# National Journal of Research in Community Medicine

*of India*

ISSN: 2277-1522 (Print) ; 2277-3517 (Online)

An Official Publication of Community Medicine Faculties Association

Volume 7. Sup. Issue 1. 2018 (001-051)

Special Issue on Environmental Diseases
( SRM-5th International Management Development Programme)
doi: 10.26727/NJRCM.2018.7.3i

Indexed in Index Copernicus& Other database

Not for Sale

www.commedjournal.in

31-08-2018

# National Journal of Research in Community Medicine (NJRCM)

**Volume 7. Sup. Issue 1. 2018 (001-051)**
**Special Issue on Environmental Diseases**
**( SRM-5th International Management Development Programme)**

doi: 10.26727/NJRCM.2018.7.3i

**Community Medicine Faculties Association**
**Chennai**
**India**

**NJRCM- Volume 7. Sup. Issue 1. 2018 (001-051)**

National Journal of Research in Community Medicine
ISSN - Print: 2277 – 1522, Online: 2277 – 3517



Web Site: www.commedjournal.in
Association Site: https://sites.google.com/site/comfaoffice/who-we-are
E-Mail: dopnjrcm@gmail.com

**Address:**
Community Medicine Faculties Association
(Registered Under The Tamil Nadu Societies Registration Act, 1975)
No: 29/2 (New no.60) Rettaikuzhi Street, Tondiarpet, Chennai – 600 081.



**Manuscript Submission:**
http://www.commedjournal.in/man.html

**Indexed in Index Copernicus (**http://journals.indexcopernicus.com/masterlist.php): ICF value:**95.64 and other data base.**

NJRCM- Volume 7. Sup. Issue 1. 2018 (001-051)

## Table of Content

Special Issue on Environmental Diseases ( SRM-5th International Management Development Programme)
**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

# ORIGINAL RESEARCH ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 1-5**

## Cosmetic Usage and Awareness of Associated Hazards among College Students in Urban Coimbatore

Subhashini Ganesan, Darshan Manoj, Sudha Ramalingam
Affiliation: Department of Community Medicine, PSG Institute of Medical Sciences and Research, Coimbatore.

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 14-05-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 01-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr. Sudha Ramalingam, MD (Community Medicine), Department of Community Medicine, PSG Institute of Medical Sciences and Research, Coimbatore. Pin.641004 E-mail: dramritvirk@gmail.com

**ABSTRACT**

**Background:** The beauty industry in India is growing at a breakneck pace and the use of cosmetics cuts across people of all spheres of life. But people lack awareness on the knowledge of these products and the health hazards of usage of such products. Therefore this study aims at understanding the awareness and practices of cosmetic usage and the factors that influence usage of cosmetics. **Methods:** A cross sectional study was done among college students of 18 to 21 years. A self administered questionnaire was used to collect data. Data regarding the use of cosmetics, the factors influencing the use of cosmetics and their awareness on the health implications were collected. The data was analyzed using SPSS version 24. A total of 176 participants completed the study. **Results:**Our study showed that 82% of them use cosmetics. Among females 91% use cosmetics and among men 70% of them use cosmetics. Only 43.6% had awareness on the side effects of the cosmetics and only 31.3% had known the health impacts of cosmetic usage. Gender had significant association with factors like knowledge on side effects, practices of reading safety warnings, sharing of cosmetics and using beauty/salon services. Female gender and feeling of looking better were found to be significant factors influencing the use of cosmetics. **Conclusion:** Our study concludes that awareness on the health hazards associated with cosmetic usage is very less among young people while the usage is high which needs interventions designing literacy programs to improve awareness on use of cosmetics.

**Key-words:** Cosmetics, awareness, college students, health hazards, toxins.

### Introduction:

Cosmetic means any article intended to be rubbed, poured, sprinkled or sprayed on, or introduced into, or otherwise applied to, the human body or any part thereof for cleansing, beautifying, promoting attractiveness, or altering the appearance, and includes any article intended for use as a component of cosmetic.[1]

Indian markets for cosmetics are fast growing and expected to grow another 25% by 2025. [2] Women, especially college students are the high users in the cosmetic industry [3] A lot of factors play a role in use of cosmetics and studies have highlighted that brands of cosmetics, advertisements and price of cosmetics influence the purchase of cosmetic products.[4,5,6]

Studies have also shown that attractiveness and confidence of looking better are highly influencing factors for the use of cosmetics. [7,8]. Studies have shown that heavy metals such as chromium, arsenic, cadmium, and lead are used as raw materials for many cosmetic and personal care products. Absorption of these products in the body can lead to kidney damage and other neurological disorders. [9]. Cosmetics also cause allergies and acute toxicities [10]. Endocrine disruptors such as phthalates in cosmetics and increased use of cosmetics have led to developmental and reproductive diseases. [11, 12]. The bioaccumulation of these chemicals over time has been associated with various health hazards. [13]

Though cosmetic products are not often associated with serious health hazards it does not guarantee the safety of these products. Especially with regard to possible long term effects of these cosmetics as they are likely to be used over a long period of time. [13]. Also not much data is available on the level of awareness of the health implications among people who use cosmetics. Therefore understanding the awareness of toxins in cosmetics and the usage of cosmetics becomes imperative.

Hence this study aims to

- Study the awareness levels of the health hazards associated with cosmetic usage
- Find out the practices in use of cosmetics
- Understand the factors influencing the use of cosmetic products among college going students.

### Methodology

The study was conducted among college students from two different colleges in urban Coimbatore.

Study design: cross sectional study

Study participants: college students 18 years and above who were willing to participate were included in the study

Sample size: Based on studies that showed consumption of cosmetic products to be around 45% in cities, [7] the sample size was calculated to be 135.

Sampling method: convenience sampling

A self administered questionnaire was used to collect data. Data regarding the use of cosmetics, the factors influencing the use of cosmetics and their awareness on the health implications were collected.

The data was analyzed using SPSS version 24. Statistical test chi square was used to test significance.

The study was approved by the Institutional Human Ethics Committee

**Results**

Totally, 176 participants completed the study, of which 86 were from technology background and 90 were medical students. The study participants were in the age group of 18 to 21 years. The demographical details of the participants are shown in Table1.

Out of the 176 study participants, 82% of them use cosmetics. Among females 91% use cosmetics and among men 70% of them use cosmetics. This shows that cosmetics are used more by females than males.

Our study showed that awareness on the side effects of cosmetic product was only 43.6% and only 8.5% were aware about the regulations on cosmetic products. Figure 1 shows the awareness on the various aspects of cosmetic usage.

Figure 2 and 3 show the cosmetics products used daily among men and women respectively.

Figure 4 shows the purpose of using cosmetics by the study participants. Attraction, hygiene/ protection and fashion were the reasons given. Apart from that 48% chose other reasons which included for attending functions, parties, to try and see, to experiment products and because they are recommended or used by friends.

Table 4 shows the association of gender with the knowledge and practices of cosmetic usage. The knowledge on the side effects of the products and practices of reading safety warnings, using salon/beauty services, sharing cosmetic products and cleaning off products from face before sleep were found to be statistically significant.

Table 5 showed the association between factors which influence the use of cosmetics. Female sex and the feeling of looking better were the two influencing factors for cosmetic usage which were found to be statistically significant.

**Table 1: Demographic details of participants (n=176)**

| | | |
|---|---|---|
| **Sex distribution** | | |
| Male | 77 | 43.8% |
| Female | 99 | 56.2% |
| **Place of residence** | | |
| Urban | 156 | 88.6% |
| Rural | 20 | 11.4% |
| **Socio economic status *** | | |
| Class I | 122 | 69.1 % |
| Class II | 33 | 18.6 % |
| Class III | 13 | 7.4% |
| Class IV | 8 | 4.9% |

*Modified Prasads Classification

**Fig 1 : Awareness on cosmetic usage**

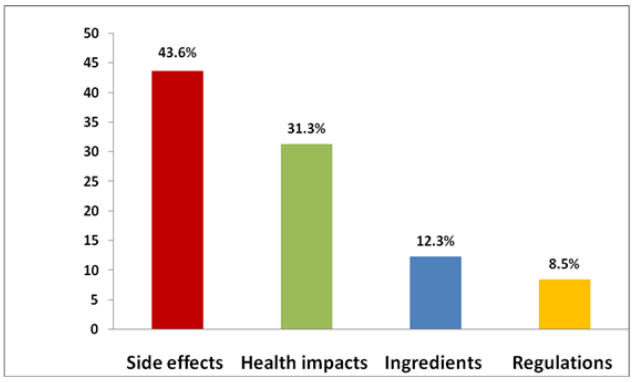



Fig 2: **Daily usage of cosmetic products among male**

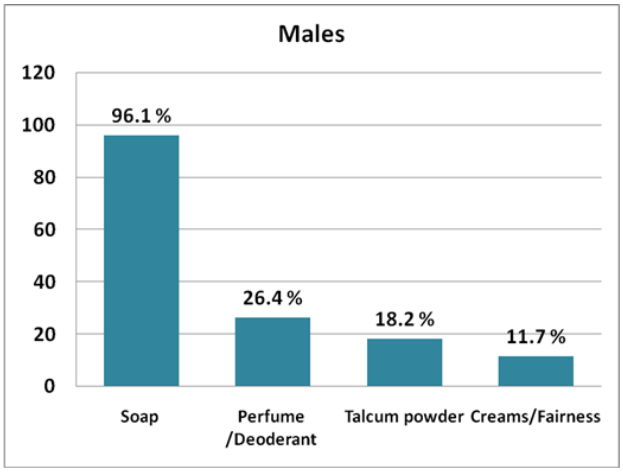


**Table 2: Association of gender with knowledge & practices**

| Factors | Male (%) | Female (%) | P Value<br><br>Odds Ratio (95% CI)* |
|---|---|---|---|
| Aware of health impacts | 21<br><br>(27.3) | 34<br><br>( 34.3) | 0.331 |
| Know about the side effects | 23<br><br>(29.9) | 52<br><br>(52.5) | **P =0.008**<br>**OR – 1.4 (1.1 – 1.8)** |
| Check for Expiry | 69<br><br>(89.6) | 92<br><br>(92.9) | 0.588 |
| Look for the Ingredients | 31<br><br>(40.3) | 49<br><br>(49.5) | 0.285 |
| Check for Animal testing | 8<br><br>(10.4) | 9<br><br>(9.1) | 0.802 |
| Read Safety warnings | 43<br>(55.8) | 71<br>(71.7) | **P =0.038**<br>**OR – 1.5 (1.04 – 2.33)** |
| Use Beauty Services /Salon | 56<br>(72.7) | 50<br>(50.5) | **P =0.003**<br>**OR – 2.6 (1.3 – 4.9)** |
| Use services in Skin Clinics | 16<br>(20.8) | 21<br>(21.2) | 1.000 |
| Sharing of beauty products | 31<br>(40.3) | 58<br>(58.6) | **P =0.022**<br>**OR – 1.4 (1.09 – 1.94)** |
| Clean off products before sleep | 37<br><br>(48.1) | 83<br><br>(83.8) | **P =0.001**<br><br>**OR – 3.21(1.98– 5.28)** |

*CI - Confidence interval

Fig 3: **Daily usage of cosmetic products among female**

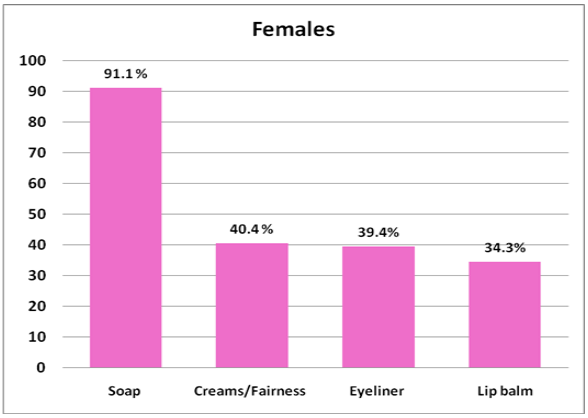



Fig 4: **Purpose of using cosmetic products**

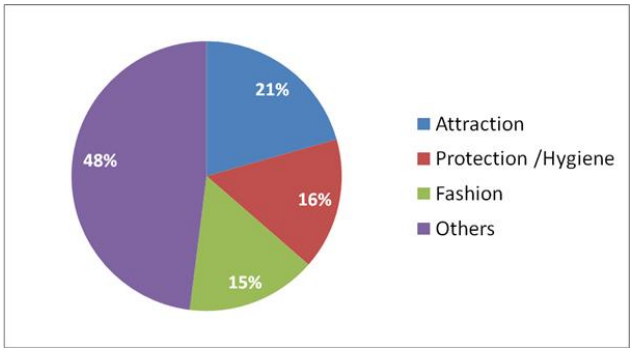



**Table 3: Factors influencing use of cosmetics**

| Variables | Use<br><br>(%) | Don't use<br><br>(%) | P value<br><br>Odds Ratio (95% CI) |
|---|---|---|---|
| Female Sex | 90<br>(90.9) | 9<br>(9.1) | **P- 0.001**<br>**OR – 4.2 (1.6 – 6.6)** |
| Advertisements | 49<br>(76.5) | 15<br>(23.5) | 0.171 |
| Endorsement by Celebrity | 10<br>(76.9) | 3<br>(23.1) | 0.634 |
| Peer pressure | 12<br>(100) | 0 | 0.164 |
| Feel of looking better | 111<br>(89.5) | 13<br>(10.5) | **P -0.000**<br>**OR – 5.4 (2.3 – 12.1)** |
| Brands | 125<br>(83.3) | 25<br>(16.7) | 0.324 |
| Price | 124<br>(81.6) | 28<br>(18.4) | 0.769 |

CI – Confidence interval

**Discussion**

The study showed use of cosmetics to be 82% among the young people, which was little less than a study done in Kerala that showed a 92% prevalence [15]

We found that more females use cosmetics compared to males and the difference was found to be statistically significant. Female sex is at four times more risk of using cosmetic compared to men. This was again similar with other studies done which shows that female use cosmetics more than males[16]

The most commonly used daily cosmetics are different for men and women. Men, apart from soaps

used deodorants /perfumes, talcum powder and creams including fairness creams on a daily basis. Women used creams including fairness creams, eyeliner and lip balms on a daily basis. This was similar to a study done in Gujarat were deodorant was the commonly used cosmetic among men (56%), though the percentage was much less in our study (26.4%) and among women the use of eyeliner / kajal was close to 40% .[3]

Our study showed that feeling of looking better as a significant factor which is associated with the use of cosmetics. Similarly a study done in Kerala has shown that nearly 76% believed cosmetics enhanced their general appearance. Our study failed to show significant association with other factors like brand, advertisements, peer pressure or price factor though studies have shown them to be a significant factor. [16, 17, 18,19]

Awareness regarding health impacts (30%) and side effects (43.6%) of cosmetics were less compared to the study done in Gujarat (70%). This could be because of the fact that the population was diverse which included participants from different age groups. [3, 20]

Our study also showed that 21% of college students use cosmetics for attraction, 16% for personal hygiene and 15% for fashion. The study by Tejal also showed that 73% used for personal hygiene and 19% and 37% used for attraction and fashion purposes respectively. [3]

Regarding practices like reading safety details of products, knowledge on the side effects and cleaning off the products before sleep, women had better practices and the difference between male and female was found to be statistically significant. But among women the habit of sharing cosmetics was more when compared to men and the difference was found to be significant.

Our study also showed men use beauty/salon services more than female and the difference was found to be statistically significant. But a study done in Kerala has shown that females use beauty parlor services more than men.[14] This could be because the usage of either beauty or salon services were asked and men used salon services for haircut, shaving etc more often than women.

## Conclusion

Awareness on the health hazards associated with cosmetic usage is very less among young people while the usage is high which calls for an immediate intervention to educate them. Perfumes/ deodorants, eyeliners are used on a daily basis so young people should be made aware on long term complications of these products. Females and feeling of looking better which are found to have significant association with use of cosmetics have to be addressed in designing literacy programs to improve awareness on use of cosmetics.

## References


1. The Drugs and Cosmetics act 1940 [Internet]. Cdsco.nic.in. 2005 [cited 7 June 2018]. Available from: http://cdsco.nic.in/writereaddata/Drugs&CosmeticAct.pdf

2. Cosmetics market to grow by 25% to $20 billion by 2025 [Internet]. The Economic Times. 2018 [cited 7 June 2018]. Available from: https://economictimes.indiatimes.com/industry/cons products/fmcg/cosmetics-market-to-grow-by-25-to-20-billion-by-2025/articleshow/62838360.cms

3. Britton A. The Beauty Industry's Influence on Women in Society [Internet]. University of New Hampshire Scholars' Repository. 2012 [cited 7 June 2018]. Available from: http://scholars.unh.edu/honors/86

4. Alhedhaif S, Lele U, Kaifi BA. Brand Loyalty and Factors Affecting Cosmetics Buying Behavior of Saudi Female Consumers. Journal of Business Studies Quarterly. 2016 Mar 1;7(3):24-38.

5. Koshy L, Manohar SJ. Factors influencing the buying behaviour of face care products among youth. Journal of Industrial Microbiology and Biotechnology. 2013;6(6).

6. Anderson PM, He X. Price influence and age segments of Beijing consumers. Journal of Consumer Marketing. 1998 Apr 1;15(2):152-69.

7. Tejal P, Nishan D, Amisha J, Umesh G, Desai KT, Bansal RK. Cosmetics and health: usage, perceptions and awareness. Bangladesh Journal of Medical Science. 2013 Jan 1;12(4):392.

8. Rajajeyakumar M, Aswitha Priya MS, Ajanta, Janitha A, Ramanaa M. J Psychiatry. 2016: 19:5(Suppl).35. Available at: https://www.omicsonline.org/conference-proceedings/2378-5756.C1.008_008.pdf

9. Naseem Mohammed Abdulla, Samer Hamidi, Mustafa Z Younis and Jai Parkash.Consumer Awareness of Health Risks of Arsenic, Cadmium, Chromium and Lead Present in Cosmetic and Personal Care Products in Dubai. J Community Med Health Educ 2013; 3(3):213.

10. P.K. Nigam, "Adverse Reaction to cosmetics and method of testing," Indian J Dermatol Venerol Leprol, 2009;75(1): 10–19.

11. Barrett JR. Chemical exposures: the ugly side of beauty products. Environmental health perspectives. 2005 Jan;113(1):A24.

12. Koniecki D, Wang R, Moody RP, Zhu J. Phthalates in cosmetic and personal care products: concentrations and possible dermal exposure. Environmental research. 2011 Apr 1;111(3):329-36.

13. Okereke JN, Udebuani AC, Ezeji EU, Obasi KO, Nnoli MC. Possible health implications associated with cosmetics: a review. Sci. J. Pub. Health. 2015;3(5-1):58-59.

14. Joan Felicita Samson, Mariam Philip, Arjun C, Soumya Varadan. Trends in awareness and use of cosmetics among medical students – a study from a medical college in South Kerala, India. International Journal of Contemporary Medical Research 2017;4 (6):1415-1417.

15. Latha DS. A study on factors influencing on consumer behaviour towards cosmetics with special reference to Chennai city. IJAR. 2017;3(6):1038-42.

16. Manickam Ps, Ceasar Mj. Tv Advertisement Of Cosmetics And The Buying Behavior Of College Going Girls In Selected Cities Of Tamilnadu. ICMRR. 2016 Feb; 4(2): 13-19.

17. Khraim HS. The influence of brand loyalty on cosmetics buying behavior of UAE female consumers. International Journal of Marketing Studies. 2011 Apr 28;3(2):123-133.

18. Junaid AB, Nasreen R, Ravichandran N, Ahmed F. Indian cosmeceutical market: a study of consumer preferences and consumption patterns. J Clin Exp Dermatol Res. 2014;5(212):25-95.

19. Shrestha R, Shakya J. Knowledge regarding adverse effects of selected cosmetic products among higher secondary level girl students, Chitwan. Journal of Chitwan Medical College. 2017 Feb 20;6(2):27-32.

**Conflict of Interest: None**
**Source of funding support:** Nil


**NJRCM: www.commedjournal.in**

**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

# ORIGINAL RESEARCH ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 6-9**

## Knowledge Attitude and Practices about dengue among adults slum population of Chennai, India

Nilofur Banu[1], Kalaivani A[2*], Muthukumar T[3], Karnaboopathy R[3]

Affiliation:1Post graduate student, Department of Community Medicine, 2 Associate Professor, Department of Community Medicine, &3 Assistant Professor, Department of Community Medicine, Shri Sathya Sai Medical College & Research Institute, Sri Balaji Vidyapeeth.

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 25-05-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 01-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr. Kalaivani, Associate Professor, Shri Sathya Sai Medical College & Research Institute, Sri Balaji Vidyapeeth-603108, E-mail: kalaimedicos11@gmail.com

**ABSTRACT**

**Back ground**: Dengue is one of the major public health problems and contributes to annual outbreak in India. Rapid urbanization, neglected slum area and environmental changes results in vector breeding, since dengue doesn't have specific treatment and vaccination, people's attitude and knowledge towards disease plays a vital role in preventing and controlling dengue. **Aims:** To study the knowledge, attitude and practices towards dengue among adult slum population of Chennai. **Methods**: A community based cross sectional study was conducted among adult slum population in Vadapalani, Chennai. Institutional Ethical clearance was obtained and 100 houses in the slum were selected by systematic random sampling method, one adult member in each house was interviewed using semi-structured schedule. The results were shown in frequencies and percentage. **Results**: Among the study population, 83% of population was aware that dengue can be prevented, 55% of population had knowledge that dengue spreading mosquito breeds in clean water, 95% of the participants said dengue can only be treated by hospitalization and 85% of them believe that nilavembu kudineer helps in reducing severity of dengue. About 89% of respondent were using some form of preventive measure against mosquito. Only 2% of population was aware that the dengue spreading mosquitoes were day time biters. **Conclusion:** Even though majority of respondent were aware of dengue fever almost all of them were not aware that dengue mosquito is a day time biter and resulting in untimely use of anti mosquito measures. The finding from this study can be used as an input for government and policy makers to frame appropriate strategies to prevent future outbreaks

**Key-words:** Dengue, Urban slum, Nilavembu kudineer.

### Introduction:

Dengue is one of the major public health problems and contributes to annual outbreak in India. Dengue is caused by Flavi virus, transmitted by Aedes aegypti and it has four different serotypes, namely DEN-1, DEN-2, DEN-3 and DEN-4.[1] In rare cases, second infection with a serotype of dengue virus different from that involved in primary infection leads to dengue hemorrhagic fever with severe shock, which can cause serious illness and even death.[2] Significant gradual global upsurge of dengue cases had been reported predominantly affecting South-East Asia, the Americas, Africa and the Caribbean Islands.[3] It has become a notable public health problem in recent years because of the mortality and morbidity which is associated with dengue.[4,5]

According to World Health Organization (WHO), early detection and proper medical care can lowers fatality rate below 1% world wide.[6] In India dengue morbidity estimated to be 157,220 and mortality to be 250 in the year 2017.[7] Analysis shows India has emerged as the country with the world's highest dengue burden, with about 34% of all such Dengue cases. Tamil Nadu reported the highest number of dengue deaths and dengue cases in 2017, and reported 63 deaths and 23,035 cases.[8]

Rapid urbanization, poor planning, neglected slum area and environmental changes results in vector breeding. Since dengue doesn't have any specific treatment, people's attitude and knowledge towards disease plays a vital role in preventing and controlling dengue. So this study was planned in assessing knowledge attitude and practices towards dengue among adult population in an urban slum of Chennai and will help to develop strategies in filling the gap about their awareness and practices by increasing their participation.

### Methods:

A community based cross sectional study was conducted among adult slum population of Vadapalani, Chennai. The study was done for a period of two months (Jan –Feb 2018) duration. Institutional Ethical clearance was obtained before the starting of the study. Sample size of 100 was taken based on previous study done by Jogdand KS et al which observed that 78.65% of study population was aware of dengue. A slum in South Chennai was selected by simple random sampling method and list of

houses was obtained from Chennai corporation office and out of 2000 houses in the slum, the houses to be interviewed were selected by systematic random sampling, every 20th house was selected and one adult above the age of 18 from each house were interviewed face to face using semi-structured schedule in their local language Tamil by investigator which comprised of four sections, which included socio-demographics profile, knowledge, attitude towards dengue and practices related to prevention against diseases. Adult who were willing to participate in the study and are residing in the slum for more than five years duration were included in the study. Those not willing to participate in the study and houses locked even after four visits by the investigator were excluded. Data was entered in Microsoft Excel sheet and analyzed by using Statistical software Package for Social Science (SPSS) version 21.0. Each question was analyzed individually. The results were shown in proportions and percentage.

