item. In view of increased consumption of high fat, salt and sugar food items, a communication module called READ-B4-U-EATwas developed to enhance knowledge and promote food label reading practices among school-going adolescents, thereby promoting healthy eating practices(Gavaravarapu, et al, 2016).

OBJECTIVES

1. To assess the awareness and knowledge of nutrition labels on pre-packaged food items among adolescents residing in urban areas of Delhi.
2. To assess the factors associated with information read by adolescents on nutrition labels.

METHODOLOGY

Study design: A community-based cross-sectional, descriptive study was conducted among purposively selected urban Delhi-based adolescents.

Sample size: 570 adolescent girls and boys aged 11-18 years (61.8% females).

Methods: A pre-tested interviewer-administered interview-schedule was developed both in Hindi and English languages. It was used to elicit information on awareness of nutrition labels on pre-packaged food items, practice of reading nutrition labels, contents/ information read on nutrition labels, knowledge of serving size, amount of pre-packaged food items consumed at one time and helpfulness of nutrition labels on pre-packaged food items. Details regarding socio-demographic and economic profile, lifestyle, and physical activity behavior and consumption pattern of high fat, salt, and sugar foods were also assessed. All anthropometric assessments (i.e., height, weight, waist circumference) were conducted using standard methodologies. Factors associated with information read by adolescents on nutrition labels were grouped under the following: socio-economic and demographic variables; adolescents' characteristics; lifestyle and physical activity behavior of adolescents; and their high fat, salt, and sugar foods consumption pattern. Households were classified as high, middle and low income group, and urban slums based on criterion used by (Indian Council of Medical Research, 2011) for assessing socio-economic status. Adolescents were classified as overweight, thin and stunted using body mass index classifications given by(WHO, 2007). Recommendations by Misra et al. (2012) for duration of moderate-to-vigorous intensity physical activity and screen time were used. Waist-to-height ratio≥0.5 was used to assess central adiposity among adolescents (Ashwell & Hsieh, 2005).

Operational definitions:

- A food label was defined as information in the form of a tag/ brand/ mark/pictographic or other descriptive matter, which is written, printed, drawn, marked, engraved on or attached to a food container(FAO, 2016).
- Pre-packaged food items were defined as food items which are available in a package of any type such that the contents cannot be tampered with and are ready for sale to consumer (FSSAI, 2020).

Data analysis: Results are presented as frequencies. Factors associated with information read by adolescents on nutrition labels were assessed using Pearson Chi-Square test and Fisher's Exact test. A p-value less than 0.05 was considered as significant. Cramer's V was used to test the strength of association between significant variables.

The results presented in this paper are a part of a larger study conducted to assess the consumption pattern of high fat, salt, and sugar food items among adolescents. The study protocol was approved by the Institutional Ethics Committee, Lady Irwin College, University of Delhi.

LIMITATION

Data for high income group was collected from a school catering to adolescents of this income group. The study setting was modified because response received from this income group in the community was poor.

FINDINGS AND DISCUSSION

Awareness of nutrition labels: Approximately 74% adolescents (n=420) were aware that pre-packaged food items contain nutrition labels.

Information read on nutrition labels: Eighty percent adolescents (n=335) reported reading information given on pre-packaged food items. These adolescents were further asked about the specific information read (Fig.-1). Best before or use by date (70.4%) was the most read information followed by name of food (45.1%), ingredients (32.5%), nutrition information (32.2%), logo for vegetarian/ non-vegetarian (28.7%), date of manufacture or packing (24.5%), etc.

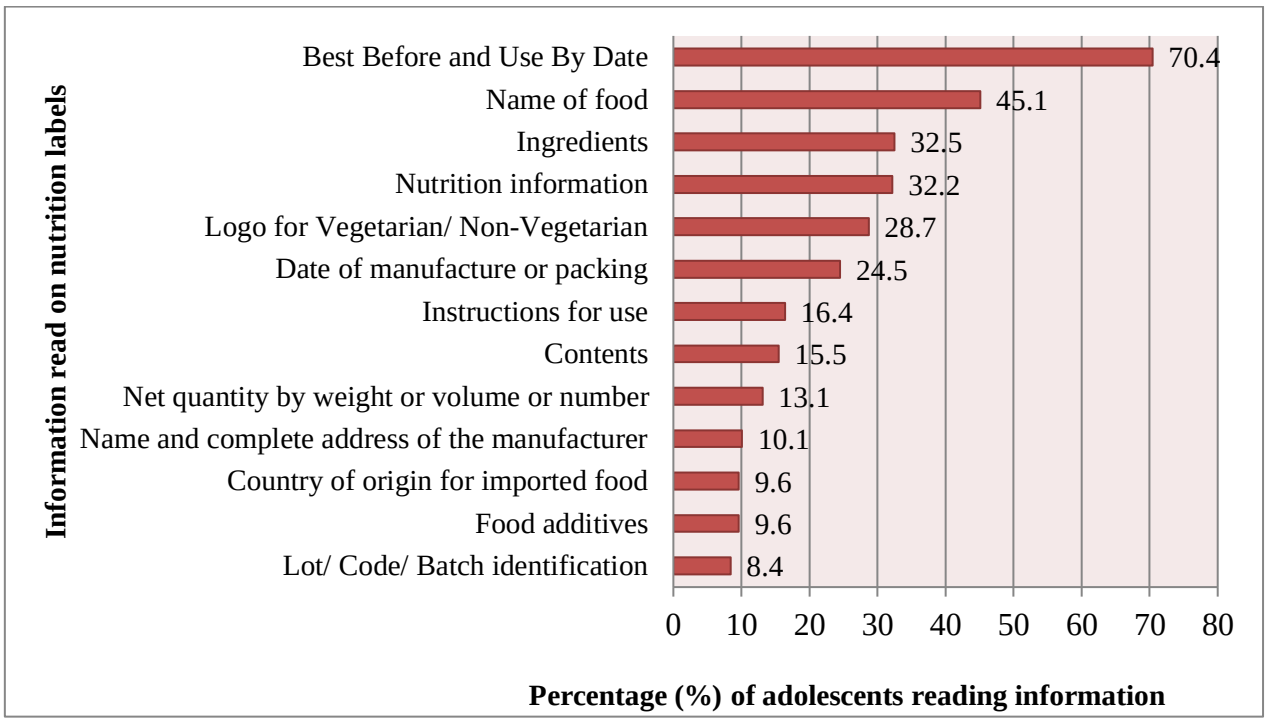


Figure 1: Percentage of adolescents reading information given on nutrition labels on pre-packaged food items

Eighty one percent adolescents from Kolkata (n=297; age: 13-16 years) studying in government and private schools reported reading food labels always or sometimes (Saha, et al, 2013). This percentage is quite close to the result of present study. Whereas the percentage of adults from Puducherry (n=153; mean age: 38.05±11.67; females=52.2%) who were aware of presence of food labels on pre-packaged food items was 92.2%. And 76% checked for a food label when buying these food items. This could signify that label reading practices of present study population were quite good even when compared with adults. Further, (Saha et al., 2013) also reported that most read information on food labels included date of manufacture (79%), date of expiry (74%), best used before date (65%), ingredients (50%) and nutrition information (20%). School-going Sri-Lankan adolescents (n: 542, ages: 16-17 years) reported paying attention to expiry date (93.6%), date of manufacture (55.2%), nutrition information (38.4%), price (34.7%) and brand name (24.6%) always (Talagala & Arambepola, 2016). A cross-sectional consumer market survey conducted in New Delhi and Hyderabad among individuals (n=1832) of three age groups, viz. adolescents (10–19 years), adults (20–59 years) and elderly (60 years) reported that the most read information included brand name (85%), best before date (80%) (Vemula, et al, 2014).

Nutrition information read on nutrition labels: Among those adolescents who read nutrition information (n=108), maximum reported reading values of total fat (66.7%) followed by total calories (63.0%), protein (61.1%), carbohydrates (50.9%), sugar (50.0%), vitamins (50.0%), minerals (42.6%), salt/ sodium (37.0%), trans fats (34.3%), cholesterol (32.4%) and SFA (22.2%) (Fig.-2).

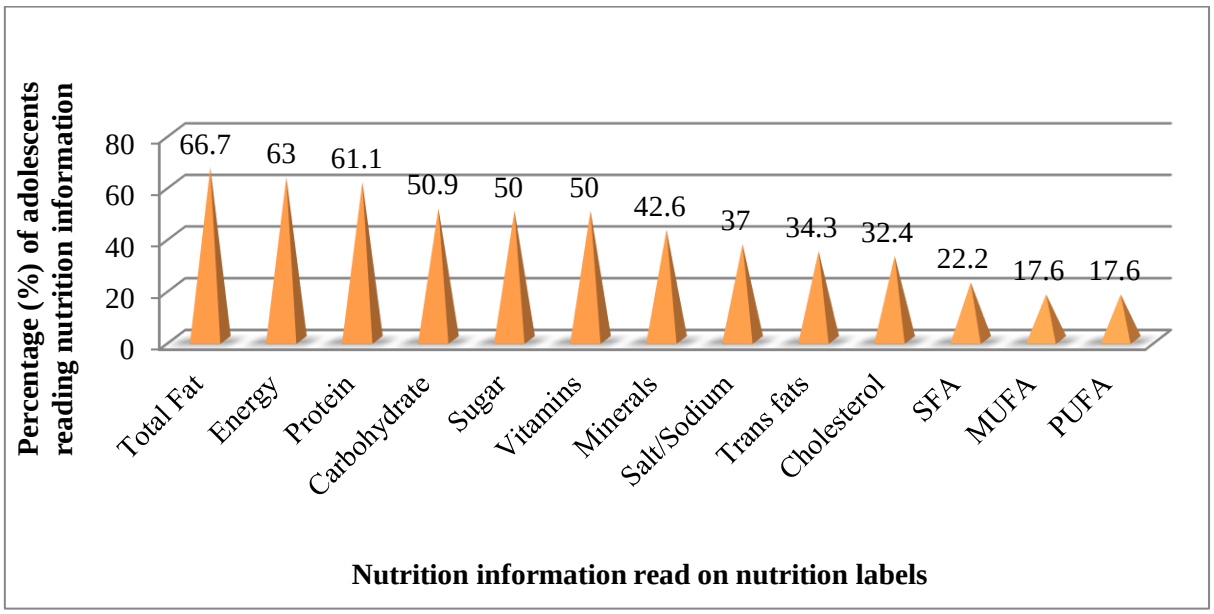


Figure 2: Percentage of adolescents reading nutrition information on nutrition labels

A community-based study conducted among individuals (n:368; mean age: 29.1±9.7, males: 64.7%) residing in an urbanized village of south Delhi reported that a quarter of study population read nutritional information. Specific information read included calorie content (56.0%), sugar (56.0%), fat (47.5%), trans fats (27.1%) and salt (8.7%) (Bhilwar, et al ,2018).

Awareness of difference in calories provided by one serving and full packet of pre-packaged food items: Adolescents were asked if they were aware that calories provided by one serving of a pre-packaged food items can be different from one full packet (Fig.-3). Only 7.2% adolescents were aware of the same. Maximum adolescents (79.7%) reported that they did not know that there is a difference between the two.

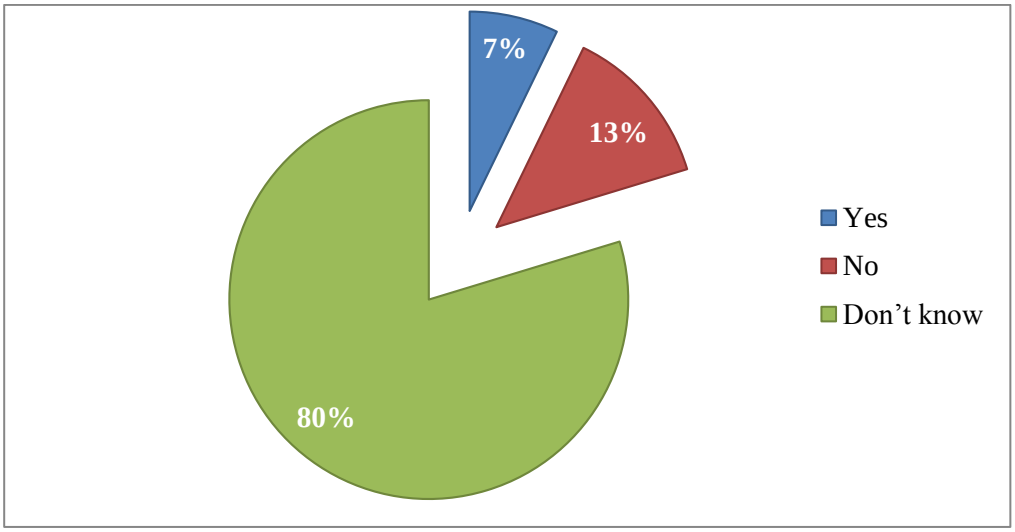


Figure 3: Awareness of adolescents regarding difference between calories provided by one serving and one full packet of a food product

Amount of pre-packaged food items consumed at a time: The adolescents who were aware that calories provided by one serving could be different from calories provided by one full packet (n=24) were further asked the amount consumed from pre-packaged food items at one time (Fig.-4). Only 16.7% adolescents reported consuming one serving of the pre-packaged food items at one time. Rest of the 83.3% adolescents either consumed the entire packet or did not measure the amount before consuming.

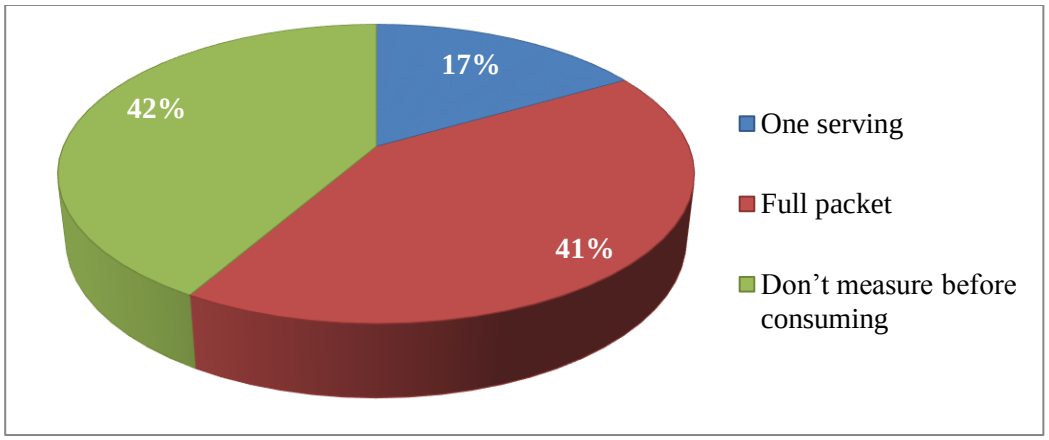


Figure 4: Amount of pre-packaged food items consumed at one time

Helpfulness of nutrition labels on pre-packaged food items: Adolescents were asked if having nutrition labels on pre-packaged food items is helpful for the consumers (Fig.-5). Almost half (49.9%) of the adolescents reported that it was helpful. However, 39.1% adolescents did not know if having nutrition labels was helpful.

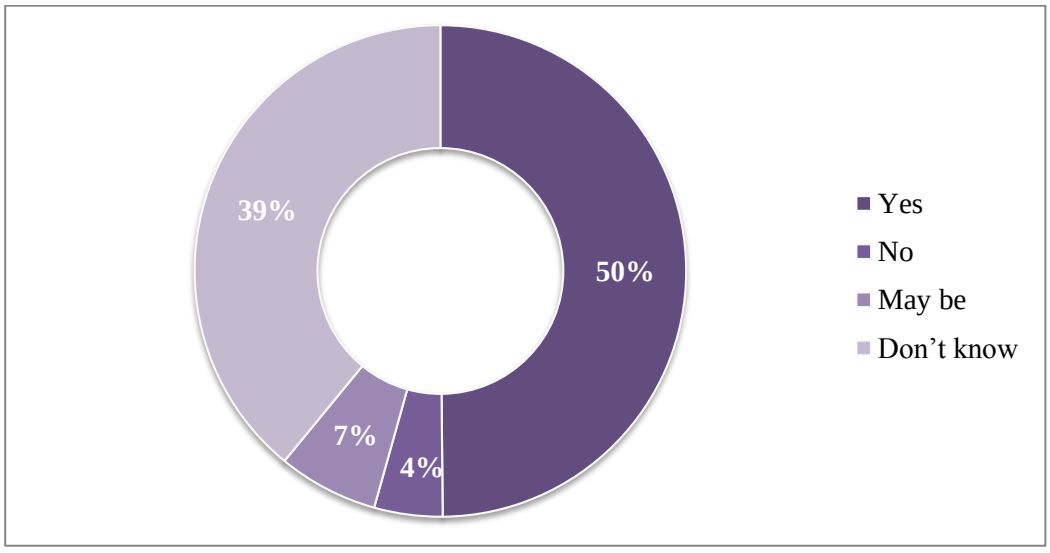


Figure 5: Adolescents' opinion if nutrition labels on pre-packaged food items are helpful

The adolescents who reported (Yes + May be) that having nutrition labels on pre-packaged food items was helpful (n=189) were further asked how the same help consumers (Fig.-6).

Maximum number of adolescents reported that consumers can check best before and use by date (88.9%).

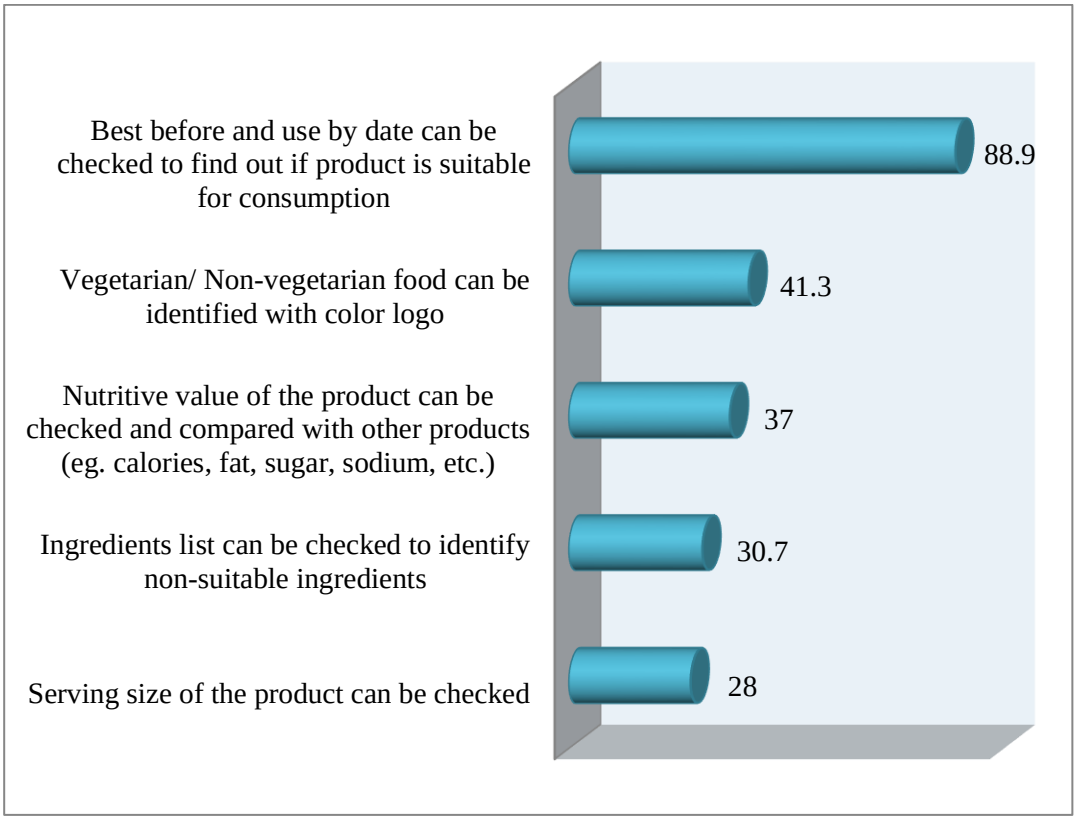


Figure 6: Knowledge about helpfulness of nutrition labels on pre-packaged food items

Categorization of information read by adolescents on nutrition labels according to different variables (Table-1):

- *Socio-economic and demographic variables*: Majority of adolescents reading information on nutrition labels belonged to high income group (35.5%) and nuclear families (63.0%). As per present study, the parents of majority of adolescents who read information on nutrition labels did not complete high school.
- *Adolescents' characteristics*: Majority of adolescents reading information on nutrition labels were females (59.1%), studying in government schools (48.8%), were not overweight (83.4%), were not thin (87.6%), were not stunted (83.1%) and had waist-to-height ratio<0.5 (75.8%).
- *Lifestyle and physical activity behavior of adolescents*: Majority of adolescents reading information on nutrition labels did not own a personal smart phone (73.0%) or a computer/ laptop (62.7%), engaged in moderate-to-vigorous intensity physical activity<60 minutes/day (59.5%), watched screens ≥120 minutes/day (51.8%)and watched T.V./ laptop while eating (78.2%).
- *Consumption pattern of high fat, salt, and sugar food items*: Majority of adolescents reading information on nutrition labels consumed main meals with family (77.9%),

consumed high fat, salt, and sugar foods in main meals with family (64.0%) and perceived high fat, salt, and sugar food items as unhealthy (55.1%).

Table 1: Categorization of information read by adolescents on nutrition labels according to different variables

Variables	Categories	Adolescents who read information given on nutrition labels n (%)	p value
Socio-economic and demographic variables			
Socio-economic status	Urban slums	70 (20.9)	.528*
	Low-income group	61 (18.2)	
	Middle-income group	85 (25.4)	
	High-income group	119 (35.5)	
Type of family	Nuclear	211 (63.0)	#
	Joint	42 (12.5)	
	Extended	64 (19.1)	
	Single-parent	18 (5.4)	
Father's educational level	Completed high school	133 (42.2)	.169^
	Did not complete high school	182 (57.8)	
Mother's educational level	Completed high school	133 (40.7)	**.032^**
	Did not complete high school	194 (59.3)	
Adolescents' characteristics			
Sex	Male	137 (40.9)	.622^
	Female	198 (59.1)	
Stages of adolescence	Early adolescence	207 (61.8)	**.042^**
	Late adolescence	128 (38.2)	
Type of school	Government	145 (48.8)	#
	Municipal Corporation	4 (1.3)	
	Public	8 (2.7)	
	Private	140 (47.1)	
Status of overweight	Overweight (BAZ>+1SD)	55 (16.6)	.740^
	Not overweight (BAZ≤+1SD)	276 (83.4)	
Status of thinness	Thin (BAZ<-2SD)	41 (12.4)	1.000^
	Not thin (BAZ≥-2SD)	290 (87.6)	
Status of stunting	Stunted (HAZ<-2SD)	56 (16.9)	.870^
	Not stunted (HAZ≥-2SD)	275 (83.1)	
Central adiposity	Waist-to-height ratio≥0.5	79 (24.2)	.236*
	Waist-to-height ratio<0.5	248 (75.8)	
Lifestyle and physical activity behavior of adolescents			
T.V. in bedroom	Yes	199 (64.0)	**.049^**
	No	112 (36.0)	
Ownership of personal	Yes	84 (27.0)	.890^

Variables	Categories	Adolescents who read information given on nutrition labels n (%)	p value
smartphone	No	227 (73.0)	
Ownership of computer/ laptop	Yes	116 (37.3)	.071^
	No	195 (62.7)	
Moderate-to-vigorous intensity physical activity (minutes/day)	≥60 minutes	126 (40.5)	.452*
	<60 minutes	185 (59.5)	
Screen time (minutes/day)	≥120 minutes	161 (51.8)	.902^
	<120 minutes	150 (48.2)	
Watching T.V./laptop while eating	Yes	244 (78.2)	.364*
	No	68 (21.8)	
Consumption pattern of high fat, salt, and sugar food items			
Consume main meals with family	Yes	261 (77.9)	.387^
	No	74 (22.1)	
Consume high fat, salt, and sugar foods in main meals with family	Yes	167 (64.0)	.385^
	No	94 (36.0)	
Perception about high fat, salt, and sugar foods	Healthy	36 (10.8)	.060*
	Unhealthy	184 (55.1)	
	Neither healthy nor unhealthy	114 (34.1)	

BAZ- Body mass index-for-age z-scores
HAZ- Height-for-age z-scores
*p value reported for Pearson Chi-Square Test (Asymptomatic significance (2-sided))
#p value for Pearson Chi-Square Test not reported because cells had expected count less than 5
^p value reported for Fisher's Exact Test (Exact significance (2-sided))

Factors associated with information read on nutrition labels: A highly significant association was reported between information read by adolescents on nutrition labels and the following:

- Mothers who did not complete high school ($X^2(1) = 5.014$, $p = .032$) (Cramer's V=.110, $p=.032$);
- Early adolescence ($X^2(3) = 4.487$, $p = .042$) (Cramer's V=.103, $p=.042$); and
- Having a T.V. in bedroom($X^2(1) = 4.176$, $p = .049$) (Cramer's V=.103, $p=.049$)

Unlike in the present study, no significant association ($p<.05$) was found between mother's education and the adolescent's practice of reading nutrition labels in the study conducted by (Saha et al., 2013). A study among Canadian adults (n: 639; age: ≥18 years) reported lower comprehension of nutrition labels by individuals belonging to lower socio-economic status(Sinclair, Hammond, & Goodman, 2013). However, in present study, no significant association was observed between adolescents reading information on nutrition labels and socio-economic status.

SUMMARY

Almost a quarter of the study population was aware that pre-packaged food items contain nutrition labels and 80% reported reading information given on nutrition labels on pre-packaged food items. Majority of adolescents reported reading 'best before' or 'use by date' (70.4%) followed by name of food (45.1%), ingredients (32.5%), nutrition information (32.2%), etc. More than half of the adolescents reading nutrition information (n=108) checked values of total fat (66.7%), total calories (63.0%), protein (61.1%) and carbohydrates (50.9%). However, only 7.2% adolescents were aware that calories provided by one serving could be different from calories provided by one full packet of pre-packaged food items. Additionally, 41.7% did not measure the amount of pre-packaged food items before consuming. Further, only half (49.9%) of the adolescents reading information given on nutrition labels reported that it was helpful. Helpfulness of nutrition labels was reported in terms of checking best before and use by date (88.9%) followed by identification of vegetarian/ non-vegetarian food (41.3%). Only 37.0%, 30.7% and 28.0% adolescents reported reading nutritive value, ingredients and serving size respectively. Factors significantly associated with information read by adolescents on nutrition labels included early adolescence and having a T.V. in bedroom($p<.05$). Mother's educational level was inversely associated with information read by adolescents on nutrition labels ($p<.05$).

CONCLUSION

- Evidence suggests educational interventions focusing on educating consumers on how to comprehend the complex nutrition information given on nutrition labels have a positive impact (Moore, et al, 2018; Saha et al., 2013). Increasing nutrition knowledge of consumers may support both- frequency of use of nutrition labels and its understanding(Miller & Cassady, 2015).
- Implementing school health programmes aimed at improving the knowledge regarding use of nutrition labels among adolescents; and, educating them about the aggressive marketing strategies and health claims used by manufacturers to promote high fat, salt, and sugar food items will be helpful (Talagala & Arambepola, 2016).
- Food labeling regulations vary across different countries. Along with helping consumers, harmonization/ standardization in food labeling can help in providing easy to understand information, encourage manufacturers to reformulate products, reduce trade difficulties and costs. However, this will require close coordination of governments, food industries, and academia (Thavorncharoensap, 2017; WHO, 2018).

SUGGESTIONS FOR FUTURE RESEARCH

Future research should focus on consumer-friendly formats of nutrition labels, viz. symbols, images, graphics, etc. as well as front-of-pack labeling. These formats are effective and have a greater impact as they make nutrition information accessible to various population sub-groups (Campos et al., 2011).

REFERENCES

- Ashwell, M., & Hsieh, S. D. (2005). Six reasons why the waist-to-height ratio is a rapid and effective global indicator for health risks of obesity and how its use could simplify the international public health message on obesity. *International Journal of Food Sciences and Nutrition*, *56*(5), 303–307. https://doi.org/10.1080/09637480500195066
- Bhilwar, M., Tiwari, P., Saha, S. K., Sharma, P., & Parija, P. P. (2018). Use of information on pre-packaged foods among residents of an urban village of south delhi, india. *The National Medical Journal of India*, *31*(4), 211–214. https://doi.org/10.4103/0970-258X.258219
- Campos, S., Doxey, J., & Hammond, D. (2011). Nutrition labels on pre-packaged foods: A systematic review. *Public Health Nutrition*, Vol. 14, pp. 1496–1506. https://doi.org/10.1017/S1368980010003290
- FAO. (2016). *HandBook On Food Labelling To Protect Consumers*. Retrieved from http://www.fao.org/3/a-i6575e.pdf
- FSSAI. (2020). *Food Safety and Standards (Labelling and Display) Regulations, 2020. Chapter 1. General*. Retrieved from https://www.fssai.gov.in/upload/notifications/2020/12/5fd87c6a0f6adGazette_Notification_Labelling_Display_14_12_2020.pdf
- Gavaravarapu, S. R. M., Saha, S., Vemula, S. R., & Mendu, V. V. R. (2016). Read-B4-U-Eat: A Multicomponent Communication Module to Promote Food Label Reading Skills Among Adolescents in India. *Journal of Nutrition Education and Behavior*, *48*(8), 586-589.e1. https://doi.org/10.1016/j.jneb.2016.05.014
- Indian Council of Medical Research. (2011). *ICMR Task Force Study on Consumption pattern of carbonated water among Indian population*.
- Kerr, M. A., McCann, M. T., & Livingstone, M. B. E. (2015). Food and the consumer: Could labelling be the answer? *Proceedings of the Nutrition Society*, *74*(2), 158–163. https://doi.org/10.1017/S0029665115001676
- Miller, L. M. S., & Cassady, D. L. (2015, September 1). The effects of nutrition knowledge on food label use. A review of the literature. *Appetite*, Vol. 92, pp. 207–216. https://doi.org/10.1016/j.appet.2015.05.029
- Ministry of Health and Family Welfare, & UNICEF. (2019a). *Comprehensive National Nutrition Survey Delhi Preliminary Factsheet 2016*. Retrieved from https://www.popcouncil.org/uploads/pdfs/2019RH_CNNSfactsheet_Delhi.pdf
- Ministry of Health and Family Welfare, & UNICEF. (2019b). *Comprehensive National Nutrition Survey India Preliminary Factsheet 2016-18*. Retrieved from https://www.popcouncil.org/uploads/pdfs/2019RH_CNNSfactsheet_India.pdf
- Misra, A., Nigam, P., Hills, A. P., Chadha, D. S., Sharma, V., Deepak, K. K., … Gupta, S. (2012). Consensus physical activity guidelines for Asian Indians. *Diabetes Technology and Therapeutics*, *14*(1), 83–98. https://doi.org/10.1089/dia.2011.0111
- Moore, S. G., Donnelly, J. K., Jones, S., & Cade, J. E. (2018, October 4). Effect of educational interventions on understanding and use of nutrition labels: A systematic review. *Nutrients*, Vol. 10. https://doi.org/10.3390/nu10101432
- Musuwo, N. (2019). *International policies to reduce childhood obesity-a Health Action Campaign review*. Retrieved from https://www.healthactioncampaign.org.uk/assets/documents/international-childhood-obesit

- NCD Risk Factor Collaboration (NCD-RisC). (2017). Worldwide trends in body-mass index, underweight, overweight, and obesity from 1975 to 2016: a pooled analysis of 2416 population-based measurement studies in 128·9 million children, adolescents, and adults. *The Lancet*, *390*, 2627–2642. https://doi.org/10.1016/S0140-6736(17)32129-3
- Saha, S., Vemula, S. R., Mendu, V. V. R., & Gavaravarapu, S. R. M. (2013). Knowledge and practices of using food label information among adolescents attending schools in Kolkata, India. *Journal of Nutrition Education and Behavior*, *45*(6), 773–779. https://doi.org/10.1016/j.jneb.2013.07.011
- Sinclair, S., Hammond, D., & Goodman, S. (2013). Sociodemographic differences in the comprehension of nutritional labels on food products. *Journal of Nutrition Education and Behavior*, *45*(6), 767–772. https://doi.org/10.1016/j.jneb.2013.04.262
- Storcksdieck genannt Bonsmann, S., Marandola, G., Ciriolo, E., van Bavel, R., & Wollgast, J. (2020). *Front-of-pack nutrition labelling schemes: a comprehensive review*. https://doi.org/10.2760/436998
- Storcksdieck genannt Bonsmann, S., & Wills, J. M. (2012). Nutrition Labeling to Prevent Obesity: Reviewing the Evidence from Europe. *Current Obesity Reports*, Vol. 1, pp. 134–140. https://doi.org/10.1007/s13679-012-0020-0
- Talagala, I. A., & Arambepola, C. (2016). Use of food labels by adolescents to make healthier choices on snacks: A cross-sectional study from Sri Lanka. *BMC Public Health*, *16*(1). https://doi.org/10.1186/s12889-016-3422-1
- Thavorncharoensap, M. (2017). *Effectiveness of Obesity Prevention and Control. ADBI Working Paper 654*. Retrieved from https://www.adb.org/publications/effectiveness-obesity-prevention-and-control
- The GBD 2015 Obesity Collaborators. (2017). Health Effects of Overweight and Obesity in 195 Countries over 25 Years. *New England Journal of Medicine*, *377*(1), 13–27. https://doi.org/10.1056/nejmoa1614362
- Vemula, S. R., Gavaravarapu, S. R. M., Mendu, V. V. R., Mathur, P., & Avula, L. (2014). Use of food label information by urban consumers in India - A study among supermarket shoppers. *Public Health Nutrition*, *17*(9), 2104–2114. https://doi.org/10.1017/S1368980013002231
- WHO. (2018). Taking Action on Childhood Obesity. In *World Health Organization*. https://doi.org/WHO/NMH/PND/ECHO/18.1
- WHO. (2020). Obesity and Overweight. https://doi.org/10.1007/978-1-4419-1695-2_447
- World Health Organization. (2007). Growth reference 5-19 years | BMI-for-age (5-19 years). Retrieved June 27, 2020, from https://www.who.int/growthref/who2007_bmi_for_age/en/

The Indian Journal of Home Science 2022: 34(1)

DEVELOPMENT OF NUTRITIOUS BARS ENRICHED WITH MORINGA FOR HIV INFECTED CHILDREN

Priyanka Arora[1], Vyoma Agarwal[2], Dr. Pradeep Chaudhary[3]
[1]Student, [2]Assistant Professor,
Department of Home Science, IIS (deemed to be University),
Jaipur, Rajasthan, India
[3]Joint Director, IEC, Rajasthan State Aids Control Society,
Medical Directorate, Jaipur, Rajasthan, India
vyoma.aggarwal@gmail.com

ABSTRACT

Human Immunodeficiency Virus (HIV) is a retrovirus that attacks & impairs the body's natural defense system against disease & infection. HIV infection leads to malnutrition which further contributes to a weakened immune system making a vicious cycle. Good nutrition can help maintain and improve the nutritional status of a person with HIV/AIDS and delay the progression from HIV to AIDS-related diseases. Studies have shown that consumption of 5g moringa leaf powder per day increases the CD4 cell count significantly. The objective of the present study was to develop a nutritious bar for HIV- Infected children enriched with energy, protein, carbohydrates, fats & micronutrient which will provide several health benefits and increase CD4 cell count. The bars were formulated using ingredients like Bajra, green gram dal (de-husked), groundnuts, jaggery, ginger powder, chocolate, and ghee and moringa powder. The score of all types of bars was found to be good and the bar variation with 25% moringa powder had highest overall acceptability.

