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Original research article

Assessment of the knowledge, attitude and practices regarding household solid waste disposal among housewives in the urban area of Nanded city of Maharashtra: A community based cross-sectional study

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Abstract

Context: People must have good practices regarding household waste disposal in their homes. Moreover, Poor waste disposal practices lead to contamination of environment there by increasing the burden of infection and diseases among the peoples. Practices can be improved by providing knowledge regarding household waste disposal.

Objectives: To determine the knowledge, attitude and practices towards household solid waste disposal among housewives in urban area of city.

Method: A community based cross sectional study was conducted among housewives in urban area of Nanded city in Maharashtra, India. A total of 210 housewives were included in to the study. A face-to-face interview was conducted using a pretested semi-structured questionnaire to assess the knowledge, attitude and practices among the housewives regarding disposal of household solid waste. Data was entered and analyzed using SPSS software.

Results: Among the 210 Housewives demographic variables shows that 50% belonged to 20 to 29 years, 23% belonged to 30 to 39 years and 27% is belongs to 40 and above age group; 58% are Hindu,31% are Buddhist and 11% are Muslim religion. 30% are belongs from Illiterate to Primary education, 34% are belonged from Primary to Intermediate education, 36% belonged to Graduation and above; 46% have less than equal to 4 members in their home, 45% have 5-8 members in their home and 9% have 9-12 members in their home; 44% have information from Mass media, 40% have information from waste disposal agencies and 16% have information from others like Poster, Banner and Neighbors etc., 20% belongs to Class I, 34% belongs to Class II and 46% belongs to Class III &IV according to their family's Socioeconomic status. This study shows 29%, 25%, 46% of housewives were having adequate, moderate and inadequate knowledge score respectively; also 26%, 20%, 54% of housewives is having positive, average and negative attitude level respectively; and 20%, 20%, 60% of housewives having good, average, and poor practices score respectively.

Conclusion: There is significant association between the knowledge of the Housewives regarding household solid waste disposal and demographic variable that is age, source of information and socioeconomic status. The knowledge regarding household waste disposal in the most of Housewives was found good. In spite of good knowledge, the Housewives having poor practices regarding waste disposal.

Keywords: Solid waste, household, knowledge, attitude, practices, waste disposal, environment

Introduction

A clean environment influences good health and improves quality of human's life. Awareness and

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education is very necessary about waste disposal for household people [1]. Proper waste disposal is important for protection of environment. Poor knowledge about waste disposal is the major Problem for human health. Waste container and dustbins are very important need for dispose of waste. Due to lack of knowledge and insufficient availability of dustbins in homes people are faced many problems [2]. People must have positive attitude towards household waste disposal. The attitude of people towards waste disposal is affected by their level of knowledge. Most of peoples due to lack of knowledge does not used the dustbins. Open defecation poses the serious threat to the health of peoples [3]. People must have good practices regarding household waste disposal in their homes. Moreover, Poor waste disposal practices lead to contamination of environment there by increasing the burden of infection and diseases among the peoples. Practices can be improved by providing knowledge regarding household waste disposal. Waste disposal Mass media, television, radio, all can play an important role in improvement of knowledge and practice regarding waste disposal [4].

Swachh Bharat Mission (SBM) was launched on 2nd of October, 2014 with a vision to achieve a clean India as a tribute to the father of the nation, Mahatma Gandhi, on his 150th birth anniversary, in 2019. SBM is being implemented by the Ministry of Urban Development (MoUD). Municipal Solid Waste Management (MSWM) a major component of the SBM (urban) "refers to a systematic process that comprises of waste segregation and storage at source, primary collection, secondary storage, transportation, secondary segregation, resource recovery, processing, treatment, and final disposal of solid waste [5]". Solid waste is the unwanted or useless solid materials generated from combined residential, industrial and commercial activities in a given area. It may be categorized according to its origin (domestic, industrial, commercial, construction or institutional); according to its contents (organic material, glass, metal, plastic paper etc.) or according to hazard potential (toxic, non-toxin, flammable, radioactive, infectious etc.) [6]. Management of solid waste reduces or eliminates adverse impacts on the environment and human health and supports economic development and improved quality of life [7].