**Results:**

**Table 1: Socio-demographic details of the participants (N=100)**

| Variables | | Percentage |
|---|---|---|
| Sex | Male | 48% |
| | Female | 52% |
| Age in yrs | 18-25 | 10% |
| | 26-35 | 16% |
| | 36-45 | 45% |
| | 46-60 | 16% |
| | Above 61 | 13% |
| Religion | Hindus | 57% |
| | Muslims | 23% |
| | Christians | 20% |
| Type of family | Nuclear | 30% |
| | Joint family | 60% |
| | Three generation | 10% |
| Occupation | Unemployed | 29% |
| | Unskilled | 7% |
| | Semi-skilled | 32% |
| | Skilled | 4% |
| | Housewife | 28% |
| Education | Illiterate | 6% |
| | Primary school | 26% |
| | Middle school | 32% |
| | Intermediate/Diploma | 28% |
| | Graduate/PG | 8% |
| Socio-economic classification | Class 2 | 20% |
| | Class 3 | 40% |
| | Class 4 | 32% |
| | Class 5 | 8% |

Half of the study population (45%) belongs to the age group of 36-45 years. And the mean age of the study population was 38.16 with standard deviation of 17.309 years. Among the respondents, 74% were married and 26% were unmarried. Among the study population, only 6% of them were illiterate, monthly income of majority of the study population (40%) was between 1952-3252 which belong to socio economic class 3 of modified BG Prasad classification.(Table.1) Among the respondents, only 46% of them knew that dengue is caused by a virus, All of them knew dengue spreads by mosquitoes, 98% of the respondents mentioned that dengue spreading mosquito is a night time biter, 55% of the study population were aware that dengue spreading mosquito breads on clean water, the rest of the respondents reported that drainage, garbage and stagnant dirty water could be the breeding sites for dengue vector.(Figure1)

**Table 2: Association between socio-demographic variables and anti-mosquitoes measures adopted (N=100)**

| Variables | | Anti-mosquito measures | | $\chi^2$ Value | p value |
|---|---|---|---|---|---|
| | | Practiced | Not practiced | | |
| Sex | Male | 49 | 4 | 1.373 | 0.241 |
| | Female | 40 | 7 | | |
| Age group | ≤ 40 years | 55 | 11 | 6.367 | 0.012 |
| | >40 years | 34 | 0 | | |
| Religion | Hindus | 57 | 0 | 16.38 | 0.000 |
| | Muslims & Christians | 32 | 11 | | |
| Marital status | Married | 69 | 5 | 5.234 | 0.022 |
| | Unmarried | 20 | 6 | | |
| Type of family | Nuclear family | 29 | 1 | 2.573 | 0.109 |
| | Joint family & Three generation family | 60 | 10 | | |
| Occupation | Unemployed | 25 | 4 | 0.499 | 0.919 |
| | Unskilled/ Semi-skilled/ Skilled | 39 | 4 | | |
| | Housewife | 25 | 3 | | |
| Education | Till schooling | 47 | 0 | 10.960 | 0.001 |
| | Diploma & graduates | 42 | 11 | | |
| Socio-economic classification | Class 1, 2 & 3 | 52 | 8 | 0.834 | 0.361 |
| | Class 4& 5 | 37 | 3 | | |

**Figure 1: Percentage distribution of respondent's knowledge of dengue (N-100)**

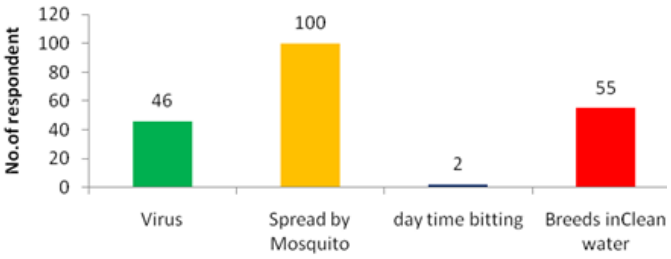



**Figure 2: Percentage distribution of respondent's attitude towards dengue (N-100)**

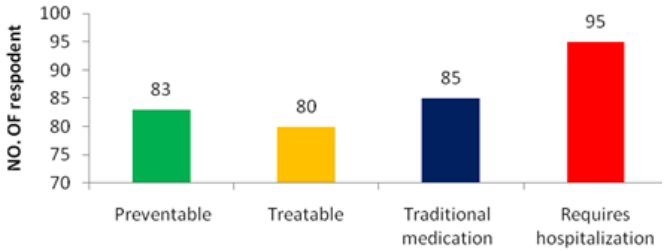
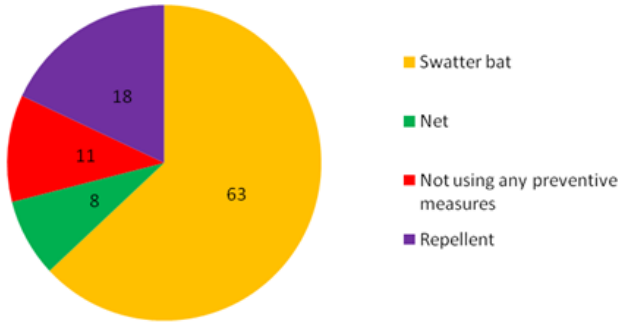



**Figure 3: Percentage distribution of respondent's anti-mosquito measures (N-100)**




Majority of the study populations (83%) agreed/strongly agreed that dengue can be prevented, 80% of the participants agreed that dengue is treatable disease and 90% of them agreed that dengue is treatable only by hospitalization and 85% of them believe that nilavembu kudineer helps in reducing severity of dengue.(Figure 2)

Preventive measures adopted by the respondent were used mainly during night time in the form of swatter bat, coils and mosquito nets. (Figure 3) It was found that gender, type of family, occupation and socio-economic class were not associated with their anti-mosquito practices whereas age group, religion, marital status and education was found to be significantly associated with their anti-mosquito practices. (Table 2)

**Discussion**:

In this study, an overwhelming 100% of respondents knew that dengue fever is transmitted by mosquito. Similar results were found in the study done by Harish S et al in Bangalore and Tikoo D in Punjab in which 91% and 98.8% of the participants knew that dengue is transmitted by mosquito respectively and the similarities in the results may be due to the fact that all the above mentioned study area being dengue epidemic often.[9,10] But in various other studies done by Jogdand KS et al in south India and Taksande A et al from central India in which 78.65% and 76.58 % of respondents knew that dengue fever is transmitted by mosquito, this difference may be due to difference in sample size and duration of study.[11,12]

In our study only 2% of them knew about correct timing of biting habit (night) of dengue spreading mosquitoes, similar result was found in study done by Mohapatra S et al in Bihar in which 14% of respondents were aware about biting habit of dengue spreading mosquito.[13] The above finding was inconsistent with some other studies done by Gupta S et al in Jhasi city in which their knowledge on timing of biting habit of dengue spreading mosquito was found to be 75% and the difference might be due to better information, education and communication strategies.[14]

In this study, 55% of respondent knew dengue spreading mosquito breeds in clean water but in a study done by Chellaiyan VG et al in rural area of Tamil Nadu noted that only 1.3% of respondents knew about breeding site of dengue mosquitoes and this difference may be because of different study area.[15] In our study, 83% of population were aware that dengue can be prevented, but Jogdand KS et al and Chellaiyan VG et al reported 59.25% and 40% respectively being aware that dengue can be prevented.[11,15] This vast variation might be due to difference in the population studied and time of study.

In our study, majority of them (63%) were using swatter bats in contrast to the study done by Mohapatra S et al in Bihar, in which 96.4% of respondent were using mosquito nets as preventive measures and this difference might be due to different study location.[13] It was found in our study that gender, type of family, occupation and socio-economic class were not associated with their anti-mosquito practices whereas age group, religion, marital status and education was found to be significantly associated with their anti-mosquito practices but Chellaiyan VG et al reported significant association between type of family and preventive measures.[15]

In our study, there were few limitations such as the survey was interviewer based schedule, some participants would provide socially desirable responses to some questions. Secondly, the small sample size may have limited our ability to detect associations that were small and moderate in magnitude.

In conclusion, we like to highlight the need for further effective information, education, communication programs to educate the people to identify, seek ways, to translate knowledge about dengue into positive preventive practices that would ultimately reduce the transmission of dengue.

**References:**

1. World Health Organization, Weekly epidemiological record. 24thFeb,2012. Available from http://www.who.int/wer/2012/en/ [Last accessed 18th April 2018].

2. Clanene J Peters. Harrison's Principal of Internal Medicine. Infections caused by arthropod and rodent borne viruses, 18th edition.2014; 1164.

3. Hales S, Maindonald J, Woodward A. Potential effect of population and climate changes on global distribution of dengue fever: an empirical model. Lancet. 2002; 360:9336.

4. Malhotra G, Yadav A, Dudeja P. Knowledge, Awareness and practices regarding dengue among rural and slum communities in north Indian city, India. Int J Med Sci Public Health. 2014; 3:295-9.

5. Jogdand KS, Yerpude P. The Community knowledge and practices regarding dengue fever in an urban slum area of south India. Peoples journal 2013; 6(1):13-5.

6. World Health Organization. Fact sheet: Dengue and severe dengue, 2015. Available at http://www.who.int/mediacentre/ factsheets/fs117/en/. [Last accessed 18th April 2018].

7. Raj GN. India leads the world in dengue burden nature. Thiruvanthapuram: The Hindu: 2016 . Available at http://www.thehindu.com/sci-tech/health/policy-and-issues/india-leads-the-world-in-dengue-burden-nature/article4592098.ece. [Last accessed 18th April 2018].

8. Ministry of Health and Family Welfare. National Vector Borne Diseases Control Program; Dengue cases and deaths in the country since 2010. Available from http://nvbdcp.gov.in/den-cd.html. [Last accessed 18th April 2018].

9. Harish S, Srinivasa S, Shuruthi P, Ranganatha P, Devaranavadagi RA, Bhavya G, Anjum Sk. Knowledge, attitude and practice regarding dengue infection among parents of children hospitalized for dengue fever. Curr Pediatr Res 2018; 22 : 33-7

10. Tikoo D, Sharma G, Gupta M.Assessment of knowledge, attitude and practice of dengue in factory workers of Amritsar, Punjab. Int JBasic Clin Pharmacol 2016;5:38-44

11. Jogdand KS,Yerpude P. The Community knowledge and practices regarding dengue fever in an urban slum area of south India. Peoples journal 2013; 6: 13-5.

12. Taksande A, Lakhkar B. Knowledge, Attitude and Practice (KAP) of Dengue Fever in the Ru-ral Area of Central India. Shiraz E Medical Journal,2012; 13:146-57.

13. Mohapatra S, Aslami AN.Knowledge, attitude and practice regarding denguefever among general patients of a rural tertiary-care hospital in Sasaram, Bihar. Int J Community MedPublic Health 2016;3:586-91

14. Shubhanshu Gupta, A. K. Malhotra, Santosh K. Verma, Mrigen Deka, Preeti Rai, Rashmi Yadav, Swati Singh. A Study on Knowledge, Attitude and Practices Regarding Dengue Fever among People Living in Urban Area of Jhansi City (UP. Journal of Evolution of Medical and Dental Sciences 2014; 3: 15388-98

15. Chellaiyan VG. Knowledge and awareness towards dengue infection and its prevention: a cross sectional study from rural area of Tamil Nadu, India Int J Community med public health. 2017;4(2):494-9.

**Conflict of Interest: None**
**Source of funding support:** Nil


**NJRCM: www.commedjournal.in**

**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

# ORIGINAL RESEARCH ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 10-14**

## A study to assess the Knowledge, Attitudes and Practices regarding Dengue Transmission In the Field Practice areas of a Medical College in Trichy

Shankar.S,* Raghuram.V,**, Abivignesh Prabhu.G#, Aashika.C#, Ponsaranya.P#, Manojkumar.R#, Elango.S***

Affiliation: *Assistant Professor, Department of community medicine, ** Professor, Department of community medicine, *** Professor & Head, Department of community medicine, Trichy SRM medical college hospital and research centre, Trichy. # Intern, Trichy SRM medical college hospital and research centre, Trichy, Tamil Nadu.

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 20-03-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 01-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr. Shankar.S, Assistant Professor, Department of community medicine, Trichy SRM medical college hospital and research centre, Trichy, Tamil Nadu

**ABSTRACT**

**Introduction:** Dengue is a vector-borne disease that is a major public health threat globally. In India, the risk of dengue has shown an increase in recent years due to rapid urbanization, lifestyle changes and deficient water management. Tamil Nadu is one of the states with high incidence of Dengue. In this context the study was conducted to assess the level of awareness, attitude and practices regarding Dengue Transmission. **Methods:** A cross sectional Community based study was conducted using pre-tested, semi-structured questionnaire in the urban and rural field practice areas of Trichy SRM medical college hospital and research centre, Trichy. Heads of families of 150 households were selected by simple random method and were interviewed. Data was analysed using SPSS version 15.0. **Results:** Majority (84%) of the study population were aware of dengue fever & it mode of transmission. Nearly Half (50%) of the households had potential vector breeding sites. Use of personal protective devices was high among upper socio-economic class. **Conclusion:** Lower levels of Awareness and negative attitude, and moderate use of personal protective measures among people belonging to low soico-economic group's calls for intensified community education efforts in the study area.

**Key-words:** Dengue, Practices, Transmission, Awareness, Control

## INTRODUCTION

Dengue is a vector-borne disease that is a major public health threat globally. It is caused by the dengue virus (DENV, 1–4 serotypes), which is one of the most important arboviruses in tropical and subtropical regions[1]. The vectors transmitting the disease are Aedes aegypti and Aedes albopictus[2]. The Aedes aegypti mosquito lives in urban habitats and breeds mostly in man-made containers[3].

One recent estimate indicates 390 million dengue infections per year, of which 96 million manifest clinically[4]. The South-East Asia and Western Pacific regions are most seriously affected[5]. Detection of all four serotypes has now rendered the countries hyperendemic[6].

In India, the first epidemic of clinical dengue-like illness was recorded in Chennai in 1780. High dengue incidence, ranging between 21 and 50 per million, was reported for the states of Punjab, Gujarat, Karnataka, Kerala, Tamil Nadu and Orissa [7,8].

The expansion of dengue in India has also been related to unplanned urbanization, changes in environmental factors, host–pathogen interactions and population immunological factors[9]. The disease has a seasonal pattern i.e. the cases peak after monsoon, and it is not uniformly distributed throughout the year[10].

In Tamil Nadu, According to the National Vector Borne Disease Control Programme of the Ministry of Health and Family Welfare. In 2016, Tamil Nadu reported 5 dengue deaths. In 2017, the number is 52. The nearly 800 percent increase also saw the reporting of 22,197 dengue cases this year alone compared to 2531 cases reported last year[11].

In the Trichy district in 2012, the highest number of cases were reported, since then numbers have declined to 150 cases in 2015[12]. Recently, Trichy faced a dengue outbreak between July to October 2017.

In this context the present study was conducted to assess the knowledge attitude practice regarding Dengue transmission in the field practice are of CMCHRC, Trichy.

### Materials and Methods:

This is a Community based cross-sectional study of the households in field practice area of CMCHRC, Trichy. The study was carried out between October to November 2017. This study area encompassed Sangendi,

Samayapuram and Vellanur. A sample of 50 households from each area was selected by simple random sampling method to represent each village, thus a total of 150 households were surveyed for this study. Head of Households were chosen because they were the decision makers of the house and play crucial role regarding decisions related to health. The data was collected by a face-to-face interview of the head of households using a pre-tested and semi-structured questionnaire on knowledge, attitudes and practices of dengue control. The Head of households were targeted, as they are the authoritative person in the family who is responsible and capable of taking subsequent preventive and control measures. The questionnaire was divided into six sections; the first section is concerned with demographic details of the family and its members comprised 9 questions, the second part is related to the incidence of fever in any of the household members in the past 6 months and its details. The third part is for those households who had any dengue fever cases in the last 6 months. The fourth part is comprised of 11 questions regarding practices undertaken for dengue prevention in each household. The fifth part is consists of questions to assess knowledge regarding dengue symptoms, mode of spread, and sources of information. The sixth part consists of 4 questions regarding the attitude of people towards dengue fever. The responses were scored on a scale of 0 to 32 based on the number of questions, then categorised into adequate and inadequate knowledge. The medium of interview was Tamil since it is the mother tongue of the residents. Data was entered and analysed using Statistical Package for Social Sciences (SPSS) version 15.0.

**RESULTS:**

Our study included 150 households containing 497 residents. Majority of them (78%) belonged to upper lower Socio-Economic status (determined by modified BG Prasad classification 2017).

About 43.3% lived in pucca houses, while 36% in semi pucca and 20.7% in kuccha houses. About half (50.7%) of study population had areas of stagnation around their houses. Majority 82.7% were nuclear families and 17.3% were joint families.

**Table 1: Presence of Water stagnation based on House Type (n=150)**

| Type of House | Stagnation Present (%) | Stagnation Absent | Total Houses | Chi-square value | P-value* |
|---|---|---|---|---|---|
| Pucca | 36 (55.4) | 29 | 65 | 19.6972 | <0.001 |
| Semi Pucca | 35 (64.8) | 19 | 54 | | |
| Kucha | 5 (16.1) | 26 | 31 | | |
| Total | 76 (50.1) | 74 | 150 | | |

*P-value < 0.05 was considered to be statistically significant.

Majority 84% of water stagnation was present among Pucca and Semi-Pucca House. More than Half i.e., 55.4% of those living in pucca houses had areas of stagnation, whereas only 16.1% of kuccha houses had areas of stagnation. There was statistically significant difference regarding water stagnation and type of house.

**Table 2: Presence of Water Stagnation according to Socio-economic status (n=150)**

| Type of House | Stagnation Present (%) | Stagnation Absent | Total Houses | Chi-square value | P-value* |
|---|---|---|---|---|---|
| Upper Middle | 5 (55.6) | 4 | 9 | 5.0774 | >0.05 |
| Middle | 20 (38.5) | 32 | 52 | | |
| Lower Middle | 42 (56.0) | 33 | 75 | | |
| Lower | 9 (64.3) | 5 | 14 | | |
| Total | 76 (50.1) | 74 | 150 | | |

*P-value < 0.05 was considered to be statistically significant.

Areas of stagnation were highest in lower socioeconomic status homes (64.3%) and lowest in lower middle socioeconomic status homes (38.5%). In total 7 out of 13 (53.8%) Dengue positive cases had occurred in households where areas of stagnation were present. The difference in water stagnation was not statistically significant.

Among the 150 households interviewed, 100 fever cases were reported in last 6 months and of them 11 were confirmed as dengue fever. Hence the fever prevalence was 20.12%, and the dengue was 2.2%.

Of the 13 dengue positive cases 10 were proven by dengue antigen tests at a hospital. Of the rest 3, 2 were cases of classical dengue fever, 1 was a case of probable dengue. (Probable dengue (undifferentiated fever) – Maculopapular rashes, URI symptoms, GI symptoms. Classical dengue – high fever with chills, headache, myalgia, photophobia, anorexia, constipation, abdominal pain, altered taste sensation, sore throat, biphasic and rash. DHF –Black tarry stools, Epistaxis, Low BP)[10].

**KNOWLEDGE:**

Of the 150 household heads, 2% were unaware of the term dengue. About 84% were aware that dengue was spread by mosquito bite. Majority (76%) were aware that the dengue mosquito breeds in artificial collections of water. But only 42.7% were aware that the aedes mosquito bites at day time.

About 18.7% still thought flies transmit dengue fever and 15.3% believed contact with infected persons transmits dengue. Also 10% believed that contaminated food and water transmitted dengue.

Majority (76.7%) of the study population knew stagnant water and keeping water containers opened were known to increase mosquito spread.0.7% knew neither of the

facts. Only about 17.3% responded that only stagnant water was a cause, and 5.3% said only keeping water containers were a cause.

**Table 3: Awareness of symptoms of Dengue fever among study population (n=150)**

| Symptoms | Aware (%) | Not-Aware (%) |
|---|---|---|
| Fever | 148 (98.7) | 2 (1.3) |
| Headache | 106 (70.7) | 44 (29.3) |
| Joint pain | 76 (50.7) | 74 (49.3) |
| Muscle pain | 94 (62.7) | 56 (37.3) |
| Eye pain | 64 (42.7) | 86 (57.3) |
| Skin rashes | 5 (3.3) | 145 (96.7) |

Awareness of symptoms was highest for fever (98.7%), headache (70.7%), muscle pain (62.7%). Only 3.3% were aware of skin rashes, and 42.7% were aware of eye pain as symptoms.

**Table 4: Knowledge score and socioeconomic status**

| Knowledge score | Upper middle | Middle | Lower middle | Lower | Pearson Chi-square value | P-value* |
|---|---|---|---|---|---|---|
| ≤8 | 3 (37.5%) | 25 (47.1 %) | 49 (62.8%) | 10 (90.9 %) | 9.567 | 0.02 |
| >8 | 5 (62.5%) | 28(52. 9%) | 29 (37.1%) | 1 (0.09 %) | | |

*P-value < 0.05 was considered to be statistically significant.

**Table 5: Source of Information regarding Dengue**

| Sources of information | Frequency | Percentage |
|---|---|---|
| Television | 127 | 84.6 |
| Radio | 122 | 81.3 |
| Posters | 47 | 31.3 |
| Pamphlets | 98 | 65.3 |
| Health workers | 109 | 72.6 |
| News papers | 125 | 83.3 |
| Magazines | 85 | 56.6 |
| Neighbours | 103 | 68.6 |

Knowledge score was calculated for each candidate. The total score was 16. Score of ≤8 was considered as inadequate knowledge. About 29.4% in the studied population had inadequate knowledge. 70.6% had adequate knowledge. Knowledge score was highest among upper middle SE status (62.5% had score>8) and lowest among lower SE status (0.09% had score >8) which was statistically significant (p=0.02)

Most candidates came to know about dengue through television (84.6%), radio (81.3%), and newspapers (83.3%). We can conclude from this statement that mass media plays an important role in spreading awareness among people.

**PRACTICES:**

Half (50%) of the study population used mosquito mats/coils & 87.3% used mosquito sprays/insecticide sprays. Majority (82.7%) used window/door screens & nets, while 64.7% used mosquito repellent creams. The above mentioned practices are those that required spending of money and were more practiced in those households where the income was in the upper range. The use of individual personal protective measures among various SES classes were found to be statistically significant as depicted in Table 6.

Majority (96%) of the study population believed prevention of water stagnation reduces mosquito load, about 86.7% believed cutting shrubs, vegetations around the house reduced the mosquito load .(practiced in 92.6% of pucca, 89.2%of semi-pucca, and 71% of kuccha houses). Only 82% kept their water storage tanks covered. 100% of pucca and semi-pucca, and 87.1% of kuccha houses regularly cleaned their trash and garbage.

Practices score was done out of a total of 11. On the whole, 17.4% had a score<=7, and 82.7% had a score >7. The lower SE status had the least rates of practices (50%). Lower middle and upper middle SE middle statuses had higher rates.

**ATTITUDES**

78% thought dengue was a serious illness, of which majority belonged to lower middle (90.4%) and upper lower (84%) SE status. 78.6%of the lower SE status said dengue was not a serious illness (p=0.000)

Only 48.7% thought they were at risk of infection, of which majority belonged to lower middle (51.9%) and upper lower (57.3%) SE status (p=0.002). 92.9% of the lower SE status said they were not at risk of infection

Majority (92%) believed it is a preventable disease. All (100%) of those belonging to upper middle socioeconomic status said that dengue was preventable, and 92% of lower socioeconomic status said it was a preventable disease.

Most of them (97.3%) were aware that it is a transmissible disease. All (100%) of those of upper middle socioeconomic status said it dengue was transmissible and 85.7% said the disease was dangerous.

**Table 6: Socio-economic Status and Use of Protective Measures among study population (n=150)**

| SES class | Usage | Lower | Lower Middle | Middle | Upper middle | Total (%) | P-value* |
|---|---|---|---|---|---|---|---|
| Mosquito mats/coils | Yes | 3 | 42 | 24 | 6 | 75 (50.0) | 0.15 |
| | No | 8 | 36 | 29 | 2 | 75 (50.0) | |
| Mosquito spray/insecticides | Yes | 6 | 70 | 47 | 7 | 131 (87.3) | 0.01 |
| | No | 5 | 8 | 6 | 1 | 19 (12.7) | |
| Mosquito net/Screens | Yes | 4 | 68 | 44 | 7 | 124 (82.7) | 0.001 |
| | No | 7 | 10 | 9 | 1 | 26 (17.3) | |
| Mosquito repellent creams | Yes | 2 | 52 | 35 | 7 | 97 (64.7) | 0.001 |
| | No | 9 | 26 | 18 | 1 | 53 (35.3) | |

*P-value < 0.05 was considered to be statistically significant.

**TOTAL SCORE**

The scores of knowledge, attitudes and practices were summed up and calculated out of a total score of 31 and assessed.

**Table 7: Combined Knowledge, Attitude and Practice Score according to Socio-economic Status**

| Total score | SE Status | Upper Middle (%) | Middle (%) | Lower Middle (%) | Lower (%) | P-value* |
|---|---|---|---|---|---|---|
| <=16 | | 3.8 | 11.1 | 9.3 | 78.5 | <0.001 |
| >16 | | 96.2 | 88.9 | 90.7 | 21.5 | |

*P-value < 0.05 was considered to be statistically significant.

On the whole, 12.7% of the candidates had a score <=16. Around 78% of the lower socioeconomic status had a score <=16, whereas only 3.8% of the candidates had a score<=16. Hence, we can conclude that the higher socioeconomic statuses have higher awareness about dengue.

**DISCUSSION**

Various studies have been conducted across the state to assess knowledge, attitudes and practices regarding dengue. A survey carried out in Chennai city[13] showed that only 34.5% of the households were aware of dengue fever and only 3.3% of them responded that virus was the causative agent. In contrast to this in the present study it was observed that about 84% were aware about Dengue. Only 8.3% said clean-water holding containers contributed to vector breeding and nearly 65% did not follow any measures to control mosquito breeding. Similar findings were observed in the present study where about half (50.1%) of household surveyed had water stagnation.

A study conducted in Puducherry[14] showed inadequate knowledge regarding the symptoms and mode of transmission of dengue fever. 86% had heard of dengue fever, only 25% was aware that clean water was a breeding habitat

Another study in kannamangala village, Bangalore[15] showed that 28.9% knew clean-water holding containers contributed to vector breeding and 62.2% had sufficient knowledge regarding prevention of dengue fever.

**CONCLUSION:**

Lower levels of Awareness and negative attitude, and moderate use of personal protective measures among people belonging to low soico-economic group's calls for intensified community education efforts in the study area.

**REFERENCES:**


1. Ananthanarayanan R and Paniker CKJ. Text book of microbiology 7th edition, Orient Longman 2008. Pg 530.
2. Parks textbook of social and preventive medicine 23rd Edition. M/S Banarasidas Bhanot Publishers, Jabalpur 2015 p. 247
3. Dengue and severe dengue ,fact sheet 117 http://www.who.int/mediacentre/factsheets/fs 117/en/Updated April 2017.
4. Bhatt S, Gething P.W, Brady OJ, Messina JP, Farlow AW, Moyes CL et.al. The global distribution and burden of dengue. Nature 2013;496(7446):504-7
5. Comprehensive guidelines for prevention and control of dengue and dengue haemorrhagic fever. Revised and expanded edition. (SEARO Technical Publication Series No. 60)page no. 5-7
6. WHO, Variable Endemicity For Df/Dhf In Countries Of SEARegion Dengue. Available @ http://www.searo.who.int/entity/vector_borne_tropical_diseases/data/data_factsheet/en/index1.html – accessed on 24.09.2017

7. Gupta N, Srivastava S, Chaturvedi UC. Dengue in India- Indian J Med Res. 2012 Sep; 136(3): 373–390.
8. Mutheneni SR, Morse AP, Upadhyayula SM. Dengue burden in India: recent trends and importance of climatic parameters. Emerg Microbes Infect. 2017 Aug; 6(8) volume 6, p70
9. Mistry M, Chudasama RK, Mehta G. Epidemiological characteristics of dengue disease in Saurashtra region, India, during year 2015. J Family Med Prim Care. 2017 Apr.-Jun; 6(2): 249–253
10. National Vector Borne Diseases Control Programme (NVBDCP), NR. Annual report 2014-15. Page 16,17
11. Dengue vaccine research. Geneva: World Health Organization; 2012. Available from http://www.who.int/immunization/research/development/dengue_vaccines/en/ accessed on 5 December 2017
12. Shuaib F, Todd D, Jolly PE. Knowledge, attitudes and practices regarding dengue infection in Westmoreland, Jamaica. West Indian Med J. available in PMC 2010 Dec 2.West Indian Med J. 2010; 59(2): 139–146.
13. Ashok Kumar et.al. Studies On Community Knowledge And Behaviour Following A Dengue Epidemic In Chennai City. Tropical Biomedicine 2010. 27(2): 330–336
14. Sabesan JE,.Subramanian.S, Valantine B et al. Knowledge Awareness And Preventive Practices Regarding Dengue Fever In Puducherry-South India,Vector control research centre, ICMR. Int J Community Med Public Health. 2017; Mar 4(3):623-627
15. Pradeep C., Achuth K. S., Manjula S. Awareness and practice towards dengue fever in Kannamangala village, Bangalore, Karnataka, India. Int J Community Med Public Health. 2016; Jul;3(7):1847-1850.