Keywords:CD4 cells count, Macronutrient, Moringa Powder, Nutrition status.

INTRODUCTION

Human Immunodeficiency Virus (HIV) is a retrovirus that attack & impairs the body's natural defense system against disease & infection. CD4 T-cells are the victims of this disease which are disabled and killed during the course of infection (Khanna, 2017). HIV can lead to opportunistic infection after 3-4 weeks of being infected. If HIV infection is severe long lasting it can lead to micronutrient deficiency. There is a progressive decline in CD4 count to around 50 cells per year in case of HIV infection (Duggal & Chaugh, 2012). In 2018, there were 37.9 million people worldwide living with HIV/AIDS, of these, 2.8 million were children aged 0 -19 years. In 2018, It was estimated that 190,000 adolescents newly infected with HIV between the age of 10 to 19 years. In 2015, there were 0.26%people living with HIV in India and were aged 15-49 years (National AIDS Control Organization,2016)

Severe nutritional and immune deficiencies can occur in children under 5 years of age, leading to death. 40% of HIV-infected children, under 18 months, in clinics, experience developmental delays. Without care and treatment including ART, one third will die in the first one year, 50% by the second year and 60% within three years. The effect of HIV on nutritional status

of children can occur early in the course of the disease. HIV infection results in an increased need for energy, protein and other micronutrients like vitamin C, iron and zinc. In infants and children, HIV infection causes more rapid progression to AIDS compared to adults because of the immaturity of children's immune systems as well as a higher viral load, especially if the route of transmission is parent-to-child transmission. When the immune system is impaired, other infective agents can attack the weakened system easily. Such 2 infections, like tuberculosis, pneumonia, diarrhea and oral thrush, place higher nutritional demands on the body and weaken it further, resulting in a decline in the nutritional status. When the child is co-infected with HIV/AIDS, the body needs much more nutrition in order to function optimally. Good nutrition cannot cure AIDS, but it can help maintain and improve the nutritional status of a person with HIV/AIDS and delay the progression from HIV to AIDS related diseases. It can therefore improve the quality of life of people living with HIV/AIDS (National AIDS Control Organization, 2016)

Anorexia leading to a reduced nutrient intake is the most important cause of weight loss in HIV-positive patients. Encouraging severely malnourished children to eat is often difficult until their infections are adequately treated. A healthy and balanced diet helps sustain body weight and fitness. Eating well also helps maintain and improve the performance of the immune system – the body's protection against infections – which in turn helps a person stay healthy. Many of the conditions associated with HIV/AIDS affect food intake, digestion and absorption, while others influence the functions of the body. The requirement of energy is increased by 10% over the RDA to maintain body weight & physical activity. The protein intake should be between 12-15% of the total energy. Zinc is a component of both structural and catalytic proteins of HIV. Zinc is required for the activity of reverse transcriptase and the production of infectious virus and may inhibit HIV replication through binding to the catalytic site of HIV protease (World Health Organization, 2005).

Moringa. Oleifera has an impressive range of medicinal uses with high nutritional value. Different parts of this plant contain a profile of important minerals, and are a good source of protein, vitamins, β-carotene, amino acids and various phenolic (Flavonoids, anthocyanins, proanthocyanidin and cinnamates) (Mudansiru et al., 2016). The high antioxidant activity of M.O. Lam. leaf powder extracts has been reported (Fuglie, 2001), as well as its ability to complement the calories of staple food in a limited-resource area and effectiveness as a supplement for People living HIV (Coppin, 2008). This plant is easily accessible and available to all for use as a nutritional supplement especially among people living with HIV treated with ART (World Food Program,2014).

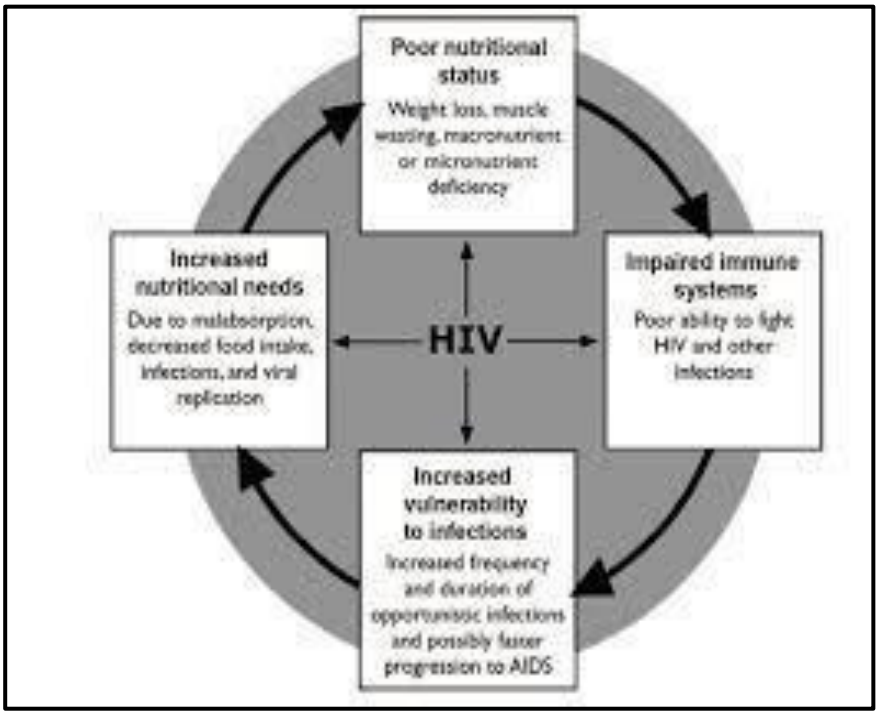


Figure 1: Vicious Cycle (NACCO, 2013)

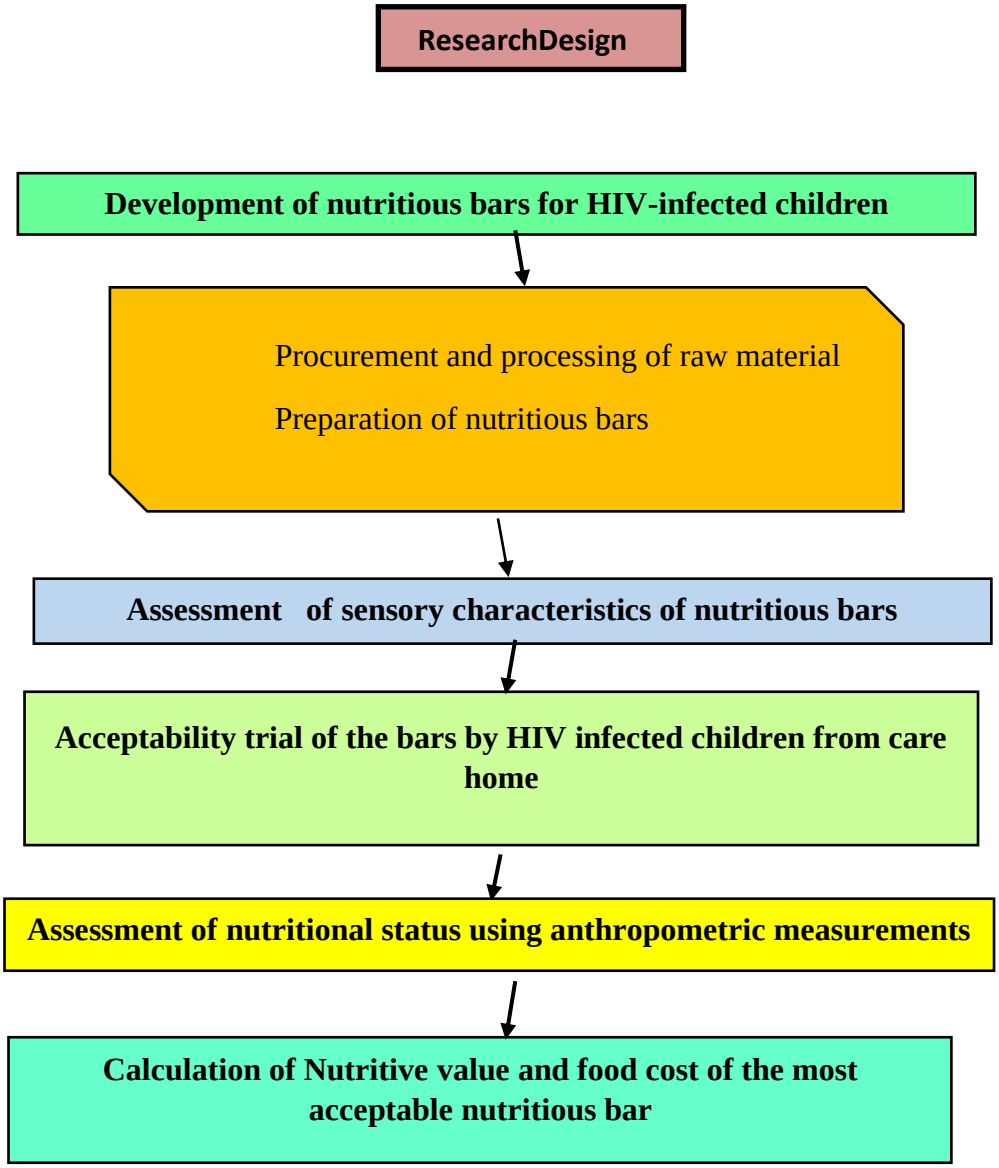
OBJECTIVES

The present study diversifies the use of ingredients to develop nutritious bars by incorporating moringa and increase immunity. The objectives of the study were as follows:

1. To develop nutritious bars for HIV- Infected children by incorporating *Moringa olifera*.
2. To assess the sensory characteristics of the nutritious bars.
3. To calculate the nutritive value and cost of the developed bars.

This study provides opportunities to improve the nutritional status of HIV infected children, at a minimum cost.

METHODOLOGY



Development of nutritious bars for HIV-infected children

The nutritious bars were planned to contribute high energy, high protein and micronutrients which could help to boost immunity of the HIV- positive children. The preparation of the nutritious bars was carried out in the Foods and Nutrition Laboratory, Department of Home Science, IIS (deemed to be University), Jaipur. The raw material was procured from the local market of Jaipur city. Moringa leaves were collected, washed and kept under the sun for 4 days for drying. After drying, the leaves were grinded using a mixer to form powder. Bajra and Amaranth flour were roasted for 5 minutes until golden brown colour. Green gram dal (de-husked) and groundnuts were roasted separately and ground in a powder. Chocolate was melted in a pan. Ghee was melted and jaggery was added to it. All the ingredients were mixed and bars were set in

moulds. Apart from the control, three version of nutritious bars were prepared by replacing amaranth flour/ bajra flour with moringa oleifera leaf powder at 12.5%, 25% and 37.5% level. Weight of each bar was 65grams.

Table 1: Variations in the nutritious bajra bars

Ingredients	BE111 (Control)	BE112 (12.5%)	BE113 (25%)	B114 (37.5%)
Bajra Flour(g)	20	17.5	15	12.5
Moringa Powder(g)	-	2.5	5	7.5
Green gram Dal(g)	7.5	7.5	7.5	7.5
Jaggery(g)	10	10	10	10
Groundnuts(g)	10	10	10	10
Ginger Powder(g)	1	1g	1	1
Chocolate(g)	10	10	10	10
Ghee(g)	6.5	6.5	6.5	6.5

Figure 2: Bajra enriched bars

Table 2: Variations in the nutritious amaranth bars

Ingredients	AE221 (Control)	AE222 (12.5%)	AE223 (25%)	AE224 (37.5%)
Amaranth Flour(g)	20	17.5	15	12.5
Moringa Powder(g)	-	2.5	5	7.5
Green gram Dal(g)	7.5	7.5	7.5	7.5
Jaggery(g)	10	10	10	10
Groundnuts(g)	10	10	10	10
Ginger Powder(g)	1	1g	1	1
Chocolate(g)	10	10	10	10
Ghee(g)	6.5	6.5	6.5	6.5

Figure 3: Amaranth enriched bars

Sensory evaluation

The sensory evaluation of developed nutritious bars was carried out and comparison was made with the control bar to select the most acceptable bar. The Panel of 5 semi-trained judges was selected through sensitivity threshold test (sweet) from amongst the faculty members of IIS (deemed to be University), Jaipur.

The evaluation was performed by the selected panel of 5 semi-trained judges using nine-point hedonic scale (where '1'- dislike extremely and '9' like extremely). Evaluation was carried out on attributes such as colour, appearance, texture, taste, after taste and overall acceptability.

Acceptability trial

A sample of 30 HIV infected participants (15 boys and 15 girls) was taken for conducting acceptability trial of the developed bars. All the 30 children of a care home for HIV positive children in Jaipur, were included in the study. The children were in the age group of 7-18 years. The children used 5-point rating scale for testing the acceptability of the developed bars. Data related to weight, height, body mass index and CD4 cell count of HIV- infected children was also collected from care home.

Informed Consent

All the participants provided informed written consent for participation in the study. The aims and procedures of the study were explained to the participants. The anonymity of the participants was guaranteed and no personal details were recorded.

Ethical Approval

This study was reviewed and approved in accordance with the ICMR National Ethical Guidelines 2017, by the members of Ethics Committee, IIS (deemed to be University), Jaipur.

Estimation of nutritive value and cost of the nutritious bars

The nutritive value of the most acceptable variation of the bars was calculated using I.F.C.T. (Indian Food Composite Table), 2017.The nutrients taken into consideration were energy, protein and fat**.** Cost of the bars was calculated on 65g basis**.**

FINDINGS AND DISCUSSION

Assessment of sensory characteristics of the nutritious bars

The data collected from sensory evaluation of the bars by the panel of 5 semi trained judges was evaluated using Analysis of Variance (ANOVA), followed by the test of averages (Tukey, $p < 0.05$).

Table3: Mean Scores of Sensory characteristics of Bajra Enriched Bars

PARAMETERS	BE111 (Control)	BE112 (12.5%)	BE113 (25%)	BE114 (37.5%)
Colour	8.2 ±0.74[a]	8.2±0.4 [a]	8.2±0.74 [a]	6.8±0.4 [b]
Appearance	7.2±0.4[a]	7.4±0.48 [a]	8.0±0.63 [a]	6.6±0.48 [b]
Texture	7.8±0.74 [a]	7.6±0.8[a]	8.0±0.63 [a]	6.6±0.8 [a]
Taste	7.4±0.8 [a]	7.2±0.97 [a]	8.0±0.63 [a]	6.8±0.74 [a]
After Taste	7.2±0.4 [a]	7.2±0.4 [a]	7.6±0.48 [a]	7.2±0.74 [a]
Overall Acceptability	7.4±0.48 [a]	7.4±0.48 [a]	7.6±0.48 [a]	7.0±0 [a]

Mean ± Standard Deviation

Mean with different superscript in a row denote significant difference at $p < 0.05$

Mean with same superscript in a row denote no significant difference at $p < 0.05$)

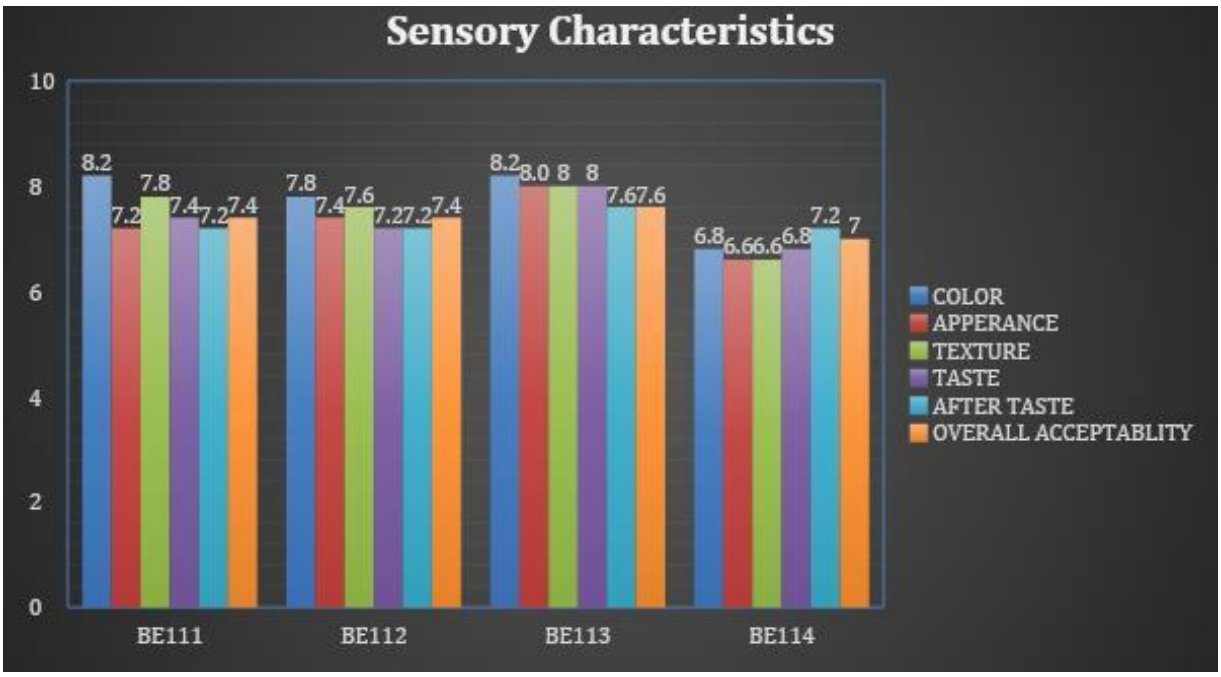


Figure 4: Mean scores of sensory qualities of control and variation of Bajra enriched bar

Results of the sensory evaluation showed that Bajra enriched bar (BE113) in which 25% (5g) moringa leaf powder was added, was preferred best among all the variations and had the highest mean scores for all the attributes. Pena et al., (2018) prepared a granola bar with taro (colocation esculenta) root, okra pulp floor and moringa oleifera leaves and found that 9g of moringa powder was acceptable in the product. Statistical analysis of the data revealed significant differences ($p<0.05$) in appearance and colour of BE114 from the control and other variations. The mean score for texture, taste, after taste and overall acceptability were statistically same for all the variation and control. Table 4: Mean Scores of Sensory characteristics of Amaranth Enriched Bar

Table4: Mean Scores of Sensory characteristics of Amaranth Enriched Bars

PARAMETERS	AE221 (Control)	AE222 (12.5%)	AE223 (25%)	AE224 (37.5%)
Colour	8.6±0.48[a]	7.8±0.4[b]	8.6±0.4 [b]	7±0.6 [a]
Appearance	8.6±0.48 [a]	8.6±0.48[a]	8.6±0.48 [a]	8±0.2 [a]
Texture	8.4±0.48 [a]	8.4±0.4 [a]	8.4 ±0.48 [a]	7.4±0.8 [a]
Taste	8.6 ±0.48 [a]	8.2 ±0.48 [a]	8.4 ±0.48 [a]	6.6±0.48 [a]
After Taste	8.2±0.4 [a]	8.6 ±0.48 [a]	8.4 ±0.48 [a]	6.8±0.7 [a]
Overall Acceptability	8.6 ±0.48 [a]	8.6±0.48 [a]	8.6±0.48 [a]	7.6±0.48 [a]

Mean ± Standard deviation

Mean with different superscript in a row denote significant difference at $p < 0.05$)

Mean with same superscript in a row denote no significant difference at $p < 0.05$)

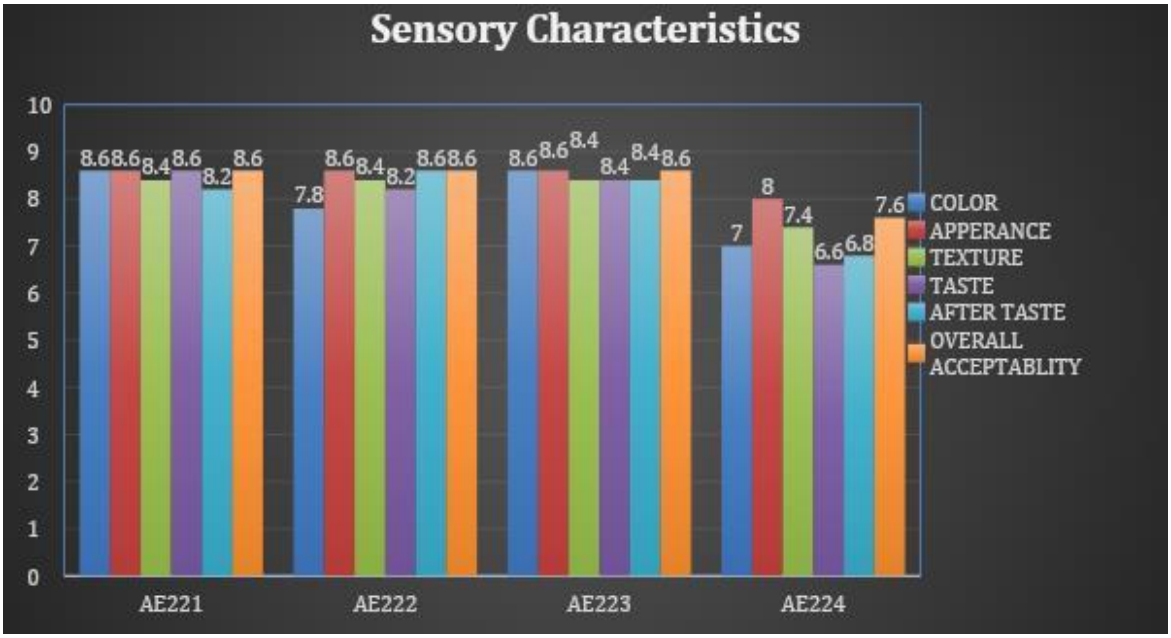


Figure5 – Mean scores of sensory qualities of control and variation of Amaranth enriched bar

The results of the sensory evaluation revealed that the Amaranth enriched bar AE223 in which 25% (5g) of moringa powder was added, was most preferred among all the variations and had the highest mean score for all attributes. Bourekoua et al (2018) prepared a gluten-free bread enriched with Moringa Oleifera leaf powder and found that 2.5% (12.5) g of moringa powder was acceptable in the product. Statistical analysis of the collected data revealed a significant difference ($p<0.05$) in colour of AE223 from the control and other variations. The mean score for appearance, texture, taste, after taste and overall acceptability were statistically the same for all the variations and control. It was found that Bajra enriched bar and amaranth enriched bar with BE113 and AE223 were most preferred among all the variations with the highest mean scores for all attributes.

Acceptability Trial by HIV infected children

Acceptability trial was conducted for the most acceptable variation of bajra enriched bar.

The bajra enriched bars were given to the children for a period of one month to check the acceptability and after one month, the acceptability was tested using five-point hedonic scale (Table 5). The children liked it and they were ready to consume the bars on regular bases as a part of their diet.

Table 5: Acceptability scores of bajra enriched bar

Parameters	**BE113**
Colour	4.30±0.46
Appearance	4.17±0.64
Texture	4.37±0.55
Taste	4.73±0.44
After Taste	4.63±0.48
Overall Acceptability	4.37±0.48

Data related to age, height, weight, BMI and CD4 cell count of the 30 HIV infected children was collected (Table 6). The selected 30 HIV- Positive children were in the age group of 7-18 years. It was observed that 6.7% of the subjects (boys and girls) were in the age group of 7-9 years. It was followed by 26.7% (girls) and 46.7 %(boys) in the age group of 10-12 years. There were 33.3 % (girls) and 26.6% (boys) in the age group of 13-15 years, 33.3% (girls) and 20% (boys) in the age group of 16-18 years. Rawat et al., (2016) also reported that children are most likely to suffer from HIV in the age group. In the present study, body mass index for age CDC percentile criteria was used as reference. It was found that 40 percent of the children were underweight, 56.7% healthy weight, 3.3% overweight. The percentage of girls who were underweight was higher (53.3%) as compared to boys (40%). Rakholia et al., (2016) reported that 43.9 per cent of the HIV-infected children were underweight according to the BMI for age CDC percentile criteria. In the present study, CD4 cell count of HIV-infected children was collected and it was found that 20% of the children were found to have AIDS defining illness, 23.3% were minor symptomatic, 13.3% had moderate symptoms and 43.3% asymptomatic. The percentage of girls having AIDS defining illness was higher (26.6%) than boys (13.4%) children. Carolline et al., (2011) reported that CD4 < 200 cells/ml was associated with underweight in an HIV population.

Table 6: Body mass index of the subjects

Classification	Girls (n=15)	Boys (n=15)	Total (N=30)
Obese	-	-	-
Overweight	-	1(6.7%)	1 (3.3%)
Healthy Weight	7(46.7 %)	10 (66.6%)	17 (56.7%)
Underweight	8 (53.3 %)	4 (26.6%)	12 (40%)

Nutritive value and cost estimation

As compared to the most acceptable variation of Bajra enriched bar (BE113), the most acceptable variation of amaranth enriched bar (AE223) provided more energy, more protein and both the bars provided an appreciable amount of carbohydrates and fat.

Table 7: Nutritive values of most acceptable bars

NUTRIENTS	BE113	AE223
Energy(kcal/65g)	282.5	283.79
Protein (g/ 65g)	6.7	9
Fat (g/ 65g)	14.02	14.08
Carbohydrates (g/ 65g)	30.1	30.49

The total cost of the bajra enriched bar was Rs 7.14 and cost of amaranth enriched bar was Rs 8. The higher yield and low cost of moringa powder made the developed bar cost effective.

SUMMARY, CONCLUSION AND IMPLICATIONS

In the present study two bar were developed using Moringa powder each with three variations (12.5%, 25% and 37.5%). Bajra and amaranth provide good sensory characteristics like texture, taste and acceptability and give higher yield. The sensory evaluation was done using 9-point hedonic scale. The bars with 5% (5g) moringa leaf powder were found most acceptable. The Bajra enriched bars were given to children for a period of 1 month to be consumed daily. The number of bars to be consumed daily was decided in order to provide $1/4^{th}$ of the daily RDA of energy, protein, carbohydrates & fat of each child. Food cost of developed nutritious bars revealed that they were cost effective.

The bars developed in this study can prove as a boon for improving immunity and provide appreciable amount of macro and micronutrients to HIV positive children and improve their nutritional status also.

SUGGESTIONS FOR FUTURE RESEARCH

There is further scope to check the effect of consumption of these bars on BMI and immunity of HIV infected children.

REFERENCES

- Bourekoua,H.,Różyło,R.,Gawlik-Dziki,U.,Benatallah,L.,Zidoune,M.N.,&Dziki,D.(2018). Evaluation of physical, sensorial, and antioxidant properties of gluten-free bread enriched with Moringa Oleifera leaf powder. *European Food Research and Technology*, *244*(2),189-195.
- Carolline de Araújo, M., Maria de Fátima, P., de Albuquerque, M.., de Alencar, R.A., de Melo, H.R.L.; Bandeira, F; de Oliveira, T.G.B., de Carvalho, é.H., da Silva, A.P. and de Barros Miranda Filho, D. (2011) Body Mass Index in Individuals with HIV Infection and Factors Associated with Thinness and Overweight/Obesity. Cadernos de SaúdePública, 27.
- Coppin J. A study of the nutritional and medicinal values of *Moringa oleifera* leaves from sub-Saharan Africa: Ghana, Rwanda, Senegal and Zambia. M.Sc. thesis, Rutgers University-Graduate School-New Brunswick, New Brunswick. May 2008. https://doi.org/10.7282/T3MG7PVN.
- Duggal, S., Chugh, T. D., & Duggal, A. K. (2012). HIV and malnutrition: effects on immune system. *Clinical and developmental immunology*, *2012*.s
- Fuglie LJ. The Miracle Tree: *Moringa oleifera*: natural nutrition for the tropics, (Church World Service, Dakar, 1999). pp: 68. Revised in 2001 and published as The Miracle Tree: The Multiple Attributes of Moringa, CTA, 2001. pp: 172.
- Khanna,.K,Gupta,S.,Passi,S.,Seth,R.,Mahna,R.,&Puri,S.(2017).Atextbookofnutrition&dietetics: National Institute of NutritionHyderabad,India,II,193-199
- Mudansiru, A., Haidara, A. M., Ibrahim, S., Zaharaddeen, U., &Darma, A. M. (2016). Ethno-botanical survey of some medicinal plants of Gumel Town, Jigawa State, Nigeria. *Age*, *20*(30), 5.
- National AIDS Control Organization(2016)p.340.Retrieved on September, 2019 from naco.gov.in
- Pena, C. J. D., Fabito, M., Jacinto, M. J., & Balagtas, M. (2018). Development of granola bars with taro (colocasia esculenta) root, okara pulp floor, and moringa oleifera leaves. *Adventist University of the Philippines*, 13
- Rakholia, R., Bano, M., & Rawat, V. (2016). Malnutrition among HIV-infected Children by Anthropometric Measures in Poor Outreach Area of a Developing Country and its Relationship with CD4 Counts. *International Journal of Pediatrics*, *4*(4), 1643-1654.
- World Food Program (WFP), the United Nations Program on HIV/AIDS (UNAIDS) and the U.S. President's Emergency Plan for AIDS Relief (PEPFAR): Nutrition assessment, counselling and support for adolescents and adults living with HIV. A programming guide: food and nutrition in the context of HIV and TB classification. Guide note 2014http://documents.wfp.org/stellent/groups/public/documents/newsroom/wfp271543.pdf . Accessed Jan 2020.
- WorldHealthOrganization.(2005). *Diet,nutrition,andthepreventionofchronicdiseases:report of a joint WHO/FAO expert consultation* (Vol. 916). World HealthOrganization.