A significant portion of the population does not have access to primary waste collection service and only 50 to 70% of waste collected is transported for disposal. Processing and treatment of waste is limited and final disposal is in unscientific dumpsites, posing problems of ground and water contamination and air pollution [5]. Around the world, waste generation rates are rising. In 2020, the world was estimated to generate 2.24 billion tonnes of solid waste, amounting to a footprint of 0.79 kilograms per person per day. With rapid population growth and urbanization, annual waste generation is expected to increase by 73% from 2020 levels to 3.88 billion tonnes in 2050 [8]. Globally, million tons of municipal solid waste are generated every day and India with the fastest growing economy and as the second most populated country in the world, facing a major challenge in handling solid waste [9, 10]. Nanded-Waghala Municipal Corporation (NWMC) is responsible for collection, storage, segregation, transportation and disposal of all solid waste generated in the city. Nanded is the 2nd largest city in Marathwada in Maharashtra with an area of 51.76 km^2 and population of 550439 as per 2011 census. In Nanded the estimated current waste generation in Nanded-Waghala is around 257.32TPD from all sources. The waste generation rate is about 380 grams/capita/day. 32 Tata ape and 60 Tractor Trolley used to collect waste door to door, collecting per day; 80 percent of households have door to door coverage; 20 percent of households provide segregated waste. In an attempt to make Nanded a "Zero garbage discharge" city, the Nanded-Waghala Municipal Corporation (NWMC) implemented rules for all societies in the city and advised to use different colored bins to store household wet waste in green bins; dry waste in Blue bin and domestic hazardous waste in black bins at their own house levels [5]. The output of daily waste depends upon the dietary habits, life styles, living standards and the degree of urbanization and industrialization. There is a correlation between improper disposal of solid wastes and incidence of vector-borne diseases. In all civilized countries, there is an efficient system for its periodic collection, removal and final disposal without risk to health**.** Women play an important role in household waste management in the family; if she has adequate knowledge on it, she can educate her children, family members and neighbors. This paper attempts to assess the attitude, perception, practices and general information regarding collection, segregation, transportation, recycling and disposal of household waste among housewives residing in selected urban area of Nanded city [5, 11].

Aim: To assess the knowledge, attitude and practices regarding household solid waste disposal among the housewives.

Objectives

1. To assess the knowledge, attitude and practices regarding household solid waste disposal among the housewives in selected urban areas of Nanded City, Maharashtra.
2. To find out the association between knowledge score, attitude level and practices regarding household solid waste disposal among the housewives with their selected demographic variables.

Materials and Methods

Methodology research: Approach: Research approach for the study is quantitative.

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Research design: An exploratory descriptive survey design

Conceptual framework: Dr. Nola J. Pender developed the Health Promotion Model (HPM) that is used universally for research, education, and practice. According to this theory health promotion model focuses on helping people achieve higher levels of wellbeing through health promotion strategies like, educate the people, and change their behavior and practices to promote the health. Through this model enhance the Knowledge, attitude and practices of people. Through this model assess the Knowledge and give awareness about different types of waste. Modify the people attitude and thinking regarding waste disposal and can improved the practices about different method of waste disposal [12].

Variables under study: The study variables are knowledge, attitude and practices among the Housewives on household waste disposal. Demographic variables are age, religion, education, family member in the household, source of information of household solid waste disposal and family's socioeconomic status.

Sampling technique & procedure: 30x7 stage cluster sampling method is used [13]. There are 79 wards in the urban area of city. Arranging the all 79 wards of the city as per chronological order from 1 to 79 along with their total population and using Probability proportionate sampling method [14] 30 wards selected. 7 households are randomly selected from this selected ward.

Sample size: 210 Housewives residing in the selected municipal corporation area of City.