**Conflict of Interest: None**
**Source of funding support:** Nil


**NJRCM: www.commedjournal.in**

**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

# ORIGINAL RESEARCH ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 15-18**

## FOOD HANDLING IN PLASTIC CONTAINERS: KNOWLEDGE ATTITUDE AND PRACTICES AMONG DOCTORS

**Sriram RM.[1] Sowmiya KR[2*]., Gopi Krishna S.[3], Balaji Arumugam.[4]**

**Affiliation:** 1 Assistant Professor, 3 II MBBS student, 4 Professor and Head, Department of Community Medicine, Tagore Medical College & Hospital. 2 Professor, Department of Community Medicine, Chettinad Hospital & Research Institute, Chennai.

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 30-04-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 01-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr. Sowmiya KR, Professor, Department of Community Medicine, Chettinad Hospital & Research Institute, Chettinad Health City, Kelambakkam, Kanchipuram Dist.– 603103. E-mail: krs3012@gmail.com

**ABSTRACT**

**Introduction:** Plastic is everywhere in today's lifestyle because it is cheaper, lighter, stronger, more durable and versatile. Day by day demand for plastics expected to increase to meet the increasing need of public. Plastics are indispensible materials in modern world and are boon to public health. In our routine life, plastic containers are widely used for storing food and drinks. These containers were made of chemicals like Bisphenol (BPA), phthalate and styrene which acts as endocrine disrupting compounds (EDC) affecting health. Real concern is how these non degradable plastics were handled and disposed. **Methodology:** Descriptive Cross-sectional study was done among 200 doctors (selected by simple random sampling method.) of a private medical college. A validated structured close-ended questionnaire was used to collect data on their general demographic details, knowledge, attitude and practice of food handling in plastic containers. Data was entered in Microsoft Excel and analyzed by IBM SPSS 19.0. Results were given in percentages and categorical variables were analyzed by Chi Square Test. $P<0.05$ was taken as significant. **Results:** 200 doctors had participated in the study and the mean age of participants was 33.3 ± 9.1 year. 139 (69.5%) and 136 (68%) of the study participants were having good knowledge and good practice about food handling in plastic containers respectively. 99% of the participants willing to use ecofriendly substitutes for plastics. Statistical significant association ($p<0.05$) between variables like gender (males) and marital status (unmarried) with knowledge was found. Also significant association between gender (male) and good practice was established. **Conclusion:** Many ill health effects reported to occur due to plastics. It is practically impossible to avoid plastics completely, but it is possible to health educate people and improve quality of life either by selecting good quality plastic or any other alternative ecofriendly containers, thus reducing development of health risks.

**Key-words:** food handling, plastic containers, health, doctors

## INTRODUCTION:

Plastic is everywhere in today's lifestyle due to advances in material science and engineering. Plastics are cheaper, lighter, stronger, more durable and versatile. It has become a useful material with wide range of application like packing, protecting, serving and disposing all kinds of consumer goods. Day by day demand for plastics expected to increase to meet the increasing need of public.[1] The word "plastic" comes from the Greek word "plastikos" meaning "to form". Plastics have taken the places of other materials like glass, wood and metals. Plastics includes elements such as carbon, hydrogen, oxygen, nitrogen, chlorine, and sulphur in various composition.[2]

5.6 million Metric tons of plastic waste generated by India. On an average, one kilogram of plastics was used by Indian in a year.[2] Plastics are indispensible materials in modern world and many products manufactured from plastics are a boon to public and health sector (disposable syringes, intravenous bags, catheters, etc).[3] The real concern is how these non degradable plastics were disposed and how they will affect the environment.[4]

In our routine daily life, plastic containers are widely used for storing food and drink. Some chemicals like bisphenol A (BPA), phthalate and styrene from plastics may accumulate in human body and impair organ functions. These chemicals, used in plastics to provide better physical qualities, may also act as endocrine-disrupting compounds (EDCs) that could lead to adverse effects on health.[5] Phthalate is another chemical found in polyvinyl chloride plastics such as plastic wrap. Studies revealed that phthalate was found to interfere with hormone production and has been called a "hormone disruptor," that may also be a liver carcinogen.[5]

Food consumption is the major route of human exposure to endocrine-disrupting chemicals, and since we live in a generation where plastics are being used extensively to store food and water, makes it is a huge public concern. When food is stored in plastic containers certain chemicals from it are slowly released into the food over course of time. In daily life, we use plastic products

such as water bottles, baby bottles, plates, cups, containers to store foodstuffs, which leave us susceptible to its health risks.[6,7,8]

Consumption of commercially bottled mineral water in PET bottles or TETRA PACKS may contribute to the overall exposure of humans with endocrine disruptors. This is evident from a study using bottled mineral water which indicated the presence of broad contamination of mineral water with xenoestrogens.[7]

Several animal studies have shown that BPA and phthalates increase the risk of developing prostate cancer, breast cancers, insulin resistance, atypical sperm characteristics, and testicular cancer. [9-14] Epidemiological studies have found associations between blood levels of BPA in women and impaired health including obesity, endometrial hyperplasia, recurrent miscarriages, sterility, and polycystic ovarian syndrome.[7] At higher level concentrations these chemicals, alterations occurs in immune function, behavioral effects such as hyperactivity and increased aggressiveness were also observed.[15] Even though there are so many ill health effects reported to occur due to plastics, avoidance of plastic containers for food and drinks may be unfeasible. The recommendation is to select either plastic of good quality or any other alternative ecofriendly containers.

After extensive literature search, we were able to find few research articles related to knowledge and practice of food handling in plastic containers. However, larger population is unaware of effects caused due to food handling in plastics over a longer period of time. Doctors play a major pivotal role in providing health care to the public. Due to paucity of data from India on knowledge and practice of food handling in plastic containers, we planned to conduct this study among doctors, on whose hands the future health of the nation rests.

**OBJECTIVE:**

1. To find out the knowledge, attitude and practice of food handling in plastic containers among doctors.
2. To study the association of selected factors with knowledge and practice of food handling in plastic containers among doctors.

**METHODOLOGY:**

A cross sectional study was carried out for a period of one month in February 2018 among doctors working in a private medical college in Kanchipuram district. The complete list of all doctors working from the selected college was obtained from the college administrative section and from that list, 200 study participants were selected by simple random sampling through random number generator. Participants who were not present for two consecutive visits at the time of data collection were excluded from the study.

Study tool:

A self administered validated structured close ended questionnaire was used to collect information on their socio demographic details, knowledge attitude and practice of food handling in plastic containers. Socio demographic details like age, gender and marital status were elicited.

Nine questions related to knowledge about plastic containers such as make of plastics, biodegradability of plastics, recycling of plastics and long term health effects of using plastics. A positive response was ascertained with a score of '1' and negative response a score of '0'. Out of a total score of 9, the participant who scored 7 and above were considered as to have good knowledge about food handling in plastic containers. Questions like willingness to use ecofriendly substitutes in place of plastics and propagation against plastics usage were used to obtain attitude of participants towards food handling in plastic containers.

Frequency of usage of plastic bottles, plastic wrap for cooked foods, storage of food substances in plastic containers and bringing food to work place in plastic containers were used to ascertain practice of food handling in plastic containers. For these questions, responses like never, occasionally, sometimes and usually were assigned a score of 4, 3, 2 and 1 respectively. The study participants can score a maximum of 32 and minimum of 8. The participant who secured a score of 25 and above were considered as to have good practice (avoiding plastic) about food handling in plastic containers.

The questionnaire was pilot tested with 20 doctors out of the sample and needed modifications were done before administering the questionnaire to the study participants. After getting approval from the institutional ethics committee, the data collection was started.

Data collection:

Consent for participation in the study was obtained from the participants. Study subjects who are not willing to participate in the study were excluded. Questionnaire was filled by the participants after it had been completely explained by the investigator.

Statistical analysis:

Data was then entered in Microsoft Excel and analyzed using SPSS statistical package version 19.0. Descriptive statistics (mean and standard deviation) were arrived for socio demographic characteristics like age of the participants. Level of knowledge and practice on food handling in plastic containers was calculated and expressed in percentage. Chi square test was applied at 95% confidence interval to test association of selected factors with level of knowledge and practice on food handling in plastic containers. The p value $<0.05$ was considered as statistically significant.

**RESULTS:**

In the study, 200 doctors had participated and the mean age of the study population was found to be 33.3 ± 9.1 year. Majority of study participants 150 (75%) were less than 36 years of age as shown in Fig 1.

Among the study participants, 103 (51.5%) were males and 97 (48.5%) were females. 67 (65%) of male

doctors and 69 (71%) of female doctors were married as shown in Fig.2.

**Fig 1. Age distribution of study participants**

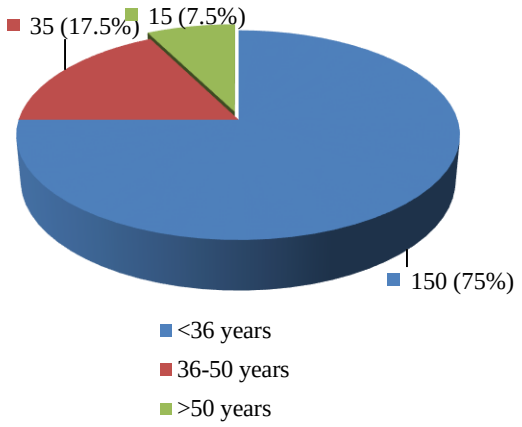



**Fig 2. Demographic details of study participants**

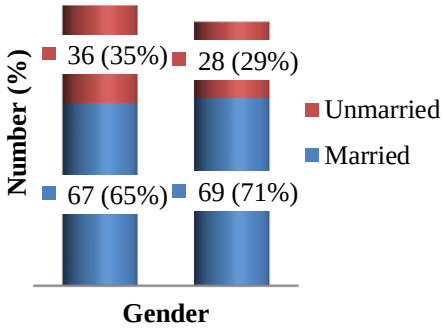



**Table 1: level of knowledge and practice of food handling in plastic containers among study participants**

| | Good Number (%) | Poor Number (%) | Total Number (%) |
|---|---|---|---|
| **Knowledge** | 139 (69.5%) | 61 (30.5%) | 200 (100%) |
| **Practice** | 136 (68%) | 64 (32%) | 200 (100%) |

Of the study participants, 139 (69.5%) were having good knowledge about food handling in plastic containers (food should not be handled in plastic containers). Regarding the attitude about plastic containers for food and drinks, 99% the participants were willing to use ecofriendly substitutes in the place of plastics. All the participants were willing to propagate information against usage of plastics to others. 98% of the participants wanted the government to enforce avoidance of plastics for the handling of food and drinks. 136 (68%) of the doctors were having good practice of not handling food in plastic containers as shown in table 1.

Table 2 shows that knowledge about food handling in plastic container is good among males and unmarried participants than their counterparts. And this difference is statistically significant ($p<0.05$). Male participants have better practice of avoiding food handling in plastic containers than females and this difference is statistically significant ($p<0.05$).

**Table 2: demographic variables and its association with knowledge and practice of food handling in plastic containers**

| Factors | | Knowledge | | | Practice | | |
|---|---|---|---|---|---|---|---|
| | | Good N (%) | Poor N (%) | P value | Good N (%) | Poor N (%) | P value |
| **Age Category** | < 36 Yrs | 105 (70%) | 45 (30%) | 0.836 | 101 (67.3%) | 49 (32.7%) | 0.240 |
| | 36 – 50 Yrs | 23 (65.7%) | 12 (34.3%) | | 22 (62.9%) | 13 (37.1%) | |
| | > 50 Yrs | 11 (73.3%) | 4 (26.7%) | | 13 (86.7%) | 2 (13.3%) | |
| **Gender** | Male | 78 (75.7%) | 25 (24.3%) | **0.043*** | 75 (77.3%) | 22 (22.7%) | **0.006*** |
| | Female | 61 (62.9%) | 36 (37.1%) | | 61 (59.2%) | 42 (40.8%) | |
| **Marital status** | Unmarried | 51 (79.7%) | 13 (20.3%) | **0.032*** | 41 (64.1%) | 23 (35.9%) | 0.413 |
| | Married | 88 (64.7%) | 48 (35.3%) | | 95 (69.9%) | 41 (30.1%) | |

## DISCUSSION:

The study was undertaken among doctors to find out the level of knowledge, attitude and practice of food handling in plastic containers. The knowledge regarding food should not be handled in plastic containers was good among 69.5% of the participants. Study done by Kasemsup R et al [5] among health personal in Thailand quoted only 8.5% having good knowledge and another study by Dehghan et al [16] done among medical university students in Iran reported good knowledge of 72.7%.

Kasemsup R et al [5] found that only 16% of the participants occasionally uses plastic container for food handling which was very less than this study were 68% having good practice. Almost all the study participants were willing to use ecofriendly substitutes in place of plastic containers and 98% wanted the government to enforce avoidance of plastics for the handling of food and drinks.

In this study knowledge and practice about food handling in plastic containers was good among male doctors than the female and this difference was statistically significant ($p< 0.05$). Knowledge was good among unmarried doctors than the married person and this is also statistically significant. Even though the knowledge was good among unmarried doctors, there is lack of practice of avoiding plastic food containers. Knowledge and practice regarding drink and food handling in plastic containers is less among individuals in the age group of 36 – 50 years and this is statistically insignificant.

It can be seen that attitude towards food handling in plastic containers is higher than knowledge, which reflects that study participants are willing to change and use other alternatives in the place of plastics. But they require more knowledge about plastic usage for food and drinks, such as types of plastic containers, symbols and their specification. Government should enforce strict measures to prevent food handling in plastic containers of poor quality. Also it should ensure proper safety disposal of these non biodegradable plastic wastes. Even though it is not practicable to completely avoid plastics, it is certainly possible to educate people on how to use and what kind of plastics to use, to store food and water and by doing so it is possible to improve their practices thereby reducing the possibility of developing the health risks.

## CONCLUSION:

Plastics are being used widely, are a boon to public and health sector (disposable syringes, intravenous bags, catheters, etc). They have almost become indispensible in our daily life especially to store food and water. In daily life, we use plastic products such as water bottles, baby bottles, plates, cups, containers to store foodstuffs, all of which are made of different kinds of plastics. Though the knowledge and practice of food handling in plastic container is reasonably higher among the doctors, which may not be sufficient enough to bring behavioral changes in general public because doctors who are ultimately the health care providers. Even though it is not practically possible to avoid plastics completely, but certainly it is possible to health educate people and improve quality of life by reducing development of health risks.

## REFERENCES:


1. Callan SJ, Thomas JM. Environmental Economics and Management. Environmental Health Journal. 2006; 4(2):59.
2. Elias HG. An Introduction to Plastics, 4th ed. Wiley & Weinheim Publishers; 2003. p121.
3. Andrady AL, Neal MA. Applications and societal benefits of plastics. Philos Trans R Soc Lond B Biol Sci. 2009 Jul 27; 364(1526):1977–84.
4. Krishna S. Knowledge, attitude and practices of students regarding plastic waste management among students. The Internet Journal of Public Health. 2000; 15(1): 51-63.
5. Kasemsup R, Neesanan N. Knowledge, attitudes and practices relating to plastic containers for food and drinks. J Med Assoc Thai 2011; 94 (Suppl. 3): S121-5.
6. Wagner M, Oehlmann J, Endocrine disruptors in bottled mineral water: total estrogenic burden and migration from plastic bottles. Environ Sci Pollut Res Int. 2009 May;16(3):278-86.
7. Halden RU, Plastics and Health Risks; Annu. Rev. Public Health. 2010;31:179–94.
8. Le HH, Carlson EM, Chua JP, Belcher SM. Bisphenol A is released from polycarbonate drinking bottles and mimics the neurotoxic actions of estrogen in developing cerebellar neurons. Toxicol lett. 2008 Jan 30; 176(2): 149–156.
9. Prins GS; Endocrine disruptors and prostate cancer risk, Endocr Relat Cancer. 2008 Sep; 15(3):649–656.
10. Meeker JD, Sheela S. and Swan SH. Phthalates and other additives in plastics: Human exposure and associated health outcomes; Philos Trans R Soc Lond B Biol Sci. 2009 Jul 27; 364(1526): 2097–2113.
11. Vom S F, Skakkebaek N, Joffe M, Sharpe R, Swan S, et al. 2001; Testicular dysgenesis syndrome: an increasingly common developmental disorder with environmental aspects—discussion;Apmis 109:S28–30.
12. Stahlhut RW, Edwin V W, Dye TD, Stephen C, Swan S. Concentrations of Urinary Phthalate Metabolites Are Associated with Increased Waist Circumference and Insulin Resistance in Adult U.S. Males. Environmental Health Perspectives. Volume 115, number 6, June 2007, pg 876-882.
13. Vom SFS, Cooke PS, Buchanan DL, Palanza P, Thayer KA, et al. A physiologically based approach to the study of bisphenol A and other estrogenic chemicals on the size of reproductive organs, daily sperm production, and behavior. Toxicol Ind Health. 1998. Jan-Apr. 14:239–60.
14. Vandenberg LN, Maffini MV, Sonnenschein C, Rubin BS, Soto AM. Bisphenol-A and the great divide: a review of controversies in the field of endocrine disruption; Endocrine Rev. 2009; 30(1):75–95.
15. Vom Saal FS, Hughes C. An extensive new literature concerning low-dose effects of bisphenol A shows the need for a new risk assessment. Environ Health Perspect. 2005; 113:926–933.
16. Dehghan P et al. Knowledge and attitude towards health and food safety among students of Tabriz University of Medical Sciences, Tabriz, Iran. J Anal Res Clin Med. 2017; 5(2): 62-68.


**Conflict of Interest: None**
**Source of funding support:** Nil


**NJRCM: www.commedjournal.in**

**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

# ORIGINAL RESEARCH ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 19-22**

## PREVALENCE OF RESPIRATORY SYMPTOMS AND ITS ASSOCIATION WITH INDOOR ENVIRONMENT IN THE FIELD PRACTICE AREA OF SRM URBAN HEALTH CENTRE MARAIMALAI NAGAR

**Bincy Roy [1*], M.V.M Pradeep[2], Balaji Ramraj[3], PapaSaleema[4]**

**Affiliation:** 1. Health Educator 2.Post-Graduate 3.Associate Professor 4. Medical Officer, Department of Community Medicine, SRM Medical College Hospital and Research Centre.

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 20-05-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 02-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr. Bincy,No 75,G1, Sowbagya nagar, Vishnu Priya Avenue, Guduvanchery, Chennai-603202 .E-mail: bincylilly@gmail.com

**ABSTRACT**

**INTRODUCTION**: Housing characteristics that may contribute to indoor air pollutants include type of fuel for cooking and heating and occupants' activities such as tobacco smoke. Indoor air pollution increases the risk of chronic obstructive pulmonary disease and acute respiratory infections. **AIM**: To estimate the prevalence of respiratory symptoms and its association with indoor environment. **METHODOLOGY:** A Cross-Sectional study using purposive sampling technique, 72 household members were interviewed during house to house visit by modified standard questionnaire. Data was analyzed using SPSS 17. **RESULTS:** Male were 42% and female 58%. Prevalence of respiratory symptoms of sneezing and rhinorrhoea 85%, wheeze 32%, shortness of breath 32%, short of breath after strenuous work 50%,cough in the morning and cough with sputum38%, cough with sputum forat least 3 consecutive months7%, 32% suffered from asthma, 23% were treated for COPD. Overcrowding 44%, 75% kitchens have no vent emission, 32% have no cross ventilation and 56% cook daily. We found significant association between sneezing and rhinorrhoea with family history, overcrowding, cross ventilation, black soot, perception of dust(p-0.04,0.01,0.01,0.03, 0.01). There was significant association between chronic respiratory symptoms with smoking(p-0.02),cooking (p-0.002), overcrowding(p-0.03), exposure to dust(p-0.001) ,mosquito coil use (p-0.009), exposure to ETS(p- 0.04) **CONCLUSION:** It is concluded that indoor environment exposures associated with respiratory symptoms. It is suggested that for reducing this effect people should avoid overcrowding and use vent emissions , cross ventilation, stop mosquito coil use and utilise air cleaners that can improve the air quality efficiently. Health education for behavioural change is needed.

**Key words:** Indoor Environment, Respiratory Symptoms, ETS- Environment Tobacco Smoking.

**INTRODUCTION**:

The World Health Organization (WHO) has revealed that indoor air quality as the eight most important risk factor and responsible for 2.7% of the global burden of disease [1]. People spend 80% of their day in the indoor environment. Indoor environment is a major threat to health particularly for women, children and those who may spend many hours close to fire. Cooking oil fumes can be a source of indoor air pollution in the kitchen, which is associated with negative impacts on respiratory, cardiovascular, and cardiopulmonary health [(2)].During cooking, women were likely to experience more respiratory symptoms and for every extra hour spent in the kitchen, the likelihood of having hay fever increased almost twice. More people in the kitchen also contributed to the increased prevalence of runny nose, hay fever, and eczema[(3)].Housing characteristics that may contribute to indoor air pollutants include type of fuel for cooking and heating, and occupants' activities such as tobacco smoke [(3)]. Indoor air pollution increases the risk of chronic obstructive pulmonary disease and of acute respiratory infections [(4)]. Exposure to mosquito coil smoke for at least three nights a week was independently associated with asthma and persistent wheeze. Passive smoking, defined as sharing a bedroom with an adult smoker, was independently associated with a chest illness[(5)(12)]. Pesticides applied outside or within the house that are absorbed and preserved by house dust which has exposure to everyday activities of children and infants [(6)]. Incense burning also produces volatile organic compounds, such as benzene, toluene, and xylenes, as well as aldehydes and polycyclic aromatic hydrocarbons (PAHs), incense smoke pollutants are inhaled, they cause respiratory system dysfunction[(9)]. Respiratory disease with huge burden is a preventable and treatable one, risk factors are modifiable and stopping exposure to these factors can reduce the burden of respiratory health.Up-to-date estimates of the prevalence of respiratory problems is needed, in order to describe their magnitudeand for the planning of services and health education. Hence the present study was performed to estimate the prevalence of

respiratory symptoms and its association with indoor environmentin the population covered by SRM Urban primary health centre (PHC).

**OBJECTIVES:**

1. To estimate the prevalence of respiratory symptoms.

2. To determine the association of respiratory symptoms with indoor environmental factors.

**MATERIALS & METHODS**

A community based cross sectional study was conducted in the field practice area of Department of Community Medicine i.e. Urban health training centre, Maraimalainagar of SRM Medical College Hospital and Research Institute, Kattankulathur, Kancheepuram district between February and March 2018. Based on 5% prevalence of respiratory symptoms[4] and 5% precision, sample size was calculated as 72. 72 household members above 18 years residing under Maraimalai nagar municipality during the time period of study were selected by purposive sampling and they were interviewed during house to house visit. A pretested semi structured questionnaire comprising questions regarding demography, respiratory symptoms, and indoor environment assessment factors. Subjects were interviewed after obtaining consent. Data entry and analysis was done using Statistical Package for Social Sciences (SPSS) version 17.0. Frequency distribution and Chi square analysis were used and p <0.05 was considered statistically significant.

**RESULTS:**

Of the 72 participants who participated in the study 42 (58%) were female and 30 (42%) were male.

**Table: 1 Distribution of study population based on Age and Gender (N=72)**

| AGE | MALE | FEMALE |
|---|---|---|
| 18-38 YEARS | 8 (11%) | 16 (22%) |
| 39-59 YEARS | 18 (25%) | 23 (32%) |
| ABOVE 60 YEARS | 4 (6%) | 3 (4%) |
| TOTAL | 30(42%) | 42(58%) |

Majority of the study subjects were in the middle age group 39-59yrs. Mean age of the study participants was 41.2± 0.93 years. Majority of the study subjects 30 (41%) were housewives and12 (17%) were working women and rest of the study subjects belonged to other variety of employment categories.

Among the study subjects prevalence of respiratory symptoms sneezing and rhinorrhoea 61(85%), wheeze 23(32%), shortness of breath 23(32%), short of breath after strenuous work 36(50%), cough in the morning and cough with sputum 27(38%), cough with sputum at least 3 consecutive months 5(7%), suffered from asthma 23(32%),treated for COPD 16(23%). (Table 2)

**Table: 2 Prevalence of Respiratory Symptoms Among Males And Females**

| RESPIRATORY SYMPTOMS | MALE (N=30) | FEMALE (N=42) | TOTAL (N=72) |
|---|---|---|---|
| Sneezing and running nose | 20(66%) | 41(97%) | 61(85%) |
| Cough | 12(40%) | 15(35%) | 27(38%) |
| Cough with sputum | 15(50%) | 12(26%) | 27(38%) |
| Whistling sound | 10(33%) | 13(31%) | 23(32%) |
| shortness of breath | 9(30%) | 14(33%) | 23(32%) |
| Shortness of breath after strenuous work | 10(33%) | 26(62%) | 36(50%) |

**Table: 3 Distribution of Indoor Environment Risk Factors among study population (N=72)**

| RISK FACTORS | N(%) |
|---|---|
| OVERCROWDING | 32(44%) |
| NO CROSS VENTILATION | 23(32%) |
| BLACK SOOT PRESENT | 7(10%) |
| COOKING DAILY | 40(56%) |
| NO VENT EMISSION | 54(75%) |

Overcrowding was found in44%, 75% kitchen had no vent emission, 32% had no cross ventilation, 56% cook daily. We found significant association between sneezing and rhinorrhoea with family history, overcrowding, cross ventilation, black soot, perception on dust (p-0.04,0.01,0.01,0.03, 0.01). There was significant association between respiratory symptoms with smoking(p-0.02),cooking daily (p-0.002), overcrowding(p-0.03), exposure to dust(p-0.001),mosquito coil(p-0.009), exposure to ETS(0.04)(Table 3,4)

**DISCUSSION:**

The present study was aimed at finding prevalence of respiratory symptoms in the community. We found prevalence of respiratory symptoms sneezing & rhinorrhoea 85%, wheeze 32%, shortness of breath 32%, short of breath after strenuous work 50%,cough in the morning & cough with sputum 38%, cough with sputum at least 3 consecutive months 7%. We found our findings are quite higher than the study done in Urban Area of Delhi, which showed overall prevalence of chronic cough, chronic phlegm and dyspnoea was 2.0%, 1.2% and3.4%, respectively. Indoor environment factors were distinctly lacking in their study population that may explain the lower prevalence of respiratory symptoms.[4]

Our study shows poor housing conditions such as Overcrowding, kitchen without proper vent emission and no proper cross ventilation can significantly contribute to common respiratory symptoms which we find similar to a community-based study in the rural area of Kashmir that reported a considerably higher prevalence, a attributing factors being domestic air pollution, lower socioeconomic status, poor housing facilities and overcrowding.[6]

**Table: 4 Association between Respiratory Symptoms and Indoor Environment Risk Factors.**

| RESPIRATORY SYMPTOMS | RISK FACTORS | N (%) | df | CHI - SQUARE | P-VALUE |
|---|---|---|---|---|---|
| SNEEZING AND RHINORRHOEA | OVERCROWDING | 30 (42%) | 1 | 6.109 | 0.01 |
| | NO CROSS VENTILATION | 32(44%) | 1 | 5.669 | 0.01 |
| | PERCEPTION OF DUST | 49 (68%) | 1 | 6.045 | 0.01 |
| | BLACK SOOT PRESENT | 26(36%) | 1 | 4.471 | 0.03 |
| | EVER SMOKING | 7(10%) | 1 | 5.929 | 0.01 |
| WHEEZE | COOKING DAILY WITHOUT VENT EMISSION | 16 (14%) | 1 | 14.786 | 0.001 |
| | PERCEPTION ON DUST | 14(19%) | 1 | 6.154 | 0.01 |
| | OVERCROWDING | 8(11%) | 1 | 3.921 | 0.04 |
| COUGH | MOSQUITO COIL | 22(31%) | 1 | 6.767 | 0.009 |
| COUGH WITH SPUTUM | OVERCROWDING | 7(10%) | 1 | 5.17 | 0.02 |
| | MOSQUITO COIL | 22(31%) | 1 | 8.503 | 0.04 |
| | EXPOSURE TO ENVIRONMENTAL TOBACCO SMOKE | 9(13%) | 1 | 4.093 | 0.04 |
| SHORTNESS OF BREATH | EVER SMOKED | 6(8%) | 1 | 6.429 | 0.01 |

Majority of the study subject were female who cook daily without proper vent emission which shows significant contribution in developing respiratory health problems. It correlates with the study on indoor air pollution and its association with poor lung function, micro albuminuria and variations in blood pressure among kitchen workers in India, Cooking oil fumes can be a source of indoor air pollution in the kitchen. Kitchen workers in South India showed lower lung capacities and a greater risk of obstructive and restrictive abnormalities than their North Indian counterparts [(2)]

Population of our study belongs to middle and upper middle socioeconomic class, most of them were migrated population living in rental house with poor housing characteristics due to economic constraints. This is somehow similar to the observed prevalence of populations belonging to upper socioeconomic class as per Radha et al.[(11)]

When we compared our data, the study findings agree with the result reported that there is significant health impact of housing and socioeconomic characteristics on the burden of respiratory illness among women of Tirupur, South India[(3)]

Burning mosquito coils reveals that there is a strong liaison in people affected by cough and cough with sputum, but it fairly coincides with the risk of developing bronchial asthma and persistence wheeze[(5)]

Our study results did not substantiate with the findings mentioned in the earlier studies that Incense burning emits smoke containing particulate matter, gas products and other organic compounds and causes air pollution, airway dysfunction and health problems.[(8)]

In this study we tried to list out the indoor environment risk factors which directly or indirectly relate to respiratory symptoms and prevalence of respiratory symptoms and we found there is a significant relationship between indoor environment and common respiratory symptoms. The present study will serve as a pilot study for future research on this problem though more validation studies are required with larger sample.