The Indian Journal of Home Science 2022: 34(1)

SUPPLEMENTATION WITH NUTRACEUTICAL AND MEAL REPLACEMENT ON OBESE WOMEN - A PARALLEL ARM RANDOMIZED CONTROL TRIAL

Raju Sujatha[1], Chandrasekhar Kalaivani Ashok[2]
[1]Research Scholar, [2]Associate Professor and Head
Department of Home Science, Queen Mary's College,
Chennai, Tamil Nadu, India
Email: kalaimcs@yahoo.com

ABSTRACT

The present study aimed to evaluate the combined effect of meal replacement and nutraceutical supplementation on obese women. A parallel arm randomized control trial was conducted with 24 obese women. The selected participants were equally and randomly assigned to experimental and control groups. Assessments of anthropometric, lipid profile and functional capacity were done at baseline and post-intervention period on all participants. Intervention with supplementation was given only to the participants in experimental group for 120 days. A significant reduction in body weight, body mass index, hip circumference, body fat percent, serum cholesterol and a significant improvement in functional capacity was observed in the experimental group after 120 days of supplementation as compared to baseline values. However, all parameters assessed during post-intervention period showed no significant difference between the experimental and control group. Supplementation with meal replacement and nutraceutical capsule could be considered as a therapeutic strategy in the treatment of obesity.

Key words: Supplementation, Meal Replacement, Green Coffee Bean Extract, White Kidney Bean Extract, Cinnamon, Obesity.

INTRODUCTION

Obesity is a term used to describe a metabolic disorder where excess fat gets accumulated in the body. Obesity develops as a result of positive energy balance, where the caloric intake is more than that of energy expenditure (Bray, 2008). This energy imbalance is attributed to improper diet and inadequate physical activity. Furthermore, genetic and environmental factors also contribute to obesity (Maria & Evagelia, 2009). Obesity is considered as a serious and complex condition affecting all age groups from different socioeconomic backgrounds. It is found to be a prime risk factor for a majority of non-communicable diseases including type 2 diabetes mellitus, cardiovascular diseases, osteoarthritis, cancer, menstrual and infertility disorders (Gothankar, 2011). Therefore, prevention and treatment of obesity has become a major necessity.

Multiple approaches available to treat obesity include dietary modification, physical activity, pharmacological therapy and bariatric surgery (NHLBI, 2000). Treating obesity with diet and exercise demands discipline, while pharmacological therapies and surgery that treat obesity

carry undesirable side effects (Kang & Park, 2012; Schulman & Thompson, 2017). These conditions have led to the search for alternative solutions for weight reduction that are both safe and effective. Natural food supplement products containing bio-active compounds yield better medicinal properties in curing diseases. The discovery of these active ingredients led to the evolution of a new field called nutraceuticals. Nutraceuticals is a new era of alternative medicine and fills the gap between the pharmaceutical drug and food (Shende et al., 2016). Nutraceutical food supplements may hold the key to solving the elusive weight management problem. Among the various supplements, green coffee bean (GCB) extract, white kidney bean (WKB) extract and cinnamon powder are currently in use as weight loss supplements.

Several studies have shown that supplementation of GCB extracts (Onakpoya et al., 2011), WKB extract (Obiro et al., 2008) and cinnamon powder (Mollazadeh & Hosseinzadeh, 2016) is effective in treating and preventing obesity. GCB extract containing 3-caffeoylquinic acid (3-CQA) as a major chlorogenic acid has the potential to reduce body fat accumulation by regulating adipogenesis and lipogenesis (Choi et al., 2016). Alpha amylase inhibitor in WKB has the capacity to reduce the rate of absorption of carbohydrates and induce weight loss in obese individuals (Barrett & Udani, 2011). Cinnamon is reported to increase high density lipoprotein and reduce low density lipoprotein and total cholesterol (Pinky et al., 2017).

Yet another effective weight loss strategy is the use of meal replacements in the diet. Meal replacements containing high protein are useful in assisting weight reduction (Heymsfield et al., 2003). Supplementation of meal replacement as a dietary intervention is associated with greater weight loss, better compliance, reduced rate of drop-outs and adequate supply of essential nutrients (Davis et al., 2018). Combining the use of meal replacement with nutraceutical capsule containing GCB extract, WKB extract and cinnamon powder is expected to accelerate weight reduction and constitute an effective weight loss strategy. To have empirical evidences, the present study was conducted with the following objectives and hypotheses.

OBJECTIVES OF THE STUDY

1. To determine the effect of supplementation with meal replacement and nutraceutical capsule for a period of 120 days, on the anthropometric parameters, lipid profile and functional capacity of obese women.

2. To compare the anthropometric profile, lipid profile and functional capacity between the experimental group that has received meal replacement and nutraceutical supplementation for 120 days and control group that has received no such supplement.

HYPOTHESES OF THE STUDY

Hypothesis 1: The experimental group and control group would not differ in anthropometric measurements such as weight, body mass index, waist circumference, hip circumference, waist to hip ratio and body fat percent at baseline.

Hypothesis 2: The experimental group and control group would differ in anthropometric measurements such as weight, body mass index, waist circumference, hip circumference, waist to hip ratio and body fat percent in the post-intervention period.

Hypothesis 3: The baseline anthropometric measurements would differ from the post-intervention anthropometric measurements in the experimental group.

Hypothesis 4: The experimental group and control group would not differ in blood lipid profile levels such as serum cholesterol, serum triglycerides, very low-density lipoprotein, low density lipoprotein, high density lipoprotein and cardiovascular risk ratio at baseline.

Hypothesis 5: The experimental group and control group would differ in blood lipid profile levels such as serum cholesterol, serum triglycerides, very low-density lipoprotein, low density lipoprotein, high density lipoprotein and cardiovascular risk ratio in the post-intervention period.

Hypothesis 6: The baseline blood lipid profile levels such as serum cholesterol, serum triglycerides, very low-density lipoprotein, low density lipoprotein, high density lipoprotein and cardiovascular risk ratio would differ from the post-intervention blood lipid profile levels in the experimental group.

Hypothesis 7: The experimental group and control group would not differ in functional capacity at baseline.

Hypothesis 8: The experimental group and control group would differ in functional capacity in the post-intervention period.

Hypothesis 9: The baseline functional capacity would differ from the post-intervention functional capacity in the experimental group.

MATERIAL AND METHODS

Research Design

A pre-test post-test experimental research design with control group (Parallel arm randomized control trial) was used in the study.

Study Participants

All women aged 25 to 55 years who volunteered to participate in the trial were first screened for obesity. 24 women who were obese according to the body mass index (BMI) classification of Asian adults given by WHO (2000) and who conformed to the following inclusion criteria were selected.

1. Female participants between the age group of 25 to 55 years.
2. BMI of participants greater than or equal to 25 kg/m^2 without or with type 2 diabetes mellitus for more than one year
3. Participants not using any medication or supplement to treat obesity.
4. Participants free from adverse health conditions and infirmity.

From the selected 24 participants, 12 participants were randomly assigned to the experimental group and the remaining 12 participants to the control group. The experimental group received meal replacement and nutraceutical capsule containing GCB extract, WKB extract and cinnamon powder for a period of 120 days and on the other hand, the control group did not receive any such supplement.

An Ethical Committee instituted by the Department of Home Science, Queen Mary's College examined in detail the proposal of the study for ethical clearance and granted approval to conduct the study in the present form. Informed consent and declaration were obtained from each participant prior to enrolment in the study. The disclaimer provided by the company supplying the supplements was informed to all the participants.

Intervention methods and Participants compliance

Meal replacement and nutraceutical capsule were supplemented to the participants in the experimental group. Directions on timing and dosage of nutraceutical capsule and reconstitution of meal replacement were given to the participants in the experimental group individually. Meal replacement used in the study was in the form of fine powder that could be administered as a shake. 3 levelled scoops of meal replacement powder with each scoop containing 12g of meal replacement powder was mixed thoroughly in 250ml of water and consumed immediately. Breakfast/Dinner of the participant was replaced by the meal replacement shake for a period of 120 days. Each nutraceutical capsule administered, weighed 355mg. Two capsules were consumed each day, 30 minutes prior to breakfast and dinner for 120 days. The entire dosage of nutraceutical capsule containing GCB extract (Francis et al., 2016), WKB extract (Udani & Singh, 2007) and cinnamon powder (Ahmad et al., 2015) did not exceed the safety limits and was well within the prescribed limits. The participants were instructed to report in case of any unusual symptoms appearing after consuming the supplements. Throughout the supplementation period, participants in the experimental group were continuously followed-up and reviewed in person every 10 days to ensure compliance and well-being.

Outcome assessments

Information regarding demographic profile and medical history of all the participants enrolled were recorded at baseline using a questionnaire. Anthropometric assessments such as standing height, body weight, Body Mass Index (BMI), Waist Circumference (WC), Hip Circumference (HC), Waist to Hip ratio (WHR) and Body Fat Percent (BF%) were obtained at baseline and at the end of 120 days. The standing height was measured using a stature meter. The body weight was measured using an electronic bathroom weighing scale with minimal clothing. BMI or Quetlet index was calculated from standing height and body weight using the formula.

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

Waist circumference and hip circumference were measured using a fibre glass inch tape, keeping it horizontal to the floor. Waist to hip ratio was calculated from waist circumference and hip circumference using the formula given below.

$$\text{WHR} = \frac{\text{Waist Circumference}}{\text{Hip Circumference}}$$

Body fat percent of participant was assessed using bioelectrical impedance analyser, Tanita BC 601.

Serum lipid profile was assessed for all the participants at baseline and at the end of 120 days. 5ml of blood from each participant was drawn from median cubital vein in the 12-hour fasting state and analysed for blood lipid profile parameters. Serum was analysed for cholesterol (Chol) concentration by cholesterol oxidase/peroxidase method, triglyceride (TG) concentration by glycerol phosphate oxidase/peroxidase method, high density lipoprotein concentration by enzymatic method.

Very low-density lipoprotein (VLDL) concentration in serum was determined using the following formula.

$$\text{VLDL} = \frac{\text{Triglyceride}}{5}$$

Low density lipoprotein (LDL) concentration in serum was determined using the formula given below.

$$\text{LDL} = \text{Total Cholesterol} - (\text{HDL} - \text{VLDL})$$

The risk of developing cardiovascular diseases was calculated using the formula:

$$\text{CV risk ratio} = \frac{\text{Total Cholesterol}}{\text{HDL}}$$

Clinical screening for the presence of Acanthosis nigricans, a hyperpigmentation of skin in neck, axilla, knee, elbow, groin and knuckle region using Quantitative scale for Acanthosis nigricans developed by Burke, Hale, Hazuda and Stern (1999) was done for all the participants at baseline. The severity of acanthosis nigricans was estimated.

Information related to dietary habits including the type of food consumed, amount consumed, type of snack consumed and frequency of consumption was obtained using the 24-hour recall schedule at baseline.

Functional capacity of the participants was assessed using 6-minute walk test (6MWT) and Duke Activity Status Index (DASI) questionnaire at baseline and at the end of 120 days. The 6MWT was carried out in a 30-meter corridor according to the American Thoracic Society guidelines. At the end of 6 minutes the total distances covered was recorded. DASI is a self-administered questionnaire with 12 questions that estimates the peak oxygen consumption by the individuals. It was originally developed by Hlatky et al., (1989).

Modified Kuppuswamy socio-economic status scale (Mohd Saleem, 2019) was used to determine the socio-economic status of the participants at baseline.

Particulars of the supplements

The supplements used in the study were: A meal replacement and nutraceutical capsule manufactured by Nutriah Nourish Private Limited, Chennai. Meal replacement and nutraceutical capsule are certified products of Food Safety Standards Authority of India (FSSAI). The

composition of supplements and nutritive value of meal replacement are given in table 1 and table 2 respectively.

Table 1: Composition of supplements

Ingredients	Quantity
Meal Replacement (Per 100g) Whey Protein Isolate	35g
Casein Protein	20g
Soy Protein	20g
Psyllium Husk Powder	5g
Flax Seed Powder	5g
Spirulina Powder	5g
Fibre (Inulin)	3g
Skimmed Milk Powder	5g
Garcinia Cambogia Extract (60% HCA)	0.5g
Green Coffee Bean Extract	0.5g
Natural Flavours and Colour	0.5g
Nutraceutical Capsule (Per capsule) Green coffee bean extract	250mg
White kidney bean extract	100mg
Cinnamon	5mg

Table 2: Nutritive value of meal replacement

Nutrient	Value per 100g
Total Calorie	361Kal
Total Protein	50g
Total Fat	1g
Total Carbohydrates	38g
Dietary fibre	3g

Calcium	499.2mg
Phosphorous	397.2mg
Iron	0.16mg
Vitamin A	53.33IU
Vitamin D	128IU
Folate	80mcg

Data analysis

Percentage analysis was used to analyse data from demographic profile, medical history, clinical examination and dietary habits of the participants. Comparison of anthropometric measurements, lipid profile values and functional capacity both between the experimental group and control group and within the experimental group were done using Student's t-test (Paired sample and Independent sample).

RESULTS

Baseline characteristics of the study participants (Table 3) showed 41.67% of the participants to be between 25 - 35 years, 37.5% to be between 35 - 45 years and 20.83% to be from the age group of 45 - 55 years. With regard to educational qualification, equal numbers of participants were graduates (29.17%), post graduates (29.17%) or educated up to the higher secondary level (29.17%). Fifty percent of the participants (50%) were home-makers while others were either employees (41.67%) or students (8.33%). Based on the Kuppuswamy socio-economic scale, nearly half of the participants (41.67%) belonged to upper extreme of the lower class, while 12.5%, 16.67% and 29.16% belonged to upper income class, upper middle class and lower middle class respectively. More than half the participants (66.67%) were married. Most of the participants (87.5%) hailed from nuclear families. A medium sized family consisting of 4 - 6 members was the most common family size (45.83%) among the participants studied.

All the participants (100%) were non-vegetarian. Very few participants (8.33%) were known diabetics with duration of 2 - 10 years. Family history of obesity (54.17%), diabetes mellitus (70.83%) and hypertension (50%) was prevalent among the participants. More than half the participants (58.33%) had regular menstrual periods. Only a small percent (16.67%) of participants involved themselves in regular physical activity such as walking, yoga, bicycling and strength training for less than 30 minutes or 60 minutes. Mild acanthosis nigricans was present in few participants (8.33%).

Dietary assessment revealed that majority (79.17%) of the participants consumed three meals per day. Skipping of meals was common in half the number of participants (50%). All the participants (100%) were in the habit of snacking between meals.

Table 3: Baseline characteristics of the participants with obesity (N = 24)

Characteristics	N (%)
Age	
25 - 35 years	10 (41.67)
35 - 45 years	9 (37.5)
45 - 55 years	5 (20.83)
Educational qualification	
Primary	3 (12.5)
Higher secondary	7 (29.17)
Undergraduate	7 (29.17)
Postgraduate	7 (29.16)
Employment details	
Home-maker	12 (50)
Business women	4 (16.67)
Private sector	3 (12.5)
Public sector	3 (12.5)
Student	2 (8.33)
Socio-economic status	
Upper class	3 (12.5)
Upper middle class	4 (16.67)
Lower middle class	7 (29.16)
Upper lower class	10 (41.67)
Marital status	
Unmarried	4 (16.67)
Married	16 (66.67)
Widow	3 (12.5)
Separated	1 (4.16)
Type of family	
Nuclear	21 (87.5)
Joint	3 (12.5)
Size of family	
3 members	10 (41.67)

4 - 6 members	11 (45.83)
Above 6 members	3 (12.5)
Type of diet	
Non-veg	24 (100)
Medical history of Diabetes mellitus	2 (8.33)
Duration of Diabetes mellitus	
2 - 10 years	2 (8.33)
Family history of obesity	13 (54.17)
Family history of diabetes mellitus	17 (70.83)
Family history of hypertension	12 (50)
Current menstrual status	
Regular periods	14 (58.33)
Changes in periods	7 (29.17)
Cessation of periods permanently	3 (12.5)
Regular exercise	4 (16.67)
Type of exercise	
Walking	1 (4.17)
Bicycling	1 (4.17)
Yoga	1 (4.17)
Yoga and Strengthening exercise	1 (4.16)
Duration of exercise	
Less than 30 minutes	2 (8.33)
30 - 60 minutes	2 (8.34)
Mild acanthosis nigricans	2 (8.33)
Number of meals	
Two meals	5 (20.83)
Three meals	19 (79.17)
Skipping of meals	12 (50)
Snacking between meals	24 (100)
Frequency of snacking	

Once per day	21 (87.5)
Twice per day	3 (12.5)

Data from 24-hour recall analysed for mean baseline macro-nutrient intake revealed that the intake of energy, carbohydrate, protein and fat of the participants in the study was lower than the recommended dietary allowance (Kamala et al., 2011) by 11.64%, 13.38%, 11.67% and 15.65% respectively (Table 4). Intake of dietary fibre was found to be 41.53% lower as compared to recommended dietary allowance.

Table 4: Baseline macro-nutrient intake of study participants (N = 24)

Nutrients	Mean intake per day	Recommended Dietary Allowance	Percentage (%) Deviation
Energy (Kcal)	1678.76	1900	- 11.64
Carbohydrate (g)	246.88	285*	- 13.38
Protein (g)	48.58	55	- 11.67
Fat (g)	53.14	63**	- 15.65
Dietary fibre (g)	22.22	38***	- 41.53
* 60% of total energy intake ** 30% of total energy intake (Visible fat and Invisible fat) *** 40 g of dietary fibre is recommended for 2000 Kcal diet			

A significant reduction in body weight [81.38 ± 14.47kg (baseline) to 79.38 ± 15.12kg (120 days), p = 0.009], BMI [33.29 ± 5.11kg/m^2 (baseline) to 32.45 ± 5.41kg/m^2 (120 days), p = 0.007] and HC [115.25 ± 11.56cm (baseline) to 111.92 ± 11.23cm (120 days), p = 0.001] was observed in the experimental group after 120 days of nutraceutical supplementation and meal replacement as compared to baseline values (Table 6). But no significant difference was observed in WC and WHR with nutraceutical and meal replacement intervention in the experimental group. No significant difference was observed in anthropometric parameters between the experimental and control group both at baseline and after intervention (Table 5).

With regard to BF% which was significantly higher in the experimental group than the control group at baseline, a decrease is observed following supplementation but it was not found to be significantly lower than that of the control group (Table 5). However, nutraceutical and meal replacement intervention resulted in a significant decrease in BF% [43.75 ± 3.68% (baseline) to 40.88 ± 3.29% (120 days), p = 0.000] in the experimental group as compared to the baseline value (Table 6).

Lipid profile parameters improved in the experimental group after supplementation for 120 days with nutraceutical and meal replacement but showed no significant differences when

compared with the control group both before and after intervention (Table 5). However, a significant decrease in cholesterol (chol) levels [186.33 ± 22.85mg/dl (baseline) to 174.75 ± 30.63mg/dl (120 days), p = 0.044] of the experimental group was found after supplementation as compared to baseline value (Table 6).

Table 5: Comparison of Anthropometric measurements and Biochemical parameters between experimental group and control group

Variables	Baseline			Post-intervention		
	Experimental group (N = 12) Mean ± SD	Control group (N = 12) Mean ± SD	p value	Experimental group (N = 12) Mean ± SD	Control group (N = 12) Mean ± SD	p value
Anthropometric measurements Weight (Kg)	81.38 ± 14.47	76.30 ± 13.10	0.378	79.38 ± 15.12	76.04 ± 12.74	0.564
BMI (kg/m^2)	33.29 ± 5.11	31.90 ± 4.62	0.491	32.45 ± 5.41	31.97 ± 4.36	0.811
WC (cm)	95.92 ± 9.37	98.17 ± 11.51	0.605	93.50 ± 9.41	97.50 ± 9.40	0.309
HC (cm)	115.25 ± 11.56	114.17 ± 12.14	0.825	111.92 ± 11.23	113.92 ± 11.69	0.673
WHR	0.83 ± 0.08	0.86 ± 0.04	0.341	0.83 ± 0.05	0.85 ± 0.07	0.456
BF (%)	43.75 ± 3.68	40.28 ± 4.10	0.040*	40.88 ± 3.29	39.32 ± 4.61	0.348
Lipid Profile parameters Chol (mg/dl)	186.33 ± 22.85	185.42 ± 22.71	0.922	174.75 ± 30.63	190.00 ± 23.65	0.186
TG (mg/dl)	137.58 ± 57.16	122.50 ± 33.14	0.437	117.58 ± 20.81	125.00 ± 33.64	0.523
VLDL (mg/dl)	27.52 ± 11.43	24.50 ± 6.63	0.437	23.47 ± 4.16	25.00 ± 6.73	0.509
LDL (mg/dl)	120.23 ± 23.89	122.17 ± 20.22	0.833	113.42 ± 29.29	125.92 ± 19.96	0.235
HDL (mg/dl)	38.58 ± 2.71	38.75 ± 2.09	0.868	38.33 ± 1.72	39.08 ± 2.15	0.356
CV risk ratio	4.80 ± 0.48	4.74 ± 0.46	0.758	4.51 ± 0.70	4.83 ± 0.43	0.191

***p<0.05**

Table 6: Comparison of Anthropometric measurements and Biochemical parameters between baseline and post-intervention period of the experimental group (N = 12)

Variables	Baseline Mean ± SD	Post-intervention Mean ± SD	p value
Anthropometric measurements Weight (Kg)	81.38 ± 14.47	79.38 ± 15.12	0.009**
BMI (kg/m^2)	33.29 ± 5.11	32.45 ± 5.41	0.007**
WC (cm)	95.92 ± 9.37	93.50 ± 9.41	0.089
HC (cm)	115.25 ± 11.56	111.92 ± 11.23	0.001**
WHR	0.83 ± 0.08	0.83 ± 0.05	0.836
BF (%)	43.75 ± 3.68	40.88 ± 3.29	0.000**
Lipid Profile parameters Chol (mg/dl)	186.33 ± 22.85	174.75 ± 30.63	0.044*
TG (mg/dl)	137.58 ± 57.16	117.58 ± 20.81	0.184
VLDL (mg/dl)	27.52 ± 11.43	23.47 ± 4.16	0.178
LDL (mg/dl)	120.23 ± 23.89	113.42 ± 29.29	0.199
HDL (mg/dl)	38.58 ± 2.71	38.33 ± 1.72	0.693
CV risk ratio	4.80 ± 0.48	4.51 ± 0.70	0.090

***p<0.05 ** p<0.01**

An improvement in functional capacity of the experimental group was evident (Table 8) after 120 days of supplementation as the values for 6MWT [358.67 ± 70.70m (baseline) to 370.08 ± 75.54m (120 days), p = 0.024] and DASI [6.28 ± 1.50 (baseline) to 6.63 ± 1.45 (120 days), p = 0.043] were significantly higher in the post intervention period as compared to the base line values. However, differences between the experimental and control group for functional capacity did not differ significantly both at the baseline and post-intervention period (Table 7).

Table 7: Comparison of Functional capacity between experimental group and control group

Variables	Baseline			Post-intervention		
	Experimental group (N = 12) Mean ± SD	Control group (N = 12) Mean ± SD	p value	Experimental group (N = 12) Mean ± SD	Control group (N = 12) Mean ± SD	p value
6MWT (m)	358.67 ± 70.70	344.33 ± 39.64	0.546	370.08 ± 75.54	330.08 ± 42.90	0.125
DASI	6.28 ± 1.50	6.18 ± 1.31	0.865	6.63 ± 1.45	6.03 ± 1.28	0.298

Table 8: Comparison of functional capacity between baseline and post-intervention period of the experimental group (N = 12)

Variables	Baseline Mean ± SD	Post-intervention Mean ± SD	p value
6MWT (m)	358.67 ± 70.70	370.08 ± 75.54	0.024*
DASI	6.28 ± 1.50	6.63 ± 1.45	0.043*

*** p<0.05**

Table 9: Interpretation of Hypotheses

Hypotheses	Interpretation
Hypothesis 1	Partially accepted
Hypothesis 2	Rejected
Hypothesis 3	Partially accepted
Hypothesis 4	Accepted
Hypothesis 5	Rejected
Hypothesis 6	Partially accepted
Hypothesis 7	Accepted
Hypothesis 8	Rejected
Hypothesis 9	Accepted

DISCUSSION

Comparison of anthropometric measurements

Comparison of anthropometric measurements between experimental group and control group at baseline showed no significant differences in the anthropometric parameters such as weight, BMI, WC, HC and WHR. Studies on supplementation with meal replacement (Guo et al., 2018), GCB extract (Haidari et al., 2017), WKB extract (Wu et al., 2010) and cinnamon (Borzoei et al., 2018) have also reported no significant differences in the anthropometric measurements at baseline. However, BF% of the experimental group is found to be significantly higher than the control group at baseline. A higher BF% at baseline which was not statistically significant was also reported by Gandhi et al., (2015) in their study on overweight participants.

In the post-intervention period, no significant difference was found in weight, BMI, WC, HC and WHR between the experimental group and control group. Even the significantly higher BF% at baseline in the experimental group has substantially decreased bringing about no significant difference in the post-intervention period when compared with the control group. Similar findings were recorded by Pal et al., (2010); Wu et.al., (2010); Haghighian et al., (2011); Udani and Singh (2007); Cket al., (2017).

The effect of supplementation with meal replacement and nutraceutical capsule brought about a significant decrease in weight, BMI, HC and BF% in the experimental group as compared to the baseline values. These findings corroborate with studies carried out by Alhamhany and Alassady (2018); Al-Dujaili et al., (2016); Celleno et al., (2007); Støa Birketvedt et al., (2005); Mangala Gowri et al., (2017); Ziegenfuss et al., (2006); Davis et al., (2018). However, no significant reduction was observed in WC and WHR in the experimental group after nutraceutical and meal replacement intervention. Similarly, no significant difference in WC and WHR within the test group after supplementation with whey protein isolates was reported by Pal et al., 2010). These findings indicate that though supplementation with meal replacement and nutraceutical capsule in obese women has had an effect in reducing overall body weight and hip circumference its impact on fat distribution or mobilization of subcutaneous fat in areas of the body that are relatively less dense in fat such as the waist, is less pronounced. Perhaps a longer period of supplementation could have resulted in a significant decrease in waist circumference and waist to hip ratio.

Comparison of lipid profile parameters

The lipid profile parameters obtained after supplementation with meal replacement and nutraceutical capsule in the experimental group and without any supplementation in control group showed no significant difference in the mean values of cholesterol, triglycerides, VLDL, LDL, HDL and cardiovascular risk ratio in the post-intervention period. Similar results were obtained by Wu et al.,(2010); Udani and Singh (2007); Ziegenfuss et al., (2006). However, in the present study, it should be noted that the mean values of lipid profile parameters of the experimental group have considerably decreased as compared to the control group, though the differences were not statistically significant.

Comparison of baseline and post-intervention lipid profile parameters in the experimental group depicted significantly lower serum cholesterol in the post-intervention period as compared to the baseline values, whereas other parameters such as serum triglyceride, VLDL, LDL, HDL and

cardiovascular risk ratio studied were not significantly different. Frestedt et al., (2008) investigated the effect of prolibra, a whey protein supplement on weight loss among obese participants and found similar results after supplementation.

Comparison of functional capacity

Functional capacity assessed after supplementation with meal replacement and nutraceutical capsule in the experimental group and without supplementation in control group showed no significant difference in 6MWT and DASI during post-intervention period. Similar observations were made by Abd et al., (2017) who found no significant difference in 6MWT between group A that received exercise and diet intervention and group B that received no such intervention.

A significant improvement in functional capacity assessed by 6MWT and DASI was obtained in the experimental group after meal replacement and nutraceutical supplementation as compared to baseline values. Likewise, a significant improvement in 6MWT in the experimental group after exercise and diet intervention as compared to baseline in post-menopausal obese women was reported by Abd et al., (2017). Geiger et al., (2011) also found a significant improvement in 6MWT in overweight children and adolescents as compared to baseline value after intervention with weight reducing program that included exercise, diet and psychological support. It should be noted that studies assessing functional capacity have physical activity as a common component in the intervention, but in the present study, an improvement in functional capacity has been recorded without the inclusion of physical activity, underlining the effect on functional capacity to be solely from the nutraceutical and meal replacement intervention. It is therefore assumed that if physical activity is also included in the intervention along with nutraceutical and meal replacement supplementation a more pronounced effect on functional capacity of obese women could have been produced.

CONCLUSION

Supplementation with meal replacement and nutraceutical capsule in obese women for a period of 120 days has the potential to reduce body weight, body mass index, hip circumference, body fat percent, serum cholesterol accompanied by an increase in functional capacity. Thus, meal replacement and nutraceutical capsule could be recommended for therapeutic purpose among obese women.

SUGGESTIONS FOR FUTURE RESEARCH

1. A randomized, double-blind, cross-over study to evaluate the effect of supplementation with meal replacement and nutraceutical capsule on obese women could be carried out.

2. A comparative study between obese men and women after supplementation with meal replacement and nutraceutical capsule could be analysed.

3. The effect of supplementation with meal replacement and nutraceutical capsule on blood pressure, blood glucose, HbA1c, serum adipocytokines concentration and anti-oxidant status of obese individuals could be studied.

REFERENCES

- Abd, S. M., Kader, E., & Jiffri, O. H. Al. (2017). Influence of weight loss on quality of life, biochemical & clinical parameters among obese postmenopausal women. 1–6. https://doi.org/10.19080/OAJGGM.2017.01.555553
- Ahmad, R. A., Serati-Nouri, H., Majid, F. A. A., Sarmidi, M. R., & Aziz, R. A. (2015). Assessment of potential toxicological effects of cinnamon bark aqueous extract in rats. *Research Journal of Chemistry and Environment*, *19*(2), 50–56. https://doi.org/10.17706/ijbbb.2015.5.1.36-44
- Al-Dujaili, E. A. S., Abuhajleh, M. N., & Al-Turk, W. (2016). Effect of green coffee bean extract consumption on blood pressure and anthropometric measures in healthy volunteers: A pilot crossover placebo controlled study. *Jordan Journal of Pharmaceutical Sciences*, *9*(3), 181–191. https://doi.org/10.12816/0033383
- Alhamhany, N. N., & Alassady, E. H. (2018). Does green coffee has a positive effect on body mass index and lipid profile in a sample of obese people. *Journal of Pharmaceutical Sciences and Research*, *10*(3), 627–630.
- Barrett, M. L., & Udani, J. K. (2011). A proprietary alpha-amylase inhibitor from white bean (Phaseolus vulgaris): A review of clinical studies on weight loss and glycemic control. *Nutrition Journal*, *10*(1), 24. https://doi.org/10.1186/1475-2891-10-24
- Borzoei, A., Rafraf, M., Niromanesh, S., Farzadi, L., Narimani, F., & Doostan, F. (2018). Effects of cinnamon supplementation on antioxidant status and serum lipids in women with polycystic ovary syndrome. *Journal of Traditional and Complementary Medicine*, *8*(1), 128–133. https://doi.org/10.1016/j.jtcme.2017.04.008
- Bray, G. A. (2008). Classification and evaluation of the overweight patient. In *Handbook of Obesity: Clinical Applications, Third Edition*. https://doi.org/10.3109/9781420051452-2
- Burke, J. P., Hale, D. E., Hazuda, H. P., & Stern, M. P. (1999). A Quantitative Scale for Acanthosis Nigricans. *Diabetes Care*, *22*(10), 1655-1659. https://doi.org/10.2337/diacare.22.10.1655
- Celleno, L., Tolaini, M. V., D'Amore, A., Perricone, N. V., & Preuss, H. G. (2007). A dietary supplement containing standardized Phaseolus vulgaris extract influences body composition of overweight men and women. *International Journal of Medical Sciences*, *4*(1), 45–52. https://doi.org/10.7150/ijms.4.45
- Choi, B. K., Park, S. B., Lee, D. R., Lee, H. J., Jin, Y. Y., Yang, S. H., & Suh, J. W. (2016). Green coffee bean extract improves obesity by decreasing body fat in high-fat diet-induced obese mice. *Asian Pacific Journal of Tropical Medicine*, *9*(7), 635–643. https://doi.org/10.1016/j.apjtm.2016.05.017
- Ck, U., Wilmoth, S., Pan, M., Jq, Z., & Dl, F. (2017). Effects of Soy Supplementation on Abdominal Obesity and Metabolic Risks on Post-Menopausal Women : A Pilot Study. *2*(1), 1–6.
- Davis, L. M., Coleman, C., Kiel, J., Rampolla, J., Hutchisen, T., Ford, L., Andersen, W. S., & Hanlon-mitola, A. (2018). Efficacy of a Meal Replacement Diet Plan Compared to a Food-based Diet Plan after a Period of Weight loss: a Randomized Controlled Trial. *Medical & Clinical Research*, *3*(2), 1–10. https://doi.org/10.33140/mcr.03.02.01
- Francis, A. K. A., Angelo, B., Augustin, A. K., & Bi, K. (2016). Acute toxicity of the aqueous extract of roasted and ground beans of Coffea canephora robusta in the wistar rat. *5*(12), 1–5.