Inclusion criteria
- The study includes Housewives that have been dwelling in the respective place at least 6 months prior to the time of interview.
- Housewives who present at the time of data collection.
- Housewives who can read and write in Marathi, Hindi or English.

Exclusion criteria
- Housewives who have prior scientific knowledge regarding household waste disposal.
- Housewives who are employed.

Ethical consideration
- Formal and administrative permission was taken from the concerned authorities.
- Consent from the subject before the data collection.
- Confidentiality of the data of the subject.

Methodology: The study was carried out from 01 January 2023 to 31 April 2023. A responsible Housewives from each household was chosen and a face-to-face interview was conducted using a pretested semi-structured questionnaire after obtaining their informed consent. The demographic performance, structured knowledge, attitude and practices questionnaire were developed by an extensive review of research and non-research literature regarding household waste and its management. Individual discussion with guide, peer groups, and own experiences also helped in the development of questionnaire [15-16]. It had parts that are multiple choice questions and others that are open ended to allow the households to express their attitude and perception of specific areas within the services by the local body. The socioeconomic status was assessed using modified BG Prasad classification [17]. The responses were entered through Epi-info application on android mobile devices. Information regarding socio-demographic characteristics of the study participants, their perception about different methods of waste disposal and its harmful effects on health and environment etc. were documented. Likewise, participant's opinion regarding segregation of waste at the source and responsibility of keeping the community clean were recorded to assess their attitudes. The household's method of waste collection and storage practices were observed with help of a checklist. A score of "1" was given to all correct answer while a score of "0" given to all wrong answer to find out the household solid waste and its disposal management among the housewives [18, 19].

Statistical analysis: Data was analyzed using SPSS version 15.0 and was summarized as frequencies and percentages and expressed as percentages. Knowledge score, attitude level and practices score will be analyzing by computing frequency percentage of answered question. Chi-square test and p value will be used to determine the association.

Results

Description of demographic variables of housewives: Majority of Housewives was aware about adverse

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effects of improper waste disposal on environment and harmful effect on human health if it disposed on open place. Housewives was poor knowledgeable about Dry and Wet household waste.

Table 1: Frequency and percentage distribution of housewives according to socio demographic variables (n=210)

Sr. No.	Demographic Variables	Categories	Frequency	Percentage
1.	Age	20-29 years	105	50%
		30-39 years	49	23%
		40 and above	56	27%
2.	Religion	Hindu	121	58%
		Buddhist	66	31%
		Muslim	23	11%
3.	Education	Up to Primary education	62	30%
		Up to Intermediate	72	34%
		Graduation & Post-graduation	76	36%
4.	Size of family	Less than equal to 4 members	97	46%
		5-8 members	95	45%
		More than equal to 9 members	18	9%
5.	Source of information	Mass media	92	44%
		Waste disposal agencies	83	40%
		Others	35	16%
6.	Socio-Economic Status	Class I	43	20%
		Class II	71	34%
		Class III & IV	96	46%

It was seen from **Table 1** that among the 210 housewives, 50% belonged to 20 to 29 years age group, 23% belonged to 30 to 39 years age group and 27% is belongs to 40 and above age group and 58% are Hindu,31% are Buddhist and 11% are Muslim, Religion. 30% are belongs from Illiterate to Primary education, 34% are belonged from Primary to Intermediate education, 36% belonged to Graduation and above, 46% have less than equal to 4 members in their home, 45% have 5-8 members in their home and 9% have 9-12 members in their home.44% have information from Mass media, 40% have information from waste disposal agencies and 16% have information from others like Poster, Banner and Neighbors etc., 20% belongs to Class I, 34% belongs to Class II and 46% belongs to Class III &IV according to their family's Socioeconomic status.