Limitation of the study was that the information collected was based on self-reporting. Examination and diagnosis were not done.

**CONCLUSION AND RECOMMENDATION:**

From the present study our findings had concluded that indoor environment is associated with respiratory symptoms. It is suggested that to reduce this effect people can use mosquito nets instead of using mosquito coils, use vent emissions in the kitchen, to maintain proper cross ventilation one should keep the opposite windows or doors open to give natural breeze pathway, avoid overcrowding and utilize air cleaners that can improve the air quality efficiently. Health education for behavioural change is needed for reducing indoor environment tobacco smoke.

**References:**

1. WHO. Air Quality Guidelines for Particulate Matter, Ozone, Nitrogen Dioxide and Sulfur Dioxide; World Health Organization: Geneva, Switzerland, 2005.

2. Singh A ,Chandrasekharan Nair K, Kamal R, Bihari V , Ansari A, Abdul azee P,et al.Indoor air

pollution and its association with poor lung function, microalbuminuria and variations in blood pressure among kitchen workers in India a cross-sectional study. Environmental Health 2017 16:33.

3. Rumchev K, Zhao Y, Spickett J. Health Risk Assessment of Indoor Air Quality, Socioeconomic and House Characteristics on Respiratory Health among Women and Children of Tirupur, South India. Int J Environ. Res. Public Health 2017, Apr;14(4): 429

4. Chhabra P, Sharma G, Kannan AT. Prevalence of Respiratory Disease and Associated Factors in an Urban Area of Delhi. Indian Journal of Community Medicine 2008 Oct;33(4):229-32.

5. Spengler JD, Jaakkola JJ, Parise H, Katsnelson BA, Privalova LI, Kosheleva AA. Housing characteristics and children's respiratory health in the Russian Federation. Am J Public Health 2004 Apr;94(4):657-62.

6. Butte W, Heinzow B. Pollutants in house dust as indicators of indoor contamination. Rev Environ Contam Toxicol 2002;175:1-46.

7. Kankaria A, Nongkynrih B, Gupta.Indoor S K. Air Pollution in India: Implications on Health and its Control. Indian Journal of Community Medicine 2014 oct;39(4):203-7.

8. Ta-Chang Lin, GuhaKrishnaswamy, David S Chi.Incense smoke: clinical, structural and molecular effects on airway disease.J Clinical Molecular Allergy 2008Apr 25;6(1)1.

9. Zhou R, An Q, Pan X W, Yang B, Hu J, Wang Y H. Higher cytotoxicity and genotoxicity of burning incense than cigarette .J Environmental chemistry letters 2015 dec;13(4):465-4.

10. Sunyer J. Urban air pollution and chronic obstructive pulmonary disease a review. European Respiratory Journal 2001; 17: 1024–1033.

11. Radha TG, Gupta CK, Singh A, Mathur N. Chronic bronchitis in an urban locality of New Delhi-an epidemiological survey. Indian J Med Res 1977;66:273-85.

12. Azizi BH, Henry RL. The effects of indoor environmental factors on respiratory illness in primary school children in Kuala Lumpur. International journal of epidemiology 1991 Mar;20(1):144-50.

**Conflict of Interest: None**
**Source of funding support:** Nil


**NJRCM: www.commedjournal.in**

**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

## ORIGINAL RESEARCH ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 23-26**

# Impact of health education on Knowledge, Attitude and Practice of Sanitary latrine among Rural population of Kanchipuram District.

Gopinath.K[1], Roseline F.William[2],Thirunaaukarasu D[3], Karthikeyan.E[4], Gladius Jennifer H[5]

Affiliation: 1. Post Graduate, 2. Professor& HOD, 3. Professor, 4. Assistant Professor, 5. Assistant Professor Biostatistics. Department of Community Medicine, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Madurantagam, Kancheepuram District, Tamilnadu

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 20-03-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 01-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr. Gopinath.K, Post Graduate ,Department of Community Medicine, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Madurantagam, Kancheepuram District, Tamilnadu.

**ABSTRACT**

**Introduction:** India has the highest number of people without access to toilets. 53% of households defecate in open, out of which 69.3% belongs to rural areas and 18.6% belongs to urban areas. Despite the ongoing Swachh Bharat Mission, India ranks low on the sanitation index. Improved sanitation could prevent around 842,000 deaths each year. Health education improves the level of knowledge and change in the attitude towards sanitation and helps to bring positive, healthy behavior. **Objectives:** 1.To assess the level of knowledge, attitude and practices (KAP) on sanitary latrine among rural people. 2.To assess the improvement in KAP after health education intervention. **Materials and Methods:** A Cross sectional study was conducted during October 2017 to December 2017 among people aged 18 years and above in the rural area of Pulipakkam, which is a rural field practice area of Karpaga Vinayaga Institute of Medical Sciences & Research Centre, Kanchipuram district, Tamilnadu. The households were selected by systematic random sampling method and interviewed using a structured questionnaire. After a baseline assessment of knowledge, attitude and practice (KAP), intervention activities were conducted. Post KAP was assessed after one month. Association of difference was found using McNemar's test and paired t test. **Results:** Among 261 study subjects, 143(54%) were females and 187(72%) literates. 112(43%) belonged to class III socio economic status according to modified BG Prasad classification. Awareness regarding protection from disease transmission by sanitary latrine usage improved from 44% to 87% after intervention ($p<0.01$). Attitude on need to wash hands with soap was 73% which increased to 92% post intervention ($p<0.01$). Practice on washing hands with soap after toilet was 26% and increased to 74% following intervention ($p<0.0001$). The mean scores for each domain also improved after the intervention, which is statistically significant ($p<0.01$). **Conclusion:** Health education intervention has led to significant and improvement in KAP with regard to sanitation.

**Key-words:** Sanitary latrine, KAP, footwear, hand washing, health education

## Introduction:

Globally, 2.3 billion people lack basic sanitation service.[1] 600 million people use limited sanitation service where improved facilities are shared with other households. Sixty percent of the global population has either no toilet at home or one that doesn't safely manage excreta.[2]

India has the highest number of people without access to toilets. Around 732 million people (355 million women and girls) have no access to a toilet. 53% of households defecate in open, out of which 69.3% belongs to rural areas and 18.6% belongs to urban areas. Despite the ongoing Swachh Bharat Mission, India ranks low on the sanitation index. Since the launch of Swachh mission, country's sanitation coverage has increased from 39% to 65%. However, open defecation has been reduced by just 40%[3].

Diarrhea is the leading cause of malnutrition, and is the second leading cause of death in children under five years. Diarrhea kills around 525,000 children under five every year around the world. India contributes the most number of child deaths due to diarrheal disease globally, where over 1 lakh children succumb to diarrhea every year. 90% of all deaths from diarrhea, mainly in children are due to lack of access to safe, clean drinking-water and basic sanitation facilities[4]. Worldwide 300,000 women and 400,000 babies die every year from infections often caused by lack of water, sanitation and poor hand washing practices. Access to sanitation reduces cases of diarrhea thereby malnutrition among children[5].

Worldwide, more than a billion people are infected with soil transmitted helminths (SHTs). Hookworm may enter the body by burrowing through the skin, mainly when bare footed individuals walk on infected soil. Repeated infection with SHTs leads to chronic diarrhea,

malnutrition, anemia, stunting of physical growth and slowing of mental development. Hand washing, soap use and using footwear has shown reduction in SHT infection[6].

Combined with safe water and good hygiene, improved sanitation could prevent around 842,000 deaths each year[7]. Health education improves the level of knowledge and change in the attitude of the people towards sanitation and helps the people to bring or to maintain a positive, healthy behavior. Since very few intervention studies were conducted on this aspect, this study was attempted.

**Materials and methods:**

A Cross sectional study was conducted during October 2017 to December 2017 among people aged 18 years and above in the rural area of Pulipakkam, which is a rural field practice area of Karpaga Vinayaga Institute of Medical Sciences & Research Centre, Kanchipuram district, Tamilnadu.

**Sample size & Sampling:**

In a study conducted by Veerapu et al., it was found that there was at least 10% increase in the knowledge or attitude or practice after the intervention. Taking this as prevalence & assumption of absolute precision 4, the sample size was calculated to be 225 using the formula $4pq/d^2$. Considering 10% non response, the sample size was calculated as 261 households. Study subjects were selected by systematic random sampling and K = N / n = 696/261 = 3; every 3rd household was included. One responsible person from the selected household aged 18 years and above was selected randomly and interviewed.

**Study tool:**

A structured questionnaire was developed, translated into local language Tamil, and back into English. The questionnaire included socio demographic characteristics of the study subjects, knowledge, attitude, and practice regarding sanitary latrines, hand washing, and usage of footwear. The knowledge and practices were assessed by "Yes or No" questions. "Yes" indicates the presence of knowledge/positive practice. The attitude was assessed with responses such as disagree and agree. "Agree" indicates positive attitude. The questionnaire included a checklist for the presence of soap and to see whether latrine is sanitary or not.

**Intervention:**

A baseline survey was conducted as pretest to assess initial level of KAP with the questionnaire and one individual from every house was interviewed separately. After the survey, intervention in the form of health education was given to family members regarding dynamics of disease transmission and explained about importance of sanitation and hygiene. After the health education doubts were clarified with every family member. Subsequent survey was conducted after an initial of one month (post test) with the same question for the same study subjects.

**Data Analysis:** The data obtained was entered in Microsoft Excel 2007 and analyzed using IBM SPSS version 16. Descriptive Statistics was calculated as mean, standard deviation and percentage. Association of difference was found using McNemar's Chi square test and paired t test.

**Ethical Issues:** Approval for the study was obtained from the Institutional Ethics Committee of Karpaga Vinayaga Institute of Medical Sciences and Research Centre.

**Results:**

Among the three hundred study subjects, 143(55%) were females. Majority of the subjects were literates 187(72%) and 16(64%) belonged to nuclear family. Socio economic status showed that 112(43%) belonged to class III and 80(30%) belonged to class II according to modified BG Prasad 2017 classification [Table 1].

**Table 1: Socio demographic profile of the study subjects (N=261)**

| Variables | N (%) |
|---|---|
| G+I41:I60ender | |
| Male | 118 (45%) |
| Female | 143 (55%) |
| Age in groups (years) | |
| 21 - 30 years | 26 (10%) |
| 31 – 40 years | 49 (18%) |
| 41- 50 years | 35 (14%) |
| 51 – 60 years | 84 (33%) |
| 61- 70 years | 67 (25%) |
| Literacy status | |
| Literate | 187 (72%) |
| Illiterate | 74 (28%) |
| Type of family | |
| Nuclear family | 167 (64%) |
| Joint family/ 3generation family | 94 (36%) |
| SES[ Modified B G Prasad Classification] | |
| Class-I | 5 (3%) |
| Class-II | 80 (30%) |
| Class-III | 112 (43%) |
| Class-IV | 61 (23%) |
| Class-v | 3 (1%) |

Table 2 shows that the knowledge scores among the study subjects increased after the intervention. The knowledge regarding sanitary latrine protection from transmission of many diseases increased from 44% to 88% after intervention. Awareness of Government schemes for construction of sanitary latrine was 86% before intervention which increased to 985 following intervention. The knowledge about Hand washing with

soap gives protection against many diseases was increased from 53% to 95%. There was statistically significant increase in the overall knowledge score (P < 0.01). The knowledge that footwear protects from transmission of some diseases was 35% increased from 92% after intervention in post test.

**Table 2: Knowledge about sanitary latrine, footwear, and hand washing with soap (N=261)**

| Knowledge statement (Yes/No) | Pre test | Post test | p value |
|---|---|---|---|
| Sanitary latrine protects from trans mission of many diseases | 114 (44%) | 229 (88%) | <0.01 |
| Name any one disease that can be prevented by sanitary latrine | 2 (0.5%) | 13 (5%) | <0.01 |
| Aware of government schemes for construction of sanitary latrine | 224 (86%) | 257 (98%) | <0.01 |
| Footwear protects from transmission of some diseases | 91 (35%) | 240 (92%) | 0.005 |
| Name any one disease that can be prevented by wearing footwear | 5 (2%) | 86 (33%) | 0.99 |
| Hand washing with soap gives protection against many diseases | 139 (53%) | 247 (95%) | <0.01 |
| Name any one disease that can be prevented by hand wash with soap | 2 (0.5%) | 39 (15%) | 0.17 |

**Table 3: Attitude toward sanitary latrine, footwear, and hand washing (N=216)**

| Attitude statement (Agree/ Disagree) | Pre test | Post test | P value |
|---|---|---|---|
| Construction of sanitary latrine is not expensive | 71 (27%) | 136 (52%) | <0.01 |
| There is a need for sanitary latrine | 134 (51%) | 237 (90%) | <0.01 |
| Opportunity for morning walk will not be missed, by sanitary latrine | 157 (60%) | 218 (84%) | <0.01 |
| You are in favor of constructing sanitary latrine | 151 (57%) | 240 (92%) | <0.01 |
| Buying Footwear is not expensive | 139 (54%) | 234 (89%) | <0.01 |
| There is a need to wear footwear | 206 (79%) | 253 (97%) | <0.01 |
| Buying a soap for hand washing is not expensive | 172 (65%) | 241 (93%) | <0.01 |
| There is a need to wash hands with soap (and water) | 193 (74%) | 240 (92%) | <0.01 |
| Hand washing is not a time waste process | 211 (81%) | 251 (96%) | <0.01 |

Table 3 shows that the positive attitude scores among the subjects increased after the intervention. There was statistically significant increase in the overall attitude scores (P < 0.01). The need for having sanitary latrine as felt by the respondents increased from 51% to 90% after intervention. Also, the perception of need to wear footwear increased from 79% to 90%. The attitude score of need to wash their hands with soap increased from 74%to 92%. There was statistically significant increase in the overall attitude scores (P< 0.01).

**Table 4: Practices of sanitary latrine, usage of footwear and hand washing (N=261)**

| Practice statement(Yes/No) | Pre test | Post test | P value |
|---|---|---|---|
| Latrine sanitary or not (check) | 223 (85%) | 228 (87%) | <0.01 |
| Latrine routinely used or not (ask) | 181 (70%) | 208 (80%) | <0.01 |
| Using foot wear or not (ask) | 212 (81%) | 240 (92%) | <0.01 |
| Presence of soap at hand washing site (check) | 149 (57%) | 199 (77%) | <0.01 |
| Wash hands with soap before food (ask) | 83 (32%) | 172 (66%) | <0.01 |
| Wash hands with soap after toilet (ask) | 98 (26%) | 192 (73%) | <0.01 |
| Wash hands with soap after work (ask) | 128 (50%) | 235 (90%) | <0.01 |
| Wash hands with soap before cooking food(n=143) | 65 (45%) | 101 (71%) | <0.01 |
| Wash hands with soap after cleaning child's bottom/feces (n=89) | 39 (43%) | 77 (86%) | 0.003 |

Table 4 reveals that the practice scores increased after intervention among the study subjects. There was statistically significant increase in the overall practice scores (P < 0.01). The practice of using sanitary latrine routinely increased from 70% to 80% after intervention. The practice of hand washing with soap before cooking (32% to 66%), after toilet (26% to 73%), after work (50% to 90%), cleaning child bottom is (43% to 86%) increased after intervention.

**Table 5: Mean value of KAP domains before and after the intervention**

| Domains | Pre test (Mean ± SD) | Post test (Mean ± SD) | t-value | P value |
|---|---|---|---|---|
| Knowledge | 2.2 ± 0.99 | 4.25±0.89 | 27.58 | <0.01 |
| Attitude | 5.5 ± 1.69 | 7.8±0.96 | 26.26 | <0.01 |
| Practice | 4.5±2.21 | 6.3±1.85 | 23.73 | <0.01 |

Table 5 shows that the overall mean score of Knowledge (2.2 to 4.25), Attitude (5.5 to 7.8) and Practice (4.5 to 6.3) has increased after intervention and was also statistically significant.

**Discussion:**

Sanitary latrine protects against typhoid, diarrhea, parasitic infections, etc. In this study, the knowledge that sanitary latrine protects from diseases has increased from

44% to 88% following intervention. Similar results were shown by study conducted by Veerapu et al. Hand washing with soap protects against many diseases like diarrhea, pneumonia, etc which could prevent deaths especially among children. In this study, the awareness on protective nature of hand washing increased from 53% to 95%. In a study conducted at Andhra Pradhesh, the awareness increased from 41% to 91%. In this study, 35% of participants were aware that footwear protects from transmission of some diseases which improved to 92% after intervention. Similarly it had improved from 21% to 74% in a study by Veerapu et al, at Andhra Pradesh.[8]

The attitude towards construction of sanitary latrine was not expensive has increased from 27% to 52% after intervention in the present study. In a study conducted in Thailand[9], two groups were compared. Out of them, 93.3% of the group committee having a sanitary latrine and 8.69% of the group committee not having sanitary latrine agreed that constructing sanitary latrine was not an economic problem for them.

In this study, 26% of participants washed their hands with soap after defecation which further increased to 73% after the intervention. Similarly a study conducted by Sandeep et al, at South Chandrapur, on hand washing after defecation showed that it had improved from baseline 65% to 98%[10]. Presence of sanitary latrine does not mean the usage. Routine use of sanitary latrine was 83% in a study conducted at Vellore. In the present study, the usage of sanitary latrine routinely was only 70% which however increased by 80% after intervention. Hand washing with soap after defecation was 69% in a study conducted in a rural area of Vellore, Tamil Nadu[11], whereas it was 26% in the present study which further increased to 73% after intervention.

**Conclusion:** Health education intervention has led to significant improvement in knowledge, attitude and practice of the participants regarding sanitary latrine, footwear use and hand washing. However the practice among the households is still inadequate, which calls for regular motivation and follow up to prevent the transmission of diseases due to inadequate hygiene and sanitation.

**Limitation:** Since we have included only one respondent from each household, we could not assess the knowledge, attitude and practice of other members in the family.

**Recommendations:** Increasing awareness regarding transmission of diseases and preventive measures will help in improve the appropriate sanitation practices. Effective political commitment and administrative support will be the key points of success of the Swachh Bharat Abhiyaan programme.

**References:**


1. WHO. Progress on Drinking Water, Sanitation and Hygiene-2017 Update and SDG Baselines.
2. WHO/UNICEF (2017) Progress on drinking water, sanitation and hygiene: 2017 update and SDG baselines.
3. India water portal- India ranks low on sanitation index. Available at http://www.indiawaterportal.org/articles/india-ranks-low-sanitation-index-report.(Accessed on 22/05/2018)
4. https://swachhindia.ndtv.com/world-health-day-2018-not-access-safe-sanitation-hygiene-killing-millions-india-18691/ (World Health Day 2018: How Not Having Access To Safe Sanitation And Hygiene Is Killing Millions In India)
5. WHO. Forgetting to wash your hands can cost lives. Available at , http://www.who.int/news-room/feature-stories/detail/forgetting-to-wash-your-hands-can-cost-lives.( Accessed on 22/05/2018)
6. Eric C. Strunz ,David G. Addiss, Meredith E. Stocks, Stephanie Ogden, Jürg Utzinger, Matthew C. Freeman," Water, Sanitation, Hygiene, and Soil-Transmitted Helminth Infection: A Systematic Review and Meta-Analysis." PLOS Medicine;11;3: 1-38.
7. WHO (2014), Preventing diarrhoea through better water, sanitation and hygiene: exposures and impacts in low- and middle-income countries: http://apps.who.int/iris/bitstream/10665/150112/1/9789241564823_eng.pdf
8. Veerapu N, Subramaniyan P, Praveenkumar BA, Arun G, "Promotion of sanitation and hygiene in a rural area of South India: A community-based study." J Family Med Prim Care 2016; 5 :587-92.
9. Doolyabhat M. Survey of Attitude and Knowledge about Latrine in Rural Thailand [Published graduate project on the internet]. Northridge: California State University; 1974. Available from: http://www.scholarworks.csun.edu/bitstream/handle/10211.2/4713/DoolyabhatManus1974. pdf?sequence=1.
10. Sandip Kumar R, Forhad AkhtarZ, Nasrin Banu L, "Hand Washing Practices in Two Communities of Two States of Eastern India: An Intervention Study". Indian Journal of Public Health 2010; 54; 3:126-130.
11. Kalyan Bandaa , Rajiv Sarkar.et al.. "Water handling, sanitation and defecation practices in rural southern India: a knowledge, attitudes and practices study". Royal Society of Tropical Medicine and Hygiene 2007; 101:1124—1130.


**Conflict of Interest: None**
**Source of funding support:** Nil


**NJRCM: www.commedjournal.in**

**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

# ORIGINAL RESEARCH ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 27-31**

## Knowledge, Attitude and Practice on Domestic Usage of Plastics in a Rural Area of Kancheepuram District

Kanagabala B[1], Roseline F.William[2], Thirunaaukarasu D[3], Gladius Jennifer H[4]

Affiliation: 1.Post Graduate, 2. Professor& HOD, 3.Professor, 4. Assistant Professor Biostatistics Department of Community Medicine, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Madurantagam, Kancheepuram District, Tamilnadu

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 25-05-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 01-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr. Kanagabala B, Post Graduate ,Department of Community Medicine, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Madurantagam, Kancheepuram District, Tamilnadu

**ABSTRACT**

**Introduction:** Plastics are part of everyday life and cover every aspect like construction, household items, food and packaging. Tamil Nadu leads South Indian states in plastic consumption and manufacturing. Only 9% of plastic waste produced is recycled. More than 79% of plastic waste is piled up in landfill or elsewhere in the environment. **Objectives:** 1.To assess knowledge, attitude and practice of using plastics in households of a rural area. **Materials and Methods:** A community-based, descriptive study was conducted during January to February 2018 among households of Melamaiyur village, Chengalpattu, Kancheepuram. Households were selected randomly and interviewed using a semi-structured questionnaire. Descriptive Statistics was calculated as mean, standard deviation, percentage and proportion. Association between attitude and demographic variables was analysed using Chi-Square test. **Results:** Among 206 participants, 156 (78.7%) were females. The mean age of participants was 43±15.25 years. 72(35%) belonged to upper middle class according to modified BG Prasad Classification. About 205(99.5%) were aware that plastics are hazardous to environment. Majority 182 (88.3%) strongly favored ban on plastic bag usage. Instead of regular plastics, 144(70%) households showed interest for biodegradable plastics. Most of them 161(78%) were using plastics to store food items and water. Three-fourth of households 153(74.3%) used their own bag for shopping. Burning 100(48.5%) and dumping in garbage truck 56(27%) were common methods of plastic disposal. **Conclusion:** Most households were aware of the hazards of plastic products and had satisfactory attitude towards reducing plastics. Majority favored ban on plastic products. However, all households used plastics for various purposes.

**Key-words:** Plastics, Knowledge, Attitude, Practice.

### Introduction:

Plastics are part of everyday life which covers every sphere like construction, electronics and electrical appliances, furniture, automobiles, household items, agriculture, packaging, medical appliances, etc[1]. Plastics are durable, light weight, strong and inexpensive. These properties make them a convenient material for the manufacture of everyday products. Plastics deliver many benefits. Plastics reduce the cost of building materials. They facilitate clean drinking water supplies, and enable medical devices ranging through surgical equipment, aseptic medical packaging, and blister packs for pills. Packaging also reduces food wastage[2].

The Per capita plastic products consumption in India has increased from 9.7kg (2014) to 11kg (2017)[1].The per capita consumption is likely to triple in a decade. It is estimated that by 2020, India will be the third largest consumer of plastics. Tamil Nadu leads the South Indian states in plastic consumption and manufacturing[3]. With increased manufacturing and consumption, the amount of plastic waste is generated throughout the world is enormous. Chennai city generates 429 tonnes of plastic waste daily and is second only to Delhi's 689 tonnes[4]. The most important question posed is how to manage these wastes effectively.

Plastics are petroleum based which are not biodegradable and remain in the environment for long time. They are difficult to reuse and recycle. Recycling usually results in the down cycling of plastics into lower-quality products that have higher levels of toxicity[5]. More than 79% of the plastic waste is piled up in the landfill or elsewhere in the environment[6]. Plastic wastes, thrown on the sides of road, open areas, riverbanks, in drainage canals, and common places resulted in ground water pollution, disturbance in soil microbial activity, death and health problems of cattle[7,8]. Only 9% of the plastic waste produced is recycled[6].With the limited recyclability of plastics, much of the plastic wastes are burnt in incinerators. In villages in India, plastic wastes are disposed by burning which leads to production of noxious substances, thereby causing respiratory problems, endocrine problems, cancer, etc[5]. Plastic litter in marine environment kills thousands of whales, birds and turtles as they mistake plastic bags as jellyfish[9]. By 2050, 99% of the seabirds

will have ingested plastics[10]. Studies focus on urban litter of plastics, plastics in marine environment.The real impact of plastic waste is felt on both marine environment and in rural areas[9]. Since there are very few studies which deal with the domestic usage of plastics in rural area, this study was attempted.