- Frestedt, J. L., Zenk, J. L., Kuskowski, M. A., Ward, L. S., & Bastian, E. D. (2008). A whey-protein supplement increases fat loss and spares lean muscle in obese participants: A randomized human clinical study. *Nutrition and Metabolism*, *5*(1). https://doi.org/10.1186/1743-7075-5-8
- Gandhi, K., Sasikumar, S., & Eagappan, K. (2015). Coalesced impact of green tea and cinnamon on metabolic parameters of overweight participants. *Journal of Nutritional Disorders & Therapy*,*5*(3), 164. doi: 10.4172/2161-0509.1000164
- Geiger, R., Willeit, J., Rummel, M., Högler, W., Stübing, K., Strasak, A., Geiger, H., Stein, J. I., & Rauchenzauner, M. (2011). Six-minute walk distance in overweight children and adolescents: Effects of a weight-reducing program. *Journal of Pediatrics*, *158*(3), 447–451. https://doi.org/10.1016/j.jpeds.2010.08.020
- Gothankar, J. S. (2011). Prevalence of Obesity and Its Associated Co Morbidities Amongst Adults. *National Journal of Community Medicine*, *2*(2), 221–224. http://njcmindia.org/uploads/2-2_221-224.pdf
- Guo, X., Xu, Y., He, H., Cai, H., Zhang, J., Li, Y., Yan, X., Zhang, M., Zhang, N., Maddela, R. L., Nicodemus-Johnson, J., & Ma, G. (2018). Effects of a Meal Replacement on Body Composition and Metabolic Parameters among Participants with Overweight or Obesity. *Journal of Obesity*, *2018*. https://doi.org/10.1155/2018/2837367
- Gupta Jain, S., Puri, S., Misra, A., Gulati, S., & Mani, K. (2017). Effect of oral cinnamon intervention on metabolic profile and body composition of Asian Indians with metabolic syndrome: A randomized double -blind control trial. *Lipids in Health and Disease*, *16*(1), 1–11. https://doi.org/10.1186/s12944-017-0504-8
- Haghighian, H. K., Naimi, A. F., Gargari, B. P., Asgharzadeh, A. A., & Nemati, A. (2011). Effect of cinnamon supplementation on blood glucose and lipid levels in type2 diabetic patients. *Journal of Paramedical Sciences*,*2*(1), 2-6. doi: 10.22037/jps.v2l1.2140
- Haidari, F., Samadi, M., Mohammadshahi, M., Jalali, M. T., & Engali, K. A. (2017). Energy restriction combined with green coffee bean extract affects serum adipocytokines and the body composition in obese women. *Asia Pacific Journal of Clinical Nutrition*, *26*(6), 1048–1054. https://doi.org/10.6133/apjcn.022017.03
- Heymsfield, S. B., Van Mierlo, C. A. J., Van Der Knaap, H. C. M., Heo, M., & Frier, H. I. (2003). Weight management using a meal replacement strategy: Meta and pooling analysis from six studies. *International Journal of Obesity*, *27*(5), 537–549. https://doi.org/10.1038/sj.ijo.0802258
- Hlatky, M. A., Boineau, R. E., Higginbotham, M. B., Lee, K. L., Mark, D. B., Califf, R. M., Cobb, F. R., & Pryor, D. B. (1989). A brief self-administered questionnaire to determine functional capacity (the Duke Activity Status Index). *The American Journal of Cardiology*, *64*(10), 651-654. https://doi.org/10.1016/0002-9149(89)90496-7
- Kamala K, Bhaskaram P, Bhat RV, R. T. (2011). National Institute of Nutrition - Dietary Guidelines. *National Institute of Nutrition*, *3*(1), 139. http://ninindia.org/DietaryGuidelinesforNINwebsite.pdf
- Kang, J. G., & Park, C. Y. (2012). Anti-obesity drugs: A review about their effects and safety. *Diabetes and Metabolism Journal*, *36*(1), 13–25. https://doi.org/10.4093/dmj.2012.36.1.13
- Mangala Gowri, P., Mary Minolin, T., Thenmozhi, P., Meena, P., & Vimala, S. (2017). Effectiveness of cinnamon tea in reducing weight among late obese adolescence. *Asian Journal of Pharmaceutical and Clinical Research*, *10*(4), 156–159.

https://doi.org/10.22159/ajpcr.2017.v10i4.16420

- Maria, P., & Evagelia, S. (2009). Obesity disease. *Health Science Journal*, *3*(3), 132–138.
- Mohd Saleem, S. (2019). Modified Kuppuswamy socioeconomic scale updated for the year 2019. *Indian Journal of Forensic and Community Medicine*, *6*(1), 1–3. https://doi.org/10.18231/2394-6776.2019.0001
- Mollazadeh, H., & Hosseinzadeh, H. (2016). Cinnamon effects on metabolic syndrome: A review based on its mechanisms. *Iranian Journal of Basic Medical Sciences*, *19*(12), 1258–1270. https://doi.org/10.22038/ijbms.2016.7906
- NHLBI Obesity Education Initiative. The Practical Guide - Identification, Evaluation and Treatment of Overweight and Obesity in Adults. 2000; 25.
- Obiro, W. C., Zhang, T., & Jiang, B. (2008). The nutraceutical role of the Phaseolus vulgaris α-amylase inhibitor. *British Journal of Nutrition*, *100*(1), 1–12. https://doi.org/10.1017/S0007114508879135
- Onakpoya, I., Terry, R., & Ernst, E. (2011). The use of green coffee extract as a weight loss supplement: A systematic review and meta-analysis of randomised clinical trials. *Gastroenterology Research and Practice*, *2011*. https://doi.org/10.1155/2011/382852
- Pal, S., Ellis, V., & Dhaliwal, S. (2010). Effects of whey protein isolate on body composition, lipids, insulin and glucose in overweight and obese individuals. *British Journal of Nutrition*, *104*(5), 716–723. https://doi.org/10.1017/S0007114510000991
- Pinky, Agrahari, K., Jaiswal, M., & Singh, A. (2017). Efficacy & development of products by incorporating cinnamon for weight loss and diabetes. *International Journal of Home Science*, *3*(1), 84–87.
- Schulman, A. R., & Thompson, C. C. (2017). Complications of Bariatric Surgery: What You Can Expect to See in Your GI Practice. *American Journal of Gastroenterology*, *112*(11), 1640–1655. https://doi.org/10.1038/ajg.2017.241
- Shende, P., Desai, D., & Gaud, R. S. (2016). Nutraceuticals: An Imperative to wellness. *Research and Reviews: Journal of Pharmacy and Pharmaceutical Sciences*, *5*(1), 69-74.
- Støa Birketvedt, G., Langbakk, B., & Florholmen, J. (2005). A dietary supplement with bean extract decreases body weight, body fat, waist circumference and blood pressure in overweight and obese participants. *Current Topics in Nutraceutical Research*, *3*(2), 137–142.
- The Asia Pacific perspective: Redefining obesity and its treatment. Regional Office for the Western Pacific of the World Health Organization. World Health Organization, International Association for the Study of Obesity and International Obesity Task Forc, A. 2000. (2000). *0957708211_Eng.Pdf* (pp. 8–45).
- Udani, J., & Singh, B. B. (2007). Blocking carbohydrate absorption and weight loss: A clinical trial using a proprietary fractionated white bean extract. *Alternative Therapies in Health and Medicine*, *13*(4), 32–37.
- Wu, X., Xu, X., Shen, J., Perricone, N. V., & Preuss, H. G. (2010). Enhanced weight loss from a dietary supplement containing standardized Phaseolus vulgaris extract in overweight men and women. *Journal of Applied Research*, *10*(2), 73–79.
- Ziegenfuss, T. N., Hofheins, J. E., Mendel, R. W., Landis, J., & Anderson, R. A. (2006). Effects of a Water-Soluble Cinnamon Extract on Body Composition and Features of the Metabolic Syndrome in Pre-Diabetic Men and Women. *Journal of the International Society of Sports Nutrition*, *3*(2), 45–53. https://doi.org/10.1186/1550-2783-3-2-45

The Indian Journal of Home Science 2022: 34(1)

AN ASSESSMENT OFWASH PRACTICES AMONG LACTATING MOTHERS VISITING GOVERNMENT HOSPITALS, CHANDIGARH

Ritu Pradhan[1], Saloni Joshi[2], Pooja Chouhan[3]
[1]Associate Professor and H.O.D., [2]Research Scholar, [3]Post Graduate Student
Department of Foods and Nutrition, Government Home Science College,
Chandigarh, India
Email ID:sharmapritu@yahoo.com

ABSTRACT

The significance of sanitation in the follow up of Adverse Pregnancy Outcome which include both preterm births and low birth weight is widely studied in developed as well as in developing countries. Inadequate provision of sanitation facilities is one of the causes of worry in India as sanitation contributes to adverse pregnancy outcome (Patel *et al* 2019). According to a new report by UNICEF and WHO some 2.2 billion people around the world do not have safely managed drinking water services, 4.2 billion people do not have safely managed sanitation services, and 3 billion lack basic hand washing facilities (WHO 2019).The study attempt to assess the WASH (Water Sanitation and Hygiene) practices among lactating mothers. A hospital-based study was conducted amongst 300 randomly selected lactating mothers between 19-30 years of age visiting government hospitals, Chandigarh. WASH practices were assessed by pre-tested general assessment questionnaire consisting of questions related to WASH practices comprising of personal hygiene, sources of drinking water and their defecation facilities. Nearly all the respondents took bath, washed clothes and brushed teeth daily. All of the respondents had availability of toilet facility. 85.67%(n=257) respondents were using tap water as source of drinking water and 11.3% were using stored water. Nearly 60% of the respondents used filter or boiling as a method to obtain safe drinking water. Majority of respondents 88.6% (n=266) disposed the garbage into municipality bins. For home sanitation nearly half of the respondents 44.67% used sanitizers such as dettol or ethanol followed by 33.67% who used disinfectant such as phenyl or lizol liquid. Improved conditions of hygiene and sanitation practices are associated with reduced prevalence of diseases. Pregnant women and lactating mothers must be provided with appropriate knowledge about personal hygiene and sanitation in order to maintain the health status of both mother and child.

Keywords: Water Sanitation and Hygiene, WASH Practices, Lactating Mothers, Pregnancy, Hospital Based

INTRODUCTION

The term WASH stands for Water Sanitation and Hygiene. Growing evidence suggests a link between child linear growth and household Water Sanitation and Hygiene (WASH) practices (Rah*et al* 2015). It has previously been estimated that as much as 50% of child under nutrition may be attributed to poor WASH practices (World Bank 2008).

Women have more needs for continuous access to clean water and sanitation to maintain personal hygiene. Insufficient water and sanitation approach may affect a women well-being in many ways such as making them prone to diseases, increased psychosocial stress, urinary tract infections, maternal mortality and preterm birth(Baker *et al* 2017).

In Low Middle Income Countries (LMICs) the struggle to address basic water, sanitation, and hygiene (WASH) needs may also be a major contributor to adverse birth outcomes (Baker *et al* 2018). The mechanisms through which WASH practices affects birth outcomes are potentially be multifactorial. Inadequate WASH access can increase the risk of diarrheal and helminthic infections, as well as maternal malnutrition and mortality (Benova L *et al* 2014).

Ingestion of high quantities of faecal bacteria from both human and animal sources by infants and young children through mouthing soiled fingers and household items is very common. This leads to intestinal infections which affect a child's nutritional status by diminishing appetite, impairing nutrient absorption and increasing nutrient losses (Rah*et al* 2015).

Water Sanitation and Hygiene (WASH) practices are very important criteria in determining the health of the mother and individual (Gopal *et al* 2009). Safe water sources include: a household piped water connection; a public stand pipe; a borehole; a protected dug well; a protected spring and a rainwater collection system (Hamner*et al* 2006). In terms of sanitation it refers to connection of households to a private or sewer septic system, a pour flush latrine, a simple pit latrine, or a ventilated improved pit latrine (WHO/UNICEF, 2017).

Nearly 1 billion people still practice open defecation globally, and a further 1.4 billion use unimproved toilet facilities (WHO 2015). The problem is especially severe in India, where 44% of the population still practice open defecation and only 40% of the population use improved sanitation (WHO 2015). With response to this, the Government of India launched a series of initiatives, including the Total Sanitation Campaign (TSC) (1999–2012), Nirmal Bharat Abhiyan (2012–2014) and most recently Swachh Bharat Abhiyan (2014). While these programmes have been successful in expanding sanitation coverage, the use of these facilities has been found to be poor (Freeman *et al* 2016). Despite evidence of the positive health impact of improved sanitation generally, rigorous evaluation programmes implementing the TSC have shown no effect on diarrhea, soil-transmitted helminth infection or nutritional status. (Patil *et al* 2014). Hence it can be said that monitoring WASH practices becomes very crucial for improving the overall health status.

Proper Hand washing with soap after defecation or before the preparation of food reduces diarrheal diseases and acute respiratory infections. Hand washing with soap is an important measure to prevent the spread of diarrhea, Acute Respiratory Infection (ARI) and other infectious diseases as it acts as a barrier and protect the children from harmful pathogen (WHO 2014). Mother's Hand washing practices also helps in reduction of malnutrition among children as evidence from recent studies (Rah *et al* 2015). Health education of mothers in this region regarding Hand Washing with Soap (HWWS) is a necessary intervention for reduction of diarrhea and related diseases; this is also going to help in reducing high infants and childhood mortality (Borah *et al* 2016).

In 2011 The World Health Organizations (WHO) studies suggest after a period of exclusive breastfeeding in the early months of life, children 6-17 months of age show an increase in the incidence of diarrhea that correlates with the introduction of complementary feeding. The primary cause of diarrhea in children during transition from exclusive breast feeding is consumption of unsafe water but some recent evidence also points to unsafe food (Curtis *et al* 2000).

In urban India, Water Sanitation and Hygiene (WASH) practices are a major public health concern because residents in urban area has more adverse exposure to WASH practices and there is more crisis of demand and supply. The study was conducted in the present locale in order to cover

several facets of WASH practices and related behaviors among lactating mothers as not much data is available regarding this aspect. With this background the present study was conducted with the following objectives.

OBJECTIVE

To assess the Water Sanitation and Hygiene (WASH) practices among lactating mothers from Chandigarh It includes the personal hygiene, water storage as well as the sanitary facilities.

METHODOLOGY

Sample size: The present study was conducted on 300 lactating mothers in the age group 19-30 years.

Sample selection: The study was carried out amongst randomly selected lactating mothers.

Inclusion Criteria: Mothers of 0-1-year infant, women of age 19-30 years, respondents present on the day of survey were included in the study.
Exclusion criteria: Women with incomplete information and women who did not respond to all the questions or gave incomplete information

Locale of the Study

Two government hospitals from Chandigarh were identified for selection of respondents. Mothers having children in the age of 0-1 year and who regularly visited hospital for general and scheduled checkups were made part of the study sample.

Assessment of WASH practices

The Water Hygiene and Sanitation practices (WASH) was assessed by using a pre-tested interview schedule comprising of both open ended and closed ended questions. Questions related to demographic profile, personal hygiene practices, sanitary facilities, hand wash practices, and water supply storage and purification were asked. All the questions were explained in local language for a better understanding. The prepared schedule was pretested on few respondents visiting the gynae OPD before collecting the data. It was tested to overcome the problem of administration and comprehension. On the basis of feedback received during the pretesting necessary changes were made. The modified interview schedule was used for collecting data for the study.

RESULTS AND DISCUSSION

Socio-Demographic Profile

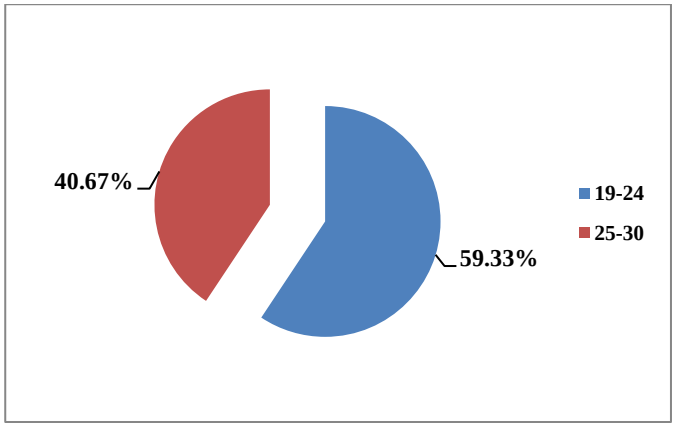


Figure- 1 Distribution of respondents according to age

Out of total respondents enrolled for the study,59.33%were in the age group of 19-24 years followed by 40.67% in the age group of 25-30 years. The mean age of the respondents was 24.14±2.14 years.

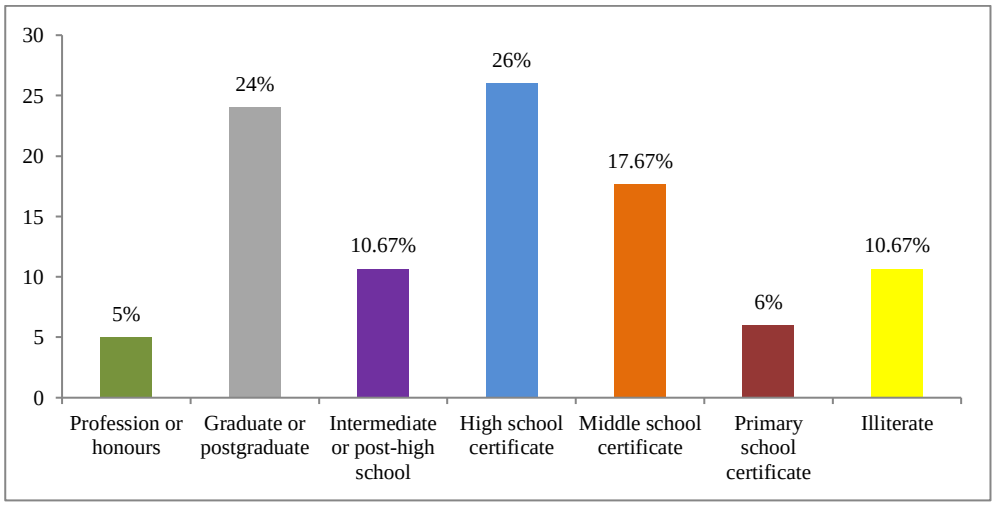


Figure-2 Distribution of respondents according to educational qualification

The collected data was categorized according to the educational qualification of the respondents. The results revealed (fig.2.) that more than one fourth of respondents (26%) were found to be educated up to high school level and 24% were found to be graduate or post graduate. Remaining 39.3 % were either educated up to primary, middle or intermediate level. Few respondents that are10.6% were found to be illiterate.

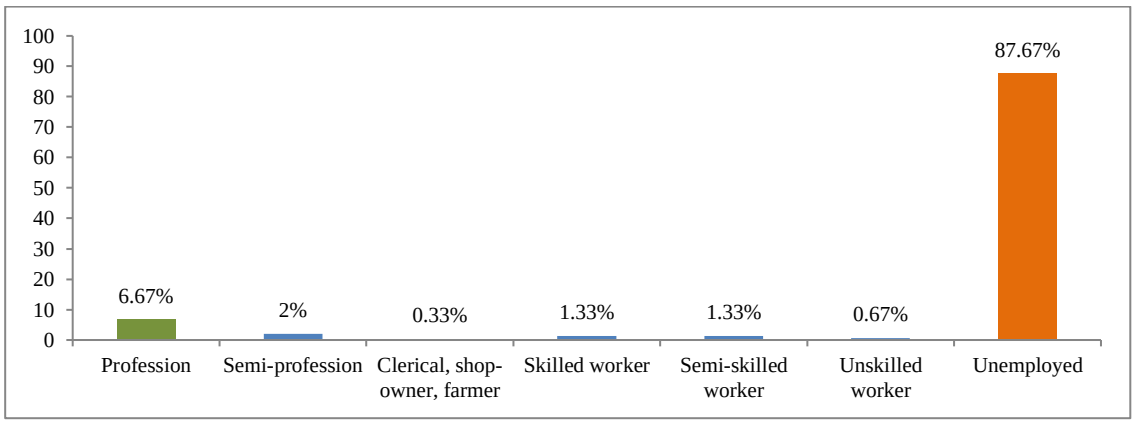


Figure-3 Distribution of respondents according to Occupational status

Occupational status of the respondents showed (fig.3) that majority of the mothers 87.67% (n=263) were unemployed followed by 6.67% (n=20) who were professional workers and remaining 5.6% (n=17) skilled, semi-skilled, unskilled workers, shop owner or farmers.

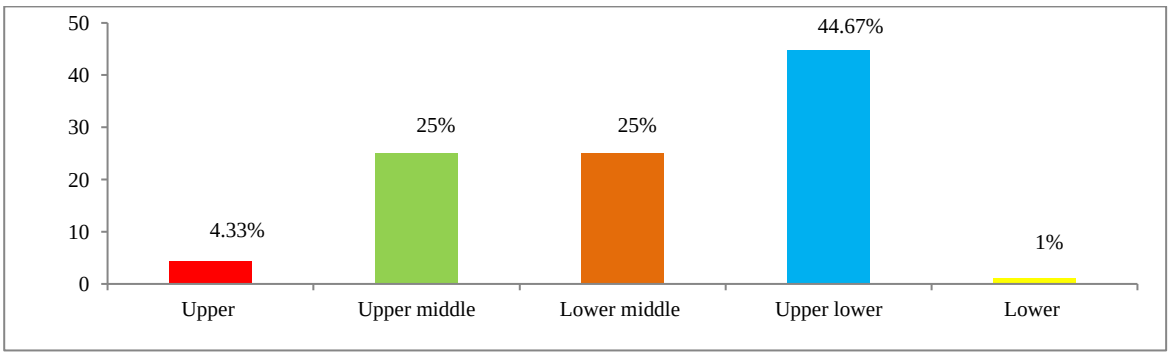


Figure-4 Distribution of respondents according to Socio Economic Status

According to the Kuppuswamy's Socio Economic Scale (Thakkar *et al* 2015) half of the respondents enrolled in the study belonged to upper middle and lower middle class together, followed by upper lower i.e. 44.67%.

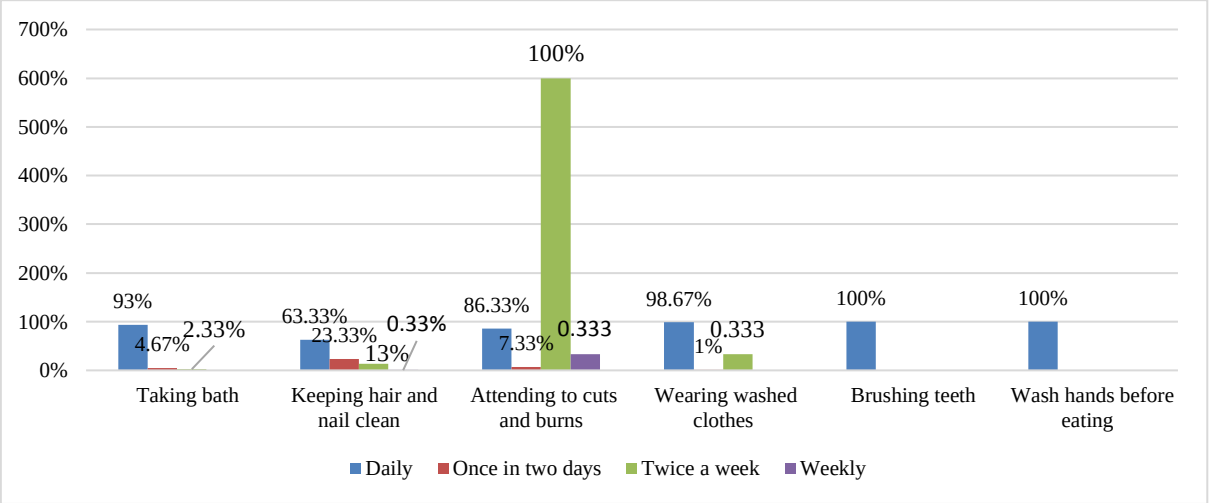


Figure-5 Distribution of respondents according to Personal Hygiene Practices

Water Sanitation and Hygiene (WASH) are very important for child health because it helps to prevent the transmission of the pathogens through fecal-oral route that cause diarrheal diseases. Many studies show that hand washing before food preparation and after defecating significantly reduced child diarrhea, particularly when soap was used for washing and cleaning hands (Biran A *et al*, 2012).

Hence, it becomes very crucial to maintain hygienic conditions. Nearly all the respondents washed their hand, brushed teeth and washed clothes on daily basis followed by attending to cuts and burns and keeping hair and nail clean. The respondents reflected good personal hygiene practices which may be due the fact that majority of them belong to urban area and were aware of importance of maintaining cleanliness and sanitation.

Table-1 Distribution of respondents on the basis of water supply, storage and purification

Category	Variables	Frequency	Percentage
Source of Drinking Water	Tap water	257	85.67
	Tank or stored water	34	11.33
	Handpump	9	3
	Total	300	100
Storage of Drinking Water	Earthen pot	35	11.67
	Bottles	136	45.33
	Overhead tanks	127	42.33
	Tin drums	2	0.67
	Any other	300	100
Water purification	Yes	172	57.33
	No	128	42.67
	Total	300	100

Out of total subjects, 85.67 % (n=257) used tap water as drinking water followed by 11.33 % (n=34) used tank or stored water for drinking purpose and very few 3 % (n=9) used hand pump.

For the purpose of storage of drinking water majority of respondents 45.33% (n=136) and 42.33% (n=127) used bottles and overhead tanks respectively. Similarly, in a study conducted by De M *et al* (2016) results showed that majority (69.3%) of the study population used plastic products (bottles & buckets) for the storage of drinking water. Another significant storage container was metal pots. More than half of the (55.5%) study population cleaned the storage container daily. Most of the study respondents (65%) used to drink water without any purification at household level.

A study was conducted by Palo S.K. *et al (2021)* in order to evaluate the WASH practices among 879 participants from Odisha and the results showed that approximately 49.3% of the respondents consumed tube well water for drinking purposes and only 7.1% respondents reported drinking purified water.

In a study conducted by Patel, S. K.*et al* (2020) to assess the WASH conditions and their association with selected diseases in urban areas shows that about 95% of households studied had access to improved sources of drinking water, 77% had water sources within their premises, and 90% had improved latrine facilities. 52% were covered by municipalities garbage collection facilities, 60% were connected with improved drainage, whereas 97% had problems with flies and mosquitoes. Unimproved sources of drinking water were significantly associated with stomach problems and skin diseases.

In the present study respondents were not aware about cleaning and home purification of water. Almost half of them did not purify water which needs to be given attention for better public health. Sanitation has to be used in a hygienic manner by all to prevent excreta reaching the environment and to prevent excreta contaminating water supplies.

Table-2 Distribution of respondents according to type of Sanitary Facilities

Category	Variable	Frequency	Percentage
Toilet facility	flush or pour flush toilet	290	96.67
	composting toilet	6	2
	no facility/open space	0	0
	flush to septic tank	1	0.333
	PIT Latrine	3	1
	Total	300	100
Use of Garbage Bin	Yes	287	95.67
	No	13	4.33
	Total	300	100
Coverage of garbage	Yes	243	84.67
	No	44	15.33
	Total	300	100
Disposal of Garbage	Burn it	10	3.33
	Municipal bin	266	88.67
	Throw in street	22	7.33
	Any other	2	0.67

	Total	300	100
Use of mosquito protection	Coils	85	28.33
	Mosquito cream	36	12
	Mosquito nets	52	17.33
	All-out	109	36.33
	Do not use	18	6
	Total	300	100

Nearly all the respondents enrolled in the present study had toilet facility available out of which most of them were using flush or pour flush toilet, these findings may be due the fact that there is increased government attention in the campaign of building toilet in every house, now even in villages it is being promoted under Swachh Bharat Abhiyan.
Nearly 95% (n=287) of the subjects used dustbin, among which almost 85% (n=243) used covered bin. For the Disposal of garbage majority of respondents 88.6% (n=266) used municipal bin service provided by Municipal Corporation.

Awareness regarding proper disposal of garbage and covering of dustbins must be given to the respondents who are not aware. Majority of respondents used one or other means of mosquito protection the most common being the use of mosquito repellant all-out or coils.

A similar study was conducted by Rah *et al* (2015), where finding revealed that majority (86%) of the study population had access to sanitary latrines & 72% of them had their own latrines. About 1/5th (19.3%) of the study population used open area for disposing off the solid waste which is quite similar to present study findings and signifies that sanitation practices are very good among population but only a few points need to be noticed such as disposal of garbage.
A study by Palo S.K. *et al* (2019) showed that 40% of the respondents from a total of 879 used to defecate in open which is quite opposite from the present study where majority of respondents used proper toilet facilities.

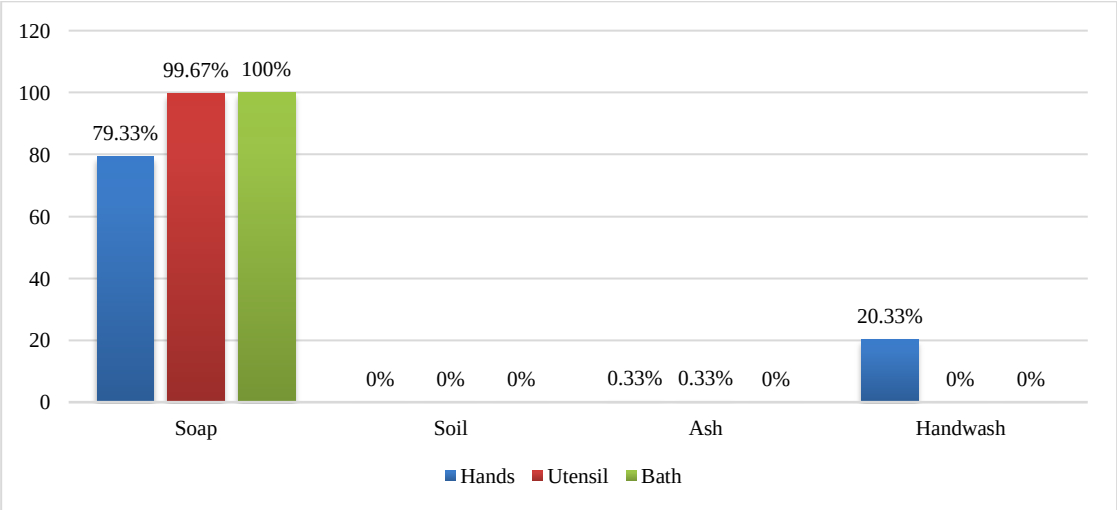


Figure-6 Distribution of respondents according to Hands Washing Practices

Washing hands is considered as one of the most important steps to avoid getting sick and prevent spreading germ. Majority of respondents used soap as a medium to clean or wash hands, utensils

and for bathing purposes i.e. 79.33%, 99.6% and 100% respectively. Some respondents also used hand wash available in market for cleaning hands.

In a similar study conducted by De M *et al* (2016) findings revealed that majority of the population were aware of hand washing practices. Majority, nearly 75% of the respondents, used water and soap for cleaning and washing hands. 73% of the respondents believed that hand washing is crucial for removal of dirt, while 45% of the respondents believed it important for prevention of diseases.

Chattopadhyay A *et al* (2019) conducted a study to evaluate the WASH practices on adolescents. The results revealed that 82% of the adolescent girls were practicing open defecation. They also concluded that unhygienic and poor practices like not having proper water facility inside the household premise, unimproved sanitation facility and not using of soap to clean hands after defecation significantly affects the health and nutritional status of girls.

CONCLUSION

The health of the child and mother are related to the hygienic and sanitation conditions because the better the hygiene and sanitation facilities the less will be the spread of germs and bacteria causing various diseases. In conclusion, this analysis revealed that mother's personal hygiene and household sanitation practices were found to be appropriate. But the respondents were not much aware of the water purification methods at household level and majority of them consumed untreated tap water for drinking. Thus, it is important to educate them about the household level water purification methods and the adverse effects of consuming untreated water for better health.

All of them had access to sanitary latrines. Majority of the respondents followed the proper garbage disposal methods whereas there were few who disposed the garbage on street or burned it. So in order to maintain the proper hygienic conditions for outside environment also they must be educated about the fact that improper disposal of garbage can cause fatal human diseases and can be extremely dangerous for health of individuals. Although the Water Sanitation and Hygiene (WASH) conditions amongst the respondents were found to be appropriate still there is a prompt need for proper education about hygiene and sanitation practices, proper disposal of garbage, purification and storage of drinking water to all the mother's for healthy and safe living of the child and family members.