Findings of knowledge, attitude and practices regarding household solid waste disposal:

Table 2: Depict knowledge, attitude and practices score of housewives regarding household solid waste disposal

Knowledge		Attitude		Practices	
Score	**Frequency (%)**	**Level**	**Frequency (%)**	**Score**	**Frequency (%)**
Adequate (> 75%)	61 (29%)	Positive (> 75%)	55 (26%)	Good (> 75%)	43 (20%)
Moderate (51-75%)	52 (25%)	Neutral (51-75%)	43 (20%)	Satisfactory (51-75%)	42 (20%)
Inadequate (< 50%)	97 (46%)	Negative (< 50%)	112 (54%)	Poor (< 50%)	125 (60%)
Total	210 (100%)	Total	210 (100%)	Total	210 (100%)

As seen from Table 2 that among the 210 housewives 29% of housewives have adequate knowledge, 25% have moderate knowledge and 46% have inadequate knowledge.

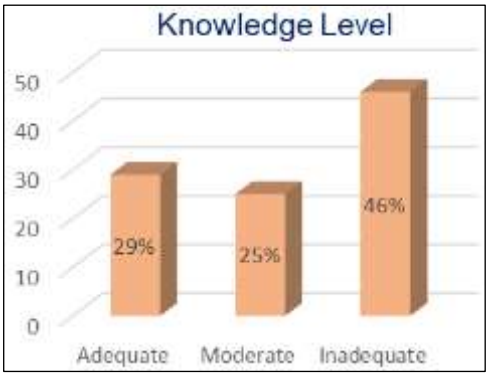

Fig 1: Percentage distribution of housewives knowledge regarding household waste disposal

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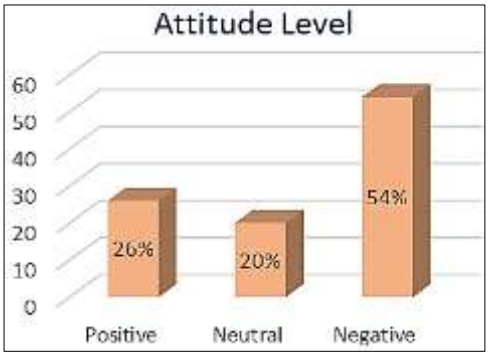

Fig 1: Percentage distribution of housewives attitude regarding household waste disposal

Fig. 1 shows that 26% of housewives have Positive attitude, 20% have Neutral and 54% have Negative attitude.
Fig. 2 shows about 20% of housewives have good practice, 20% have average and 60% have poor practices
Fig. 3 revealed regarding household solid waste disposal.

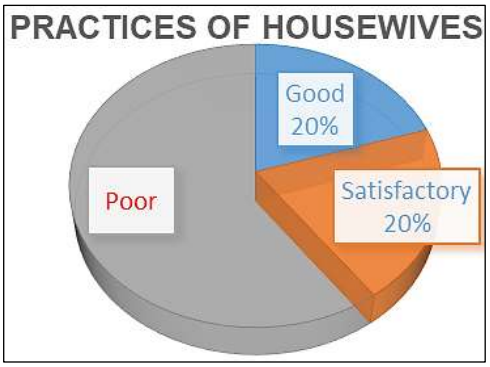

Fig 3: Practices of housewives on household solid waste disposal

Table 3: Association between demographic variables and Knowledge Score

Sr. No.	Demographic Variables	Categories	Knowledge Score			X2-Value	P-Value
			Adequate	Moderate	Inadequate		
1.	Age	20-29 years	40	15	50	14.81	0.005*
		30-39 years	10	18	21		
		40 and above	12	19	25		
2.	Religion	Hindu	43	28	50	7.40	0.115
		Buddhist	17	17	32		
		Muslim	2	7	14		
3.	Education	Up to Primary education	13	14	35	9.03	0.060
		Up to Intermediate	18	21	33		
		Graduation & Post-graduation	31	17	28		
4.	Size of family	Less than equal to 4 Members	28	26	43	2.25	0.688
		5-8 members	31	21	43		
		More than equal to 9 members	3	5	10		
5.	Source of information	Mass media	34	23	35	11.59	0.020*
		Waste disposal agencies	14	23	46		
		Others	14	6	15		
6.	Socio-economic status	Class I	9	15	19	11.65	0.020*
		Class II	30	10	31		
		Class III & IV	23	27	46		