**Objective:**

To assess the knowledge, attitude and practice of plastic usage in households of a rural area

**Materials & Methods:**

A community-based, descriptive study was conducted during January 2018 to February 2018 (2 months) in Melamaiyur, a village in Chengalpattu, Kancheepuram district, field practice area of Karpaga Vinayaga Institute of Medical Sciences & Research Centre with around 750 houses.

**Inclusion criteria:** People residing for more than 6 months at Melamaiyur village who were available at home and willing to participate was included.

**Sample Size and Sampling:** In a study conducted by Joseph et al[11],86.4% were aware of the hazards of plastic use. Taking this as prevalence and considering 5% of absolute precision, the sample size was calculated to be 188. Adding 10% of non response, the sample size was calculated as 206 houses.The sampling technique was Systematic Random Sampling.k=N/n =750/200 =4$^{th}$ house. Every 4$^{th}$ house was taken for the study.

**Study Tool:** A Pretested and semi-structured questionnaire containing the details of socio demographic data, knowledge, attitude and practice of plastics used at home was used.

**Data Collection:** Prior permission was obtained from the concerned authorities of the village. One responsible adult from each randomly selected household of Melamaiyur village was chosen for the study. Informed consent of the households was taken. The households were interviewed personally using a semi-structured questionnaire.

**Data Analysis:** The data obtained was entered in Microsoft Excel 2007 and analyzed using IBM SPSS version 16. Descriptive Statistics was calculated as mean, standard deviation, percentage & proportion. Association between attitude and demographic variables was calculated using Chi Square test at 5% level of significance.

**Ethical issues:** Ethical clearance was obtained from Institutional Ethics Committee of Karpaga Vinayaga Institute of Medical Sciences and Research Centre.

**Results:**

This study was conducted with 206 households. The age range was 18-75 years. Mean age was 43.1 ± 15.26 years. Among them 156(75.7%) were females and 132(64.1%) were married. Around175(85%) were graduates 62(30.1%). Economic status showed that 72(35%) belonged to upper middle class (according to modified BG Prasad Classification). (Table.1)

Table 2 shows the knowledge of plastic products among respondents. More than 95% were aware that plastics are hazardous to human health, animals and environment. For the alternatives to plastic bags, 197(95.6%) were aware that cloth bags are the alternatives. About 130(63.1%) and 101(49%) were aware that reduction in usage of plastic products and proper disposal respectively are the ways to reduce the hazard of plastic wastes. Most of them 202 (98.1%) were aware that storing or using hot food items in plastics affects human health. Regarding the degradable nature of plastics, majority 200 (97.1%) were aware that plastics are non-biodegradable and 194 (94.2%) were aware that plastics can be recycled. More than three fourth of the respondents 180(87.4%) were aware of plastic bags being banned in certain places.

**Table 1: Socio demographic Profile of households N=206**

| Variables | Frequency | Percentage (%) |
|---|---|---|
| Age Median: 43 years | | |
| Upto 45 years | 114 | 55.3 |
| > 45 years | 92 | 44.7 |
| Gender | | |
| Female | 156 | 75.7 |
| Male | 50 | 24.2 |
| Literacy status | | |
| Illiterate | 31 | 15.1 |
| Primary school | 11 | 5.3 |
| Middle school | 25 | 12.1 |
| High school | 36 | 17.5 |
| Intermediate/post high school diploma | 41 | 20 |
| Graduate/post graduate | 62 | 30.1 |
| Socio Economic Status [Modified BG Prasad Classification] | | |
| Upper | 63 | 30.6 |
| Upper Middle | 72 | 35 |
| Middle | 36 | 17.5 |
| Lower Middle | 26 | 12.6 |
| Lower | 9 | 4.3 |
| Type of family | | |
| Nuclear | 144 | 69.9 |
| Joint family | 62 | 30.1 |

Table 3 shows the attitude of respondents on plastic usage. Eighty percent strongly favored that utilization of plastic bags can be reduced and 86(41.7%) strongly favored that biodegradable plastics can be the alternatives to the regular non-biodegradable plastics. Ninety three percent favored ban on plastics usage. The overall attitude score was 17.4 ± 2.239. It was found that age, gender and education status did not have any impact on attitude,

wherein socio economic status had significant association with attitude scores ($p<0.01$).

**Table 2: Knowledge of plastic products among respondents [N=206]**

| Knowledge | Frequency n(%) |
|---|---|
| **Hazards of plastics usage** | |
| Affects human health | 195 (94.7) |
| Affects the environment | 205 (99.5) |
| Affects animals | 199 (96.6) |
| **Alternatives of plastic bags** | |
| Jute bags | 64 (31.1) |
| Paper bags | 73 (35.5) |
| Cloth bags | 197 (95.6) |
| **Ways to reduce the hazards of plastics** | |
| Segregation | 25 (12.1) |
| Reduce the usage | 130 (63.1) |
| Proper disposal | 101 (49) |
| **Storing/ Using hot food items in plastics injurious to health** | |
| Yes | 202 (98.1) |
| **Are plastics biodegradable?** | |
| Yes | 6 (2.9) |
| No | 200 (97.1) |
| **Are plastics recyclable?** | |
| Yes | 194 (94.2) |
| No | 12(5.8) |
| **Have you heard that plastic bags are banned in certain places?** | |
| Yes | 180(87.4) |
| No | 26(12.6) |

**Figure 1: Practice of using plastic items in food storage and packaging [N=206]**

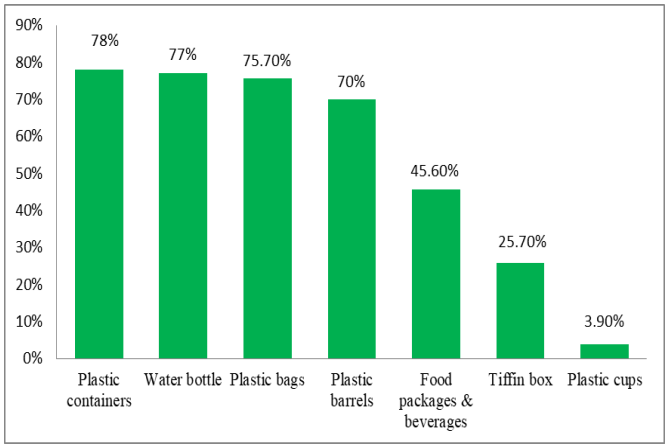
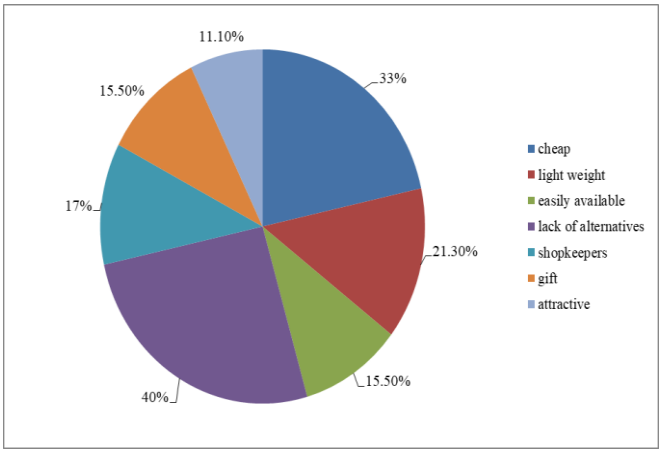



Table 4 shows the practice of using plastic products and methods of disposal among households. Major use of plastic products were for electrical and electronic items 203(98.5%) followed by household items 200(97.1%), furnitures195(94.7%), automobiles 194(94.1%) and construction 192(93.2%), etc. Burning 100(48.5%) followed by dumping in garbage truck 56(27.1%) were the common methods of disposal. Throwing in open space was the method of disposal among 27(13%) of households. Figure 1 shows the practice of using plastic items in food storage and packaging. Most of the households used plastics as plastic containers 161(78%), water bottle 158(77%), plastic bags 156(75.7%) and plastic barrels 146(70%). Although the households192(93.2%) did not prefer to use plastics over other materials, they used plastics for reasons like lack of alternatives 82 (40%), low cost 68(33%), etc. (Fig.2). Seventy five percent of the households used their own bags while shopping.

**Table 3: Attitude of households on plastics usage [N=206]**

| Variables | Strongly agree n(%) | Agree n(%) | Neutral n(%) | Disagree n(%) | Strongly disagree n(%) |
|---|---|---|---|---|---|
| Utilization of plastic bags can be reduced | 163 (79.1) | 36 (17.5) | 3 (1.5) | 4 (1.9) | 0 |
| Recycling & reusing of plastic products helps to reduce its hazards | 87 (42.2) | 75 (36.4) | 26 (12.6) | 17 (8.3) | 1 (0.5) |
| Biodegradable plastic bags can be the alternatives | 86 (41.7) | 58 (28) | 20 (9.7) | 33 (16) | 9 (4.4) |
| I favor ban on plastic bag usage | 178 (86.4) | 13 (6.3) | 2 (1) | 6 (2.9) | 7 (3.4) |

**Figure 2: Distribution of households based on reasons for preference of plastic products [N=206]**




**Discussion:**

Plastics have become the choice of extensive usage because of its properties. The advantages of plastics are many. As the usage of plastic products has increased, the awareness of people about the properties of plastics and its impacts is also mandatory. Plastics can affect humans,

animals and environment. In the present study, 99.5% respondents were aware of the environmental hazards of plastics. Similar results were shown in a study by Chaudhuri et al[12], where all the respondents were aware; yet another study by Babu et al[13], 65% of the respondents were aware of the environmental hazard. In this study, 194 (94.2%) participants were aware that the plastic products are recyclable, whereas Joseph et al[11] report that 179(71.6%) participants were aware.

**Table 4: Practice of using plastic products and methods of disposal[N=206]**

| Variables | Frequency n(%) |
|---|---|
| **Plastic products used** | |
| Electrical & Electronics | 203 (98.5) |
| Household items | 200 (97.1) |
| Furniture | 195 (94.7) |
| Automobiles | 194 (94.1) |
| Construction | 192 (93.2) |
| Packaging | 119 (57.8) |
| Medical Appliances | 95 (46.1) |
| Toys | 66 (32) |
| Footwear | 3 (1.5) |
| **Methods of disposal** | |
| Burning | 100 (48.5) |
| Garbage truck | 56 (27) |
| Throwing in open space | 27 (13.1) |
| Dump on dumping site | 19 (9.2) |
| Recycle | 10 (4.8) |
| Reuse | 4 (1.9) |

In this study, 182 (88.3%) strongly favored the ban on plastic bags usage, which was higher than in a study done by Joseph et al[11] (77.9%).

In the present study, the most common plastic products used by the households were plastic containers(78%), followed by water bottle (77%), plastic bags (75.7%) and plastic barrel (70%). The most common plastic item used by the surveyed population were bottles (51%) in a study by Babu et al[13]. In a study done by Adane et al[14], plastic bag was used in high frequency (76.52%) which was followed by the usage of plastic bottles (40%), plastic buckets, barrels and baskets (19.13%).

Lack of alternatives was the reason for preference of plastics in this study; easy availability (55%) in a study by Joseph et al[11]. Burning (48.5%) was the most common method of disposal among the households in this study, however this should not be encouraged as burning releases toxic substances into the environment, which can cause respiratory problems, cancer, etc,. The next common method of disposal was dumping in garbage truck (27%). In a study done by Babu et al[13], throwing in dustbin (31%) was the common method and in a study by Chaudhuri[12], open dumping to surrounding areas was practiced (41%).

**Conclusion:**Most of the households were aware of the hazards of plastic products and had satisfactory attitude towards reducing plastics. Majority favored ban on plastic products. However, all the households used plastics for various purposes. The common method of disposal of plastic wastes was burning which can add to significant environmental pollution.

**Recommendations:**Excessive usage, improper disposal, plastics of low microns contributes to the problems caused by plastics. As plastics cannot be kept away from use, judicious use, re-use, utilization of biodegradable plastics as alternatives, proper disposal of plastic wastes will help to reduce the impacts on health and environment. Also effective implementation of legislation on plastic ban, strict adherence to recommended guidelines of plastic manufacture is crucial for plastic waste handling.

**Acknowledgment:** I thank the Organizing team, 5th International Management Development Programme, SRM University and the Department of Community Medicine, KIMS & RC for their support.

**References:**

1. FICCI. 3rd National Conference on Sustainable Infrastructure with Plastics. 2017. Available at URL://http://ficci.in/spdocument/20872/report-Plastic-infrastructure-2017-ficci.pdf [Accessed on 1 Jan 2018]
2. Anthony L, Neal MA. Applications and societal benefits of plastics. Phil. Trans. R. Soc. B. 2009; 364:1977-1984
3. Tamilnadu leads South Indian Stated in Plastic Manufacturing, Consumption. Available at http://www.thehansindia.com/posts/index/Business/2017 [Accessed on 1 Jan 2018]
4. Central Pollution Control Board. Consolidated Guidelines for Segregation, Collection and Disposal of Plastic Waste. September 2017. Available at cpcb.nic.in. [Accessed on 5.5. 2018].
5. Zareena B.Plastics and environment. Dissemination 12. The Centre of Excellence in Environmental Economics. Available at http://coe.mse.ac.in. [Accessed on 1.1.2018]
6. Ronald G, Jenna R, Kara L. Production, use and fate of all plastics ever made. Sci.Adv. 2017; 3:1-5.
7. Ramaswamy V, Sharma H. Plastic bags – threat to environment and cattle health: A retrospective study from Gondar city of Ethiopia. The Official J. Inst. Integr. Omics Appl. Biotech. J. 2011; 2(1): 7-12.

8. Ponnusamy R. A study on the Plastic Waste and Environmental Degradation. ABC Journal of Advanced Research. 2015;4(1):9-15.
9. How Plastic Bags affect Wildlife. Animal Friends. Available at www.prijateliji-zivontinja.hr/index.en.php?id=934. [Accessed on 3.5.18]
10. Bauer R. Plastic waste. Campaign Art: By 2050 more plastics in the oceans than fish? 15.03.2017. Available at https://blogs.worldbank.org/taxonomy/term/15631. [Accessed on 30.4.2018]
11. Joseph N, Kumar A, Magji S, Kumar G, Prahalad R. Usage of Plastic Bags and Health Hazards: A Study to Assess Awareness Level and Perception about Legislation among a Small Population of Mangalore City. Journal of Clin and Diag Res, 2016 Apr;10(4): 1-4.
12. Chaudhuri T. Usage Of Plastic Carry Bags and Impact on Environment, in Mumbai. Abhinav Int Journal of Res In Management & Technology. 2016; 5(3):16-21.
13. Babu D, James R. Survey on Plastic Usage among the Teenagers of Alappuzha Town, Kerala. Sch. Acad. J. Biosci.;2016; 4(6):488-497.
14. Adane, L. and Muleta, D. Survey on the usage of plastic bags, their disposal and adverse impacts on environment: A case study in Jimma City, Southwestern Ethiopia.Journal of Toxicology and Environmental Health Sciences. 2011; 3(8): 234-248.

**Conflict of Interest: None**
**Source of funding support:** Nil


**NJRCM: www.commedjournal.in**

**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

# ORIGINAL RESEARCH ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 32-38**

## ENDOCRINE DISRUPTOR CHEMICALS: USAGE AND AWARENESS ON HARMFUL CHEMICALS EFFECTING ENDOCRINE SYSTEM IN PERSONAL CARE PRODUCTS AMONG MEDICAL FRATERNITY

Sree T.Sucharitha[1], K.OmSaiPriya [2], SM Balaji [3]

**Affiliation:** 1Associate Professor, Tagore Medical College and Hospital, Chennai & 2 MBBS student,Tagore Medical College and Hospital, Chennai, India & Assistant Professor, Madras Medical College, Chennai, India

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 18-04-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 01-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr. Sree T.Sucharitha, Associate Professor, Department of Community Medicine, Tagore Medical College & Hospital, Chennai – 600127. E-mail: sucharithat2@gmail.com

**ABSTRACT**

**INTRODUCTION:** Endocrine disruptors are chemicals present in personal care products as contaminants or ingredients in various forms. These chemicals are known to interact with cell and tissue programming causing side effects over entire life span. In recent times, the increased occurrence of hormone-related cancers, reproductive disorders are attributed to universal and daily exposure to endocrine disruptors in personal care products. **OBJECTIVES:** To describe the usage of personal care products among medical fraternity & To assess awareness about the endocrine disruptor chemicals present in the personal care products among medical fraternity. **METHODOLOGY:** A cross-sectional study was conducted through e-survey created by Google Docs and shared with medical fraternity across South India, through social media to submit their responses during February-March 2018. **RESULTS:** Out of 452 respondents, majority, 415 (92%) of medical fraternity were below 25 years, 272(60.2%) were females, 426(94.4%) were undergraduates. Males-66(37%) were using more than 3 personal care products on daily basis. About 213(47%) medical fraternity heard of EDC among whom majority-134 (62.9%) were females and 79(37.1%) were males. Out of 107 respondents, 67(62.6%) females and 40(37.4%) males identified more than two EDC from the given list of options. Among 136 respondents, females 92(67.6%) and males 44(32.4%) identified more than two health outcomes due to exposure to EDC during prenatal period. Only 87 (21.50%) respondents identified adverse pregnancy outcomes like intra-uterine growth restriction, poor weight gain during fetal development -76 (18.80%) and pre-term delivery -72 (17.80%) due to pre-natal exposure to EDC. Majority were little confident 176(42%), whereas 129(30.80%) were fairly confident in assessing the risk from chemicals by reading the product labels. **CONCLUSION**: Poor levels of awareness were obtained from medical fraternity about endocrine disruptor chemicals in personal care products.

**Key-words:** Endocrine disruptors, personal care products, medical fraternity, e-survey, risk-reduction measure.

### INTRODUCTION:

Endocrine disrupting chemicals (EDCs) are chemicals contaminating our biological ecosystem and are associated with adverse effects on the endocrine homeostasis leading to immunological problems, cancers, neuro-developmental delays, and reproductive problems in the humans [(1-3)]. These chemicals when bound to steroid receptors such as androgen and progesterone receptors cause endocrine disruption [(4)]. These chemicals mimic or antagonize normal hormones and can have permanent effects in organisms as well as progeny.

A large variety of products which we use on daily basis, starting from a tooth paste to the skin care products and perfumes, contain chemicals as major ingredients which can cause endocrine disruption. Endocrine disrupting chemicals (EDCs): butylated hydroxyl anisole (BHA), butylated hydroxyl toluene (BHT), dimethyl, dibutyl, diethyl phthalates, Parabens, BPA -Bis Phenol A (BPA), butylated hydroxyl anisole (BHA) and butylated hydroxyl toluene (BHT). [(5)] Butylated hydroxyl anisole and toulene (BHA and BHT) are used as antioxidants, stabilizers, fragrance ingredients and are found in hazardous proportions in personal care products including cosmetics such as lipstick, eye-shadow and petroleum jelly products like vaseline and body lotions[(5)]. Dimethyl, dibutyl, diethyl phthalates are used as plasticizer and fragrance ingredients are found in nail polish, hair sprays, perfumes, lotions, soaps, shampoos. Phthalate exposure in high levels causes numerous side effects like cryptorchidism, sperm DNA damage in men as well as miscarriage, breast cancer in women [(5)]. Parabens are used as preservatives and are found in make-up products, moisturizers, conditioners, shaving products, body scrubs [(5)]. Bis Phenol-A (BPA) is used in eyeglass lenses, water bottles, medical equipment, consumer electronic goods and daily

house hold appliances. In women, they are found to be associated with infertility, implantation failure and endometrial disorders. In men, they are associated with sexual dysfunction, low sperm quality, hormonal imbalance. Pre natal exposure can result in low birth weight babies, genital abnormalities, especially in female children, premature puberty appears to be the major side effect [5]. Higher BPA levels lead to multiple side effects like the obesity and metabolic diseases [6].

Endocrine disruptor chemicals act as double trouble as they have adverse effects on human health and environment. Improper disposal of these chemicals from manufacturing processes pollute water, soil and air thus effecting the environment [5]. Phthalate plasticizers are esters of phthalic acid and these compounds are linked non-covalently to industrial materials which readily leach into the environment [5]. National Toxicology Program of the United States Environmental Protection Agency and the European Union [7] focussed on reproductive impact of these Pthalates. Organo-chlorine pesticides and plasticizing agents are ubiquitous environmental endocrine disrupting compounds and have potential to bind and activate the oestrogen receptor-a (ER). DDT and BPA are ubiquitously present in the environment, and DDT and BPA levels in human blood and adipose tissue are detectable in most of the people [8]. In mammals, germ cell differentiation is initiated in the primordial germ cells (PGCs) during foetal development. Prenatal exposure to endocrine disruptors may alter PGC differentiation, development of the male germ line and induce trans-generational epigenetic disorders [9].

Women are exposed to 168 different chemicals on daily basis by using 12 personal care/cosmetic products while men to about 85 such chemicals daily [11]. Teens, use an average of 17 personal care products a day and are thus exposed from a younger age [11]. When teens were tested 16 different hormone altering chemicals, including phthalates and parabens, were detected [11]. In India there is a growing demand for personal care products due to extreme interest in personal grooming industry. The projected growth rate of cosmetic industry is expected to be massive during next decade as per market reports. Medical professionals have a significant role in educating not only public but themselves as they are also primary consumers of many of these personal care products and thus exposed to harmful effects. Studies among medical fraternity assessing their awareness on EDC are non-existent in India and through this study we attempted to understand the awareness among medical fraternity regarding endocrine disrupting chemicals in personal care products.

**OBJECTIVES:**

**1.**Describe the usage of personal care products among medical fraternity.

2.Assess awareness about endocrine disruptor chemicals and their harmful effects in the personal care products among medical fraternity.

**METHODOLOGY:**

A cross-sectional study was done during the months of February and March of 2018. An Electronic survey (e-survey) was created using Google docs and Google forms. Google Docs is a Google feature and a word processing tool in which documents and spread sheets can be prepared. Google Forms is a survey creation tool, which is a component of Google Docs. Google Docs has many attractive features, of which few are voice typing, clear formatting and offline mode is available. It is simple, user-friendly and mobile-friendly.

Google Forms gives users an easy way to create a survey that contains as many questions as they need to ask, in a variety of styles. Here are the steps in order to create a survey using Google Docs.

1. Navigate to https://docs.google.com/forms/ and click blank. Google Docs has a variety of pre-made template forms and we can select one of those according to our need.
2. We need to name our survey if we wish, by clicking on the untitled form on the top of the left side.
3. Write the question by clicking on the untitled question.
4. Select an option for how the question can be answered. Either a paragraph or multiple choice.
5. The plus button adds the questions.
6. Click the required switch to make the question mandatory.
7. Any settings can be done by clicking the gear icon.
8. Finally this form can be sent by using the link to many people through social media like whatsapp and facebook.

After the questionnaire is prepared two tabs are shown. One tab titled Questions and other tab titled Responses. The link of e-survey questionnaire: https://docs.google.com/forms/d/1gkCAG7pSLDMoHLW4EkWk9KHmtUnRIfP3VcE2HsdX13Q was shared through social media platforms (Whatsapp and Facebook) using snowballing technique through medical fraternity of TAGORE. Medical fraternity, both the undergraduates and qualified medical professionals were invited to undertake this survey. The link was made available February 15- March 15, 2018. The responses can be viewed in real time and researchers send out reminders inviting participants to submit survey based on the response rate.

The questionnaire included data on socio-demographic characteristics of medical fraternity, usage of various personal care products on daily basis, awareness about the endocrine disrupting chemicals present in the personal care products, knowledge regarding health effects due to

exposure during pre-natal period, and personal protective measures undertaken to prevent harm from exposure to such chemicals in personal care products.

The data was entered in MS-Excel Sheet 2016 version and the results were analysed. Descriptive statistics were performed and test of significance with $p<0.05$ is considered significant.

**RESULTS:**

In our study of 452 respondents, majority, 415 (92%) were below 25 years and 37(8%) were above 25 years. About, 180(39.8%) were males and 272(60.2%) were females. Also, 426(94.4%) were undergraduates and thus students and 26(5.6%) were qualified, registered doctors and employed. Majority belong to urban areas 379(83.8%) and 73(16.2%) belong to rural areas, and all this is shown in table1.

**TABLE 1: Socio-demographic features of the medical fraternity participating in the study (respondents N=452)**

| Characteristics | N -number of respondents | % |
|---|---|---|
| **Age** | | |
| <25 years | 415 | 92 |
| >25 years | 37 | 8 |
| **Gender** | | |
| Male | 180 | 39.8 |
| Female | 272 | 60.2 |
| **Education** | | |
| Graduate | 375 | 82.8 |
| PG | 77 | 17.2 |
| **Occupation** | | |
| Student | 426 | 94.4 |
| Doctor | 26 | 5.6 |
| **Residence** | | |
| Rural | 73 | 16.2 |
| Urban | 379 | 83.8 |

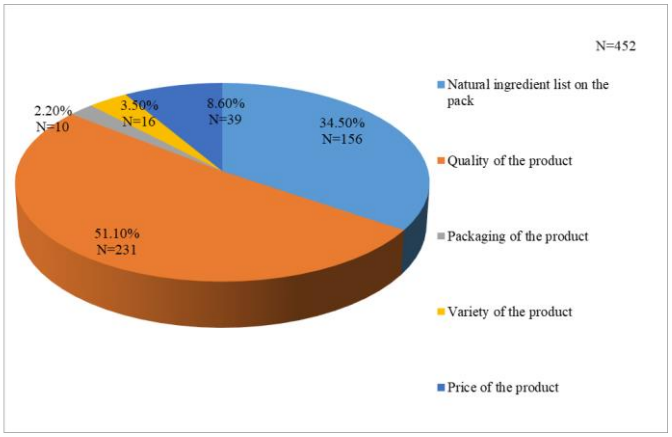
**TABLE 2: Usage of personal care products among the medical fraternity**

| Variable | Male(N) | Male (%) | Female(N) | Female (%) |
|---|---|---|---|---|
| More than 3 products daily | 66 | 37 | 112 | 41 |
| Less than 3 products daily | 114 | 63 | 160 | 59 |
| Total (N=452) | | 180 | 272 | |

Also, it was found that 66(37%) of males were using more than 3 personal care products on daily basis as compared to 41% among females. Majority,63% males were using less than three personal care products on daily basis as compared to 59% among female respondents and is shown in table2.

Regarding the factors influencing medical fraternity when purchasing personal care products, quality of the product 231(51.10%) and natural ingredients present in the product 156(34.50%) were found to play a major role. The price of the product 39(8.60%), packaging of the product 16(3.50%) and variety 10(2.20%) play little role in influencing the purchase of personal care products as seen in Figure 1 below.