In addition to application of other tested interventions worldwide towards improvement in hand washing practices; health workers such as Anganwadi workers, ASHA should also be motivated and supported who have better link among the communities towards promotion of activities to promote proper and regular hand washing practices.

The evaluation of Water Sanitation and Hygiene (WASH) practices strongly stipulates the importance of health educational program addressing the mothers. Swachh Bharat Abhiyan (Clean India Mission) the national program launched by government of India is a step in right direction to make safe water, sanitation and hygiene universal and accessible. Health education of mothers on proper hand washing might be a valuable addition to this program which in turn would definitely help in improving the health of young children of India. Maintaining proper Water Sanitation and Hygiene (WASH) practices are a crucial part of life in order to maintain healthy and prosperous living as well as preventing the spread of any infectious disease.

WASH practices are crucial for healthy lifestyle and wellbeing of individuals. They are an integral part of life not only for lactating mothers but for general population also. Following appropriate WASH practices is a prerequisite for health and safety for all population groups and helps to create

a healthy living environment. Scientific studies based on WASH practices have clearly highlighted the importance of safe hygiene practices to the young generation. Good WASH practices play a very important role in preventing the spread of several diseases and infections which can cause serious health hazards. Hence, understanding and sustaining good WASH practices becomes a crucial part of life for all.

REFERENCES

- Baker K. K., Padhi B., Torondel B., Das P., Dutta A., Sahoo K. C., & Sager L. (2017). From Menarche to Menopause: A Population-Based Assessment of Water, Sanitation, and Hygiene Risk Factors For Reproductive Tract Infection Symptoms over Life Stages in Rural Girls and Women in India. *Public library ofScience*; 12(12).
- Baker K. K., Story W. T., Walser-Kuntz E., & Zimmerman M. B. (2018). Impact of Social Capital, Harassment of Women and Girls, and Water and Sanitation Access on Premature Birth and Low Infant Birth Weight in India.*Public library ofScience*; *13*(10).
- Benova L., Cumming O &Campbell O.M. (2014). Systematic Review and Meta-analysis: Association between Water and Sanitation Environment and Maternal Mortality. *Tropical Medicine and International Health*;19(4):368–87.
- Biran, A., Curtis, V., Gautam, O. P., Greenland, K., Islam, M. S., Schmidt, W. P., &Torondel, B. (2012). Background paper on measuring WASH and food hygiene practices–definition of goals to be tackled post 2015 by the Joint Monitoring Programme. *London School of Hygiene and Tropical Medicine, Department. of Public Health and Polic, London, 81*.
- Chattopadhyay, A., Sethi, V., Nagargoje, V.P. *et al.* WASH practices and its association with nutritional status of adolescent girls in poverty pockets of eastern India. *BioMed Central Women's Health* **19,** 89 (2019).
- Curtis V., Cairncross S., Yonli R. (2000) Domestic Hygiene and Diarrhea-Pinpointing the Problem. *Tropical Medicine and International Health*; 5(1): 22–32.
- De, M., &Taraphdar, P.(2016).A Study on Water, Sanitation and Hygiene and Hand Washing Practices Among Mothers of Under Five Children Attending Tertiary Care Hospital in Kolkata, India. *Journal of Dental and Medical Sciences*. 15(7), 54-59.
- Freeman M. C., Majorin F., Boisson S., Routray P., Torondel B., &Clasen T. (2016). The Impact of a Rural Sanitation Programme on Safe Disposal of Child Faeces: A Cluster Randomised Trial in Odisha, India. *Transactions of the Royal Society of Tropical Medicine and Hygiene*; *110*(7). 386-392.
- Gopal S., Sarkar R., Banda K., Govindarajan J., Harijan B.B., Jeyakumar M.B., et al.(2009) Study of Water Supply and Sanitation Practices in India Using Geographic Information Systems: Some Design and Other Considerations in a Village Setting. *Indian Journal of Medical Research*; 129: 233-41.
- Hamner S., Tripathi A., Mishra R., Bouskill N., Broadaway S.C., Pyle B.H., Ford T.E.(2006) The Role of Water Use Patterns and Sewage Pollution in Incidence of Water-Borne/Enteric Diseases Along the Ganges River in Varanasi, India. *International Journal of Environmental Health Research*; 16(2): 113 – 32.
- Palo, S. K., Kanungo, S., Samal, M., Priyadarshini, S., Sahoo, D., & Pati, S. (2021). Water, Sanitation, and Hygiene (WASH) practices and morbidity status in a rural community:

findings from a cross-sectional study in Odisha, India. *Journal of preventive medicine and hygiene*, *62*(2), E392.

- Patel, R., Gupta, A., Chauhan, S., &Bansod, D.W. (2019). Effect of Sanitation Practices on Adverse Pregnancy Outcomes in India: A Conductive Finding from Recent Indian Demographic Health Survey. BMC Pregnancy and Childbirth, 19(1), 378.
- Patel, S. K., Pradhan, M. R., & Patel, S. (2020). Water, sanitation, and hygiene (WASH) conditions and their association with selected diseases in urban India. *Journal of Population and Social Studies*, *28*(2), 103-115.
- Patil S. R., Arnold B.F., &Salvatore A.L. (2014). The Effect of India's Total Sanitation Campaign on Defecation Behaviors and Child Health in Rural Madhya Pradesh: A Cluster Randomized Controlled Trial. *Public library ofScience*;11
- Rah, J.H., Cronin, A.A., Badgaiyan, B., Aguayo, V.M., Coates, S., & Ahmed, S. (2015). Household Sanitation and Personal Hygiene Practices are associated with Child Stunting in Rural India: A Cross- Sectional Analysis of Surveys. *British Medical Journal Open*; 5(2).
- Thakkar, H., & Rawat, C. M. S. (2015). Kuppuswamy's Socio-economic Status Scale: Updating Income Ranges for the Year 2015. *Indian Journal of Community Health*, *27*(4), 415-417.
- UNICEF (2016) Water, Sanitation and Hygiene. Retrieved from https://www.unicef.org/wash/3942_3952.html
- WHO (2014).Preventing Diarrhoea through Better Water, Sanitation and Hygiene: Exposures and Impacts in Low- And Middle-Income Countries. World Health Organization; Geneva.P:14.
- WHO/UNICEF (2015) Joint Monitoring Programme for Water Supply and Sanitation. Progress on Sanitation and Drinking Water2015 update and MDG assessment. Geneva: World Health Organization and United Nations Children's Fund.
- World Bank, Environmental Health and Child Survival: Epidemiology, Economics, Experience. Washington DC: World Bank, 2008.
- World Health Organization (2019). Progress on Household Drinking Water, Sanitation and Hygiene 2000-2017: Special Focus on Inequalities. World Health Organization.

The Indian Journal of Home Science 2022: 34(1)

ASSESSMENT OF KNOWLEDGE REGARDING FOOD LABELS AMONG THE FOOTBALL PLAYERS (10-14 YEARS) OF URBAN VADODARA

Yamee Bardoliwala[1] and Prof. Komal Chauhan[2]

[1]PhD scholar [2] Professor

Department of Foods and Nutrition, Faculty of Family and CommunitySciences,

The Maharaja Sayajirao University of Baroda,Vadodara, Gujarat.

E-mail: yamee.bardoliwala-fn@msubaroda.ac.in

ABSTRACT

Football players undergo nutritional stress due to intensive training, lack of knowledge and competitive schedules which ultimately affects their performance. The Performance can be enhanced by adopting healthy food choices. Processed foods are high in unhealthy nutrients and low in essential nutrients. Healthy processed foods can be selected by comprehension of food labels. The study was planned with an objective to elicit information regarding players' knowledge on comprehension of food labels. For assessment of knowledge, 250 male football players (10-14 years) of urban Vadodara were enrolled and data on socio-economic status, knowledge regarding various components of food labels and GDA labels were collected. The data was procured by using a semi structured questionnaire. After post intervention, it was observed that in both the age-groups majority of the football players had poor knowledge score on various components of food labels. Only 1% of the total players had good knowledge score which was increased to 15% after post intervention. Remarkable shift was observed from poor to average and from average to good score category post intervention. Similar shift pattern was observed for GDA colour coding scheme. None of the player fell in good category pre intervention. After colour coded GDA was introduced post intervention, 70% from (10 to 12 years) and 86% from (>12 to 14 years) age group fall in good category. Constant and repeated awareness sessions on food labelling for players will help them to choose processed products wisely from the variety of foods available in market.

Keywords: Football players, Food labels, processed foods

INTRODUCTION

Dietary habits of the people are changing from traditional to westernized diets all over the world. Processed foods are high in unhealthy nutrients and low in essential nutrients. Regular consumption of processed foods makes body vulnerable to many diseases, so it's a matter of public health concern. Along with adequate nutrition, healthy food choices are crucial in any adolescent's life, but are exceptionally important for those associated with sports (Croll et al 2006). There is an increased energy demand for those involved in sports, however, several studies have shown that the increased energy demands and other nutrient recommendations are not being met by most of the adolescent's athletes (Croll et al 2006; Petrie et al 2004; Purcell et al 2013). Prevalence of obesity in children has been linked with the consumption of sugar sweetened drinks. In Brazil, sugar and soft drinks consumption was found to be responsible for 13.4% of household energy availability and was correlated to the obesity prevalence (Lobato et al2009).

Every individual makes food choice several times in a day (Wansink and Sobal 2007). Many internal and external factors play role in selection of food items (Sobal and Bisogni 2009).Factors like taste, convenience, price and beliefs plays decisive role in selection of food items (Sobal and Bisogni 2009;Furst, Connors and Bisogniet al 1996).Many studies have been conducted to determine the factors influencing the food selection among general population however, it has not been used on athlete populations (Crossley and Nazir 2007; Share and Stewart-Knox 2012;Lockie, Lyons and Lawrence et al 2002).Recent research has examined the role of nutrition in the young athlete's (6-13 years old) diet, by looking at types of food and beverage these athletes were consuming, parental attitudes toward the food setting at sporting events, and how willing parents were to make healthier choices. They found that some parents did not feel that they were capable of picking healthy snacks due to lack of knowledge and inability to decipher meaning of "healthy" snack. Thus, children are more likely to eat healthy foods if they are more readily available in the home.

Justification of the study: The increasing trend of consumption of processed foods cannot be changed. But more healthy processed foods can be selected by comprehension of food labels. So the sports persons can be trained to select the foods according to their nutritional requirements by reading food labels. If athletes are guided properly what to eat, when to eat and how much to eat, definitely it will help them in enhancing their performance and maintaining their energy levels throughout the different phases of sports. In this context, the present study was planned with the following objectives:

OBJECTIVES

1) To analyse the factors affecting the food choices.
2) To assess the ability of the football players to comprehend food labels and identify knowledge gaps.
3) To study the impact of intervention on knowledge and comprehension skills regarding food labels among the enrolled subjects.

HYPOTHESIS

Guideline Daily Amount (GDA) labelling may help in selection of healthy food choices

METHODOLOGY

Research Design: The present study had an Experimental design.

Sample Selection and data collection: A number of 250 subjects (boys) aged 10-14 years were selected from Baroda Football Academy in Gujarat, accredited by All India Football Federation (AIFF) by purposive sampling. Pre-tested questionnaire was used to elicit information on socio-economic status, knowledge regarding various components of food labels and GDA labels among the enrolled subjects. The targeted subjects fulfilling the inclusion criteria were chosen after taking consent from their parents. The questions in the questionnaire were based on the food label. Players had to answer sixteen questions with respect to logos, NFP, ingredient list, health and nutrition claims. Another questionnaire included sixteen questions on front of pack label based on

Guideline Daily Amount (GDA) labelling scheme. Post intervention colour coded (Traffic light) scheme was introduced in questionnaire. Players had to identify the healthy product from the given two options. For the assessment of Knowledge, Attitude and Practice (KAP) the scores enlisted in the tables were assigned and a total KAP score was further categorised as low, average or high. Booklet was developed for capacity building among the subjects. Post intervention session after period of one month was conducted among the football players in order to understand their knowledge on various aspects of food labels and data was procured. A result was declared to be statistically significant only if the p value of an analysis was less than 0.05. The study was approved by the Institutional Medical Ethics Committee of the Department of Foods and Nutrition, The Maharaja Sayajirao University of Baroda and granted with the Institutional Medical Ethics Committee No. IEHCR/2018/21.

DATA ANALYSIS

Statistical analysis was performed using SPSS software (version 20.0; SPSS, Inc., Chicago, IL). Data is shown as mean, standard deviation with standard error unless otherwise stated. Student's t-test was used to compare pre and post knowledge scores. All tests of significance were two-tailed and a P value of <0.05 was considered significant.

RESULTS AND DISCUSSION

Background information of the football players

Two hundred and fifty male football players completed the study. Mean age of footballers was 12 years. There were 80 footballers in younger age group (10-12 years) and 170 footballers in older age group (>12-14 years).Background information of the athletes was elicited by using a semi-structured questionnaire. With respect to education, all the players were at primary school level, 47% of them belonged from nuclear family and around 46% belonged to lower middle socio-economic class as per Kuppuswamy scale classification as shown in Table-1.

Table 1: Background information

Parameters	Boys (n=250)
Age (10-14 years)	
10-12	80 (32)
12-14	170 (68)
Total	250
Education level	
Higher secondary school	0 (0)
Secondary school	0 (0)
Primary school	250 (100)
Illiterate	0 (0)
Religion	
Hindu	169 (67.6)
Muslim	47 (18.8)
Christian	13 (5.2)

Jain	16 (6.4)
Other	5 (2)
Type of family	
Nuclear	118 (47.2)
Joint	132 (52.8)
Extended	0 (0)
Socio-economic class	
Upper class (26-29)	23 (9.2)
Upper middle (16-25)	59 (23.6)
Lower middle (11-15)	116 (46.4)
Upper lower (5-10)	50 (20)
Lower (Below 5)	2 (0.8)

Note: Numbers in parenthesis indicate percentage

Factors affecting food choice among football players

Various factors are considered when food choice is made. The most important factor kept in mind while choosing particular food was sensory appeal (100%) in both the age groups followed by familiarity factor 61% in younger age group and 67% in older age group. As shown in table 2.none of the players considered natural content, weight control and ethical concern as one of the factors for selection of food. This can be because of young age group; these factors might not play major role while choosing food. With increase in age, older group (22.3%) felt that health factor should be taken into consideration, whereas none of the football players in younger age group considered it as an important factor.

Table 2: Factors affecting food choices

Factors	Football players (10-11.11 years, n=80)	Football players (12-14 years, n= 170)
Factor 1—Health	0 (0)	38 (22.3)
Factor 2—Mood	9(11.25)	38 (22.3)
Factor 3—Convenience	33 (41.25)	90 (52.94)
Factor 4—Sensory Appeal	80(100)	170 (100)
Factor 5—Natural Content	0(0)	0 (0)
Factor 6—Price	28 (35)	33 (19.41)
Factor 7—Weight Control	0 (0)	0 (0)
Factor 8—Familiarity	49 (61.25)	114 (67.05)
Factor 9—Ethical Concern	0 (0)	0 (0)

Note: Numbers in parenthesis indicate percentage

Pre and post intervention knowledge scores on various components of food labels among football players

Using nutrition information for healthy dietary choices requires individuals understanding and interpretation of nutrient contents on food labels. However use and understanding of nutrition labels have consistently highlighted lack of understanding as an important barrier to use of this information. Educational interventions with content concerning nutrition labels show positive

impact on understanding of this complex numerical information (Moore et al 2018). In present study in both the age-groups, majority of the football players had poor knowledge score on various components of food labels before education session. Remarkable shift was observed from poor to average and from average to good score category post intervention as shown in figure 1. None of the players in younger age group fall in good category, whereas only 2% of players in older age group were in good category pre-intervention. Graph clearly represents that post intervention, knowledge score increased among the football players.

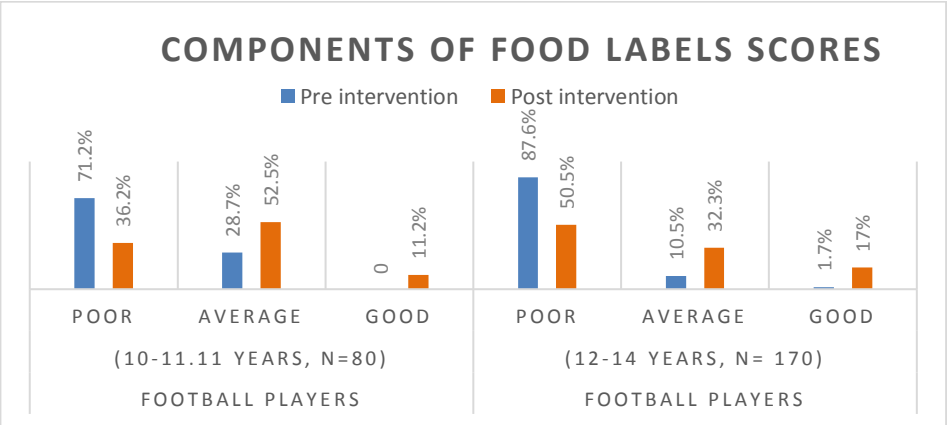


Figure-1: Pre and Post knowledge scores on food labels among football players

Table 3 shows the pre- and post-intervention mean knowledge scores of the football players on various components of food labels. Results showed that there was significant difference in the pre and post intervention mean knowledge scores. Paired sample t-test revealed statistically significant difference in the pre and post intervention knowledge scores among football players. There is a significant evidence that knowledge score for each question increased post intervention ($p<0.5$). On an average, the pre intervention score was (3.72±1.81) which increased to (5.53±2.11) significantly. Thus, the results indicated that nutrition intervention among players was effective as it improved their scores on various components of food labelling. According to the study conducted by Chandorkar and Joshi (2012) after education sessions among adolescent consumers, upward consciousness was noticed about quality symbols and logos, nutrient, health and allergen claims, comprehension of food labels in terms of importance of different nutrients and their role in wellbeing. It was observed that nutritional factors namely, quality symbols, ingredients list, nutrition facts panel information, manufacture and best before dates, medical needs and allergen information that drive processed food selection were considered by the subject's post intervention. Another study by Singh and Chandorkar (2015) showed that more than 40% of consumers were able to understand health claims, information on colors and flavors and allergen information post education session. Pre intervention, this information was assumed to be zero. One study conducted on buyers use and understanding of nutrient and health related claims showed that consumers prefer more to purchase processed foods which showed nutrient and health claims than those without claims (Roe et al, 1999).

Table-3: Pre and post scores on various Components of food labels (Mean±SD)

Parameter	Football players (10-11.11 years, n=80)			Football players (12-14 years, n= 170)		
	Pre	Post	t-value	Pre	Post	t-value
Q-1	0.31±0.46	0.36±0.48	2.039*	0.16±0.37	0.19±0.39	2.263*
Q-2	0.3±0.46	0.36±0.48	2.294*	0.16±0.37	0.25±0.43	4.190*
Q-3	0.27±0.44	0.31±0.46	1.754*	0.19±0.39	0.27±0.44	3.740*
Q-4	0.28±0.45	0.36±0.48	2.530*	0.24±0.43	0.3±0.45	3.073*
Q-5	0.3±0.46	0.38±0.49	2.752*	0.25±0.43	0.33±0.47	3.740*
Q-6	0.21±0.41	0.31±0.46	2.962*	0.20±0.40	0.26±0.44	3.25*
Q-7	0.19±0.39	0.3±0.46	3.164*	0.18±0.39	0.27±0.44	3.894*
Q-8	0.28±0.45	0.4±0.49	3.164*	0.26±0.44	0.35±0.47	4.044*
Q-9	0.25±0.43	0.32±0.47	2.530*	0.24±0.42	0.31±0.46	3.740*
Q-10	0.18±0.39	0.33±0.47	3.733*	0.15±0.36	0.28±0.45	4.880*
Q-11	0.2±0.40	0.28±0.45	2.752*	0.22±0.41	0.36±0.48	5.270*
Q-12	0.21±0.41	0.5±0.50	5.645*	0.21±0.41	0.37±0.48	5.523*
Q-13	0.2±0.40	0.33±0.47	3.548*	0.21±0.41	0.34±0.47	5.012*
Q-14	0.18±0.39	0.36±0.48	4.093*	0.11±0.32	0.31±0.46	6.380*
Q-15	0.16±0.37	0.32±0.47	3.915*	0.1±0.30	0.27±0.44	5.895*
Q-16	0.16±0.37	0.26±0.44	2.962*	0.12±0.33	0.26±0.44	5.270*
Total	3.72±1.81	5.53±2.11	10.034*	3.08±1.51	4.77±2.61	10.811*

Q-1 to Q-9: Questions based on Nutrition Facts Panel, Q-10- Quality symbol, Q-11 to 13- Nutrient claims, Q-14 to-16- ingredient list, preservatives and alternative source.
Note:* significant at p<0.05 level

As shown in table-4, in both the age groups, comparatively less percentage improvement was seen in questions related to Nutrition Facts Panel (NFP) as compared to other questions, since they were difficult to comprehend. In younger age group, the most improvement was seen for the question related to health claim (143%); whereas, in older age group, maximum improvement was seen in question related to ingredient list (206%).

Table-4: Percentage improvement in scores after post intervention for components of food labels

Parameter	Football players (10-11.11 years, n=80)		Football players (12-14 years, n= 170)	
	n	% improvement	n	% improvement
Q-1	4	25	5	31.2
Q-2	5	31.2	16	100
Q-3	3	18.7	13	81.2
Q-4	6	37.5	9	56.2
Q-5	7	43.7	13	81.2
Q-6	8	50	10	62.5
Q-7	9	56.2	14	87.5
Q-8	9	56.2	15	93.7
Q-9	6	37.5	13	81.2
Q-10	12	75	21	131.2

Q-11	7	43.7	24	150
Q-12	23	143.7	26	162.5
Q-13	11	68.7	22	137.5
Q-14	14	87.5	33	206.2
Q-15	13	81.2	29	181.2
Q-16	8	50	24	150

Q-1 to Q-9: Questions based on Nutrition Facts Panel, Q-10- Quality symbol, Q-11 to 13- Nutrient claims, Q-14 to-16- ingredient list, preservatives and alternative source.

Pre and post intervention knowledge scores on GDA labelling scheme among football players

A study by Kreuter et al 1977 has shown that consumers who read nutrition label have a healthier diet. However, many consumers don't understand back-of-pack label (Cowburnand Stockley 2005) and so it has been suggested that supplementing the back-of-pack nutrition information table with a front- of-pack (FOP) label may be more effective in encouraging consumers to choose healthier foods (Geiger et al 1991). Grunert et al (2009), Investigated the use of nutrition information on food labels and understanding of Guideline Daily Amount (GDA) front-of-pack nutrition labels in six European countries. Mean values of understanding of GDA labels, which was measured on a 10-point scale (don't understand at all – understand extremely well) was 7.1 in Poland, 6.7 in Sweden and France, 6.3 in Hungary and 5.3 in Germany. Post intervention shifting in categories was seen in knowledge scores among the subjects. Percentage of players was reduced in poor category. Around 70% players in younger age group and 86% players in older age group, showed increased in their knowledge score post intervention as shown in figure 2. This major shift can be because of the presence of traffic light colours which can be easily understood and help players in choosing healthy products easily.

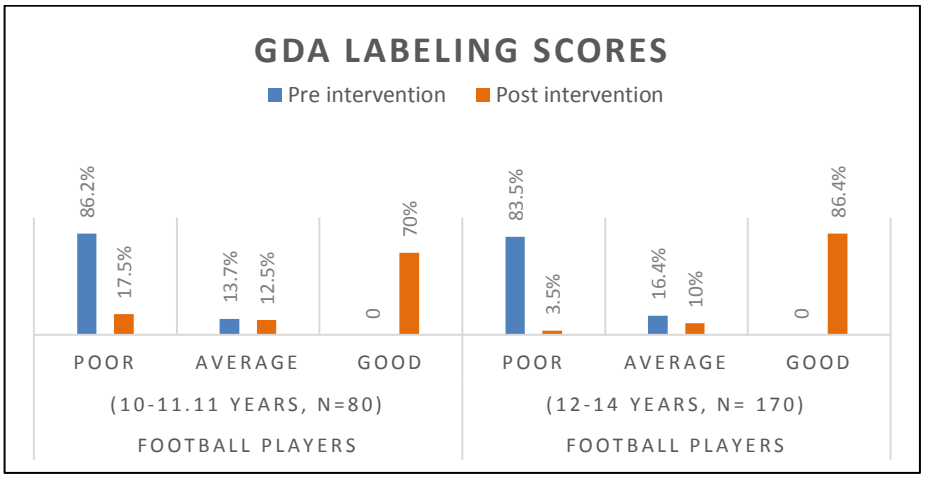


Figure-2: Pre and Post knowledge scores on GDA labelling among football players

Post intervention mean knowledge scores on GDA labelling also increased significantly as shown in table 5, which clearly indicates that if football players are given knowledge on food labels repeatedly, they may select healthy processed products from varieties of available products. Food labels are somewhat complex in nature and difficult to comprehend, but results clearly indicate that colour coded GDA labelling scheme can be easily comprehend.

Table-5: Pre and post GDA labelling scores

Parameter	Football players (10-11.11 years, n=80)			Football players (12-14 years, n= 170)		
	Pre	Post	t-value	Pre	Post	t-value
Q-1	0.28±0.45	0.53±0.50	5.131*	0.16±0.37	0.8±0.40	15.643*
Q-2	0.3±0.46	0.57±0.49	5.474*	0.16±0.37	0.54±0.49	7.982*
Q-3	0.27±0.44	0.47±0.50	4.132*	0.19±0.39	0.51±0.50	6.897*
Q-4	0.25±0.43	0.57±0.49	6.167*	0.24±0.43	0.70±0.45	9.86*
Q-5	0.28±0.45	0.51±0.50	4.789*	0.25±0.43	0.58±0.49	6.695*
Q-6	0.2±0.40	0.38±0.49	3.957*	0.20±0.40	0.39±0.49	3.814*
Q-7	0.13±0.34	0.43±0.49	5.500*	0.19±0.39	0.50±0.50	6.481*
Q-8	0.26±0.44	0.5±0.50	4.960*	0.26±0.44	0.55±0.49	5.904*
Q-9	0.17±0.38	0.47±0.50	2.530*	0.24±0.42	0.6±0.49	7.910*
Q-10	0.16±0.37	0.45±0.50	5.646*	0.16±0.37	0.57±0.49	8.780*
Q-11	0.13±0.34	0.58±0.49	8.039*	0.22±0.42	0.81±0.39	13.755*
Q-12	0.17±0.38	0.52±0.50	6.522*	0.23±0.42	0.70±0.45	10.442*
Q-13	0.18±0.39	0.58±0.49	7.257*	0.21±0.41	0.74±0.43	12.258*
Q-14	0.1±0.30	0.42±0.49	6.167*	0.13±0.34	0.5±0.50	8.021*
Q-15	0.11±0.31	0.68±0.46	10.338*	0.1±0.30	0.88±0.32	23.838*
Q-16	0.13±0.34	0.38±0.49	4.820*	0.13±0.34	0.37±0.48	5.317*
Total	3.18±1.45	8.12±3.25	13.702*	3.15±1.44	9.80±2.27	36.692*

Q-1 to 16 has two options, based on GDA labelling scheme, one product is healthy and another one is unhealthy. Post intervention colour coded GDA was introduced.
Note: * significant p<0.05 level

Table-6 depicts that in both the age groups percentage improvement was seen in all the questions post intervention. Since colour coded GDA (traffic light colour scheme) was introduced, players were able to comprehend GDA labels easily. They were able to select healthy product from the given options efficiently. Similar results were seen in study conducted in UK (Scarborough et al 2015). A food with more 'reds' was less likely to be chosen as healthy, whereas a food with more 'greens' was more likely to be chosen as healthy. Foods with better colours on saturated fat and salt were more likely to be chosen as healthy.

Table-6: Percentage improvement scores after post intervention for components of food labels

Parameter	Football players (10-11.11 years, n=80)		Football players (12-14 years, n= 170)	
	n	% improvement	n	% improvement
Q-1	20	125	64	400
Q-2	22	137.5	108	675
Q-3	16	100	55	343.7
Q-4	26	162.5	78	487.5
Q-5	18	112.5	56	350
Q-6	15	93.7	32	200
Q-7	24	150	53	331.2
Q-8	19	118.7	50	312.5

Q-9	24	150	61	381.2
Q-10	23	143.7	70	437.5
Q-11	36	225	99	618.7
Q-12	28	175	80	500
Q-13	32	200	89	556.2
Q-14	26	162.5	62	387.5
Q-15	46	287.5	133	831.2
Q-16	20	125	41	256.2

Q-1 to 16 has two options, based on GDA labelling scheme, one product is healthy and another one is unhealthy. Post intervention colour coded GDA was introduced.

CONCLUSION AND IMPLICATIONS

Nutrition awareness sessions positively effects football players knowledge and understanding on food labelling. Education of population at large could be done by advertisements through various media, including development of smart phone application, which can help consumers to choose processed products wisely. In order to improve consumer awareness and interpretation skills on food labels there is a need for constant and repeated awareness sessions on food labelling for consumers. Various nutritional education activities can be initiated in schools and colleges in order to provide education on food labelling to promote label use for healthy food choices at young age.

REFERENCES

- Chandorkar S and Joshi A (2012). A study on functional utility of nutrition labels towards making healthy food choices. Unpublished master's dissertation, Department of Foods and Nutrition, The M.S. University of Baroda, Vadodara, Gujarat, India.
- Croll, J &Harnack, L. (2006). Adolescents involved in weight-related and power team sports have better eating patterns and nutrient intakes than non-sport involved adolescents. Journal of the American Dietetic Association, 106(5):709-717.
- Cowburn, G.; Stockley, L. Consumer understanding and use of nutrition labelling: A systematic review.Public Health Nutr. 2005, 8, 21–28.
- Crossley ML, Nazir M. Motives underlying food choice: an investigation of dental students. Braz J Oral Sci. 2002;1(1):27-33.
- Furst T, Connors M, Bisogni CA, et al. Food choice: A conceptual model of the process. Appetite. 1996;26(3):247-65.
- Geiger C, Wyse B, Parent C, Hansen R. Review of nutrition labelling formats. J Am Diet Assoc. 1991;91:808–12.
- Grunert K, Celemín L, Wills J, BonsmannS &NureevaL.(2009) Use and understanding of nutrition information on food labels in six European countries, J Public Health, 18:261–277.
- Kreuter MW, Brennan LK, Scharff DP, Lukwago SN. Do nutrition label readers eat healthier diets? Behavioral correlates of adults' use of food labels. Am J Prev Med. 1997;13(4):277–83.

- Lobato JC, Costa AJ and Sichieri R (2009). Food intake and prevalence of obesity in Brazil: An ecological analysis. Public Health Nutr, 12:2209-2215.
- Lockie S, Lyons K, Lawrence G, et al. Eating 'green': Motivations behind organic food consumption in Australia. Sociol Ruralis. 2002;42(1):23-40.
- Moore S, Donnelly J, Jones S and Cade J (2018). Effect of Educational Interventions on Understanding and Use of Nutrition Labels: A Systematic Review. Nutrients, 10, 1432
- Petrie, H.J., Stover, E.A. &Horswill, C.A. (2004). Nutritional Concerns for the Child and adolescent competitor, 20(7-8):620-31
- Purcell, L.K. Canadian Pediatric Society, Paediatric Sports and Exercise Medicine Section. (2013). Sport nutrition for young athletes. Paediatr Child Health, 18(4), 200-202.
- Roe BE, Levy AS and Derby BM (1999). The impact of health claims on consumer search and product evaluation outcomes. Results from FDA experimental data. J Public Policy Mark, 18:89-115.
- Scarborough P, Matthews A, Eyles H, Kaur A, Hodgkins C, Monique M, Raats and Rayner M (2015). Reds are more important than greens: how UK supermarket shoppers use the different information on a traffic light nutrition label in a choice experiment. International Journal of Behavioral Nutrition and Physical Activity 12:151
- Share M, Stewart-Knox B. Determinants of food choice in Irish adolescents. Food Qual Prefer. 2012;25(1):57-62.
- Singh M and Chandorkar S (2015). Composition of processed foods, status of food labeling and its utility towards healthy food choices. Published PhD dissertation, Department of Foods and Nutrition, The M.S. University of Baroda, Vadodara, Gujarat, India.
- Sobal, J., &Bisogni, C. A. (2009). Constructing Food Choice Decisions. Annals of Behavioral Medicine, 38(S1), 37–46. https://doi.org/10.1007/s12160-009-9124-5
- Wansink, B., &Sobal, J. (2007). Mindless Eating. Environment and Behavior, 39(1), 106–123. https://doi.org/10.1177/0013916506295573

The Indian Journal of Home Science 2022: 34(1)

DISABILITY ENDANGERS OR ENGENDERS WOMENEMPOWERMENT – A MICRO-LEVEL STUDY

Jothi Priya.P[1]and Dr. Visalakshi Rajeswari.S[2]
M.Phil Scholar[1] and Professor[2]
Department of Women's Studies[1] and Department of Resource Management[2] Avinashilingam Institute for Home Science and Higher Education for Women,Coimbatore – 641 043, Tamil Nadu
Email id: pjothi93107@gmail.com

ABSTRACT

In India one half of the population are women where a considerable part is unfortunately, disabled. Their plight extends from social difficulties to home-level financial and personal-level health issues. Lack of identity and visibility are yet other problems faced by such women, the Women PWDs (Persons with Disabilities). In addition, receiving less priority from the educational and occupational sectors have left them with less choice, but to choose self-employment. Yet their journey to present level has not been reported smooth. With this backdrop a micro-level study on selected self-employed women PWDs from Coimbatore (purposive sampling) were studied for their decision to have taken up self-employment as their livelihood option, the pull/push factors as influencers and the extent of success realized enabling them to shine as empowered women. This article highlights the positive attributes of a few self-employed women PWDs who have emerged successful (despite various odds) in their vision and mission to steer ahead, earn a livelihood and find a self-propelled way to empowerment as individual case studies, especially during the Pandemic. The study had analyzed the argument whether their disability had endangered or engendered their pathway to self-empowerment.