*Statistically Significant (p<0.05) Test-Pearson's Chi Square

As Table 3 revealed that calculated p value of the demographic variables such as age (X^2 = 14.81, p= 0.005), source of information (X^2 = 11.19, p= 0.020) and family socioeconomic status (X^2 = 11.65, p= 0.020) are significant, whereas the p value of demographic variables that of religion (X^2 = 7.40, p= 0.11), education (X^2 = 9.03, p= 0.060) and size of family (X^2 = 2.25, p= 0.688) is not significant. Therefore, there is association between the knowledge and demographic variables like age, source of information and socioeconomic status at 0.05 level of significance.

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Table 4: Association between demographic variables and Attitude level

Sr. No.	Demographic Variables	Categories	Attitude level			X2-Value	P-Value
			Positive	Neutral	Negative		
1.	Age	20-29 years	33	25	47	10.788	0.029*
		30-39 years	14	10	25		
		40 and above	8	8	40		
2.	Religion	Hindu	35	24	62	1.500	0.826
		Buddhist	14	15	37		
		Muslim	6	4	13		
3.	Education	Up to Primary education	12	15	35	3.085	0.543
		Up to Intermediate	20	12	40		
		Graduation & Post-graduation	23	16	37		
4.	Size of family	Less than equal to 4 Members	23	17	57	3.676	0.451
		5-8 members	28	20	47		
		More than equal to 9 members	4	6	8		
5.	Source of information	Mass media	25	13	54	6.480	0.166
		Waste disposal agencies	18	23	42		
		Others	12	7	16		
6.	Socio-economic status	Class I	15	8	20	2.676	0.613
		Class II	18	13	40		
		Class III & IV	22	22	52		

*Statistically Significant (p<0.05) Test-Pearson's Chi Square

As **Table 4** revealed that calculated p value of the demographic variables such as age (X^2 = 10.788, p= 0.029) are significant, whereas p value of religion, education, size of family, source of information and family socioeconomic status are not significant. Therefore, there is association between the attitude and demographic variable age at 0.05 level of significance.

Table 5: Association between demographic variables and Practices Score

Sr. No.	Demographic Variables	Categories	Practices Score			X2-Value	P-Value
			Good	Satisfactory	Poor		
1.	Age	20-29 years	20	18	67	2.411	0.660
		30-39 years	12	12	25		
		40 and above	11	12	33		
2.	Religion	Hindu	27	23	71	2.364	0.668
		Buddhist	14	14	38		
		Muslim	2	5	16		
3.	Education	Up to Primary education	14	12	36	0.2678	0.991
		Up to Intermediate	14	15	43		
		Graduation & Post-graduation	15	15	46		
4.	Size of family	Less than equal to 4 Members	22	17	58	1.032	0.904
		5-8 members	18	21	56		
		More than equal to 9 members	3	4	11		
5.	Source of information	Mass media	18	16	58	1.100	0.894
		Waste disposal agencies	17	18	48		
		Others	8	8	19		
6.	Socio-economic status	Class I	14	6	23	5.453	0.243
		Class II	13	14	44		
		Class III & IV	16	22	58		

As Table 5 revealed that calculated p value of all the demographic variables are not significant, so there is no association between demographic variable and practices. Findings related to association between the practices score of housewives with their selected demographic variables.