**Figure 1: The factors influencing the purchase of personal care products among medical fraternity.**




Awareness about EDC among medical fraternity is assessed in this study. Out of 452 respondents, 213(47%) heard of EDC among whom majority-134(62.9%) were found to be females and 79(37.1%) are males. About, 311 participants identified the definition of EDC-females 191(61.4%) and the males 120(38.6%). Out of 107 respondents, 67(62.6%) females and 40(37.4%) males identified more than two EDC from the given list of options. Out of 253 respondents, 152(60%) females and 101(40%) males identified more than two health side effects of EDC. Among 136 respondents, females 92(67.6%) and males 44(32.4%) identified more than two health outcomes due to exposure to EDC during prenatal period as seen in Table 3.

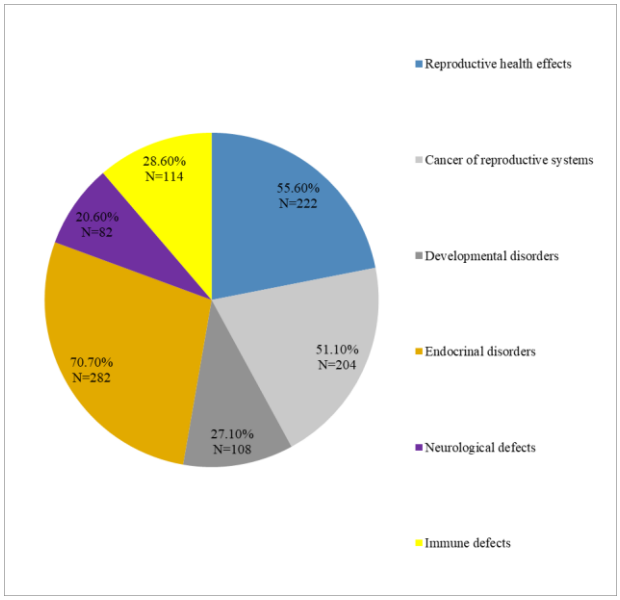
**TABLE 3: Awareness on endocrine disrupting chemicals among medical fraternity**

| Variable | (N=452) | Male (N) | Male (%) | Female (N) | Female (%) |
|---|---|---|---|---|---|
| Heard of EDC | 213 | 79 | 37.1 | 134 | 62.9 |
| Definition of EDC | 311 | 120 | 38.6 | 191 | 61.4 |
| Identified more than 2 EDC from list | 107 | 40 | 37.4 | 67 | 62.6 |
| Identified more than two health side effects of EDC | 253 | 101 | 40 | 152 | 60 |
| Identified more than two health outcomes of EDC in Prenatal period | 136 | 44 | 32.4 | 92 | 67.6 |

*The answers for this question were given in the form of multiple choices to be answered.

Out of 452 respondents, majority of 282 (70.70%) identified endocrine disorders as the most common adverse health outcome due to exposure to EDC, followed by reproductive health issues 222 (55.60%) and cancer of reproductive systems 204 (51.10%). In addition to the above, immune defects 114 (28.60%) and developmental disorders 108 (27.10%) were also identified along with neurological defects 82 (20.60%) as other side effects due to exposure to EDC and is shown in Figure 2.

**FIGURE 2: Awareness about adverse health outcomes of EDC among medical fraternity**




*The answers for this question were given in the form of multiple choices to be answered.

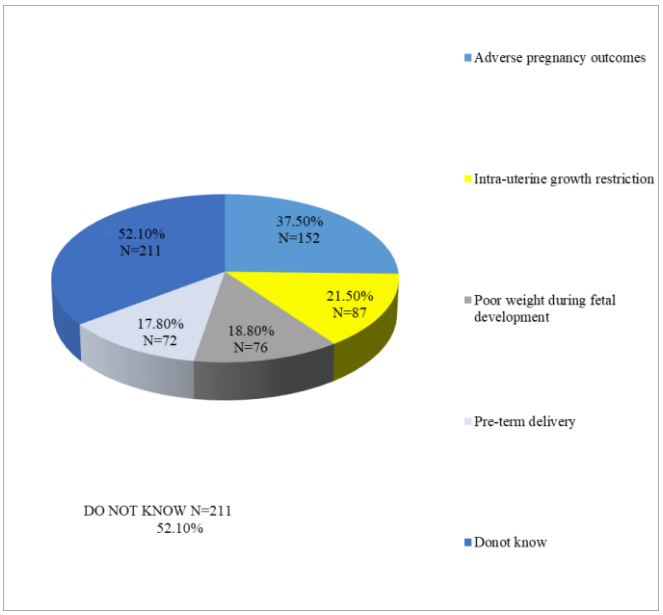
**TABLE 4: Most common EDCs identified from the list by medical fraternity**

| Variable (N=452) | (N) | (%) |
|---|---|---|
| Poly chlorinated biphenyls | 95 | 22.60% |
| Bis-phenol – A (BPA) | 87 | 20.70% |
| Phthalates | 106 | 25.20% |
| Di ethyl stilbestrol (DES) | 78 | 18.60% |
| Do not know | 235 | 56% |

Among 452 respondents, majority did not know 235(56%) the most common EDC. But among the EDCs given in the list, Phthalates 106(25.2%) were identified by majority of the respondents. After this, Poly-chlorinated biphenyls 95(22.6%), Bis-phenol A 87(20.7%) and Di-ethyl stilbestrol 78(18.6%) were identified in the respective order and this is shown in the TABLE 4 given below.

Awareness about exposure to EDC during pre-natal period among women and pregnancy outcomes were assessed in our study. As seen in figure 3, out of 452 respondents, majority 211 (52.10%) did not know the adverse health outcomes of exposure to EDC during pre-natal period. Only 87 (21.50%) respondents identified adverse pregnancy outcomes like intra-uterine growth restriction, poor weight gain during fetal development -76 (18.80%) and pre-term delivery -72 (17.80%) due to pre-natal exposure to EDC and shown in figure3.

**FIGURE3: Awareness about pregnancy outcomes due to exposure to EDC during pre-natal period among medical fraternity**




*The answers for this question were given in the form of multiple choices to be answered.

**TABLE 5: Responsibility in ensuring personal care products safe for usage**

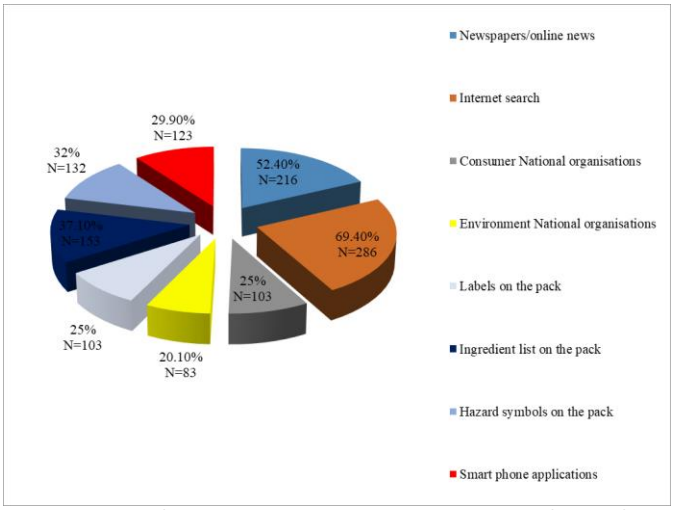
| S No | Variable | (N) | (%) |
|---|---|---|---|
| 1 | Legislators | 13 | 2.9 |
| 2 | Consumers | 55 | 12.2 |
| 3 | Manufacturers | 62 | 13.7 |
| 4 | NGO - Organizations | 21 | 4.6 |
| 5 | All of the above | 301 | 66.6 |

The major source of information on EDC was internet-286 (69.40%), followed by online news articles -216 (52.40%) and informational leaflets of NGOs was mentioned by only 83 (20.10%) participants. Product labels, hazard symbols on the products package and smart phone apps are least used sources of information for medical fraternity as shown in Figure 4.

To reduce the adverse effects caused by EDCs on both human health and environment, some risk reduction measures were to be taken. The most favored risk reduction measures taken/will be taken for both personal

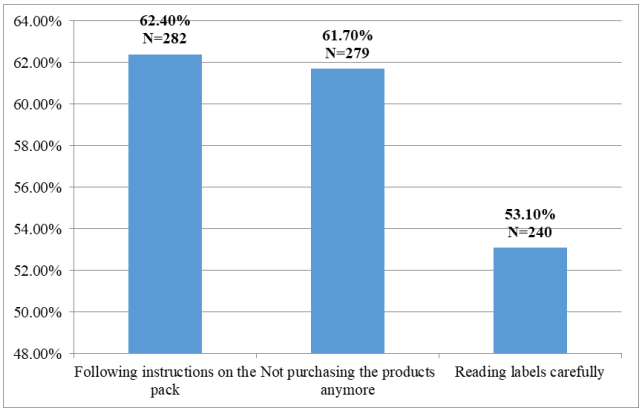
human health and environment, responses were as mentioned below in Figures 5 and 6.

**FIGURE 4: Sources of information about EDCs among medical fraternity**



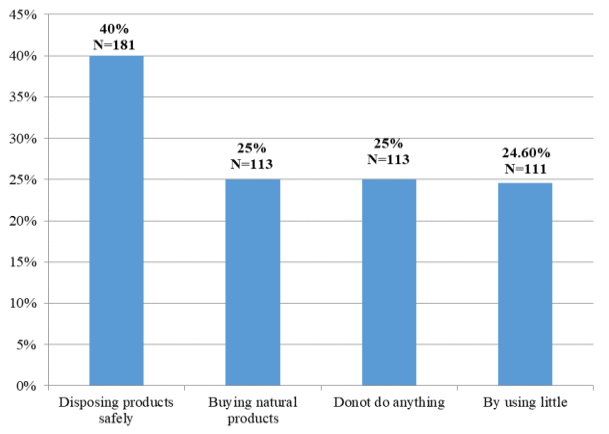

*The answers for this question were given in the form of multiple choices to be answered.

**FIGURE 5: Risk-reduction measures taken for protecting personal health from exposure to EDC by medical fraternity**




*The answers for this question were given in the form of multiple choices to be answered.

**FIGURE 6: Risk-reduction measures undertaken for environment sustainability by medical fraternity**




*The answers for this question were given in the form of multiple choices to be answered.

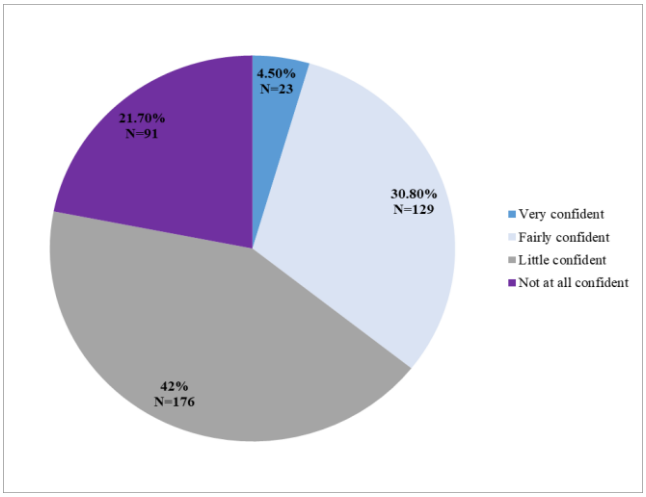
To minimize the risk for personal health, following the instructions on the product pack-282 (62.40%), avoiding the purchase of the products with chemical ingredients-279 (61.70%), reading the labels carefully for any chemical ingredients- 240(53.10%) were mentioned as seen in Figure 5.

As shown in Figure 6, disposing the used products safely-181 (40%), buying the products with natural ingredients-113 (25%), minimal usage of products with chemical ingredients so as to influence the lesser manufacture of such products-111 (24.60%) were the most favored risk reduction measures taken for the environment sustainability. One-fourth of the respondents, n=113(25%), had no interest in doing anything in order to reduce the risks of adverse effects of EDCs to the environment.

The personal care products have to fulfill safety parameters from these chemicals and a question has been asked as whose responsibility is it to make the products safe. The response given by 452 respondents is as follows: Legislators 13(2.9%), consumers 55(12.2%), manufacturers 62(13.7%), NGO- organizations 21(4.6%) and 301(66.6%) mentioned it as collective responsibility and is shown in table5.

Regarding the estimation of risk exposure to health by identifying the toxic ingredients on the product labels, among 452 respondents, majority were only little confident 176(42%), whereas 129(30.80%) were fairly confident and 91(21.70%) expressed no confidence at all. Only few of the respondents were very confident 23(4.50%) and these are shown below in the figure 7.

**FIGURE 7: Risk-Communication Confidence**




**Discussion:**

Human exposure to endocrine disrupting chemicals (EDC) present in personal care products is ever-increasing due to the current life style. Awareness regarding EDC has been identified as a gap by World Health Organization in 2012 and addressed during

technical briefing session (partially supported by the National Institute of Environmental Health Sciences). Today there are 1000 chemicals reported to have endocrine effects and this number will increase due to new products released into market almost on a daily basis. In spite of the potential of these chemicals causing wide variety of deleterious health effects, medical fraternity seems to be inadequately aware of this public health issue.

Perceiving this as a public health challenge, and appreciating that literature in this area from Indian sub-continent especially among medical professionals is minimal, in this study we attempted to understand the purchasing behaviors related to personal care products among medical fraternity. Usage of personal care products though unavoidable, the range of products being used and the essentiality of using such products can be easily differentiated. Misconceptions and misinformation by producers may influence consumers to choose products with harmful potential.

Women medical fraternity were found to be using more than three personal care products on a daily basis which is similar to studies done in India [12], reflecting that women are more at risk of exposure to EDC compared to men. In a study done in Tamil Nadu [13] 87% of the adolescent female participants were using cosmetic products. In today's world men are also increasingly investing in personal grooming as is evident through markets flooded with men fairness creams and mushrooming of beauty salons to cater for their needs. In a study [14] it was found that male respondents were more concerned with side effects of personal skin care products than females. This puts both genders at an increased exposure to these harmful chemicals. Also due to aggressive marketing strategies by the cosmetic brands, young adults and vulnerable age-group teenagers are being lured to use many of these personal care products such as deodorants, perfumes, and skin care products on daily basis. This leads to early exposure and potentially long term exposure too, which could impact the functioning endocrine systems in their life-time.

The factors influencing the purchasing behaviors in this study are driven by quality of the product (51%) and natural ingredients (34%). This is similar to the studies done in Madhya Pradesh (66.8%) and Delhi (71%), India [15] respectively. The preference to use products with natural ingredients is a favorable change but consumers also need awareness that all products claiming to be 'natural' or 'organic' could also be misleading. To be considered organic, as per US Department of Agriculture (USDA) mandates product must contain at least 95% organically produced ingredients (excluding water and salt) [16]. As this industry is not regulated effectively in India, personal caution is recommended than relying on the manufacturers to be truthful about displaying chemical ingredients related information on the product labels.

Medical undergraduates and qualified doctors are seen to possess poor awareness about EDC and their impact on health. Majority, greater than 60% of respondents claimed awareness of EDC but 56% were unable to identify any of the EDCs from the list. Though similar studies among medical fraternity were unavailable at the time of this study, a Korean study among college going students also reflected poor awareness levels about chemical components in personal care products [17]. In our study 47% identified more than two EDC from the provided list of options and reflects scope for improving the awareness as suggested in reports from India [18]

More than half i.e 52% of the study respondents were not aware of pregnancy outcomes due to pre-natal exposure to EDC. This seems to be an area of concern for us, as studies [5,9] have indicated that EDC exposure during pregnancy can result in increased risk for neuro-developmental disorders in the new born. This highlights the need for awareness campaigns to educate both medical fraternity and women consumers to minimize the risk of exposure to EDC and also to choose alternate products with safer ingredients or total non-usage of such products during pre-natal period at least.

Medical fraternity seem to majorly (69%) rely on internet resources for updates on information related to EDC, and this trend is reflected similar to other studies [16]. This can be explained by the universally increased access to internet through affordable data services worldwide. Information is just a click away though the authenticity of such information has to be double checked before relying on the information to make any purchasing decisions. This study also revealed the knowledge gap among medical fraternity and their inability to assess the risk from reading the ingredients list on the products. More efforts are needed to transfer research and scientific findings to medical fraternity for self-education in this area. Government should propose regulations towards risk communication of chemicals to the consumers in easy understandable language even for layperson as mentioned in studies [19,20].

Awareness about EDC exposure alone will not result in favorable outcomes unless it is reflected through behavior change at individual and family level. Our study respondents admitted that they would choose products with natural ingredients, and also minimize the purchasing of personal care products, which have high chemical content. Risk avoidance is also found to be a favorable strategy to minimize exposure to harmful chemicals as highlighted by Hartmann and Klaschka et al [21]. Similar efforts as in Taiwan by Chung-Yu Chen et al [22] wherein college students were educated to increase the hand washing, and reducing use of cosmetics or personal care products can also be planned as risk-reduction campaign for specific target population like women and young adults. Another study [23] revealed even reducing the exposure to EDC in personal care products such as shampoos etc can reduce the chemical concentration of EDC dramatically as less as in three days.

**CONCLUSIONS:** The study revealed poor awareness about endocrine disrupting chemicals in personal care products and their harmful effects on health among medical fraternity.

**RECOMMENDATIONS:** Medical fraternity must be informed and trained about EDC to make informed choices regarding personal care products. Risk reduction communication and behavior change communication should be provided to all groups of population such as college students, adults at residential areas and workplaces to minimize the exposure to EDC.

We believe our study is successful in making such a shift in mindset of medical fraternity. Implementing personal risk reduction measures will go a long way in reducing the risk exposure to EDC.

**Acknowledgment:** We extend our sincere gratitude to Dr.A.Balaji, Professor and HOD of Department of Community Medicine - Tagore Medical College and Hospital for his constant encouragement and support in executing this project. Finally we thank the medical professionals, who have paraticipated in this study and shared their inputs with us.

**REFERENCES:**

1. Diamanti- Kandarakis E, Bourguignon JP, Giudice LC, Hauser R, Prins GS, Soto AM, et al. Endocrinedisruptingchemicals: an Endocrine Society scientific statement. Endocr Rev. 2009; 30: 293–342. doi:10.1210/er.2009-0002 PMID: 19502515

2. WHO-UNEP. State of the science of endocrine disrupting chemicals 2012., Bergman A, Heindel JJ,Jobling S, Kidd KA, Zoeller RT editors. WHO Press, Geneva, Switzerland, 2013, pp 1–38.

3. Patel S, Zhou C, Rattan S, Flaws JA. Effects of endocrine-disrupting chemicals on the ovary. BiolReprod. 2015; 93: 20,1–9. doi: 10.1095/biolreprod.115.130336 PMID: 26063868

4. PLOS ONE | DOI:10.1371/journal.pone.0138438

5. PLOS ONE | DOI:10.1371/journal.pone.0138438

6. Rubin BS (2011) Bisphenol A: an endocrine disruptor with widespread exposure and multiple effects. J Steroid Biochem Mol Biol 127: 27–34

7. Braun JM, Sathyanarayana S, Hauser R. Phthalate exposure and children's health. Curr Opin Pediatr.2013; 25: 247–254. doi: 10.1097/MOP.0b013e32835e1eb6 PMID: 23429708

8. Rubin BS (2011) Bisphenol A: an endocrine disruptor with widespread exposure and multiple effects. J Steroid Biochem Mol Biol 127: 27–34

9. Saitou M, Yamaji M (2012) Primordial germ cells in mice. Cold Spring Harb Perspect Biol 4.

10. Fong Sheing Yee, Susan Chin Yee Suan. (2012).Analysis of the Purchasing behavior on skincare products among the young generation. International Journal of Undergraduate studies, 1 (1), 8-14.Retreived from http://www.studymode.com/essays/analysis- of-The-Purchasing-Behaviour-On-1346956.html

11. https://articles.mercola.com/sites/articles/archive/2015/05/13/toxic-chemicals-cosmetics.aspx

12. Fong Sheing Yee, Susan Chin Yee Suan. (2012).Analysis of the Purchasing behavior on skincare products among the young generation. International Journal of Undergraduate studies, 1 (1), 8-14.Retreived from http://www.studymode.com/essays/analysis- of-The-Purchasing-Behaviour-On-1346956.html

13. *Ilankizhai R J1*, Gayathri R2, Vishnupriya V2 Cosmetic contamination awareness among adolescent females Asian Journal of Pharmaceutical and Clinical Research Vol 9, Issue 5, 2016

14. *Zainabu Zuberi Massoro, Information Seeking and Use Behaviour on Beautification Product among Students of Higher Learning Institutions Middle-East Journal of Scientific Research 24 (1): 149-156, 2016 ISSN 1990-9233, 2016SEP:DOI: 10.5829/idosi.mejsr.2016.24.01.22367

15. Ratna Bhushan, Richa Maheshwari, ET Bureau Indians prefer ‘natural’, ‘organic’ in personal care Economic Times Sep30, 2016.

16. India Natural & Organic Personal and Beauty Care Products Market - Sizing and Growth, By Value, By Type, By Application, By End User: Opportunities and Forecast (2017-2022) https://www.researchandmarkets.com/research/6sl6ps/india_natural_and?w=4

17. **SoMi Park,Chaeweon Chung Health behaviors related to endocrine-disrupting chemicals and the associated factors of adolescent Korean girlshttps://doi.org/10.1080/03630242.2017.1363124

18. Debarati DasOrganic cosmetics: unleashing beauty from the roots http://www.worldofchemicals.com/chemicaltoday/chemical-today-march/3

19. Seiler T-B, Engwall M, Hollert H (2013) Lost in translation? Ways for environmental sciences to communicate about risk and research. Environ Sci Europe 25:8–12 https://link.springer.com/article/10.1186/2190-4715-25-8

20. 66. Fischhoff B (1995) Risk perception and risk communication unplugged: twenty years of process. Risk Anal 15:137–145

21. Sabrina Hartmann1 and Ursula Klaschka2* Interested consumers’ awarenessSEP: of harmful chemicals in everyday products. Environ Sci Eur (2017) 29:29 DOI 10.1186/s12302-017-0127-8

22. Chen C, Chou Y, Lin S, Lee C. Developing an intervention strategy to reduce phthalate exposure in Taiwanese girls. Sci Total Environ.2015;517:125-131.

23. *HarleyK, Kogut K, Madrigal D, Cardenas M, Vera I, Meza-Alfaro G, et al. Reducing Phthalate, Paraben, and Phenol Exposure from Personal Care Products in Adolescent Girls: Findings from the HERMOSAIntervention Study. Environ Health Perspect. 2016;124(10):1600-1607.

**Conflict of Interest: None**

**Source of funding support:** Nil



**NJRCM: www.commedjournal.in**

**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

# ORIGINAL RESEARCH ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 39-43**

## Pre-packed foods: A study on consumer awareness on chemical exposure, health and environmental effects in Chennai.

A.V.B.Roshan[1], Sree.T.Sucharitha[2]

Affiliation: [1] MBBS student, Tagore Medical College and Hospital, Chennai, India.[2] Associate Professor, Tagore Medical College and Hospital, Chennai, India.

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 20-03-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 01-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr. Sree T.Sucharitha, Associate Professor, Department of Community Medicine, Tagore Medical College & Hospital, Chennai – 600127. E-mail: sucharithat2@gmail.com

**ABSTRACT**

**Background:** Pre-packed foods consumption is a universal trend, a potential source of exposure to harmful chemicals to the consumers. Food additives and contaminant chemicals from food packaging are a potential hazard to human health as well as leading to environmental degradation. **Objectives:** In this study we aim 1. to assess the awareness on chemical exposure in pre-packed foods 2. to describe awareness about the health and environmental effects of pre-packed foods among consumers in Chennai. **Methods:** A cross-sectional study was conducted among consumers at supermarkets, Chennai with a pre-tested, self-administered questionnaire. Data was entered in MS Excel 2007 and analyzed. **Results:** Out of 251 respondents, 226(90%) were regular consumers of pre-packed foods. Respondents identified pesticide residue-108 (43.1%), misuse of food additives-126(50.4%) and food adulterants-125(50%) as common sources of chemical exposure in pre- packed foods. Only 32(13%) respondents identified Bisphenol as common Class II food preservatives used in canned foods. Only 98(39%) respondents checked food labels for any chemicals while purchasing. About 185 (74%) respondents identified obesity, cancer-154 (61.5%), food allergies-134 (53.4%) as common side effects of consumption of pre-packed foods. 129(51.4%) chose to minimize buying pre-packed food items while 87(34.6%) preferred to buy fresh produce and prepare home-made juices than packed beverages. Interestingly168 (67%) respondents were unaware of smartphone apps which scan barcode and display nutritional information. **Conclusion:** Wider consumption of pre-packed foods with poor awareness on chemical exposure through these foods is found among the consumers.

**Key-words:** Pre-packed foods, consumer awareness, Class II Food preservative, environmental degradation.

### Introduction

In adoption to modern life, the consumption of pre-packed foods increases in everyday life. Pre-packed foods are foods that are packed before being offered for sale according to the consumer requirement. These foods have improved shelf life due to the addition of chemicals and preservatives, which are commonly referred to as food additives. The pre-packed foods came into existence as canned foods in the market in 19th century primarily for the military use and became more popular during world war-I[(1)].These food colors were introduced in 1856 as much brighter, more concentrated and offered much varieties[(2)]to the packed foods.

Now a days, foods, juices and beverages are packed in cans, tins, plastic containers, foil papers with labels which attracts the consumers. New innovation of tetra packs, versa pouch make these foods easy for consumption [(3).]These foods are otherwise called as convenient foods Initially this canning method was used for preservation of foods such as pickles, which became an commercial business enterprise today.

Mainly there are two types of preservatives used in food packaging:

Class -1 preservatives, which includes common salt, sugar, honey, etc. Among these, especially sugar and salt produce high osmotic pressure which deny bacteria the aqueous surroundings they needed to live and reproduce.

Class-2 preservatives, which includes benzoic acid, sulphurous acid, nitrates and nitrites, sodium benzoates, bisphenol, etc[(4)].

The food standards regulations require that not more than one Class II preservative should be used in one particular food item People consuming food items containing more than one preservative are at risk of exposure to multiple chemicals.[(5)]

The chemicals and preservatives that are used in food products are printed in the labels according to the International Numbering System [(6).] This international numbering system is a European system, which was introduced in 1989 and revised in 2008 and 2011[(7).] The chemicals used in food products are potential health hazards which on long duration of consumption and also repetitive consumption lead to health problems like obesity (increased fat content[(8)],hypertension (due to increased salt content) [(6)]decreased absorption of vitamins and minerals, food allergies, asthma and also gastrointestinal cancer. Lack of specific knowledge on

chemicals and increased consumption of packed foods due to lifestyle changes is causing obesity, which in turn is responsible for increased occurrence of type-2 diabetes mellitus, gestational diabetes in pregnant women PCOS, cardiovascular diseases.[9]

More than 20 types of plastics, aluminium foils, tins, tin free steel, polyethylene terephthalate are used for packing foods[10]. Bisphenol-A is a chemical used as sealant in canned foods, which is found to cause weight gain, insomnia, arthritis, other heart diseases and also a endocrine disrupting chemical[10]. The improper disposal of packaging material of these foods causes environmental degradation, as burning of plastic and foils release toxins into atmosphere causing skin related disease and respiratory problems like asthma [11] and also leading to air pollution. Dumping of these plastic packing materials in soil [12,13] and other water sources pollute ground water sources, releasing noxious odors and also result in unhygienic sanitary conditions [14].