Keywords: Disability, Self-empowerment, Livelihood, Endanger, Engender.

INTRODUCTION

In India, the family - the most basic unit of the society- is considered a strong force for social cohesion and integration, strengthening of which ensures strong family ecosystems. Here the role of the women in the family is indicated as most crucial. Throughout history, Indian women have generally been relegated to the role of homemaker, that of a mother and wife, but obviously they seem to be invisible in the society. Their plight can improve only if they can have a safe entry into economic stream where they will not be contributors to the economic mainstream but also to the family. Gainful employment of women is thus identified as a major entry point in promoting their economic conditions. The most important problem is achieving successful employment and independent living. This all the more becomes stressful if the candidate is a person with disabilities (PWDs).

In India, according to MOSPI reports (2021) out of the 121 Cr population, 2.68 Cr persons are 'disabled' which is 2.21 per cent of the total population. Among them 44 per cent

(1.18 Cr) are women. Compounded factors of family situation (economic), being a woman coupled with disability and with all its malefic, leave them totally impaired to enter into gainful employment. In such situations being self- employed and that to running one-woman enterprises (solo-entrepreneurship) show many, a ray of hope. With this backdrop a study on women PWD and their livelihood options was undertaken.

MAJOR OBJECTIVES

- Elicit lifestyle orientation of selected women-- Person With Disabilities(PWD) self-employed (solo-entrepreneurs)
- Analyze if their disability endangered or engendered their success prospects

METHODOLOGY

Among Indian population 20 per cent are locomotion disabled while 19 per cent each are visual and hearing impaired respectively. A good eight per cent has multiple disabilities (MOSPI, 2016).

As the study was conducted during the pandemic, collection of data on women PWD engaged in self-employment as a livelihood avenue was obtained through secondary data. Records maintained by Directorate of Industries, Rehabilitation council, Orthopedic centers and the like were resorted to. Evidently the sampling method was snowball sampling, a non-probability (non-random) sampling method used when characteristics to be possessed by samples are rare and difficult to find (Kumar, 2014). This method relies on referrals from initial subjects to generate additional subjects. Therefore, when applying this sampling method members of the sample group are selected via chain referral (Dudovskiy,

2011). This enabled the investigator to come to know of 33 samples (women PWDs who were self- employed) without much delay and effort especially during the pandemic. An Interview schedule was drafted and sent to them through WhatsApp or e-mail as found convenient to them or were adept with them. Doubts were clarified through mobile chats. Similarly doubts about responses received were also clarified on the same mode. From this sample, for the micro - level study three women PWD solo – entrepreneurs, residing in Coimbatore (convenience sampling) and who had taken up the risk by virtue of their disability status was chosen. Only those willing to disclose personal aspects were considered. Two had studied only up to Secondary schooling, but one was a Post graduate.

Earnest interest to participate in a survey, disclose personal and business facts and approachability decided the choice of these samples. As direct personal interview plus administration of any accepted tools was impossible to figure out due to the pandemic, enforced lockdown and social distancing regulations, details on the sample's journey as solo-entrepreneurs and the extent of satisfaction and success they enjoyed was found out through communicative devices like mobile/ smart phones. The samples were requested to narrate the reasons, motivation, nature of enterprise, benefits and malefic faced and challenges fought against, which was recorded and analyzed later. Prior permission was sought to record their narrative. Details pertaining to the study were gathered using virtual mode. Hence the data

collected for the second part of the study were recorded as individual case studies. A case study is deep and intensive study of a particular social unit. It is also a diagnostic study oriented towards finding out what is happening and why it is happening and what can be done about it. Some experts refer to it as insight- stimulating study (Ravichandran, Nakkiran, 2009). Details were collected during their leisure, purpose of the study explained and recorded.

SALIENT FINDINGS

From the 33 samples surveyed only 30 had recorded responses to all queries requested in the survey format. Hence data on those 30 samples alone are discussed. Salient findings of the study are delineated under the following headings:

Phase 1: Profile of the Selected Women PWD Samples

Phase 2: Case Studies of Successful Self-employed Women PWDs

Phase 1: Profile of the Selected Women PWD Samples

This aspect of the study is discussed under the following headings:

1. **Cause of Disability**
2. **Socio-economic Profile**
3. **Nature of Avenue Chosen for Self-employment**
4. **Factors Found Encouraging**
5. **De-motivating Factors**

1. Cause of Disability:

Table 1 and Fig 1 Present details on the same

Table.1: Cause of disability

Cause of disability	Percent responding (N-30)
Polio	87
Congenital disorder	10
Amputee (Accident)	03

Among the samples studied a majority of 87 per cent were victims of Polio attacks, while 10 per cent reported of congenital reasons. Of course, a minority of three per cent also was in the group who had suffered an accident injury and had lost a limb. The statistic projected that the population of disabled is increasing is but true. It was very disheartening to record that

despite Governmental Action from several decades to eradicate Polio infection from the community is yet to receive the light of the day as more than 80 per cent among a small population reported to be victims for its after effects.

2. Socio-economic Profile:

The socio-economic profile of the selected sample is tabulated below Table 2: Socio-economic profile of the selected sample

Factors considered	Particulars	Cause of disability		
		Percent responding		
		Polio (26)	Congenital (3)	Accident (1)
Age range (in Years)	18-30	3.84	33.33	100
	31-45	69.23	66.67	-
	>46	26.93	-	-
Family type	Joint	7.70	33.33	-
	Nuclear	92.30	66.67	100
Literacy level	Primary	69.23	100	100
	Upper primary	7.69	-	-
	High School	15.39	-	-
	Higher Secondary	7.69	-	-
Marital Status	Single	30.77	100	-
	Married	69.23	-	100

More than 60 per cent among polio and congenitally affected women self-employed were found to be in the 31-45 year's age, though 18–30-year group also featured. A maximum belonged to nuclearfamilies. Exception was found among congenitally affected samples. A very disheartening fact was that 62,100 and 100 per cent from all the three groups respectively had studied only up to primary classes. At least some representation from Polio affected Self-employed women could be found in higher schooling levels. In fact, 69 per cent of polio group and cent per cent of accident affected ones were married while the rest stayed single. All these factors portray a gloomy picture as none of them were well educated and above all lacked the much-needed social support to run their families. Moreover, none of them were skilled enough to take up some entrepreneurial activity too. The pandemic had further douched their interests and motivation.

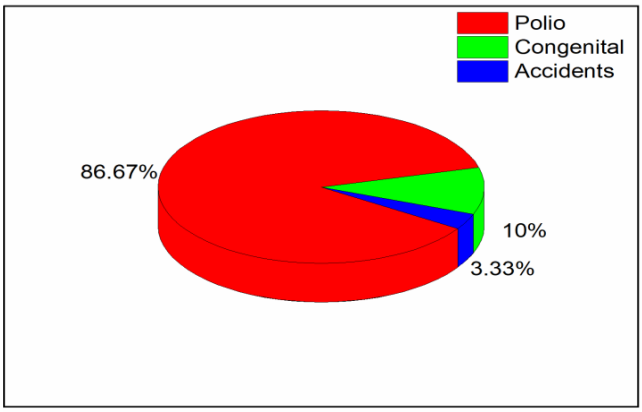


Figure 1: Cause of Disability

3. Nature of Avenue Chosen for Self-employment

Though, except a few, the others were not skill-oriented to embark on real entrepreneurship, the selected sample showed some inclination to earn for their livelihood at least. Hence this motivated findingout the avenues which they had willingly chosen, the findings of which are presented Table.3.

Table 3: Avenues chosen for self-employment

Avenue chosen (N-30)	Percent responding (N-30)		
	Cause of disability		
	Polio (26)	Congenital (3)	Accident (1)
Tailoring (13)	46.15	33.33	-
Petty shop (12)	34.61	66.67	100
Dress sales (5)	19.24	-	-

Three different avenues were identified by the samples, namely tailoring, running petty shops andsale of dresses, among which petty shop was preferred by all three groups. Next in line was tailoring. Except a few (10 %) all others were not very keen on expanding their income-generating activities and neither of them were found to be very serious about it. This was a cause for concern which prompted finding out what encouraged them to take up self-employment.

4. Factors Found Encouraging

An enquiry into the factors found encouraging for a group branded as disadvantaged had come to the forefront taking up something novel in their life. Hence it was felt necessary to find out what had motivated them to take up self-employment.

Factors stated include family support (56%), patronage from localists i.e. neighbours (43%), skill and know-how about the avenue (37%), financial assistance for initiating from friends and relatives (28%), available infrastructure (23%) and helpful friends (16%). It is clear therefore

that all the samples enjoyed some aspects conducive for them to start their income-generating joints.

5. Demotivating Factors

From the factors obtained through previous enquiries, it was possible to identify the following factors which they pinpointed as highly de-motivating to get along with the chosen avenue of self- employment, which is tabulated below (Table 4).

Table 4: Factors found De-motivating by the samples

De-motivators	Percent responding (N=30)
Pandemic and lockdown	100
Lack of social support	84
Low educational status	78
Ignorant about Government Schemes	74
Unaware to access scheme facilities	74
Lack of Skill training	56
Non-availability of financial assistance (Loans)	56
Poor earning from the avenue	42
Low self esteem	42
Social and family abuse	34
Health issues	30

A major factor found discouraging was the **pandemic and the enforced lockdown**. It totally left them less-enthusiastic and demotivated. At a time when they had just started to get rooted this had happened as many of them lost their clientele, though only were rare. There are several reports in literature supporting that women with disabilities endure various ill-treatments including social and family abuse. The concerned sample was in no way different. Next to lack of social support which determines one's standing in any field; their low educational status aggravated the status. In addition, they accepted ignorance about Government schemes which could have been helpful to them plus ways to access them. Evidently the factors the sample's found de-motivating was partially self -found. Their lack of awareness on general aspects promoting self- employment and many which were personal aspects (low educational status, skill training etc.) were factors of concern.

Observations made till this part of the study revealed that many of the samples were not serious and energetic enough to continue with their joints. With this backdrop, three samples (women with disabilities) who agreed to be have overcome the crisis (pandemic situation) and sustained their self-employment avenues were interviewed further to identify their stories of success. They are presented as individual case studies

Phase 2: Case studies of successful Women PWDs in self-employment

Participant (1)

Figure 2: Participant (1) in her petty shop

A victim of polio attack from age four, she was 39 at the time of data collection (fig 2) and hails from Vellalore in Coimbatore. Though born as a 15th child, she was unfortunate to have lost six of her siblings, who had succumbed to brain fever or polio attack. Among those who had survived she enjoyed living with five brothers and three sisters. Blessed with rare and loving parents she had the opportunity to live also with five other children adopted by the parents to replace whom they had lost. Hence her childhood, despite her impairment was quite pleasurable which paved way for her to imbibe good human values, flexibility and resilience.

After her fourth year when she became a polio victim, another turning point was when she was pursuing her Sixth Standard in a Government School when her father, a Railway employee, lost his arm in an accident. It was then she realized that she should take up the responsibility of adding to the family income. Her mother's hard efforts to meet both ends meet was an eye-opener and forced her to lend a helping hand to her mother to run the family and educate other siblings. She equipped herself by learning tailoring and first worked for hosiery industries, by collecting stock from Tirupur and stitching them at home. She excelled in reusing waste fabric which she made into attractive wall hangings.

Another shortfall from her was her marriage to a person against the wish of the family for which she had to pay a huge price. He was an alcoholic and was not a support to the family. But begetting a daughter rejuvenated her to action. It was then she tried out making homemade masalas, jams and cleaning agents (especially Phenyl). Her neighborhood appreciated her earnest attempts and patronized her products. Her reach extended up to a School nearby and people started encouraging her by purchasing her products. Such encouragement motivated her to buy four grinders (powdering) and packaging materials which widened her market to sell packaged ready to eat/ readymade powders and start a petty shop in a premise which she had bought using her savings. Hygienic preparation and ethics in selling helped her earn goodwill of the community nearby. Evidently, she increased the number and nature of items sold in the shop.

Despite her audacity to face challenges, problems chased her and the ultimate thing was when she had to face the complete charring of her petty shop by some known persons who had developed grudge against her development. Her foresight to go legal as she had all necessary documents coupled with being a regular tax payer helped her resolve the issues. Here too she had a divine support in the form of a Good Samaritan, the Director of a renowned Trust who gave his premise free of cost to run her petty shop. Such incidences had reformed her husband, who started helping her out. She had gathered enough strength to conduct the marriage of her daughter and help her financially (who was recovering from a major accident she had endured), repay her loan to get back her mortgaged property and be a friend in need for those who needed help, especially many women PWDs. She of course is very proud about the latter which she does with all soul and spirit.

This participant is really a role model not only for PWD but also other women to face life and its problems boldly. Her life is an example where family and social support was well available. Her patience, hard work, sustained efforts, optimism, commitment, compassion for others (needy and poor), positive attitude to succeed and live on self-earning are values which all women should imbibe for a successful life. For her, disability was never disabling.

Participant (2)

Figure 3: Participant (2) in action

The second participant (fig 3) was just 30 at the time of data collection and was a resident of Sundarapuram in Coimbatore She is the second child and has an elder brother. Her father was a daily wager and her mother, a housewife. She had received utmost care and support from her mother as she was born with mental disability, though her father used to be more of a pampering type. Though born with deficient intelligence quotient – IQ, she deserves compliment as she had completed her education till Class X despite her low memory power and poor speaking skills.

Having lived with her mother who sold saris and handmade baskets (done by self) to her neighbours had instilled values of hard work and perseverance in her from young age. Considering her inborn impairment, her parents had approached the Cheshire home and facilitated mentoring in basic life skills like tailoring and beautician courses and also values like gaining self-confidence, ability to resolve problems and leadership concepts. This skill orientation and mentoring had transformed her as a self-employed woman PWD and embark on an income generation venture, catering to her passion. Her marriage to a willing Engineering graduate, who was also a differently - abled proved to be of great support in expanding her clientele's reach and widen prospects for gratifying their interests and job work facilities. Next to her parents she considers him as a good mentor in her self - employment line. Using YouTube Apps, she had enhanced her potentials in both beautician skills and tailoring. She had also developed interest in Jewelry making (fig 4) and had gone deeply into sale of those too.

For her, disability was never a hindrance to growth and development in life. She had taken all as challenges in life and had overcome as any normal person. Her patience, adaptability to situations, creativity, yearning to learn and earn and to stand on own legs had paid good dividends in her life. Hers is a life of success (despite impairments) molded by human resource and social support and a strong conviction from her side to achieve an admirable life style.

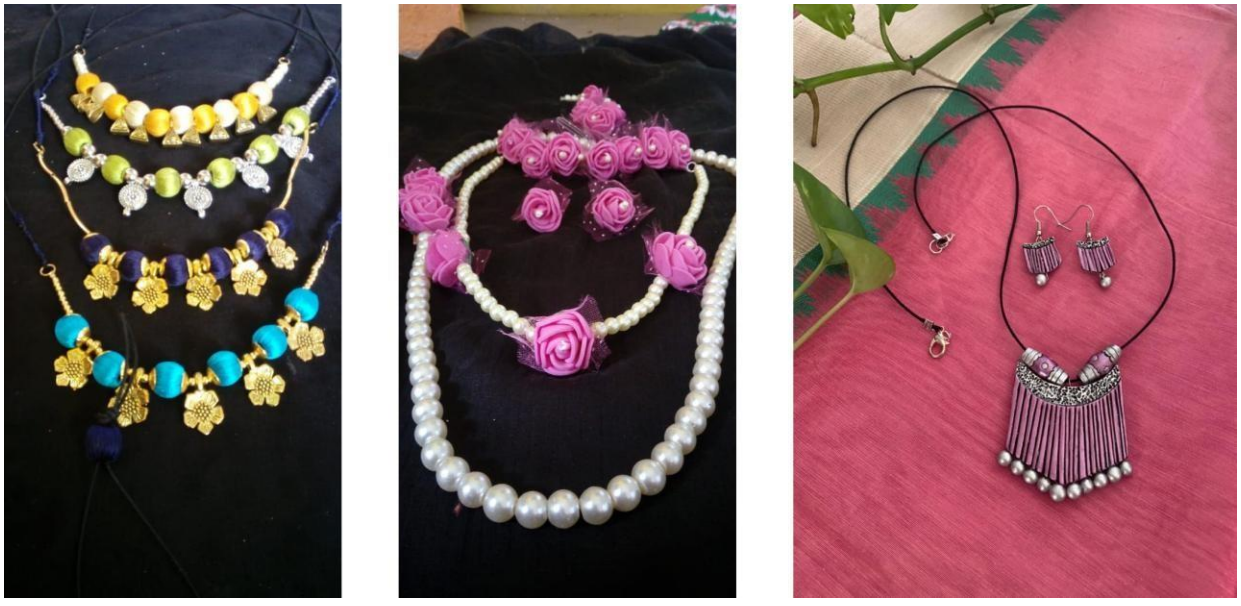


Figure 4: Hand-made Jewellery

Participant 3

Figure 5: Participant (3) in action

Born to a mill worker and housewife couple in 1977(fig 5), she had one brother as family. Despite affected with polio attack at the age of three, her commitment to face challenges and odds in life prompted her to pursue her education and complete Post graduation. She had in fact settled as an accountant, but her marriage in 2004 followed by arrival of two children forced her to quit the job. Her passion for being active and engaged in some income generating work at least during hours of leisure motivated her to undergo a Course in dress designing (fig 6) and establish a tailoring unit in 2016. Personal interest and encouragement from her husband and a dress designer friend enabled her choose a line of activity which was also lucrative. She was able enough to get a premise on lease making use of her personal savings. In the initial stages itself she had such good patronage that she had employed four assistants. Her passion for work, sincerity and integrity in delivering goods and appreciable work enabled her to get ample clientele and considerable earning urging her to purchase software for cutting jobs investing Rs. 45,000/-. Though it didn't take off well and had to suffer losses, she regained her clientele with her usual zeal and commitment.

Her dedication and consistency had made her a successful woman entrepreneur now. Her disability had never been a hindrance to her entrepreneurial spirit. She dedicates her success to the great support and

motivation given by her husband in all phases – both gloomy and bright, her education and social support from all clientele.

Figure 6: Artistic hand works done by Participant (3)

CONCLUSION

Empowerment of women as a process refers to providing power to women to free themselves from the control of others, increasing their strength of women in all quarters and creating an environment where they are allowed to take independent decisions on personal development and to enjoy gender equality. At the same time to gain empowerment women should assume power to control personal life and decide one's own conditions of life, develop confidence in their personal capacities and learn to shift from enforced powerlessness to a position of self-earned power.

These three women PWDs have emerged as role models for others to follow. According to official statistic among the disabled non – workers, for all type of disability, per cent of **dependents** are highest followed by students and those performing household duties except for mental illness, where per cent of disabled engaged in household duties is more than that of students. This cohort had emerged as one who had given least heed to their impairment, forgotten their disability and have shown to their near environment their potential to succeed in their livelihood ventures. They have to be applauded for the strong vision and mission they had framed for their life style and the dedication shown to achieve them. It

is needless to state that they have emerged as good decision makers, had complied both to pull/ push factors of influence and had self-propelled their own way to empowerment. The positive attributes possessed which guided them to success was well displayed.

The study has ***proved that disability has not endangered but has engendered the spirit in these women to excel in their self-employed life.***

ACKNOWLEDGEMENT

The authors wish to thank the Ethical Committee of the Institute (Avinashilingam Institute for Home Science and Higher education for Women, Coimbatore) for having given permission to conduct the study. They wholeheartedly thank the participants for their cooperation and willingness to be a part of the study.

REFERENCES

- Disabled Persons in India a Statistical Profile 2016. Social Statistics Division, Ministry of Statistics and Programme Implementation, Government of India. http://mospi.nic.in/sites/default/files/publication_reports/Disabled_persons_in_India_2016.pdf Accessed on 21 April 2021.
- Dudovskiy, J. (2011). *Business Research Methodology. Snowball Sampling*. https://research-methodology.net/sampling-in-primary-data-collection/snowball-sampling/. Accessed on 21 April 2021.
- Kumar, R., (2014). *Research Methodology- a step-by- step guide for beginners* (4th edition). SAGE Publishing, New Delhi.
- Ravichandran, N, Nakkiran. S,. (2009). *Introduction to Research Methods in Social Sciences*. Abhijeet Publications. New Delhi.
- Persons with Disabilities (Divyangjan) in India- A Statistical Profile: 2021. Government of India Ministry of Statistics and Programme Implementation National Statistical Office Social Statistics Division.http://mospi.nic.in/sites/default/files/publication_reports/Persons_Disabilities_31mar21.pdf. accessed 29 April 2021.

The Indian Journal of Home Science 2022: 34(1)

REFLECTIVE PRACTICE TO SUPPORT STUDENT LEARNING AND INCLUSION IN HIGHER EDUCATION

Dr. Priti Joshi
Associate Professor
Department of Human Development and Childhood Studies,
Lady Irwin College, University of Delhi
priti.joshi@lic.du.ac.in

ABSTRACT

As a university lecturer, the expansion of the higher education (HE) system had presented the author-researcher with challenges brought about by a major change in the demographic profile of students. The widening of the university enrolment has led to admissions of a substantial proportion of first-generation college students. The tertiary curricula assume a cultural capital and scholarship that the students do not have, leaving students who are first-generation University entrants unable to cope with the demands of the system. Consequently, university teachers have been facing the challenge of bridging the gap between under-prepared students and the mandated learning goals of the curriculum. This is exacerbated by the fact that there is no provision for a formal professional development programme for HE teachers regarding pedagogy appropriate for university students nor is any specific capacity building undertaken for the faculty to deal with this situation. It was in this context that the author took on the role of a researcher as well as a reflective practitioner. She developed and worked on evolving a responsive pedagogy and a reflective practice to address the limitations experienced by the students. The students' difficulties were viewed to be the natural consequence of the expansion of the university system rather than the students themselves being regarded as a "problem". Rethinking of one's own role and expectations as a teacher, were among the first few steps that helped the author to deal with the daily situation faced by her in the teaching-learning context. The paper describes disciplined, reflective action research into the daily practice of teaching and reviewing teacher-student relationship. The author maintained a daily log of her observations and her actions were based on readings and capacity building efforts undertaken by other researchers in similar situation that were contextualised. Over a period of time, this enabled students to shift from passive attendance to being engaged, connecting with learning and becoming more autonomous as learners despite the constraints.

Keywords: Inclusion, Higher Education, Pedagogy, Reflective practice

INTRODUCTION

The last two decades have witnessed a rapid expansion of the Higher Education (HE) system in India, leading to a dramatic increase in the number of colleges and students. From Independence in 1947 till about 20 years ago (i.e., 1950-51 to 2000), student enrolment ratio in HE ranged from 1.5per cent to 8.1per cent (Tilak 2015), while the current Gross Enrolment Ratio (GER) is 25.8per cent (All India Survey on Higher Education 2018). The increase in reservations around the turn of the century enabled students from disadvantaged and socially excluded groups to enter HE in large numbers. The consequence was a shift in student demographic profile, with a substantial proportion of first-generation college goers now being part of the student population (Varghese,

Sabharwal & Malish, 2018). While the quotas opened the doors, it is school-level Education for All (EFA) programmes that have generated the large numbers of students ready to enter tertiary education. This, in turn, also contributed to the substantial increase in demand for university education. However, the pace of physical growth exceeds that of quality improvement (Varghese & Panigrahi, 2019).

It has also been pointed out that the expansion in higher education has been accompanied by a lack of institutional capacity to adjust to the demographic shift and increasing student diversity (Sabharwal & Malish, 2017).Difficulties and pressures have begun to emerge from the lack of fit between the now greatly diverse student profile (with a greater proportion being from socially disadvantaged groups) and the typical university coursework and its transaction. Curricula, pedagogy, assessment, educational design – all evolved to serve the needs of the small percentage that enrolled in tertiary education earlier, who were clearly from the more advantaged sections. The students coming in then were from better resourced families, had been through reasonably good secondary education, often knew English and had inherited the kind of cultural capital needed to succeed in tertiary education.

The absence of the pre-requisites (good secondary education, cultural capital, knowledge of English) makes the university level expectations (of scholarship, independent work, deep understanding, etc.) quite difficult for first generation college goers to achieve, leading to their exclusion from or weaker participation in the teaching learning process. These limitations are carried over from inequalities in the quality of secondary education (Varghese, 2018), and are especially visible when common 'conventional' methods such as lectures and assignments are used in university teaching. Addressing these disparities calls for a radical re-think on the notion of tertiary education appropriate for today's times.

Consequently, university teachers now face the challenge of bridging the gap between under-prepared students and the mandated learning goals. This is exacerbated by the fact that there is no provision for a formal professional development programme for HE teachers on pedagogy appropriate for tertiary level (Varghese, Pachauri & Mandal, 2018). The mismatch between expectations and reality illustrates the inadequate institutional capabilities in responding to changing demographic profile and the growing student diversity. This paper traces that journey of facing these challenges in a diverse classroom and finding ways to meet them, informed by 'reflective practice' about teaching and learning.

OBJECTIVE OF THE STUDY

Since larger changes such as that in the system or curriculum are not in the hands of author-researcher, the research question was how could she adapt to the changing circumstances and do justice to her professional responsibilities? This led to the e following objective:

1. To identify specific barriers to learning that students have by observation and reflection and conceptualise a process within the given context that engages students in learning.
2. Through reflective practice, conceptualize and implement a process to address specific challenges in student learning.

METHODOLOGY

Participants and Context of The Study

Study participants were 26 students in the II year of BSc Home Science (Hons) based at a central university and were taught by the author-researcher over a period of one year. The students were part of both theory and practicum coursework and had six hours of classes every week, spread over three days per week.

The author as a faculty member in a university college was teaching both at the undergraduate and postgraduate levels. The changing student profiles as discussed in the introduction were strongly visible in the author's classes too, with students from socially disadvantaged groups being present. It was also observed that there was a preponderance of students with difficult family circumstances, including financial duress. This had resulted in many students to engage part-time work .The author observed the general trend of students not reading enough as is the requirement for university education, expecting teachers to provide notes, using mobile phones to take notes or click photos of pages from library books, and being burdened with huge store of downloaded material but unprocessed as it was too vast and they were not able to write their notes utilising this.

Facilities such as the library and the Internet were used in a limited manner for academic purposes. Though enrolment has increased manifold, attendance rates have declined sharply over the years. Within the last five years, attendance registers for the author's classroom show a decline from around 90 per cent students attending each day to around 60 per cent. The University has responded to the issue of poor attendance by allotting scores as credit for attendance. For the teacher, poor attendance rates imply is that the class as a whole lacks continuity and commitment.

As it became apparent that many of the usual practices and teaching methods were not engaging students or sparking their interest or leading to learning, greater thought was required on what needed to be done differently and hence reflective practice was selected as a method to assess and address the situation.

The methodology adopted for this research was reflective practice. In the field of education, reflective practice is recognized as one of the ways in which teachers can develop their ability to become aware of their own underlying beliefs about teaching, how students learn, and the best ways to teach them. It is defined as 'learning through and from experience towards gaining new insights of self and practice' (Dewey, 1910; Finlay, 2008; Schon, 1987). Through this process, teachers can improve their pedagogy and classroom transactions to effectively address the learning needs of their students.

As a part of this methodology, as a teacher-researcher, a necessary first step for the author was to pause and re-assess what was being followed presently in her classes, which gradually led to 'reflective practice' (Dewey, 1910) involving a re-examination of the various dimensions of education. This included her relationships with the students, understanding their strengths and limitations, and the context in which teaching-learning was taking place. This method helped to identify and solving the problems faced and move towards a more effective and satisfying educational experience for the author-researcher as well as students. It required both reflection-in-action (i.e. during the action or class) as well as reflection on one's actions i.e. thinking back on the practice afterwards Because the situations faced on a daily basis were not always predictable and required spontaneous response, often leading to an 'on the spot experiment' in her classes by trying out something new as well.

The -autonomy in the classroom provided the author-researcher the space and opportunity to attempt a number of changes and variations in her usual classroom practices with the batch of students. A series of steps were pursued to reflect on what was taught in class; these included self-assessment of effectiveness, followed by implementing and trialling of new ideas, observing student response and then repeat the cycle (Cambridge Assessment Education International, New South Wales Government, n.d).

Analyses

The weekly log maintained by the author-researcher was considered for the analysis. It contained a record of self-assessment of effectiveness, response on implementing and trialling of new ideas, and observation of student response.This study employed a qualitative design and a content analyses of the detailed log was carried out which led to the identification of themes discussed in the results section (Kember et al., 2008).

RESULTS

As a consequence of reflective practice over a period of one year led to the following reflections, action taken and outcomes about various aspects of classroom transactions, role of a teacher as well as nature of relationships with students. The results describe the changes that came about in the following sections.

Each student has the right to learn: rethinking a teacher's role

This perspective is important to consider. Underlying this perspective is the understanding that teachers must believe and start from the premise that the students have a right to learn. From a rights-based perspective, it is the teacher who is accountable to the student. Is the teacher fulfilling that right to learn, which is what her duty is?

Viewing the gaps in learning among students as a natural consequence of the opening up of the university system, rather than as a problem, led the author to re-examine her long-held perceptions about students, their roles and that of the teacher. More important than all this, though, was it is really their right to learn and the teacher's duty lay in finding ways to help them succeed. Taking this perspective helped the author re-frame many of her earlier frustrations. Among the questions that needed reflection were: what is the notion of knowledge, and how to interpret the term 'learners' in the changed context (Waring & Evans, 2015)?

Equally on author's part as a teacher, there was a need to see that their delays in submitting work or attending late were at times signs of difficult family circumstances or inadequate resources as well as difficulty in conceptual understanding.

Many factors thus led to a lack of student engagement and needed to be countered with an effort to generate involvement on their part. A degree of flexibility was called for as well as empathy from 'actors within the system' (Varghese 2018, p. 133). There were times when students, as they occasionally do, insisted that they did not 'feel like studying in the class' - these provided an entry point into discussions related to what they really wanted. As the students opened up, other strands emerged that could be followed up to create a different situation.

Addressing language/communication difficulties and discipline-specific language

One of the reasons why many students don't speak much in the class as observed by the teacher-researcher, is because they do not speak English. Even if they are able to write in the language, they are afraid of committing errors when they speak. A commonly raised question among colleagues was 'Is it our role to teach students the basics of language / grammar or the subject we are supposed to teach our own subjects?'

In this situation, despite the fact that English has been the medium of instruction for university education, a slow transition is taking place towards bilingual communication, especially at the undergraduate level. This provides grounds to ask students to use the language they are comfortable in. When thus encouraged in her class, it was found that the interaction was no more restricted to the usual few who were fluent in English. It also helped students when they provided support in taking longer to think and formulate their thoughts into presentable sentences if they want to speak in English. Like many skills that are learnt, this was slow in the beginning with students making progress as they made 'breakthroughs' in being able to communicate.

At the Bachelor's level, there is recognition of the need to overcome the language challenge. A report on reformulation of the BA programme recommends 'language competence, both in terms of linguistic skills and literary sensibility, needs to continue as a core dimension of the programme' (University of Delhi 2004, p.122). Despite the fact that bilingual transactions are no more looked down upon in classroom settings, the texts and reference materials of good quality are all in English. So, while the use of Hindi enhances inclusion, it does not entirely solve the problem.

Some other activities were adapted to student language level. For example, reading in class (say, a journal article or a chapter from a book) in pairs, checking meanings as they went along, discussing specific aspects and concepts with the teacher, and also expressing themselves in English.

Developing information literacy

Information literacy is an umbrella term that encompasses concepts such as digital, visual and media literacy, academic literacy, information handling, information skills, data curation and data management. (Society of College, National and University Libraries, SCONUL, 2011) As stated earlier facilities such as the library and the Internet are poorly used by students - books remain unread and the internet is not well utilised for academic purposes. Along with strengthening their academic foundations, therefore, students also need support in learning how to access and evaluate the quality of these resources critically and use them effectively and ethically. Hence, it cannot be separated from the learning process (Andretta, 2006).

While the author's students were skilled at using mobile phones for communication and social media, their abilities to use their access to the Internet to support their studies were very limited. They also tended to avoid taking notes on paper, relying on their phones both to read documents and take notes as well, often in an unsystematic manner or being unable to refer to them again. One of the initial efforts was to encourage students to take notes on paper, learning to transfer their understanding into their own words, recording systematically and being able to accumulate a genuine understanding of the discipline. This also allowed them to reflect on their notes, add to them or see connections as they emerged. As they gained skills to deal with information, however, it had a transformative effect on them, helping fill many gaps and supporting them in moving towards autonomy. There is, in fact, a need for information literacy to

be recognised as critical to the whole of education; it is also a societal issue and provides the basis for an information-enabled world we are transiting to, while also enabling students to take charge of their own learning (Bundy, 2004).

Generating engagement through a collaborative/constructivist approach

Another important step was, also to work on students' own notions about education, such as their expectation of 'getting' something readymade (e.g., notes) or 'just enough' to be able to 'manage', tended to reduce the chances of their own potential from being realised.

Socio-cultural learning theories emphasise that learning takes place in social contexts through interactions. Hence when students get opportunities to talk about what they know and collectively construct knowledge by sharing information, discussing and modifying their views, supported by teachers or experts (Vygotsky,1978), the end result might be called co-constructed learning.

The author tried to formulate simple principles to engage students in a learning process that would foreground their participation and contribution. - can be said to be practices drawn from constructivist positions on learning which view the learner as a responsible, active agent in his/her knowledge acquisition process (Loyens, 2007; Mensah, 2015). Enabling reflection, abstraction, making sense of new knowledge within the framework of the discipline being discovered and working with fellow students as a community of learners (Fosnot, 1989) were some of the key elements to emerge.

Understanding was constructed *with* the student, a two-sided process. The teacher-researcher did not play the role of the 'answer-provider'. Instead, a collaborative inquiry was created (between teacher and students to generate understanding) where students contributed their views, shared their experiences, with learning being drawn out of it through a co-creative process. Similarly, enabling students to collaborate with each other in meaningful tasks, reflecting on them, using their experience as well as readings - amplified the sources and situations they learnt from, with the social aspect assuming great importance in their academic journey.

A key principle that helped the author put into practice a shift in pedagogy was to engage with the students' higher order cognitive function rather than the basic information-capturing one. Thus, it is not so much about 'transferring' information as about placing it in a framework, processing it, looking for its implications, so that students see *why* it is being studied in the first place. Further linked with the previous principle, once the topic connects with students' lives, they begin to see their learning 'operating' in their daily lives, in families, peer groups, parenting and many other aspects. Establishing relevance, then, is crucial in that as they learn the subject students learn much about themselves, which helps them to imbibe a long-term interest in the subject.

CONCLUSION

The situation calls for a re-examination of how we enable learning in tertiary education in our context. With the shift in the demographic profile of our students, teachers too need to respond by adapting their pedagogical processes. The author's own effort arose from the difficulties she faced and her efforts yielded some positive results and insights with time. The shift in approach required her to move beyond the general notion that students do not have the required background for HE, highlight their right to learn and find ways to enable students to contribute to their own learning process. As mentioned, the key is to affirm equity and generate engagement by privileging

the experience, knowledge and the needs that students bring to the classroom. Obviously, this is a work in progress. Where the author was able to implement such a process, the author finds that a strong relationship develops among the students, a learning community forms, and their loyalty to the subject and taking part in the classroom processes seems to come about from inside – all of which is motivating. However even as we prepare students for, HE, there is as much a need to prepare the University system for its students by re-examining curricula, pedagogical practices and the structure of our courses. The 'neat fit' mentioned earlier can only come about if it is from both sides.

REFERENCES

- All India Survey on Higher Education (AISHE). (2018). *All India Survey on Higher Education (Report 2015-16).* Department of Higher Education, Ministry of Human Resource Development, Government of India. Retrieved from https://mhrd.gov.in/sites/upload
- Andretta, S. (2006). Information literacy: The new pedagogy of the question*?*. In G. Walton, & A. Pope (Eds.), *Information literacy recognising the need*(pp. 13-20). Oxford: Chandos Publishing.
- Bundy, A. (2004, October 4). *Zeitgeist: Information literacy and educational change.* Paper presented at the 4th Frankfurt Scientific Symposium, Germany. Retrieved from http://publikationen.ub.uni-frankfurt.de/opus4/frontdoor/index/index/year/2005/docId/3301
- Cambridge Assessment Education International (n.d).*Getting started with reflective pra*ctice. https://www.cambridge-community.org.uk/professional-development/gswrp/index.html#:~:text=Reflective%20practice%20is%20'learning%20through,your%20students%20make%20maximum%20progress.
- Dewey, J. (1910). *How we think: Restatement of the relation of reflective thinking to the educative process.* Boston, MA: D.C. Heath and Co Publishers.
- Finlay, L. (2008) Reflecting on "Reflective practice", PBPL paper 52 (January), pp.1–27. Retrieved from: www.open.ac.uk/pbpl
- Fosnot, C. T. (1989). *Enquiring teachers, enquiring learners*. New York: Teachers College Press.
- Gale, T., & Parker, S. (2011). *Good practice report: Student transition into higher education*. Good practice report, Australian Learning and Teaching Council, Sydney. Retrieved from https://ltr.edu.au/resources/Student transition into higher education. Loughran, John. J. 1996. *Developing Reflective Practice: Learning about Teaching and Learning through Modelling*. London: Falmer Press.
- Kember, D., McKay, J., Sinclair, K., & Wong, F. K. Y. (2008). A four category scheme for coding and assessing the level of reflection in written work. Assessment & Evaluation in Higher Education, 33, 369–379.
- Loyens, S. M. M. (2007). *Students' conceptions of constructivist learning*. Doctoral dissertation. Rotterdam, the Netherlands: Optima Grafische Communicatie. Retrieved from https://repub.eur.nl/pub/9264/
- Mascolo, M. F. (2009). Beyond student-centered and teacher-centered pedagogy: Teaching and learning as guided participation. *Pedagogy and the Human Sciences, 1*(1): 3-27.

- Mensah, E. (2015). Exploring constructivist perspectives in the college classroom. *SAGE Open*, 53, 1–14.
- New South Wales Government. (n.d). *Reflective practice.* https://education.nsw.gov.au/teaching-and-learning/professional-learning/teacher-quality-and-accreditation/strong-start-great-teachers/developing-focus/reflective-practice
- Report on Reformulating the BA Programme. 2004. "Reformulating the BA Programme at Delhi University". *Contemporary Education Dialogue*, 2(1): 121-128.
- Rogers, R.R. 2001. "Reflection in Higher Education: A Concept Analysis". *Innovative Higher Education*, 26**:** 37–57.
- Sabharwal, N. S., & C.M. Malish. (2017). Student diversity and challenges of inclusion in higher education in India. *International Higher Education*, *91*(Fall), 25-27. https://doi.org/10.6017/ihe.2017.91.10136Schön, Donald. 1983. *The Reflective Practitioner*. New York: Basic Books.
- Schön, D. (1983). *The reflective practitioner*. New York: Basic Books.
- Society of College, National and University Libraries, (SCONUL). (2011). *The SCONUL seven pillars of information literacy: Core model for higher education.*Retrieved from https://www.sconul.ac.uk/sites/default/files/documents/coremodel.pdf
- Tilak, J. B. (2015). How inclusive is higher education in India? *Social Change, 45*(2), 185–223.
- Varghese N.V. (2018). "Criticality, Empathy and Welfare in Educational Discourses". *Contemporary Education Dialogue* 15(2): 122–142.
- Varghese N.V., Pachauri, A., & Mandal, S. (2018). *India higher education report 2017: Teaching, learning and quality in higher education*. New Delhi: Sage.
- Varghese, N.V., & Panigrahi. J. (2019). *India Higher Education Report: Financing of Higher Education*. New Delhi: Sage.
- Varghese N.V., Sabharwal, N.S., and Malish, C.M. (2018). *India higher education report 2016: Equity*. New Delhi: Sage.
- Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.
- Waring, M., & Evans, C. (2015). *Understanding pedagogy: Developing a critical approach to teaching and learning*. Abingdon, Oxon, UK: Routledge.

The Indian Journal of Home Science 2022: 34(1)

"TRIGUNA" PERSONALITY TRAITS- (*SATTVA, RAJAS* AND *TAMAS*), *"KARMA YOGA"* AND MORAL FOUNDATIONS AMONG MATURE ADULTS FROM ASSAM

Rajlakshmi Borah[1], Shubhangi Bordoloi[2], Dr. Rachana Bhangaokar[3]
[1,2]Research Scholars, [3]Assistant Professor
Department of Human Development and Family Studies
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda, Vadodara
E-mail: borahr31@gmail.com; shubhangibordoloi1208@gmail.com
rachana.bhangaonkar-hdfs@msubaroda.ac.in

ABSTRACT

The present study examined the relationship between *Triguna (Sattva, Rajas,* and *Tamas)* personality traits, *Karma Yoga* attitudes, and Moral Foundations among eighty mature adults (35-55 years) from Assam. An equal number of men and women participants who were urban residents, married, and employed with work experience of at least 3 years, were chosen purposively using the snowball technique. The study used three standardized scales measuring *Triguna* Personality Traits, Moral Foundations and *Karma Yoga*. Data was collected online using these questionnaires through Google forms. Statistical analysis revealed that younger participants scored higher than older participants on *Tamasic* Knowledge. Participants with work experience of less than 20 years scored higher on *Tamasic* Knowledge whereas those with work experience of more than 20 years scored higher on Maturity. Participants who were married for more than 15 years significantly differed from those married for less than 15 years on the traits of *Tamasic* Knowledge, *Tamasic* Habits and *Sattvic* Knowledge. The study found significant positive correlations between Tranquility, Indifference Towards Rewards and total *Karma Yoga* score. Another *Sattvic* trait of Empathy was also significantly positively correlated with all Moral Foundations except Sanctity/De-gradation. The trait of *Rajasic* Habits was negatively correlated with Harm/Care and Loyalty/Betrayal Foundations whereas traits of *Tamasic* Knowledge and Tamasic Habits were negatively correlated with Duty Orientation. Overall, *Sattvic* personality traits, *Karma Yoga* attitudes and Moral Foundations were closely related. Future studies could examine this complex relationship for causal influences.

Keywords: *Triguna* Personality Traits, *Karma Yoga*, Moral Foundations, Mature adults, Assam

INTRODUCTION

Morality includes critical decision-making processes that uphold human and societal values through individual action. There are various cultural differences in the way morality is conceptualized and at the same time culture influences how individuals construct morality-based arguments. *Dharma* in the Indian context acts as the guiding force to remain on the righteous path and ultimately achieve spiritual liberation or *moksha*. *Kartavya* determines role-related duties to be

fulfilled by individuals at different life stages and under varied circumstances. Culture is a significant factor within which personality and morality develop and influence each other. The present study focused on the concept of morality and its relationship with personality in the Indian context.

Moral Development

Morality is influenced by culture, society, or the community in which one lives. According to Shweder et al. (1997), western theories of moral development focus on individual autonomy and aspects of fairness and justice more than other features of moral development. They broadened the realm of moral psychology by proposing the Big Three Ethics of Autonomy, Community, and Divinity through a cross-cultural study conducted in the USA and India. The Moral Foundations Theory was developed by Graham et al. (2013) to bridge the gap between Evolution and Psychology based on four assumptions of Nativism, Cultural learning, Intuitionism and Pluralism. According to Shweder et.al. (1997) Moral Foundations can also be explained in connection with the Big Three Ethics, which pointed out that Harm and Fairness Foundations were part of Ethic of Autonomy, Loyalty and Authority Foundations came under the Ethic of Community and the Foundation of Purity was within the Ethic of Divinity.

The five moral foundations were-

Harm/Care: This foundation evokes feelings of nurturing, security, and care, and avoiding harm to others.

Fairness/Cheating: This foundation is linked to the reciprocal altruism evolutionary mechanism, concerns with fairness and avoiding cheating.

Loyalty/Betrayal: This foundation was created as a result of coalitions to overcome adaptive challenges, including in-group sensitivity.

Authority/Subversion: This foundation was built on the basis of hierarchical social interactions and respect for authority.

Sanctity/Degradation: The psychology of disgust and contamination influenced this foundation with emphasis on purity.

The next section discusses the life stage of mature adulthood as experienced in the Indian cultural context.

Personality and Morality in India: Indigenous Concepts

The concept of *Dharma* is central to understanding morality in the Indian cultural context. In India, *Dharma* is a worldview that upholds universal moral order and promotes universal moral principles like tolerance, justice, nonviolence, and the preservation of all living things, among others (Bhangaokar, 2020). Dalal and Mishra (2010) stated that *Dharma* is needed to be performed as a contribution to a greater system that situations (time and place) demand rather than having any

extrinsic incentive or greed. *Dharma* is responsible for the connection between the self and the society and *Kartavya* determines the role-related duties which are to be fulfilled by the self in the society.

According to Bhawuk (2011), the Indian self is essentially a metaphysical self which is known as *Atman* and is referred to as the real self. *Trigunas* plays an important role in forming one's personality and the nature of the self. It is a combination of two words- '*tri*' and '*gunas*'. *Triguna* is a group of human qualities with distinct characteristics, such as *tamas* which has inertia, *rajas* that has enthusiasm, and *sattva* which has illumination (Bahm, 1970). *Trigunas* are fluid in nature and are found in combinations.

Various scales have been developed for the measurement of the *Triguna* Traits and one of them is Roy's Personality Trait Inventory (2020).The eleven personality traits from the Roy's Personality Trait Inventory (2020) are- *Sattvic* Knowledge, *Sattvic* Spirituality, Tranquility, Maturity, Emotional Stability, Empathy, *Sattvic* Habits, *Rajasic* Habits, Passion, *Tamasic* Knowledge and *Tamasic* Habits.

Karma Yoga and *Triguna* are interconnected as these combinations of traits determine one's way of attaining salvation or *Moksha*. The term *Karma Yoga* is composed of two Sanskrit words: (i) *karma*, which refers to all of a person's physical and mental acts, and (ii) *yoga*, which refers to an intellectual way of carrying out actions (*Srimad Bhagavad Gita* Chapter 2, Verse 50). As a result, *Karma Yoga* is described as a technique for performing actions intelligently (Mulla& Krishnan, 2011).From the interpretation of the *Srimad Bhagavad Gita* verses, Mulla and Krishnan (2007) explain *Karma Yoga* as made up of three dimensions: 'a sense of obligation or duty towards others' and 'an absence of desire for rewards and 'Equanimity'.

Adulthood in India

The experience of adulthood is culturally variable and can be roughly divided into three stages, namely emerging adulthood (18-25 years), mature adulthood (30 - 55 years), and late adulthood (60 and above). During mature adulthood, three major events that influence one's personality are work, marriage, and parenting. A significant challenge in mature adulthood is to cultivate sincere concern for future generations and to contribute to the world through family and work.

In the Indian framework, Kakar (1968) contrasted Erikson's psychosocial phases with the *Ashramdharma* stages which include *Brahmacharya ashram, Grihastha ashram, Vanaprastha ashram* and *Sanyasaahram.* In this scheme of human development, the stage of mature adulthood roughly falls under *Grihasthaashrama* (Sharma, 2007), where an individual participates actively in society abiding by the rules of his caste and spends time with his wife and children while performing his obligatory duties. In India, fulfilling obligations to one's family as well as to oneself is prioritized during adulthood. Traditionally, *Kartavya*s are gender-based, with a man's *Kartavya* being the bread-winner for his family, and a woman's *Kartavya* being to look after her family and perform household chores (Bhangaokar & Kapadia, 2019; Pande, 2013).

In recent years, the extent of dependency has changed and demographic trends, such as the rise in the number of women in the workforce and dual-income families, have resulted in a more diverse workforce and a greater need for workers to manage their work and personal lives (Bharat, 2003). Now men are facing new responsibilities and ambiguous expectations in their family roles as society develops the ideal of more egalitarian roles (Chowdhury &Patnaik, 2013).

The present study was planned to understand the dynamic interplay of *Triguna* personality traits with *Karma Yoga* and the Moral Foundations in contemporary times. The objectives of the study were:

OBJECTIVES

1. To examine the relationship between *Triguna* Personality Traits and *Karma Yoga*, *Triguna* Personality Traits and Moral Foundations, and *Karma Yoga* and Moral Foundations.
2. To describe group differences, if any in scoring patterns, if any with respect to age, years of work experience, and duration of marriage.

HYPOTHESES

1. *Sattvic* traits and Moral Foundation of Sanctity/Degradation would be evoked significantly more by older mature adults.
2. There would be positive correlation between *Sattvic* Traits and *Karma Yoga*.
3. Duty Orientation in *Karma Yoga* would be negatively correlated with *Rajasic* Traits.
4. *Tamasic* Traits would be negatively correlated with *Karma Yoga.*

METHODOLOGY

The study used a quantitative approach to examine the relationship between the concepts and components of *Triguna* Personality Traits, *Karma Yoga*, and Moral Foundations. The sample was selected purposively and participants were identified using the snowball technique. The sample size was eighty, including forty mature adult men and forty mature adult women. Age, gender, years of work experiences, and duration of marriage were treated as independent variables, while scores on *Triguna* (*Sattva, Rajas,* and *Tamas*) traits, Moral Foundations, and *Karma Yoga* were treated as the dependent variables. Participants had to be urban residents of the state of Assam between the agerange of 35-55 years, employed with a work experience of at least 3 years. They had to be married, with or without children. The online questionnaire consisted of a demographic information form, *Triguna* personality traits scale (Roy, 2020), *Karma Yoga* questionnaire (Mulla& Krishnan, 2014), and Moral Foundations questionnaire (Graham et al., 2009).

The study was approved by the Institutional Ethics Committee for Human Research (IECHR) at the Faculty of Family and Community Sciences, The Maharaja Sayajirao University of Baroda. Due to the pandemic, data was collected online and Google form links were shared with the participants. The data was entered in MS-Excel and later analyzed using Jeffreys's Amazing Statistics Program (JASP). To know the difference in scores, with reference to age, gender, years

of work experience, and duration of marriage, independent sample t-tests were conducted and to understand the relationship between the scores, correlation coefficients were computed.

FINDINGS

The participants could be divided into two age groups: (younger adults) 35-45 and (older adults) 45-55 years, where the average ages of men and women were 47.1 years and 45.2 years respectively, with average age of 39.1 years for men and 40.2 years for women in the younger group and 52.4 years for men and 50.8 years for women in the older group. In terms of work experience, the average work experience of men and women were 20.5 years and 16.1 years respectively. For duration of less than 20 years of work experience, the averages for men and women were 10.7 years and 13.2 years respectively. For duration of more than 20 years of work experience, the averages for men and women were 27.08 years and 26.3 years respectively. In terms of duration of marriage, the average age for men and women were 16.7 years and 17.5 years respectively. For duration of less than 15 years of marriage, the averages for men and women were 7.66 years and 9.8 years respectively. For duration of more than 15 years of marriage, the averages for men and women were 24.1 years and 24.3 years respectively. Most participants were into various service occupations like Manager, Professor/Teacher, Bank Cashier, Engineer, etc.

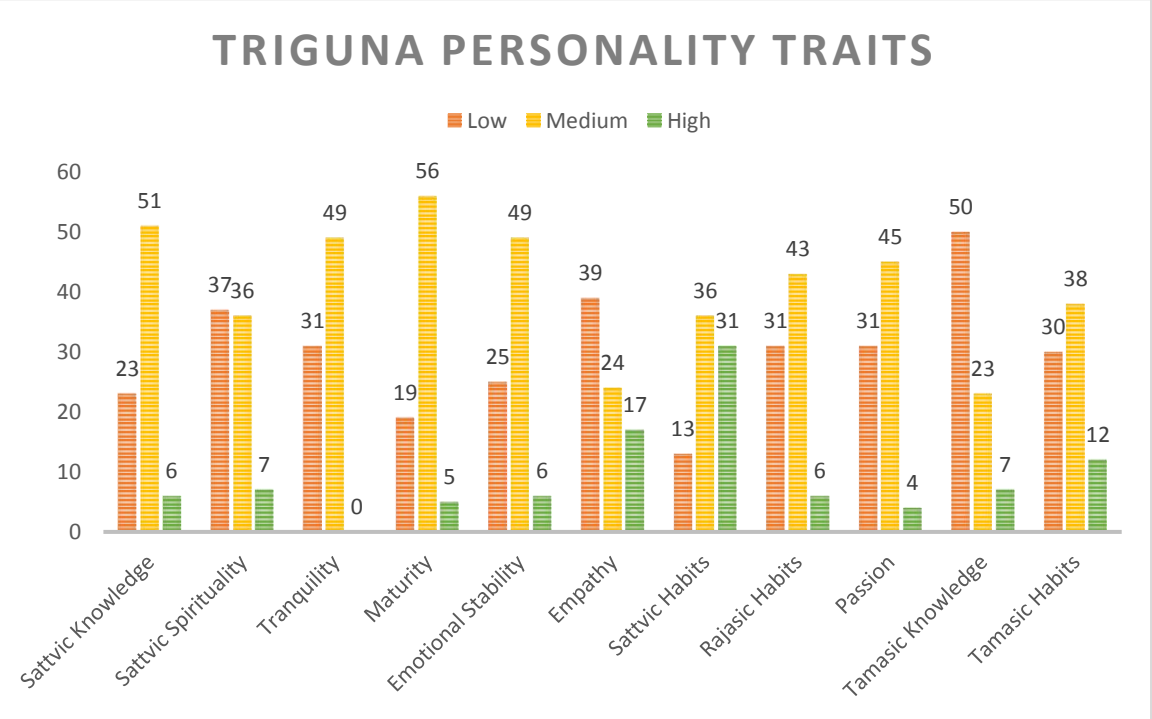


Figure 1 Norm Wise Distribution of Triguna Personality Scores

From figure 1, it is observed that majority of the participants scored average on the traits of Maturity, *Sattvic* Knowledge, *Sattvic* Habits Tranquility, Emotional Stability, Passion, *Rajasic* Habits, and *Tamasic* Habits. Only a few participants scored on the higher range on the traits of *Sattvic* Habits, Empathy and *Tamasic* Habits. On the other hand, majority of the participants scored on the lower range on the traits of *Tamasic* Knowledge, Empathy and *Sattvic* Spirituality. This

suggested that on an average, the participants' personalities had a combination of all the *Gunas* – *Sattva, Rajas* and *Tamas* at a moderate level.

Distribution of Karma Yoga Scores

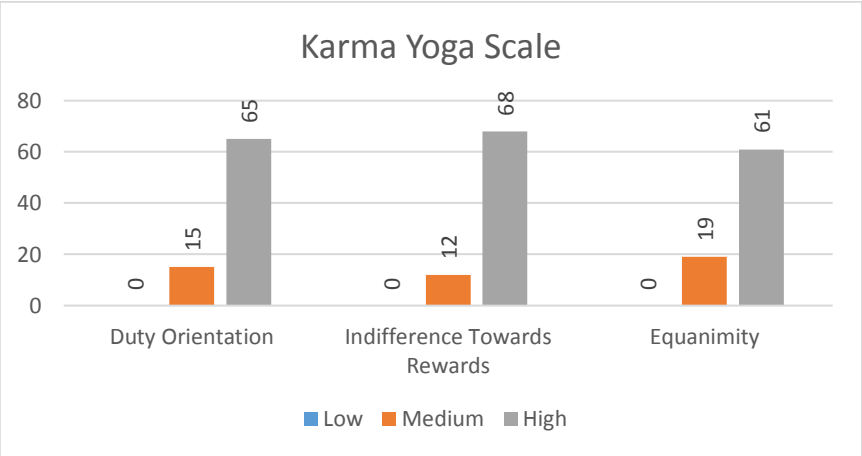


Figure 2 Frequency Distribution of Karma Yoga Scores

As seen in figure 2, majority of the participants scored in the high range on Indifference Towards Rewards (68) and Duty Orientation (65) followed by Equanimity (61). Interestingly, there were no low scorers on the *Karma Yoga* scale.

Distribution of Moral Foundations Scores

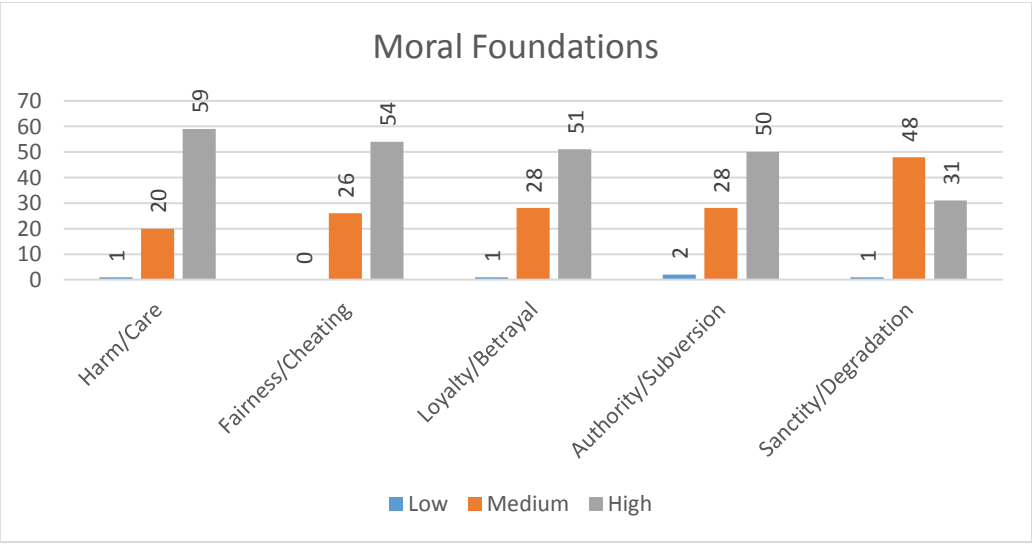


Figure 3 *Frequency Distribution of Moral Foundations Scores*

As seen in figure 3, majority of the participants scored high on Foundations of Harm/Care (59), Fairness/Cheating (54), Loyalty/Betrayal (51) and Authority/Subversion (50) whereas most of participants (48) scored in the average range on Sanctity/Degradation. There were few low scorers on all five Moral Foundations.

Triguna Personality Traits

Table 1 Age and Triguna Personality Traits

Independent Samples t-Test for *Triguna* Personality Traits within Age (Shapiro-Wilk)

	W	*p*
Tamasic Knowledge	532.000	0.010

Note. Mann-Whitney U test.

Table 1 showed that there was a significant difference between younger and older participants on *Tamasic* Knowledge U=532(*p*=0.010) where younger participants (M=10.649, S. D=3.327) scored higher than older participants (M=8.721, S. D=2.074). From the items measuring *Tamasic* Knowledge, it was found that younger adults relied more on superstitious beliefs than individual effort, resulting in higher scores on *Tamasic* Knowledge.

Table 2: Work Experience and Triguna Personality Traits

Independent Samples t-Test for *Triguna* Personality Traits within Work Experiences (Shapiro-Wilk)

	W	*p*
Tamasic Knowledge	1073.000	0.006
Maturity	574.500	0.032

Note. Mann-Whitney U test.

Table 2 showed that there was a significant difference for *Tamasic* Knowledge U=1073 (*p*=0.006) where participants with a work experience of less than 20 years (M=10.649, S.D=3.293) scored higher than participants with a work experience of more than 20 years (M=8.721, S.D=2.119). Significant difference was also found for Maturity U=574.500 (*p*=0.032) where participants with a work experience of more than 20 years (M=6.349, S.D=2.894) scored higher than participants with a work experience of less than 20 years (M=5.108, S.D=1.969). Thus, with more work experience, participants reflected maturity in adjusting to demands in life and reduced *Tamasic* Knowledge.

Table 3: Duration of Marriage and Triguna Personality Traits

Independent Samples t-Test for *Triguna* Personality Traits within Duration of Marriage (Shapiro-Wilk)

	W	*p*
Tamasic Knowledge	1132.500	< .001
Tamasic Habits	1034.000	0.017
Sattvic Knowledge	504.500	0.005

Note. Mann-Whitney U test.

Table 3 showed that there was a significant difference for *Tamasic* Knowledge U=1132.5 (p<0.001) where participants with a duration of less than 15 years of marriage(M=10.698, S.D=3.284) scored higher than participants with a duration of more than 15 years of marriage(M=8.721, S.D=2.119). Significant difference was also found for *Tamasic* Habits U=1034(p=0.017) where participants with a duration of less than 15 years of marriage(M=3.930, S.D=1.869) scored higher than participants with a duration of more than 15 years of marriage (M=2.919, S.D=1.090).Significant difference was also found for *Sattvic* Knowledge U=504.5(p=0.005) where participants with a duration of more than 15 years of marriage(M=14.730, S.D=4.501) scored higher than participants with a duration of less than 15 years of marriage (M=11.744, S.D=4.531).More years of marriage represents increasing mastery in marital roles and taking care of others in the family. This might have resulted in an increase in *Sattvic* Knowledge and corresponding decrease in *Tamasic* traits. The first hypothesis of the present study was thus rejected. Instead of older adults being higher on *Sattvic* Traits but it was found that younger adults to be higher on *Tamasic* Traits.

No significant gender differences were found on *Triguna* Personality Traits, *Karma Yoga* and Moral Foundations. Similarly, on the scales of *Karma Yoga* and Moral Foundations, no significant differences were found with reference to age, work experience and duration of marriage.

Correlation between *Triguna* and *Karma Yoga*

Table 4: Correlation between Triguna and Karma Yoga

Variable		Duty Orientation	Indifference Towards Rewards	Equanimity	Karma-Yoga
Tranquility	Pearson's r	0.190	0.283*	0.126	0.227*
	p-value	0.092	0.011	0.265	0.043
Tamasic Knowledge	Pearson's r	-0.224*	-0.200	-0.252*	-0.195
	p-value	0.046	0.075	0.024	0.083
Tamasic Habits	Pearson's r	-0.234*	-0.137	-0.212	-0.105

	p-value	0.037	0.227	0.060	0.353

* p < .05, ** p < .01, *** p < .001

Table 4 shows significant positive correlation between Tranquility and Indifference towards Rewards (r (78) = 0.283, p=0.011) and total *Karma Yoga*score (r (78) = 0.227, p=0.043), which supported partially the second hypothesis of the study. To summarize, *Sattvic* personality trait of Tranquility meant that participants had a calm and equanimous approach to work or effort, which was accompanied by Indifference towards Rewards and overall belief in *Karma Yoga*.

Our third hypothesis was not supported as no signification correlation was found between *Rajasic* Traits and *Karma Yoga*. However, significant negative correlations were found between *Tamasic* Knowledge and Duty Orientation (r (78) = -0.224, p=0.046), between *Tamasic* Knowledge and Equanimity (r (78) = -0.252, p=0.024) and between *Tamasic* Habits and Duty Orientation (r (78) = -0.234, p=0.037). To summarize, *tamas* might interfere with one's ability to perform assigned duty, have an equanimous attitude or be efficient in *Karma Yoga*.