**Objectives**

In this study we aim 1) to assess the awareness on chemical exposure in pre-packed foods and also 2) to describe the awareness about the health and environmental effects of pre-packed foods among consumers in Chennai.

**Materials and Methods**

This was a cross-sectional study conducted at two i,e., 'Nilgiris' and 'More' supermarkets in Navalur, OMR, Chennai during February-March 2018.Using non-probabilistic, convenient sampling technique, permission was obtained from the management of supermarkets to conduct the study .Two hundred and fifty three participants who were consumers at super markets, were approached with the study tool. Consumers aged 18-40 years present at supermarkets with intent of purchasing pre-packed foods were included in the study. After obtaining written informed consent, a questionnaire-based survey through self-administration was used for data collection. The questionnaire included socio-demographic features, a set of questions assessing their awareness about chemical ingredients in pre-packed foods, health hazards due to consumption of pre-packed foods and environmental effect due to hazardous disposal of package materials used for pre-packed foods. The data is entered into MS Excel and SPSS version-21 was used for the analysis of data.

**Results**

The socio-demographic features of the consumers who participated in this study were as follows:

In this study, 156(60.9%) were males and 97(38.2%) were females. As the study been conducted in supermarkets during 4:30pm to 8pm for a month -107(42%) of males and 70(28%) of females belonged to age group of 18-25 years, 60(23%) to 26-34 years of age and 16(6%) were above 35 years of age which is least due to factors like time and distance since the supermarkets are closer to IT park and educational institutes so the percentages 18-25 age group is more as compared to other age groups . Only 28(11%) males and 24(9.4%) female hold professional degree whereas the 169(67%) were non-professional degree holders. The majority 244(97%) covered were living in urban areas and the rest 9(3%) hail from rural areas as given in Table 1.

**Table 1: Socio-demographic profile of the study participants (N=253).**

| CHARACTERISTIC | MALE N (%) | FEMALE N (%) |
|---|---|---|
| **AGE (years)** | | |
| 18-25 | 107(42) | 70(27.6) |
| 26-35 | 39(15) | 21(8.3) |
| >35 | 10(3.9) | 6(2.3) |
| TOTAL | 156(60.9) | 97(38.2) |
| **EDUCATION** | | |
| PROFESSIONAL DEGREE | 28(11) | 24(9.4) |
| NON-PROFESSIONAL DEGREE | 116(45.8) | 53(20.9) |
| TOTAL | 144(56.8) | 77(30.3) |
| **RESIDENCE** | | |
| URBAN | 151(59.6) | 93(36.7) |
| RURAL | 5(1.9) | 4(1.5) |
| **TOTAL** | 156(61.5) | 97(38.2) |

According to Table 2, only 34(13%) males and 21(8%) females had specific knowledge on chemicals in pre-packed foods and were able to identify the chemicals from the list provided.39(15%)males and 9(7.5%) females found canned foods( canned fish, etc) may cause metal exposure due to the contact of the food with metal can. Majority 122(48%) of male and 77(39%) of female participants recognized dumping of plastic packing materials such as wraps, foils, etc. in water sources harms marine life. Also 95(51.7%) males and 58(36.1%) females had knowledge that burned residue of packing materials can leak into soil and pollute ground water and also causes air pollution by releasing chemical toxins into the atmosphere on burning.

Study participants found that misuse of additives and food adulterants i.e 125(50.2%) followed by pesticide residues-109 (43.9%), chemical contaminants including biological toxins- 108(43.4%) as commonest sources of chemical exposure in pre-packed foods. Only 75(30%) consumers

recognized benzoic acid, sodium diacetates-48(19.3%) bisphenol-31(12.3%), lactic acid-25(10.5%) as Class-2 in pre-packed foods as significant in Table 3 .

**Table 2: Knowledge on the pre-packaged food and environmental impact due to disposal methods among consumers**

| KNOWLEDGE | MALE N (%) | FEMALE N ( %) |
|---|---|---|
| Identified the chemicals used in pre-packed foods | 34(13.4) | 21(8.3) |
| Colored cans and tins cause heavy metal exposure due to contact | 39(15.4) | 19(7.5) |
| Dumping of packing materials such as wraps, plastic foils in water sources harm marine life | 122(48.2) | 77(39.1) |
| Burned residue of packing materials leak into soil-pollute ground water/ air pollution | 95(51.7) | 58(36.1) |

**Table 3: Awareness on the sources of chemicals and identification of chemicals in pre-packed foods among consumers**

| Common forms of chemical exposures | N (%) |
|---|---|
| Pesticide residues | 109(43.9) |
| Misuse of additives | 125(50.2) |
| Chemicals contaminants including biological toxins | 108(43.4) |
| Food adulterants | 125(50.2) |
| **Class-2 preservatives** | |
| Benzoic acid | 75(29.8) |
| Sodium diacetates | 48(19.3) |
| Bisphenol | 31(12.3) |
| Lactic acid | 25(10.5) |

In this study, 193(76%) of consumers felt that obesity, decreased absorption of vitamins and minerals were the major side-effects of pre-packed food consumption. Also 156(62%) identified cancer, food allergies-134(53%) and diabetes-73(29%) as other major side effects (Figure 1).

190(75%) of consumers recognized that improper disposal of the packing material will affect the environment, whereas a minority of 22(9%) still admitted that such disposal will not have any major effects on the environment (Figure 2).

The Table 4 shows that 144(56%)of study participants find no time to check the labels, 54(20%) were conscious on chemical exposure thus check labels for chemical ingredients and 45(18.5%) consumers check the labels only when buying a new product. Almost half of the study participants, 122(44.5%) finds that checking the labels as time consuming and difficult to practice, 71(28.7%) think that labels are not useful as they are confusing and 63(25%) find the labels are in technical language so it is difficult for the common person to review the label and comprehend the risk information.

**Figure 1: Awareness on effects on human health due consumption of pre-packed foods among consumers.**

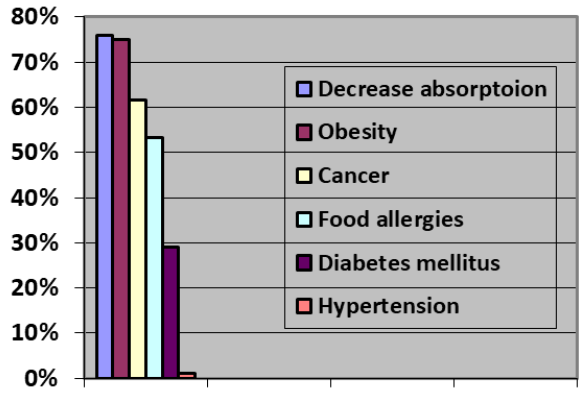



**Figure 2: Bar diagram showing improper disposal have hazardous effects on environment.**

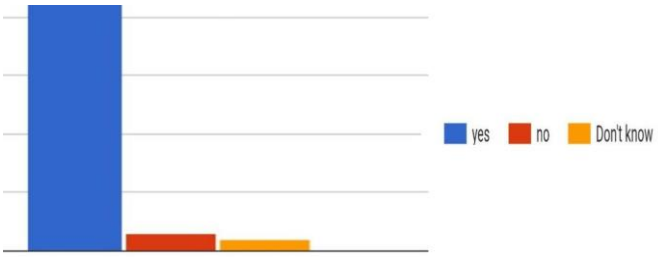



**Table 4: Practice and belief on reading product labels of pre-packed foods among consumers**

| CHECKING THE LABELS | No due to time constraints | Conscious on chemical exposure and check the labels | Check the labels every time buying a new product |
|---|---|---|---|
| N (%) | 144(56) | 54(20) | 45(18.5) |
| **BELIEF ABOUT THE LABELS** | **Time consuming and difficult to practice** | **Labels are confusing and not useful** | **Labels are given in technical language** |
| N (%) | 112(44.5) | 71(28.7) | 63(25) |

Half of the study participants-130(51.4%) mentioned minimizing the pre-packed foods consumption as major pathway to reduce chemical exposure, 88(35%) prefer to buy freshly prepared food and fruit juices instead of canned or packaged juices, and only 22(8.5%) participants disposes the pre-packed foods after crossing the date of expiry printed on the labels.

Among the surveyed consumers, Table 5 - social media feeds, such as video/audio messages, memes, act as source of information for 100(41%) of the study population; digital news- 60(25%), family and friends network-32(13%) and printed news articles-26(11%) were major sources of information about chemicals present in the pre-packed foods.

**Figure 3: Risk reduction measures taken/will be taken by consumers to reduce chemical exposure through pre-packed foods.**

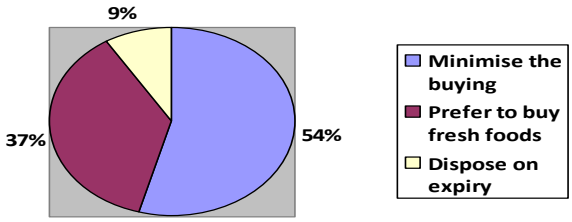



**Table 5: Source of information about the chemicals used in packed foods among the study participants.**

| SOURCE OF INFORMATION | N (%) |
|---|---|
| Social media | 100(41%) |
| Digital news | 60(25%) |
| Family and friends network | 32(13%) |
| Printed news | 26(11%) |

However, the awareness on the smart phone apps (that can scan the code on food products) is minimal. Only 34% even heard and were aware of smart phone apps.

**Discussion**

In this study, conducted among consumers at urban super markets, only 21.5% have specific knowledge on chemicals (i.e identification of Class-2 preservatives) in pre-packed foods. In comparison to a study in Abha, Saudi Arabia[10] where 38% were aware, our consumers seem to be less aware of chemicals in pre-packed foods. Also 23% of the study participants only were aware that canned foods cause heavy metal exposure due to contact of food with cans, tins. This could be explained due to only 20% of the study consumers having a professional degree. Higher education, especially professional courses with science and chemistry stream may have at least theoretical awareness about chemicals, which are added as preservatives of food additives in pre-packed foods. However no significant difference between male and female consumers' awareness about chemicals in pre-packed foods and their education could be found in our study.

As found in our study, 75% consumers believed that consumption of pre-packaged foods can cause obesity, decreased absorption of vitamins and minerals and also 61% identified cancer as health outcome which is similar to Hungarian study wherein 65% people think that pre-packed foods are major causative agent of carcinoma [15]. This shows that, consumers in Chennai are well aware about common health related side effects due to consumption of pre-packed foods. In recent times there has been an incident of banning of a certain popular pre-packed food item, which is widely consumed in India due to detection of a certain chemical(lead) above permissible limits. This was widely covered in news channels, print, digital and social media such as whatsapp. Debates were held in public forums involving nutrition experts and we believe this escalated transfer of information and thus facilitated improved awareness about deleterious side-effects on health due to consumption of pre-packed foods.

Only 8.5% consumers in this study disposed food products on expiry date whereas 47% did in Bhubaneswar[16]. This shows very poor consumer awareness and reflects unfavorable attitude, which can have harmful impact on their health leading to food poisoning. Public awareness has to be created that pre-packed foods come with a specific shelf-life and consumption should be discouraged after expiry date is reached for any such food products.

Only 18.5% check the labels every time on purchasing food products as compared to 76.6% of consumers reviewing every time in Philibhit, Uttar Pradesh [17]. Hence consumers need to be encouraged to develop the practice of checking and reviewing the labels frequently not only for the manufacturing and expiry dates but also for the information about chemical ingredients.

Nearly more than 80% of study participants were aware that improper disposal methods of packing materials of pre-packed food items like dumping in water sources and burning can release toxins and harm the environment. Since only 4% drinking water sources are available for entire population on this planet to survive - pollution of these sources will lead to decreased drinking water content.

This again is a positive feature but it will not impact the prevention of environmental degradation unless stricter regulations and policies are implemented to protect the environment.

In today's smart world, all information is accessible in real time in the convenience of a smart electronic device. Despite, interestingly, only 33.5% consumers were aware of smart phone apps that can scan barcode of the food product, and display the nutritional information and facilitate to make better choices. This is definitely an improvement compared to a study done, in Chennai (2015) showing only 2% consumer awareness [18] . This

only highlights the scope for health educators to impress upon consumers to utilize various apps, few of which are also available free of cost to access information about food products and thus make informed choices.

**Conclusion**

The consumer awareness on chemical exposure in pre-packed foods was found to be poor, and awareness on health and environmental effects due to hazardous disposal packing materials of pre-packed foods is found to be adequate.

**Recommendations**

We would like to recommend 'consumer awareness campaigns' to improve the knowledge and awareness about chemicals in pre-packed foods among consumers. A special focus on digital tools like smart phone-based apps for reading labels on food products can be attempted given the user-friendly features of such apps. We believe this will empower consumers to make informed and healthier choices. It is imperative to include subject courses about food toxicology and environmental impact of plastics and other materials used for packing of foods in school curriculum, to enable future citizens to be equipped with responsibility for safeguarding the environment.

**Acknowledgment:** We extend our sincere gratitude to Dr. A. Balaji, Professor and HOD of Department of Community Medicine - Tagore Medical College and Hospital, for his constant encouragement and support in executing this project. We sincerely thank the management of super markets for permitting us to interact with consumers and conduct this study. Finally we thank the consumers, who have participated in this study and gave us valuable inputs.

**References**

(1)Michael spencer- Food Additives (National College of Food Technology,Weybridge, Surrey

(2)Diehl JF (2002) Some established facts and some new concepts in food toxicology- A review. Acta Alimentaria 31: 355-369

(3)Abdulmumeen HA, Risikat AN, Sururah AR (2012) Food:Its preservatives, additives and applications. InternationalJournal of Chemical and Biochemical Sciences 1: 36-47.

(4) Smith AA, Murali R, et al. (2011) Preservatives in food products- Review. International Journal of Pharmaceutical and Biological Archives 2:583-599.

(5)S.P. Anand and N. Sati -ARTIFICIAL PRESERVATIVES AND THEIR HARMFUL EFFECTS: LOOKING TOWARD NATURE FOR SAFER ALTERNATIVES.

(6)Professor Peter CK Cheung: Food and Nutritional Sciences, The Chinese University of Hong Kong -Use of Food Additives and International Numbering System

(7)https://en.m.wikipedia.org/wiki/International_Numbering_System_for_Food_Additives

(8)Dhruv Sareen - How Food Preservatives May Disrupt Human Hormones and Promote Obesity,Los Angeles, August 9/2017

(9)New cause of high blood pressure, heart disease discovered: Phosphate-rich foods-Veterinärmedizinische Universität Wien

(10)V. A study on the consumer awareness of food additives in packaged food and their effects on health in Abha, Saudi Arabia.

(11)Food Packaging -- Roles, Materials, and Environmental Issues-April 1, 2007 First published in Journal of Food Science. April 2007. 72 (3), R39–R55.

(12) E. Pettry, PhD, R. B. Reneau, Jr., PhD, M. 1. Shanholtz, MD,S. A. Graham, Jr., MD, and C. W. Weston - Soil Pollution and Environmental Health

(13)Olson, G. W.: Application of soil survey to problems of health, sanitation, and engineering. Cornell University Agriculture Experiment Station Memoir No. 387. New York State College of Agriculture,Ithaca, 1964.

(14)https://googleweblight.com/i?u=https://www.nrdc.org/stories/air-pollution-everything-you-need-know&hl=en-IN

(15)Gabor TARNAVOLGYI-Analysis of Consumersí Attitudes Towards Food Additives Using Focus Group Survey

(16)Vijayeta Priyadarshini-Food safety awareness and practices by home makers in Bhubaneswar city.

(17)Kaur VP, Kaur N, Qumar N (2016) Assessment ofconsumer awareness about usage of food labels and itsimpact on food buying behaviour. International Journal of Research-Granthaalayah 4: 10-15

(18)Sree T. Sucharitha , Jarasruthi Muruganantham-FoodSwitch: Can a smart phone app help consumers switch to healthier food choices?

(19)Harsha HN, Jha AK, Taneja KK, et al. (2013) A study onconsumer awareness, safety perceptions and practices aboutfood preservatives and flavoring agents used in packed/canned foods from South India. Natl J Community Med 4: 402-406.

(20)Seetaramaiah K, Anton Smith A, Murali R and Manavalan R: Preservatives in Food Products- Review. Int J Pharm Biol Arch 2011; 2: 583-599

**Conflict of Interest: None**
**Source of funding support:** Nil


**NJRCM: www.commedjournal.in**

**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

# ORIGINAL RESEARCH ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 44-47**

## Dengue control-A nightmare. A descriptive study on dengue fever among hospital attendees at Chennai

Ashrof Raja[1], Prabakaran J[2*], Uma P[2], Sai Sabhareesh H[2], Sivalakshmi R[2], Praveena M[2], Surya G[2], Sachin Aakash R[2], Anushya A[2].

Affiliation: 1.Associate professor, Department of Community Medicine, Madha Medical College& Research Institute, Chennai, 2. MBBS Students, Madha Medical College& Research Institute, Chennai.

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 20-03-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 01-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr.Prabakaran J, M.D., Associate professor, Department of Community Medicine, Madha Medical College& Research Institute, Chennai. Pin 600128. E-mail: prabhakar.psi@gmil.com

### ABSTRACT

**Background:** Dengue is a vector-borne disease that is a major public health threat globally. . In the year 2017, 157220 cases and 250 had been reported in India and the highest and major share from Tamilnadu (23035 cases (14.7%) and 63 deaths (25.2%). **Objectives:** 1.To estimate the knowledge level of dengue among hospital attendees. To understand the attitude and practice of dengue control among study population. **Methods: Study Design:** Cross Sectional Study**. Study Period:** November 2017-December 2017. **Study Setting:** Madha Medical College, Hospital & Research Institute**. Participants:** Hospital attendees **Type of Sampling:** Simple Random Sampling. **Information Collected:** Information related to causes, spread, management and control of Dengue. **Method of data collection:** The information collected from hospital attendees by medical students using Google Forms proforma. **Results:** Only 12(24%) knew the type of mosquito causing dengue correctly while 36(72%) did not know. 16(32%) knew that the particular mosquito causing Dengue breeds in clean water. 36% of subjects have agreed that they have mosquito breeding places nearby. 62 % followed some sort of personal protective measures. Self medication for fever was preferred by 40% of them.20% felt environmental control to be done by Corporation. **Conclusion and Recommendation:** Though the basic knowledge of Dengue fever is favourable, the attitude and practice for the prevention and control of Dengue are unfavourable. The public opinion and involvement is crucial for controlling arthropod borne infections.

**Key-words:** Dengue, Mosquito, environmental control, Personal Protective measures.

## Introduction:

Dengue is a vector-borne disease that is a major public health threat globally which caused by the dengue virus (DENV, 1–4 serotypes) transmitted by ***Aedes aegypti*** mosquito. Amongst these genotypes, the "Asian" genotypes DEN-2 and DEN-3 are frequently associated with severe disease accompanying secondary dengue infections.[1,2]Dengue is widespread throughout the tropics, with risk factors influenced by local spatial variations of rainfall, temperature, relative humidity, degree of urbanization and quality of vector control services in urban areas. Before 1970, only nine countries had experienced severe dengue epidemics. Today, the disease is endemic in more than 100 countries in WHO's African, Americas, Eastern Mediterranean, South-East Asia and Western Pacific regions; the Americas, South-East Asia and Western Pacific regions are the most seriously affected[3].

The mosquito which spreads Dengue is called Aedes aegypti, or also the "yellow fever mosquito". The success of *Ae. aegypti* has largely been due to globalisation. It thrives in densely populated areas which lack reliable water supplies, waste management and sanitation. Historically, *Ae. aegypti* has moved from continent to continent via ships, and this method of dispersal is thought to present the highest risk of introducing this mosquito into continental Europe from Madeira (via ferries).[4]

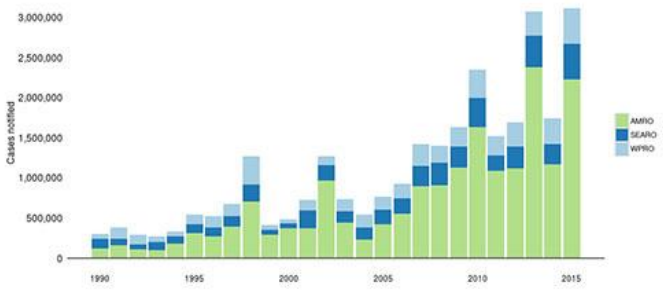



**Figure 1.Notified Dengue cases in different regions of WHO**

The *Aedes aegypti* mosquito is the main vector that transmits the viruses that cause dengue. The viruses are passed on to humans through the bites of an infective female *Aedes* mosquito, which mainly acquires the virus while feeding on the blood of an infected person.Within the mosquito, the virus infects the mosquito mid-gut and subsequently spreads to the salivary glands over a period of 8-12 days. After this incubation period, the virus can be transmitted to humans during subsequent probing or feeding. [5]

The epidemiology of dengue in India was first reported in Madras (now Chennai) in 1780. In the year 2017, 157220 cases and 250 had been reported in India and the highest and major share from Tamilnadu (23035 cases (14.7%) and 63 deaths(25.2%).[6]

In a retrospective analysis made about the Dengue dseases status in Cehnnai between 2006 and 2008, of the 968 patients, 686 (43.0%) were positive, of which 579 (84.0%) were in the paediatric age group (<14 yr) and 107 (15.5%) were adults. The IgM positivity being 356 (36.7%) in males and 330 (52.8%) in females. Of the 686 positives, 113 (16.47%) were positive for both IgM and IgG denoting secondary infection. There was a noticeable increased occurrence during the cooler months and during the monsoon and post-monsoon months.[7] The view of Dengue, prophylaxis and its treatment has also taken a huge step in the right direction in the medical community, with the advent of modern diagnostic and treatment facilities. These allopathic progressions should be made use of, by the patients.[8]

**Objectives:**

1. To estimate the knowledge level of dengue among hospital attendees in Chennai
2. To understand the attitude and practice of dengue control among study population.

## Material& Methods:

**Study Design:** Cross Sectional Descriptive Study

**Study Period:** November 2017-December 2017.

**Study Setting:** Madha Medical College, Hospital & Research Institute

**Participants:** Hospital attendees

**Type of Sampling:** Simple Random Sampling

**Information Collected:** Information related to causes, spread, management and control of Dengue.

**Method of data collection:** The information collected by medical students using Google Forms proforma. Hospital attendees were contacted in the study period and their response collected after their consent.

**Data management:** The saved information at Google Server was downloaded in the form of a Microsoft Excel sheet and the analysis was made.

## Results:

Out of 50 participants, 27(52.1%) were males and 23(47.9%) females residing in sub-urban areas of Chennai with Rs 14,060 average monthly income. All of them knew that mosquito spreads dengue syndrome, seasonal spread and at least one symptoms of dengue. Only 12(24%) knew the type of mosquito correctly while 36(72%) did not know.( Figure 2)

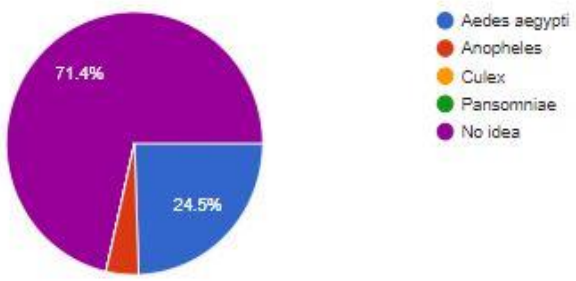



**Figure 2. Organisms Spreading Dengue fever-As per respondent's response.**

Response of day time biting of mosquito was told by 52% of people and anytime by 2%. (Figure 3)

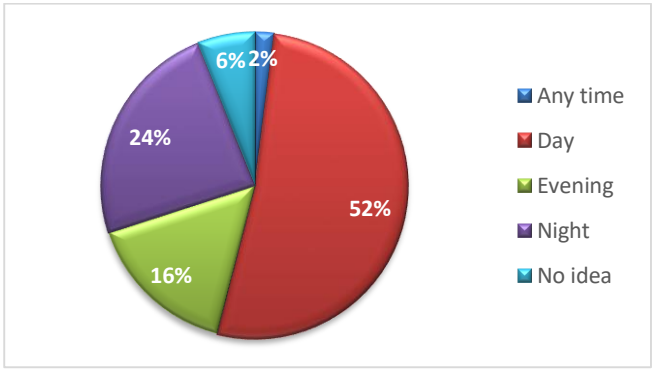



Figure 3. **Biting time of Dengue causing mosquito as responded by participants**

And 16(32%) knew that the particular mosquito causing Dengue breeds in clean water and 24(48%) were of the idea that it was dirty water. Self medication for fever was preferred by 40% of them.(Figure 4) and they contact doctor for immediate treatment.(Figure 5)

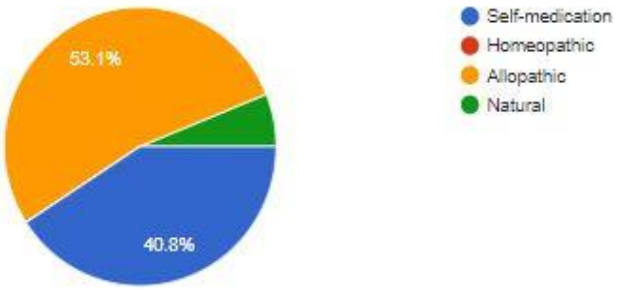


**Figure 4.Respondents's Preferred type treatment for Dengue**

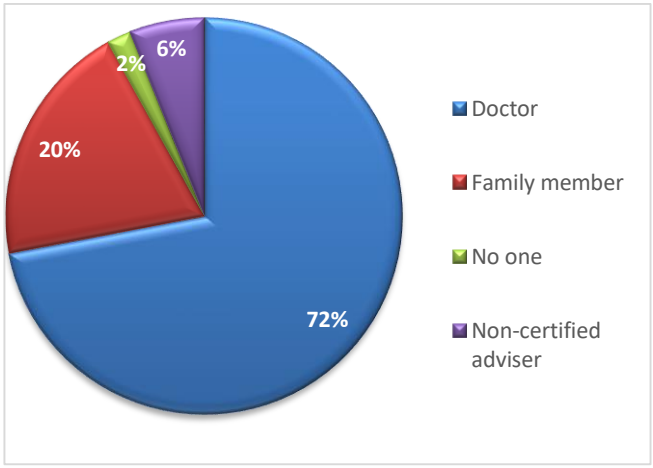



**Figure 5.Immediate Treatment Seeking behavior in case of illness**

Among participants,20% felt environmental control to be done by Corporation. Interestingly, 78% of all subjects had consumed Nilavembu Juice at one time or the other, believing it to have prophylactic properties against Degue.And 44% of subjects felt that strict isolation of the affected patient inside the house, is required to prevent the entire household from acquiring it.