Correlation between *Triguna* and Moral Foundations

Table 5: Correlation between Triguna and Moral Foundations

Variable		Harm/Care	Fairness/Cheating	Loyalty/Betrayal	Authority/Subversion	Sanctity/Degradation
Sattvic Knowledge	Pearson's r	-0.066	-0.138	-0.100	0.018	0.240 *
	p-value	0.560	0.222	0.376	0.872	0.032
Rajasic Habits	Pearson's r	-0.299 **	-0.188	-0.236 *	-0.087	0.056
	p-value	0.007	0.096	0.035	0.445	0.624
Sattvic Spirituality	Pearson's r	-0.028	-0.043	-0.026	5.182e-4	0.274 *
	p-value	0.802	0.707	0.822	0.996	0.014
Empathy	Pearson's r	0.450 ***	0.433 ***	0.453 ***	0.321 **	0.192
	p-value	< .001	< .001	< .001	0.004	0.089
Tamasic Habits	Pearson's r	0.225 *	0.196	0.011	0.144	0.064
	p-value	0.044	0.082	0.922	0.201	0.573
Passion	Pearson's r	0.168	0.097	0.087	0.195	0.241 *
	p-value	0.136	0.391	0.443	0.083	0.031

Variable	Harm/Care	Fairness/Cheating	Loyalty/Betrayal	Authority/Subversion	Sanctity/Degradation

* p < .05, ** p < .01, *** p < .001

Significant positive correlation were found between Empathy and all the five Moral Foundations except Sanctity/Degradation i.e., Harm/Care (r (78)=0.450, p<.001), Fairness/Cheating(r (78)=0.433, p<.001), Loyalty/Betrayal (r (78)= 0.453, p<.001) and Authority/Subversion (r (78)= 0.321, p=0.004). Significant positive correlations were also found between Sanctity/Degradation and *Sattvic* Knowledge (r (78) = 0.240, p=0.032), *Sattvic* Spirituality (r (78) = 0.274, p=0.014) and Passion (r (78) = 0.241, p=0.031). *Tamasic* Habits was also positively correlated with Harm/Care (r (78) = 0.225, p=0.044). *Rajasic* Habits was negatively correlated with Harm/Care (r (78) = -0.299, p=0.007), and Loyalty/Betrayal (r (78) = -0.236, p=0.035). To summarize, primarily Empathy along with *Sattvic* Knowledge and *Sattvic* Spirituality may assist in developing strong beliefs in Moral Foundations. Since *Rajasic* and *Tamasic* traits are concerned with attachment and personal desires, moral considerations may become less other-centric, bereft of concern for others' welfare, care, and loyalty. Such persons may also be overly focused on individual achievements and progress at any cost.

Correlation between *Karma Yoga* and Moral Foundations

Table 6: *Correlation between Karma Yoga and Moral Foundations*

Variable		Duty Orientation	Indifference Towards Rewards	Equanimity	Karma-Yoga
Loyalty/Betrayal	Pearson's r	0.172	0.332**	0.209	0.293**
	p-value	0.127	0.003	0.063	0.008

* p < .05, ** p < .01, *** p < .001

Table 6 shows Loyalty/Betrayal was significantly positively but weakly correlated to Indifference towards Rewards (r (78) =0.332, p=0.003) and *Karma Yoga* (r (78) =0.293, p=0.008). *Karma Yoga* attitudes and Indifference to Rewards might be associated with duties in the family or workplace as in-groups of reference and hence correlated positively with Loyalty / Betrayal.

CONCLUSION

The study found significant differences for *Triguna* Personality Traits of *Tamasic* Knowledge in terms of age; *Tamasic* Habits, *Tamasic* Knowledge and *Sattvic* Knowledge in terms of duration of marriage; Maturity and *Tamasic* Knowledge in terms of years of work experience. This indicated that repeated and regular involvement in fulfillment of everyday duties may lead to increased expertise in that sphere of life.

No significant differences were found on the scales on *Karma Yoga* and Moral Foundations with respect to age, years of work experience and duration of marriage which

indicated that moral beliefs and values were crystallized early in adulthood and age, duration of marriage and work experience did not influence them.

The study found significant correlations between *Karma Yoga* and Moral Foundations as well as between *Sattvic* Traits and Moral Foundations. Overall, it can be concluded that *SattvaGuna* is clearly connected with all Moral Foundations and *Karma Yoga*. Thus, *Sattvic* traits are essential for a morally sensitive personality, and participants of the study well embody this concept. Taken together, a dynamic and close relationship can be seen between *Sattvic* personality traits, *Karma Yoga* attitudes and the understanding of Moral Foundations. *Sattva Guna* and *Karma Yoga* together may contribute to a strong personality. Future studies can investigate causal relationships between *Sattvic* traits that led to a clearer understanding of one's familial and marital duties (*kartavya* or *dharma*) and the cultivation of an equanimity and indifference to rewards. Overall, this may contribute to moral sensitivity and a deeper understanding of moral issues.

REFERENCES

- Bahm, A. J. (1970). *Bhagawad Gita or the wisdom of Krishna*. Somaiya Publication Pvt. Ltd.
- Bhangaokar, R. (2020). The development of communal and spiritual dutifulness in India: Upholding *dharma*, offering *seva*.*The Oxford Handbook of Moral Development: An Interdisciplinary Perspective*, 327. https://doi.org/10.1093/oxfordhb/9780190676049.013.18
- Bhangaokar, R., & Kapadia, S. (2019). Gendered boundaries, cultured lives: The underexplored dimensions of duty (*kartavya*) in the Indian family context.*Psychology and Developing Societies*, *31*(2), 252–282. https://doi.org/10.1177/0971333619863235
- Bharat, S. (2003). Women, work, and family in urban India, towards new families?In J. W. Berry, R. C. Mishra, & R. C. Tripathi (Eds.), *Psychology in human and social development: Lessons from diverse cultures: a Festschrift for Durganand Sinha*(pp.155-169), Sage.
- Bhawuk, D. P. (2011). *Spirituality and Indian Psychology*. Springer. https://doi.org/10.1007/978-1-4419-8110-3
- Chowdhury, A., &Patnaik, M.M. (2013). Understanding Indian family life: The gender perspectives. *International Journal of Multidisciplinary Management Studies, 3 (7)*, 58-67.
- Dalal, A.K., & Mishra, G. (2010). The core and context of Indian psychology. *Psychology and Developing Societies, 22* (1), 121–155. https://doi.org/10.1177/097133360902200105
- Graham, J., Haidt, J., &Nosek, B. A. (2009). Liberals and conservatives rely on different sets of moral foundations.*Journal of Personality and Social Psychology*, *96*(5), 1029–1046. https://doi.org/10.1037/a0015141
- Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S. P., & Ditto, P. H. (2013). Moral foundations theory: The pragmatic validity of moral pluralism.*Advances in experimental social psychology*, (Vol. 47, pp. 55-130). Academic Press. https://doi.org/10.1016/b978-0-12-407236-7.00002-4
- Mulla, Z. R., & Krishnan, V. R. (2007). *Karma-Yoga*: Construct validation using value systems and emotional intelligence.*South Asian Journal of Management, 14*(4).

- Mulla, Z. R., & Krishnan, V. R. (2011). *I*s karma yoga possible? Can we be hardworking without being ambitious?*Great Lakes Herald*, *5*, 46-55.
- Mulla, Z. R., & Krishnan, V. R. (2014). Karma Yoga: The Indian model of moral development.*Journal of Business Ethics, 123*(2), 339-351. https://doi.org/10.1007/s 1055 1-01 3- 18428
- Pande, N. (2013). *Kartavya:* Understanding selfless acts. *Psychology and Developing Societies*,*25*(1), 109–132. https://doi.org/10.1177/0971333613477310
- Roy, G. (2020). *To construct and test the multi component trait model of personality in Indian psychology*. Prasad psycho Corporation. https://doi.org/10.31124/advance.12130521
- Sharma, A. (2007). Relevance of ashrama system in contemporary Indian society. *SSRN Electronic Journal*. https://doi.org/10. 2139/ssrn.1003999
- Shweder, R. A., Much, N. C., Mahapatra, M., & Park, L. (1997). The "big three" of morality (autonomy, community, divinity) and the "big three" explanations of suffering. In A. M. Brandt & P. Rozin (Eds.), *Morality and health* (p. 119–169). Taylor & Francis/Routledge.

The Indian Journal of Home Science 2022: 34(1)

SOURCES OF GUIDANCE AMONG ADOLESCENTS: A GENDER PERSPECTIVE

Manisha Dhami[1], Seema Sharma[2]
[1]Research Scholar, [2]Principal Extension Scientist,
Dept of Human Development & Family Studies
Punjab Agricultural University, Ludhiana-141001
Email: dhami.manisha75@gmail.com, seema_30sept@pau.edu

ABSTRACT

Guidance means an assistance or advice taken by an individual to deal with the complex problems linked with work, education, personal relationship and making into easier ones. To study differences in the perception of sources of guidance among adolescents, 200 adolescents (100 males and 100 females) were selected from Ludhiana district. A self-structured questionnaire was prepared to collect the information. Data was analyzed using Z test. Result revealed that majority of adolescents relied upon their parents for physical, social and psychological guidance whereas, more dependence for educational and vocational guidance was on internet and vocational sources. A significant difference was seen in social guidance where, parents were the source of guidance for more females than males. In physical guidance males were found more than females in taking guidance from electronic media, internet and print media. Irrespective of gender no professional counselor help was taken by any adolescents.

Keywords: Adolescents, guidance, physical, psycho-social, educational and vocational

INTRODUCTION

In the modern age, guidance and counseling have become a rising demand because of numerous conflicts that individual confront in significant domains of life. Guidance and counseling lend a hand to identify and understand about one's talents and abilities, assist to expand positive outlook for elimination of undesirable qualities and it supports individual to develop resourcefulness and self-direction in adapting to changes in society. Guidance and counseling earn recognition through their services rendered in promoting human happiness i.e. being healthier, more productive, attain valuable lesson and also eliminate later stage problems.

Adolescence is the transitional period between childhood and adulthood where adolescence experiences a diversity of physiological changes in relation to puberty, meet across a number of psychological changes. It is also considered as revolution of individual's life which begins with biological change and ends in adjusting with challenges in the society (Petersen 1988). Other than this, adolescents face major challenges like academic pressure, gaining independence from parents, intimate relationships with peers, physical maturation, starting intimate relationships, expectations from parents etc. These are escorted by a sudden amplification in the frequency at which stressful events occur. (Hankin, Mermelstein, & Roesch, 2007). For being disciplined and able to face difficulties and realities which they face in their academic, social and physical environment, guidance and counseling services are the assisting hands to help adolescents (Collins, 2007).

According to Barker (2007) Help seeking behavoiur involves any action or activity carried out by an adolescent who perceives herself/himself as needing personal, psychological, affective assistance or health or social services, with the purpose of meeting this need in an optimistic way. Adolescents seeks on sources of support that are generally familiar, mature, friendly, and most significantly, worth of trust (Camara et al. 2017). Vogel et al. (2007) in their study revealed that students feel uneasy to take counseling. They have shy attitude towards taking additional information regarding counselling process. Social stigma, fear and decreased pro therapy social rules related to males and females are the blockade for seeking help from professional counselors. Hence the present study was undertaken with the following objective

OBJECTIVE

To study the gender differences in the perception of sources of guidance among adolescents

Operational definition

a) **Guidance needs:** Guidance needs of adolescents are those needs that are necessary to resolve their problems which they experience in day to day life, help to perk up their personal development and encourage individual welfare.

b) **Sources of Guidance and counselling:** Refers to the people or helpline to whom they approach in case of any physical, psychological, social, educational and vocational problems.

METHODOLOGY

a) **Sample:** The sample comprised of 200 adolescents (16-18 years) drawn randomly from Government Senior Secondary Schools of Ludhiana district.

b) **Assessment of adolescents' perception of different sources of guidance needs**: A self-structured questionnaire was used to gather information about adolescents' perception of the sources of various guidance services being provided to them. Data was also collected about the sources of adolescents' guidance services and the people they approach for help and support viz a viz the family members, teachers, peers, electronic and print media and professional counselors

RESULT AND DISCUSSION

Table 1: Gender wise distribution of respondents across various sources of physical guidance

Sources of physical guidance **(n=200)**	**Female (n_1=100)**		**Male (n_2=100)**		**Z value**
	f	**%**	**f**	**%**	
Family members					
Parents	75	75.00	65	65.00	1.54^{NS}

Siblings	51	51.00	61	61.00	1.42^{NS}
Any other	14	14.00	7	7.00	1.61^{NS}
Peer group					
Home friends	59	59.00	40	40.00	2.68***
Classmates	35	35.00	35	35.00	0.00^{NS}
Electronic media					
Radio programmes	15	15.00	37	37.00	3.54***
TV advertisements	25	25.00	45	45.00	2.96***
Films	12	12.00	24	24.00	2.20**
Shows	22	22.00	34	34.00	1.88*
Internet					
Applications	2	2.00	15	15.00	3.29***
You tube	49	49.00	40	40.00	1.28^{NS}
Google	39	39.00	49	49.00	1.42^{NS}
Social networking sites	43	43.00	34	49.00	1.30^{NS}
Print media					
Books	47	47.00	69	69.00	3.15***
Magazines	14	14.00	17	17.00	0.58^{NS}
Newspapers	6	6.00	11	11.00	1.26^{NS}
Professional					
Teachers	79	79.00	50	50.00	4.28***
Professional counselors	0	0.00	0	0.00	0.00^{NS}

*p≤0.10 **p≤0.05 ***p≤0.01

Table 1 described gender wise distribution of respondents across various sources of physical guidance. Parents, siblings and any other source (which includes grandparents, uncle and aunty) does not differ significantly in both the gender group as majority of females (75 %) and more than half (65%) males relied on parents and more than half of males (61%) and females (51%) reported siblings as their major source of physical guidance. Peer group influence was significantly related with gender as 40 per cent of males and 59 per cent of females reported that

they take assistance from their home friends whereas equal number of adolescents answered classmates as a source of physical guidance.

Electronic media is also one of the significant source from which the adolescents seek assistance to solve their queries which include radio programmes, TV advertisement, films and TV shows and electronic media also emerged as vital source of guidance for males as they were found to take more guidance from radio programmes than females (15%) with a significant difference (Z-3.54; $p \leq 0.01$). Similarly, males were taking more advantage of T.V advertisements and shows with a significant difference.

A look into data on use of internet applications for physical guidance showed a significant gender difference ($z=3.29$; $p \leq 0.01$) as males (15%) were taking more assistance from internet sources than females (2%). Although results were non-significant, gender difference was found in the usage of you tube, google and social networking sites, males were observed to be more for taking more help from these websites as compared to females.

In print media, significant gender difference was found only for the usage of books as a source of physical guidance where females (47%) reported higher than males (69%) whereas no significant gender difference was found in usage of magazines and newspapers. In professional, females (79%) were more dependent than males (50%) for taking assistance from teachers whereas nil percent of adolescents were taking professional guidance from counselors.

Thus it could be inferred that irrespective of gender, parents were the major source of physical guidance whereas, males and females differ significantly in the usage of various sources for physical guidance need, where males were found to take more guidance from radio programmes, TV show, films, advertisement, applications and books, whereas, females took more assistance for physical guidance from teachers and home friends.

Table 2: Gender wise distribution of respondents across various sources of social guidance

Sources of social guidance (n=200)	**Female (n_1=100)**		**Male (n_2=100)**		**Z value**
	f	**%**	**f**	**%**	
Family members					
Parents	81	81.00	70	70.00	1.80**
Siblings	46	46.00	59	59.00	1.80**
Any other	6	6.00	10	10.00	1.04^{NS}
Peer group					
Home friends	35	35.00	19	19.00	2.54**
Classmates	45	45.00	40	40.00	0.71^{NS}
Electronic media					
Radio	4	4.00	12	12.00	2.08**

TV advertisements	2	2.00	7	7.00	1.70*
Films	30	30.00	25	25.00	0.79^{NS}
Shows	24	24.00	36	36.00	1.85*
Internet					
Application	00	00	00	0.00	0.00^{NS}
You tube	25	25.00	21	21.00	0.67^{NS}
Google	29	29.00	45	45.00	2.34**
Social networking sites	36	36.00	30	30.00	0.90^{NS}
Print media					
Books	43	43.00	55	55.00	1.69*
Magazine	18	18.00	11	11.00	1.40^{NS}
Newspaper	17	17.00	11	11.00	1.22^{NS}
Professional					
Teachers	27	27.00	37	37.00	1.51^{NS}
Professional counselor	0	0\.00	00	0.00	0.00^{NS}

*p≤0.10 **p≤0.05 ***p≤0.01

Table 2 showed gender wise distribution of respondents across various sources of social guidance. Parents and siblings were reported high as a source of social guidance among females than males with a significant gender difference (Z=1.80; p≤0.05) where majority of female respondents (81%) relied on parents for social guidance and 70 per cent males which were less than females were dependent on parents whereas males (59%) superseded females (46%) in taking social guidance from sibling. In peer group, more number of females (35%) reported home friends as a social guidance source than males (19%) with a significant difference (Z-2.54; p≤0.05) whereas with no significant gender difference, 40 per cent males and 45 per cent females were dependent on classmate as their source of social guidance.

In electronic media, radio programmes, TV advertisement and shows reported a significant gender difference where males were more than females in usage of these electronic media as a source of social guidance whereas a non-significant gender difference was found for taking assistance from films where 30 per cent females and 25 per cent males reported films as assistance for social guidance.

Further probe into the data presented that 25 per cent females and 21 per cent males seek social help from you tube whereas 36 per cent females and 30 per cent males take social guidance from social networking sites whereas a significant gender difference (Z-2.34; p≤0.05) was found in taking assistance from google where males (45%) were found more than females (29%) in using google as a source of social guidance.

In print media, a significant gender difference was observed for usage of books as a source of social guidance. (Z-1.69; p≤0.10) where males (55%) were found more than females (43%) whereas a non-significant gender difference was found for usage of magazines and newspapers where 18 per cent of females and 11 per cent of males were taking social assistance from magazines and 17 per cent females and 11 per cent males reported to take social guidance from newspapers. 37 per cent of males and 27 per cent females were dependent on teachers for social help, whereas, professional counselors help was taken by none of the individual.

Thus, it could be concluded that most reliable source were parents for majority of population and sources of guidance varied according to their compatibility to use that particular guidance. In line with this finding a study by Bolarin (1989) revealed that for social guidance, girls make greater use of their friends whereas boys were found to use their teachers as their support for social guidance. Social support has been proposed as one of the protective factors to stress that include social systems as a source of well-being. Specially in adolescents, social support is observed as a manifestation of community social capital (Ellonen, Kääriäinen, & Autio, 2008).

Table 3: Gender wise distribution of respondents across various sources of psychological guidance

Sources of psychological guidance (n=200)	**Female (n_1=100)**		**Male (n_2=100)**		**Z value**
	f	**%**	**f**	**%**	
Family members					
Parents	64	64.00	63	63.00	0.14^{NS}
Siblings	45	45.00	51	51.00	0.89^{NS}
Any other	12	12.00	22	21.00	1.88*
Peer group					
Home friends	20	20.00	22	22.00	0.34^{NS}
Classmates	10	10.00	8	8.00	0.49^{NS}
Electronic media					
Radio programmes	7	7.00	5	5.00	0.59^{NS}
TV advertisements	8	8.00	17	17.00	1.92*
Films	32	32.00	38	38.00	0.88^{NS}
Shows	13	13.00	11	11.00	0.43^{NS}
Internet					
Applications	2	2.00	5	5.00	1.54^{NS}

You tube	24	24.00	35	35.00	1.70*
Google	25	25.00	29	29.00	0.63^{NS}
Social networking sites	5	5.00	23	23.00	3.66***
Print media					
Books	35	35.00	30	30.00	0.75^{NS}
Magazines	13	13.00	11	11.00	0.43^{NS}
Newspapers	10	10.00	22	22.00	2.31**
Professional					
Teachers	55	55.00	43	43.00	1.69*
Professional counselor	0	0.00	0	0.00	0.00^{NS}

*p≤0.10 **p≤0.05 ***p≤0.01

Table 3 described gender wise distribution of respondents across various sources of psychological guidance where major source of psychological guidance for males (63%) and females (64%) were parents followed by siblings (females 45 %, males 51%), less proportion of sample (22% males, 12% females) were dependent on any others. (which include grandparents, uncle aunty). Non-significant gender difference was observed for home friend (22% males and 20% females) and classmate (10% females and 8 % males).

In electronic media only TV advertisement showed a significant gender difference (Z=1.92; p≤0.10) where males (17%) were found more than females (8%) whereas other electronic media sources like radio programmes, films and shows showed a non-significant gender difference.

Internet usage also plays an important role where social networking sites provide a link for psychological guidance with significant gender difference (Z-3.66; p≤0.10), where males (23%) were found more to use social networking sites as a source of psychological guidance than females (5%). Similarly, usage of you tube also showed a significant gender difference (Z-1.70; p≤0.10) where males (35%) were again found more to use you tube as a source of psychological guidance than females (24%) whereas non-significant gender differences were found for applications and google.

In print media usage of newspapers showed a significant difference (Z-2.31; p≤0.05) where females (10%) were found more than males (22%). Dependency on teacher for psychological guidance differ significantly (Z-1.69; p≤0.10) for males (43%) and females (55%) whereas no help from professional counselors was taken for psychological guidance.

Parents were the major source of psychological guidance for both the gender. TV advertisement, Social networking sites and newspaper were used more by males than females, whereas, females seek more psychological guidance from teachers. A Study by Sati and Vig (2016) recommended that for psychological well-being of adolescents there should be professional counseling for the students, going to psychologist should not be social stigma in today's time, various sensitization programme should be organized for adolescents, teachers as well as parents so that they could feel free to share their problems.

Table 4: Gender wise distribution of respondents across various sources of educational guidance

(n=200)

Sources of educational guidance	Female (n_1=100)		Male (n_2=100)		Z value
	f	%	f	%	
Family members					
Parents	36	36.00	37	37.00	0.14^{NS}
Siblings	35	35.00	41	41.00	0.87^{NS}
Any other	11	11.00	12	12.00	0.22^{NS}
Peer group					
Home friends	27	27.00	31	31.00	0.62^{NS}
Classmates	25	25.00	17	17.00	1.38^{NS}
Electronic media					
Radio programmes	25	25.00	31	31.00	0.94^{NS}
TV advertisements	11	11.00	15	15.00	0.84^{NS}
Films	0	0.00	15	15.00	4.02***
Shows	41	41.00	50	50.00	1.27^{NS}
Internet					
Applications	13	13.00	24	24.00	2.00**
You tube	37	37.00	45	45.00	1.15^{NS}
Google	49	49.00	68	68.00	2.72***
Social networking sites	38	38.00	29	29.00	1.34^{NS}
Print media					
Books	26	26.00	26	26.00	0.00^{NS}
Magazines	45	45.00	37	37.00	1.15^{NS}
Newspapers	23	23.00	18	18.00	0.87^{NS}
Professional					

Teachers	24	24.00	22	22.00	0.33^{NS}
Professional counselors	0	0.00	0	0.00	0.00^{NS}

**p≤0.05 ***p≤0.01

Table 4 showed gender wise distribution of respondents across various sources of educational guidance. For educational guidance parents, siblings, and any other (which include grandparents, uncle aunty) showed non-significant gender difference where only 36 per cent of females and 37 per cent of males took educational guidance from parents on the other hand 41 per cent males and 35 per cent females were dependent on siblings for taking help in education, Similarly, peer group also showed non-significant gender difference as 27 per cent females and 31 per cent males sought educational help from home friends and 25 per cent females and 17 per cent males used to approach classmates for educational guidance.

In electronic media a significant difference was found for films (Z-4.02; p≤0.01) where none of the female respondent and 15 per cent male respondents were dependent on films for educational assistance, whereas non-significant gender difference was found for radio programmes, TV advertisements and shows, where 31 per cent males and 25 per cent of females responded radio programmes as source of educational guidance, 15 per cent males and 11 per cent females relied on tv advertisement, whereas, half of the male sample population (50%) and 41 per cent females were dependent on TV shows as a guidance for education.

Further probe into the data presented that in internet, usage of educational application differs significantly (Z-2.00; p≤0.05) where more males (24%) were found than females (13%) who use applications for education help. Google was also mostly used by males (68%) than females (49%) for taking educational assistance (Z-2.72; p≤0.01), whereas, usage of you tube and social networking sites as a source of educational help had non-significant gender difference where 45 per cent males and 37 per cent females were found in taking assistance from you tube and 29 per cent males and 38 per cent females were dependent on social networking sites for taking help in educational matters.

In context of print media non-significant result was found, where equal number of respondents from both the gender group (26%) expressed that the source of educational guidance were books whereas 37% males and 45 % females reported magazines and 18 per cent males and 23 per cent female expressed newspapers as a source of educational guidance. For teacher as a source of educational guidance a non-significant difference was found between both the gender groups (24 % females, 22 % males), whereas, there was no one who were taking assistance of professional counselors.

For both the gender groups internet sources were used in maximum, with a significant difference between males and females, males take more educational guidance from films, application and google than females. A school counsellor's role also becomes sensitive when the ultimate aim is students' academic achievement (Shechtman 2002) but data show no involvement of counselor, which is a matter of concern.

Table 5: Gender wise distribution of respondents across various sources of vocational guidance

(n=200)

Sources of vocational guidance	Female (n_1=100)		Male (n_2=100)		Z value
	f	%	f	%	
Family members					
Parents	36	36.00	45	45.00	1.29^{NS}
Siblings	42	42.00	49	49.00	0.99^{NS}
Any other	17	17.00	18	18.00	0.18^{NS}
Peer group					
Home friends	25	25.00	23	23.00	0.33^{NS}
Classmates	21	21.00	25	25.00	0.67^{NS}
Electronic media					
Radio programmes	18	18.00	18	18.00	0.00^{NS}
TV advertisements	7	7.00	19	19.00	2.52**
Films	00	0.00	00	0.00	0.00^{NS}
Shows	47	47.00	28	28.00	2.77***
Internet					
Applications	00	0.00	0	0.00	0.00^{NS}
You tube	44	44.00	52	52.00	1.13^{NS}
Google	47	47.00	61	61.00	1.98**
Social networking sites	27	27.00	52	52.00	3.61***
Print media					
Books	18	18.00	27	27.00	0.18^{NS}
Magazines	44	44.00	41	41.00	0.42^{NS}
Newspapers	31	31.00	41	41.00	1.47^{NS}
Professional					
Teachers	43	43.00	44	44.00	0.14^{NS}

Professional counselor	0	0.00	0	0.00	0.00^{NS}

**p≤0.05 ***p≤0.01

Table 5 showed gender wise distribution of respondents across various sources vocational guidance with significant locale difference. The data revealed that 45 per cent males and 36 per cent females relied on parent as a source of vocational guidance. Sibling also plays an important role for providing vocational help as 42 per cent females and 49 per cent males were found who approach to their siblings for vocational assistance whereas only 17 per cent females and 18 per cent males answered 'any other' (it includes grandparents, uncle aunty) as a source of vocational guidance. In peer group, 25 per cent females, 23 per cent males were dependent on home friends and 21 per cent females and 25 per cent males seek vocational help from classmates.

In electronic media, equal number of respondents (18 %) from males and females revealed that radio programmes were the source of vocational help. A significant gender difference was found in shows (Z- 2.77; p≤0.01) and TV advertisement (Z- 2.52; p≤0.05) where T V Advertisements were the source of vocational help of less number females (7 %) than males (19 %), whereas, males (28%) were found less than females (47%) in taking vocational assistance from shows.

Data also unveils that non-significant gender difference in usage of you tube (44 % females and 52 % males), whereas, usage of goggle (Z-1.98; p≤0.05) and social networking sites (Z- 3.61; p≤0.01) had significant gender difference in seeking vocational help where more male respondents (61 %) were dependent on google than female respondents (47 %) Similarly, males (52%) were again found more than females (27%) in taking vocational assistance from social networking sites

In print media, non-significant gender difference was observed in all the sources where books were used by nearly one fourth of the male sample population (27%) and 18 per cent of females , magazines were used by 44 per cent females and 41 per cent males for seeking vocational help, whereas, 31 per cent females and 41 per cent males reported newspaper as their vocational assistance.

Approximately, equal number of adolescents (43% females and 44% males) seek vocational guidance from teachers, whereas, no individual approached professional counselors for help.

Adolescents from both the gender answered internet and print media as a reliable source for vocational guidance where males were found more than females to take assistance from TV advertisements, google and social networking sites whereas TV shows were more helpful for females than males in vocational guidance.

CONCLUSION

During the stage of adolescence, where individual seeks for his/her identity exploration and at the same time adolescents are confronted with role confusions. Guidance is very important for adolescents to resolve complexities of problem. Its services have huge role in bringing out the best in adolescent. Incorporation of guidance and counseling in educational curriculum will certainly boost their overall development and it can guarantee greater success even how harder the

way is. Guidance and counseling have become a key concern for today's adolescents. Young people need proper guidance that will make them potent to stand in society and make a name for themselves. Guidance and counselling not only help them to make decisions pertaining to their specialized career, but it also makes them confident and mentally prepares them for societal hardships. The Indian Education System is always under the hammer for being competitive and focusing more on academic learning. There is need to expand varied sources of guidance from where adolescent can seek help to clear up their confusion in various developmental areas.

REFERENCES

- Barker, G. (2007). Adolescents, social support and help-seeking behaviour: An international literature review and programme consultation with recommendations for action. Geneva: World Health Organization.
- Bolarin, T. A. (1989). Sex differences in the sources of academic and social guidance sought by secondary school students. *International Journal for the Advancement of Counselling*, *12*(4), 333-341.
- Camara, M., Bacigalupe, G., & Padilla, P. (2017). The role of social support in adolescents: are you helping me or stressing me out?. *International Journal of Adolescence and Youth*, *22*(2), 123-136.Collins, G R (2007) *Christian Counselling,* 3rd Edn., Thomas Nelson, Dallas.
- Ellonen, N., Kääriäinen, J., & Autio, V. (2008). Adolescent depression and school social support: A multilevel analysis of a Finnish sample. *Journal of Community Psychology*, *36*(4), 552-567.
- Hankin, B. L., Mermelstein, R., & Roesch, L. (2007). Sex differences in adolescent depression: Stress exposure and reactivity models. *Child development*, *78*(1), 279-295.Petersen A C (1988) Adolescent Development. *Annual Rev Psychol* **39**: 583-607.
- Sati, L., & Vig, D. (2016). Need of psychological counselling among adolescents. *Int J Appl Home Sci*, 3, 441-46.
- Shechtman, Z. (2002). Child group psychotherapy in the school at the threshold of a new millennium. *Journal of Counseling & Development*, *80*(3), 293-299
- Vogel, D. L., Wester, S. R., & Larson, L. M. (2007). Avoidance of counseling: Psychological factors that inhibit seeking help. *Journal of counseling & development*, *85*(4), 410-422.

Members of Editorial Board

Vadodara

Dr. Avani Maniar
Associate Professor, Department of Extension and Communication,
Faculty of Family and Community Sciences,
The Maharaja Sayajirao University of Baroda,
Vadodara

Dr. Sarjoo Patel
Assistant Professor, Department of Family and Community Resource Management,
Faculty of Family and Community Sciences,
The Maharaja Sayajirao University of Baroda,
Vadodara

Dr. Rachana Bhangaokar
Assistant Professor, Department of Human Development and Family Studies,
Faculty of Family and Community Sciences,
The Maharaja Sayajirao University of Baroda, Vadodara

Ms. Alaukika Khachar
Alumnus, Department of Human Development and Family Studies,
Faculty of Family and Community Sciences,
The Maharaja Sayajirao University of Baroda, Vadodara

INFORMATION FOR THE AUTHORS

Original research papers are invited from scholars from various fields of Home Science (Family and Community Sciences) to be published in the forth coming 'The Indian Journal of Home Science'.

- The Journal is published only in English language.
- At least one of the authors should be life member of The Home Science Association of India. .
- For the issue intended to be published in January, the last date for the submission of manuscript is 30th November and for issue to be published in June, the last date for the submission is 30th March.
- The submission is to be done ONLY though web site to the Editor.
- The guidelines for the contributors are uploaded on the website of H.S.A.I. The guidelines must strictly be followed.
- One complementary hard copy will be given to the main author of the published article.

THE HOME SCIENCE ASSOCIATION OF INDIA

FORM IV: Rule 8

1.	Name of Publication	: The Indian Journal of Home Science
2.	Periodicity of the Publication	: Twice a year
3.	Printer's Name	: Mr. Kanubhai Parmar
	Whether citizen of India? (if foreigner, state the country of Origin)	: Yes, citizen of India
	Address	: Vishal Graphics GF-18, Saffron Complex, Fatehgunj Vadodara-390002,Gujarat
4.	Publisher's Name (if foreigner, state the country of Origin)	: Home Science Association of India
	Whether citizen of India?	: Yes, citizen of India
	Address	: Faculty of F.C.Sc. The M.S.University of Baroda Vadodara
5.	Editors Name (if foreigner, state the country of Origin)	: Prof.Maneesha Shukul
	Whether citizen of India?	: Yes, citizen of India
	Address	: "Shreeram Villa", 343 Suncity Paradise, Mujmahuda, Vadodara-390011
6.	Names and address of individuals who own the newspaper and partners or shareholders holding more than one percent	: The Home Science Association of India (Registered No. R.N. 30312/66)

I, Prof. Maneesha Shukul, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/-

Prof. Maneesha Shukul

Published by: Prof. Maneesha Shukul for the Home Science Association of India, Vadodara-390002, India

Printed by: Vishal Graphics, Vadodara

EDITORIAL BOARD

OF

THE INDIAN JOURNAL OF HOME SCIENCE