Out of all, 36% of subjects have agreed that they have mosquito breeding places nearby and of those who were hypothetically questioned as to what they would do to such a breeding ground, 57% said that they would fill it with sand. (Figure 6.) For the prevention of mosquito bite, 62 % followed some sort of personal protective measures.

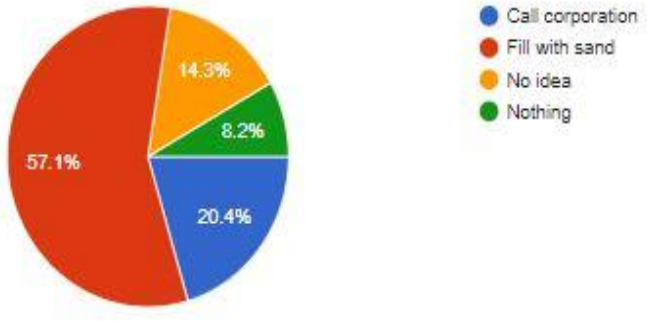



Figure 6.**Action taken for mosquito breeding places by respondent**

## Discussion:

The knowledge amongst lay people in general management of infectious diseases has greatly evolved due to the involvement of mass media. But, some drawbacks do exist in such mass communication, as misleading information finds its way into people's minds just as fast as the accurate information, if not faster. Whilst allopathy is scientifically backed, subject-tested, Ayurveda and Siddha do find their place in people's day-to-day preference of treating their ailments. A similar cross-sectional study in the Caribbean region of Columbia, which analysed the relationship between the knowledge, attitude and practice of Dengue and its prevention, with education in its subjects concluded that "Level of education could be a key determinant of knowledge of the disease and its transmission, as well as attitudes and practices, especially those that involve the integration of community efforts for dengue control."[8]

A certain question in the Google proforma that was used to conduct the study, enquired about the use of a herbal preparation called "Nilavembu Choornam", the efficacy of which in preventing Dengue has always been under question, but a study in mice models has proven the antipyretic, anti-inflammatory and analgesic property of the concoction in Chikungunya fever.[9] This points to the general rich heritage of medicine, even in the lack of education that is present in the area.

Personal protective measures that one can follow, other than the mechanical ways of installing mosquito nets, is using plant based repellents, says a study.[10] An estimated 500 000 people with severe dengue require hospitalization each year, and about 2.5% of those affected die.[11]

Whilst 44% of subjects felt that isolation of the infected is necessary, most of them did not understand that the other members of the household could still get Dengue indirectly from the patent if the entire home wasn't made free of mosquitoes. The people who are inside the house, aren't the only at risk says a study from 2013. Using contact-site cluster investigations in a case-control design, they have demonstrated that, at an individual level, risk for human infection is defined by visits to places where contact with infected mosquitoes is likely, independent of distance from the home. Their data indicates that house-to-house human movements underlie spatial patterns of DENV incidence, causing marked heterogeneity in transmission rates. At a collective level, transmission appears to be shaped by social connections because routine movements among the same places, such as the homes of family and friends, are often similar for the infected individual and their contacts. Thus, routine, house-to-house human movements do play a key role in spread of this vector-borne pathogen at fine spatial scales.[12]

**Limitations:** The study has less sample size and is hence not applicable throughout the entire country, but it does provide valuable insights regarding Dengue notification in medical sector. A study with large sample size can be planned in the future.

**Conclusion and Recommendation:** The basic knowledge about the spread of Dengue is favourable. But, people need to be educated with the colloquial term for the Aedes mosquito, which is "Tiger mosquito" as the proper lay-man identification is critical to the control of spread. Whilst knowledge of prevention of spread and the attitude towards Dengue is half-good, the practice itself lacks in efficacy and urgency. It should be stressed better,

that personal protective measures which are prophylactic are far more efficient in preventing spread, than the treatment. The public opinion and involvement is crucial for controlling arthropod borne infections.

**Acknowledgment:** The authors acknowledge the medical students that helped conduct the study and the highly compliant hospital management of Madha Medical Hospital, Kundrathur which provided the area for study.

## References:

1. WHO. Dengue Control .What is Dengue. Accessed at http://www.who.int/denguecontrol/disease/en/
2. Srinivasa Rao Mutheneni, Andrew P Morse, Cyril Caminade, and Suryanaryana Murty Upadhyayula. Dengue burden in India: recent trends and importance of climatic parameters. Emerging Microbes & Infections .2017; 6, e70. Available: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5583666/pdf/emi201757a.pdf
3. WHO. Dengue Control-Epidemiology. Accessed at http://www.who.int/denguecontrol/epidemiology/en/
4. European Centre for Disease Prevention and Control. Aedes aegypti - Factsheet for experts. Available at https://ecdc.europa.eu/en/disease-vectors/facts/mosquito-factsheets/aedes-aegypti
5. WHO. Dengue Control. The mosquito. Available at http://www.who.int/denguecontrol/mosquito/en/
6. GoI. NVBDCP. Dengue Cases and Deaths in the Country since 2010. Available: http://nvbdcp.gov.in/den-cd.html
7. P. Gunasekaran, K. Kaveri, S. Mohana, Kavita Arunagiri, B.V. Suresh Babu, P. Padma Priya, R. Kiruba, V. Senthil Kumar, and A. Khaleefathullah Sheriff. Dengue disease status in Chennai (2006-2008): A retrospective analysis. Indian J Med Res. 2011 Mar; 133(3): 322–325.Available at https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3103159/
8. Diaz-Quijano FA, Martínez-Vega RA, Rodriguez-Morales AJ, Rojas-Calero RA, Luna-González ML, Díaz-Quijano RG. Association between the level of education and knowledge, attitudes and practices regarding dengue in the Caribbean region of Colombia. BMC Public Health. 2018 Jan 16;18(1):143. doi: 10.1186/s12889-018-5055-z. Availbale at; https://www.ncbi.nlm.nih.gov/pubmed/29338712
9. Anbarasu K, Manisenthil KK, Ramachandran S. Antipyretic, anti-inflammatory and analgesic properties of nilavembu kudineer choornam: a classical preparation used in the treatment of chikungunya fever. Asian Pac J Trop Med. 2011 Oct;4(10):819-23. doi: 10.1016/S1995-7645(11)60201-0. Avialble at https://www.ncbi.nlm.nih.gov/pubmed/22014740
10. Rajkumar S, Jebanesan A. Prevention of Dengue fever through plant based mosquito repellent Clausena dentata (Willd.) M. Roem (Family: Rutaceae) essential oil against Aedes aegypti l. (Diptera: Culicidae) mosquito. Eur Rev Med Pharmacol Sci. 2010 Mar;14(3):231-4. Available at https://www.ncbi.nlm.nih.gov/pubmed/20391964
11. WHO. Dengue and severe dengue. Available at http://www.who.int/mediacentre/factsheets/fs117/en/
12. Steven T. Stoddarda, Brett M. Forshey, Amy C. Morrison, Valerie A. Paz-Soldanf , Gonzalo M. et,.al. House-to-house human movement drives dengue virus transmission. PNAS.2013;11093):994-99. Available at. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3549073/

**Conflict of Interest: None**
**Source of funding support:** Nil


**NJRCM: www.commedjournal.in**

**ISSN - Print: 2277 – 1522; Online: 2277 – 3517**

# SHORT ARTICLE

**doi: 10.26727/NJRCM.2018.7.3i** **Year: 2018 Vol: 7 Sup. Issue: 1. Aug Page: 48-51**

## Pictorial warning labels and Tobacco Consumption: Awareness and perceptions among young adults in Chennai.

Sree. T.Sucharitha[1] , K.A.V.S Shivaashish[2]

**Affiliation:** 1 Associate Professor, Tagore Medical College and Hospital, Chennai, India, 2 MBBS student, Tagore Medical College and Hospital, Chennai, India.

| | | | |
|---|---|---|---|
| **Date of Submission** | **: 30-04-2018** | **Date of online Publication** | **: 31-08-2018** |
| **Date of Acceptance** | **: 02-08-2018** | **Date of Print Publication** | **: 31-08-2018** |

***Author for correspondence**: Dr. Sree T.Sucharitha, Associate Professor, Department of Community Medicine, Tagore Medical College & Hospital, Chennai – 600127. E-mail: sucharithat2@gmail.com

**ABSTRACT**

Background: Pictorial warnings labels (PWL) that use photographs of real people whose health has been affected by smoking (testimonial PWL) provide factual information about the consequences of tobacco consumption. Pictorial warning labels are effective in promoting smoking cessation as shown by research in the developed countries. The government of India has also introduced pictorial warnings as one of the strategies among different tobacco control strategies. Objectives: The objective of this study was to find the awareness about pictorial warning labels and perception about pictorial warning labels' impact on tobacco consumption practices among young adults in Chennai. Methods: A cross-sectional study was conducted using convenient sampling and 183 participants including medical, engineering students and IT professionals were included in the study after obtaining oral informed consent. Results: Among 251 participants, 112(45%)were tobacco smokers, 149(59.1%) were males, and 409(16.3%)were under the age group of 18-21 years. Numbers (45% )of the study participants felt that pictorial warning labels were informative but will not impact considering quitting of tobacco usage. Numbers 59.1% of the study participants felt that tobacco consumers were not influenced by these labels. Only Numbers 16.3% of the study participants felt that it motivates non-smokers not to smoke.Conclusion: The perception among tobacco consumers reveals that pictorial warning labels are not effective in impacting the smokers to quit smoking.

**Key words:** : Pictorial warnings labels (PWL), factual information, testimonial PWL, tobacco consumption, young adults

**Introduction:**

Tobacco is most common modifiable risk factor for preventable disease and death in the world causing nearly 6 million deaths per year.[(1)]Around five million of those deaths are the result of direct tobacco use while more than 600,000 are due to non-smokers being exposed to second-hand smoke. One person dies every six seconds due to tobacco. Up to half of current users will eventually die of a tobacco-related disease. [(2)]

The growing use of tobacco is causing a great concern around the world due to increasing burden of non-communicable diseases (NCD'S) like ischemic heart diseases, cancers, diabetes mellitus-2, chronic respiratory diseases.[(3)] World health organization data shows that 30-80 million people die annually due to NCD's.[(4)] While tobacco packaging is a key part in marketing as it makes tobacco promotion more appealing[(5)] for manufacturers, messages on cigarette packs such as pictorial warning labels (PWL) would also offer an opportunity to provide information based on scientific facts to the consumers. The combination of high exposure, nearly universal reach, and very low cost has made pictorial warnings on cigarette packs a core tobacco control strategy globally.[(6)] The WHO Framework Convention on Tobacco Control (FCTC) demanded for the implementation of large warnings on tobacco products. The treaty's Article 11 describes that health warnings may include pictures, and also released guidelines for signatory countries across the world for implementation of pictorial warnings labels on packets. The evidence shows that PWL are 'far more effective' than text-only messages.[(7)] By 2015, implementation of pictorial warning policies had occurred in 77 countries/jurisdictions covering nearly 50% of the world's populations.[(8)] Among lower socio-economic group who are also major tobacco consumers, pictorial warning labels, were found to be more effective [(9)].

In India, NCDs are estimated to account for 53% of all deaths as per WHO statistics for 2010. Of these deaths, cardiovascular diseases and diabetes are the most common causes of deaths in India[(10)]. Research into the impact of pictorial warning labels on cigarette packs is essential to measure it's success as anti-tobacco strategy. Observational studies suggest increased cessation behaviour after the introduction of pictorial warnings, and such studies typically have high external validity.[(11)]

**Objectives:** In this study we aim to assess the awareness about pictorial warning labels among adults in Chennai and to assess the perception about pictorial warning labels

and their impact on tobacco consumption among adults in Chennai.

**Methodology:**

This was a cross sectional study done among professional college students and software professionals of Chennai during February-March 2018.Non-probabilistic, convenient sampling method was adopted and permission was obtained from the tea/coffee shop owners to conduct this survey among their consumers. Adults aged 18-35 years were approached at tea corners or coffee shops and were explained about the purpose of the study and were asked to fill the questionnaire. Women were also included in the study as we felt that they are exposed to second hand smoke at home, work-places and public-places. After obtaining written informed consent, a questionnaire-based survey through self-administration was conducted during evenings. The questionnaire included socio-demographic features of the study participants, a set of questions assessing their awareness about pictorial warning labels, recollection of the message accompanying PWLs on the cigarette packets, and perception on impact of pictorial warning labels on tobacco consumption behaviour of the tobacco users. The data is entered into the Ms-excel and SPSS version 21 for the analysis of the data.

**RESULTS:**

The results obtained from 251 participants obtained were presented here. The table 1 depicts socio-demographic features of the study participants. Majority were males 196(62.6%) and less than 25 years of age as compared to 31(20%) of females. 19(6.07%) study participants were males belonging to 26-34 years as compared to 5(1.5%) of females. 193(61.6%) of males have a professional degree as compared to 31(21%) of females. 18(5.7%) of males were software engineers as compared to 9(2.8%) of females. Majority 82(63.5%) of males were hailing from urban setting as compared to 82(25.1%) of females and 20(6.3%) of males are rural as compared 12(3.8%) of females.

**Table 1: Socio-demographic features of study participants**

| **Age** | **Males N (%)** | **Females N (%)** |
|---|---|---|
| <25 years | 196(62.6%) | 31(20%) |
| 26-34 years | 19(6.07%) | 5(1.5%) |
| Total | 215(68.67%) | 36(21.4%) |
| **Education** | **Males N (%)** | **Females N (%)** |
| Professional degree | 193(61.6%) | 31(21%) |
| Software engineers | 18(5.7%) | 9(2.8%) |
| Total | 211(67.3%) | 81(25.8%) |
| **Residence** | **Males N (%)** | **Females N (%)** |
| Rural | 20(6.3%) | 12(3.8%) |
| Urban | 82(63.5%) | 82(25.1%) |
| Total | 102(69.8%) | 94(28.9%) |

**Table 2: Knowledge about pictorial warning labels among study participants**

| **KNOWLEDGE** | **N** | **%** |
|---|---|---|
| **Heard of PWL** | | |
| Yes | 211 | (84.1%) |
| No | 40 | (15.9%) |
| **Recollect seeing PWL** | | |
| Yes | 185 | (74%) |
| No | 45 | (18%) |
| **Conversation about PWL** | | |
| Yes | 182 | (78%) |
| No | 54 | (22%) |
| **Recollecting on the spot** | | |
| Yes | 174 | (69.3%) |
| No | 77 | (30.7%) |

**Table 3: Perception about pictorial warning labels among study participants**

| **Characteristic of PWLs** | **Total participants (N%)** | **Smokers (%)** |
|---|---|---|
| Informative but will not impact considering quitting | 109(43.5%) | 100(40%) |
| Informative and compelling to quit smoking | 34(13.7%) | 31(12.2%) |
| Informative about health outcomes such as cancer only | 62(25%) | 71(28.4%) |

As seen in Table 2,majority 211(84.1%) of study participants have heard of PWL as compared to only 40(15.9%) of the smokers who had never heard of them. Around 185(74%) of study participants could recollect seeing PWL and 82(78%) said that they had a conversation about PWLs before. Also, 174(69.3%) of respondents had recollected PWLs' on the spot and were able to narrate the description of the labels along with the message to the researchers.

According Figure 1,among 251 study participants , 98(39.4%) were current smokers, and also 34(13.7%) current smokers are considering quitting,16(6.4%) were past smokers and currently non-smokers,24(9.6%) were occasional smokers and 77(30.9%) were never smokers.

According to Table 3, 109(43.5 %) of participants felt that pictorial warning labels on cigarette packets are informative but will not impact quitting tobacco usage, only 34(13.7%) of total participants believed that pictorial warning labels are informative and compelling to quit smoking.

As per Table 3, among smokers 100(41%) of them felt that pictorial warning labels are informative but will not impact considering quitting and 31(12.2%) of them felt that pictorial warning labels are informative and compelling to quit smoking and 71(28.4%) of the smokers

felt that pictorial warning labels are informative about health outcomes such as cancer only.

**Figure 1 : Tobacco consumption practices among study participants**

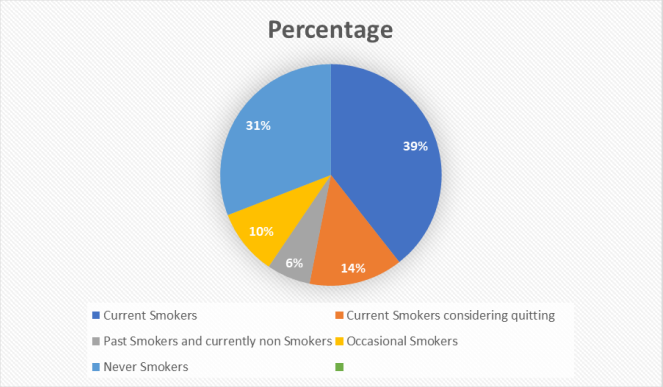
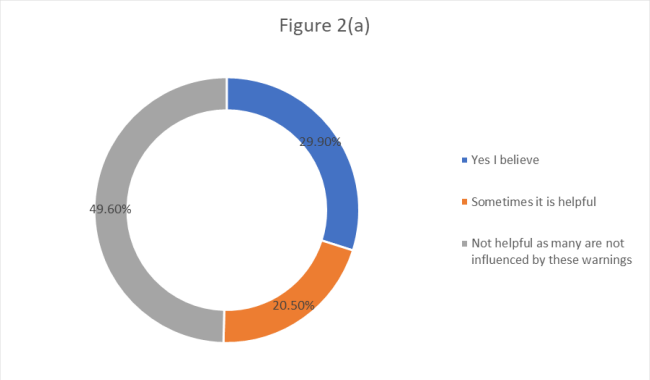
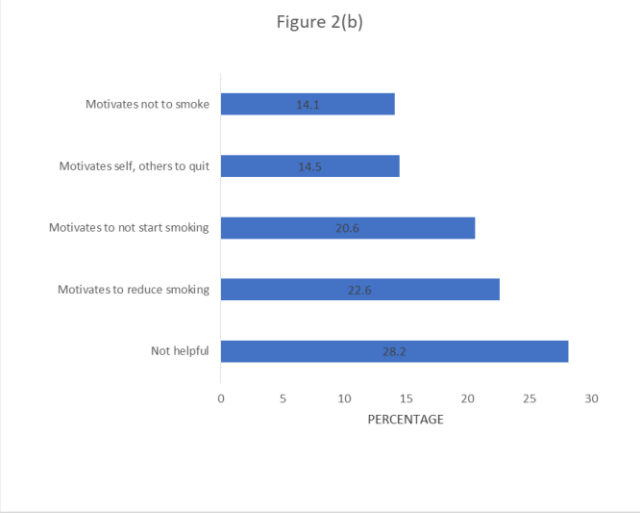



**Figure 2 : Belief on pictorial warning labels impacts on study participants(a) and smokers(b)**




According Figure 2(a) among 251 study participants,121(49.6%) of study participants felt that pictorial warning labels are not helpful as majority are not influenced by these warnings and just 73(29.9%) believe that pictorial warning labels is an effective strategy to reduce the burden of smoking, and only 50 (20.5%) felt it may help in some consumers

According Figure 2(b) among smokers 70(28.2%) feel that pictorial warning labels are not helpful as majority are not influenced by these warnings, only 56(22.6%) believed that pictorial warning labels motivates the smokers to reduce smoking and further 51(20.6%) of the study participants felt that pictorial warning labels will motivates smokers not to smoke. Around 36(14.5%) of the smokers motivated themselves not to smoke and others to quit, and 35(14.10%) of the study participants felt that pictorial warning labels motivates non smokers not to smoke.

According to Table 3,among 251 respondents 117(57%) of respondents have responded positively that pictorial warning labels have an impact on quitting tobacco usage as compared to 89(45.2%) who were negative towards pictorial warning labels having any impact on quitting tobacco usage. The respondents who were affirmative, are smokers and they have said that 79(53%) that pictorial warning labels have helped them to reduce the number of cigarettes they smoke per day and also made them less interested in smoking.

**Table 5 : Impact of pictorial warning labels on tobacco cessation among smokers(N=207)**

| Characteristic | N (%) |
|---|---|
| Consulted a counsellor for tobacco cessation | 28(19%) |
| Joined therapy for tobacco cessation | 20(13%) |
| Successfully quit smoking | 19(13%) |
| Diseases doesn't affect them | 53(37.1%) |
| PWLs are not scariest enough to consider quitting | 29(20%) |
| Craving for smoking is more stronger than the scariness of the picture | 56(39.2%) |

According to Table 5, among smokers, 28(19%) of my study population had consulted a counsellor after viewing pictorial warning labels to reduce or to stop smoking, and 20(13%) joined therapy to stop smoking and 19(13%) had successfully quit smoking after viewing pictorial warning labels. Study participants who were negative towards PWLs i,e 56(39.2%) said that craving for smoking is more stronger than the scariness of the picture and also 53(37.1%) felt and think that those diseases doesn't effect them. 29(20%) think that PWLs are not scary enough to consider quitting.

**DISCUSSION:**

This study among adults including professional college students such as medicos and engineers as well as IT professional revealed mixed results regarding the impact of PWLs on consumption behaviours of tobacco among youth. The heightened awareness about PWLs can be attributed to sustained campaigns against tobacco consumption.

Only 22.6% of our study participants felt that pictorial warning labels are helpful to reduce smoking compared to 33% in Tehren ([13]), 38% in Andhra Pradesh[14] . Also, 49.6% of my study population feel that pictorial warning

labels are an effective way to reduce the burden of smoking in comparison to 38% in European countries [15].

Among smokers, 28.2% of my study population self-admitted that pictorial warning labels influenced their smoking behaviours as compared to 33% in Australia[16] and in Punjab[17]. Also inputs were shared that pictorial warning labels are visually impressive and made them to think about cessation of smoking but when it comes to implementing it they are feeling like those diseases doesn't affect them and they are continuing smoking. This is the real challenge in public health when knowledge and awareness do not effectively translate into health promoting behaviour such as smoking cessation among smokers. Age-specific awareness sessions with strong emotional appeal and peer-support networks will enable smokers to be strongly involved in preserving their own well-being.

Among smokers, 34(13.7%) have accepted that pictorial warning labels have made them to stop smoking because of the labels depicting fatal health outcomes such as cancer . This is similar as in 27% in Punjab[17]. and also Australia (28%) [16] where in smoking burden fell in half compared to last fifteen years after implementing pictorial warning labels.

Among smokers, 13.6% considered quitting smoking due to pictorial warning labels compared to 17.6% in Mexico[18] and 18.8% in Urugway[19]. This is explained in their own words, that they are not able to cease smoking because the urge and addiction make it difficult for them to stop. This reveals that there is lack of awareness about smoking cessation programs and also non-willingness to participate in such programs as they require strong determination to overcome the habitual addiction to tobacco.

Also, in 20.6% participants opined that pictorial warning labels motivate to not start smoking among non smokers comparable to 21.2% in USA[20]. Among my study participants some people felt that pictorial warning labels are more effective on non-smokers rather than on smokers as it is motivating non-smokers not to smoke. This also provides the scope for working on alternative strategies to address tobacco consumption among smokers, which can focus on peer support such as Alcoholic Anonymous to encourage smokers to quit smoking tobacco.

**CONCLUSION:** Adequate levels of awareness (86%) on pictorial warning labels was found among professional college students and it professionals. Though pictorial warning labels are deemed informative, the youth are not impressed by them to help them quit smoking tobaccos.

**Acknowledgment:** We extend our sincere gratitude to Dr. A. Balaji, Professor and HOD of Department of Community Medicine - Tagore Medical College and Hospital, for his constant encouragement and support in executing this project. And we also thanks to the study participants for their active participation and valuable insights shared with us.

**REFERENCES :**

1. Kowitt, Sarah D.1 Noar, Seth M.2,3; Ranney, Leah M.4 - Public attitudes toward larger cigarette pack warnings: Results from a nationally representative U.S. sample. PLoS ONE. 3/2/2017, Vol. 12 Issue 3, p1-14. 14

2.3.Leanne Riley and Melanie Cowan - WHO. Non-communicable Diseases Country Profiles. 2014. Available from http://apps.who.int/iris/bitstream/10665/128038/1/9789241507509_eng.pdf. Accessed on 20th September 2014.

4. Wakefield M, Morley C, Horan J, et al- The cigarette pack as image: new evidence from tobacco industry documents. Tob Control 2002;11

5. Durkin S, Brennan E, Wakefield M.- Mass media campaigns to promote smoking cessation among adults: an integrative review. Tob Control 2012;21:127–38.

6. World Health Organization- WHO framework convention on tobacco control. Geneva, Switzerland, 2003.

7. Canadian Cancer Society- Cigarette package health warnings: international status report. Canada, 2014

8.GATS India Report 2009-2010- Available from http://mohfw.nic.in/WriteReadData/l892s/1455618937GATS%20India.pdf. Accessed on 18th September 2014

9. Talhout R, Schulz T, Florek E , Benthem J, Wester P, Opperhuizen A.- Hazardous Compounds in Tobacco Smoke. Int. J. Environ. Res. Public Health 2011;8:613-28.

10.Hoda jradi - Graphic warnings and text warning labels on cigarette packages in Riyadh Kingdom of Saudi Arabia: Awareness and perceptions

11. Conference of the Parties to the WHO FCTC WHO Framework Convention on Tobacco Control-Geneva, Switzerland: WHO; 2003. Available from: http://www.who.int/fctc. [Last accessed on 2016 Oct 04]

12. Borland R, Yong H, Wilson N, et al.-How reactions to cigarette packet health warnings influence quitting: findings from the ITC Four-Country survey. Addiction 2009.

13. Gholam reza heydari- the Impacts of cigarette packaging pictorial warning labels on smokers in the city of tehren.

14.B.Rekha and S.anjum -Effectiveness of pictorial warning labels on tobacco packs; Hospital – based study findings from vikarabad.

15.Luk joossens, brussels -Advocacy officer, Association of European cancer leagues; 2007,jan,icited on 2009 nov 1].[Homepage on the internet]. The effectiveness of pictorial warning labels on tobacco products.

16.White V, Hill,siapush m,bobevsld-How has the prevalence of cigarette smoking changed among Australian adults? Trends in smoking prevalence between 1980 and 2001.

17.Grover V, Malhothra R ,Bhatia A.-tobacco/smoking habits, oral health status and awareness about anti smokingact in patients visting to national dental college and hospital,Gulbgarh,Mohali,Punjab: A cross -sectional survey. J Indian assoc public health dent.

18. Jamaes f.thrasher- can pictorial warnoing labels on cigarette packages addresses smoking-related health disparities?: Field experiments in Mexico to asses warning label content.

19.Marissa G.hall, Coral gartner;Academic editor and britta Wigginton-Academic Editor Social interactions sparked by pictorial label warning labels on cigarette packets.

**Conflict of Interest: None Source of funding support:** Nil



**NJRCM: www.commedjournal.in**


National Journal of Research in Community Medicine