Discussion

This study deals with the major findings, discussion in relation to other studies, conclusion, implications in the field of research, limitations of the study and recommendation for future research. Major findings related to the objectives of the study include: Objective I: To assess the knowledge regarding household solid waste disposal among housewives in selected urban area of Nanded city, Maharashtra. With regards of knowledge level, among 210 housewives 50% belonged to 20 to 29 years age group, 23% belonged to 30 to 39 years age group and 27% is belongs to 40 and above age group and 58% are Hindu,31% are Buddhist and 11% are Muslim, Religion. 30% are belongs from Illiterate to Primary education, 34% are belonged from Primary to Intermediate education, 36% belonged to Graduation and above, 46% have

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less than equal to 4 members in their home, 45% have 5-8 members in their home and 9% have 9-12 members in their home.44% have information from Mass media, 40% have information from waste disposal agencies and 16% have information from others like Poster, Banner and Neighbors etc., 20% belongs to Class I, 34% belongs to Class II and 46% belongs to Class III &IV according to their family's Socioeconomic status. Shelke M *et al*. (2018) also conducted similar study in Pune city [11]. Findings of study reveals that out of 500 Housewives 10(2%) Housewives have good knowledge, 490(98%) have average and 0(0%) have poor knowledge, and 12% Housewives have good practices, 72% have average practices and 16% have poor practices. A similar study also conducted to assess the knowledge and practice regarding proper household waste management among the housewives in selected Urban slum Area, Agartala, Tripura West by Deb p *et al*. 2021 [19]. Findings of the study reveals that out of 100 housewives 23% housewives have adequate knowledge, 34% housewives have moderate knowledge, 43% housewives have inadequate knowledge. Also another similar study conducted in Northern Kerala by Gani B (2012) [20]. Findings of the study reveals that out of 60 housewives, 47(78.4%) housewives had practiced below average disposal practices,13 (28.6%) had practiced average practices on household waste management and 33% housewives had adequate knowledge, 45% had moderate knowledge and 22% had inadequate knowledge. 93.8% of the study population had above average attitude and 6.2% had below average attitude. Almost 70% had the belief that government is not doing anything to fix the garbage problem. About 97%, 88.6% and 92% were willing to do composting, segregation and recycling of waste respectively.

Objective II: To find out the association between knowledge score regarding household solid waste disposal among housewives with their selected demographic variables this study reveals that calculated p value of the demographic variables such as age, source of information and family socioeconomic status are significant, whereas the p value of demographic variables that of religion, education and size of family is not significant. Therefore, there is association between the knowledge and demographic variables like age, source of information and socioeconomic status at 0.05 level of significance. Association between attitude level and demographic variables in this study revealed that calculated p value of the demographic variables such as age ($X^2 = 10.788$, p= 0.029) are significant, whereas p value of religion, education, size of family, source of information and family socioeconomic status are not significant. Therefore, there is association between the attitude and demographic variable age at 0.05 level of significance. Association between Practices score and demographic variables in this study revealed that calculated p value of all the demographic variables are not significant, Therefore, there is no association between all demographic variable and the practices score. A similar study also conducted to assess the knowledge and practice regarding proper household waste management among the housewives in selected Urban Slum Area, Agartala, Tripura West, it reveals the calculated chi-square value with table value 3.84 with df 1. Hence the knowledge score among the housewives is significant at 0.05 level with demographic variables like education and not significant with age, religion, size of family, source of information, and family income of the housewives as the calculated value which is less than the table value 3.84. A similar study conducted by Avinir F to assess the knowledge and attitude of housewives regarding household waste management in selected rural community at Mangalore with a view to provide an information pamphlet [21]. Findings of the study reveals that there was a significant relationship between knowledge score and attitude score of the subjects on waste management (r=0.346, df=59.000, p<0.05). Shelke M *et al*. in Pune city study the relationship between knowledge and practices scores of housewives on household waste management and found Pearson's correlation coefficient 0.21, which is positive, indicating that more the knowledge of the housewives regarding household waste management better are their practices.

Limitations

Limited sample size (i.e. 210) restricts the findings to be generalized. The study was limited to only housewife. Study has limited to urban areas of Nanded city.

Conclusion

Regarding the household solid waste disposal among 210 number of housewives (in the age of 20 and its above) this study concluded that 29%, 25%, 46% of housewives were having adequate, moderate and inadequate knowledge score respectively; also 26%, 20%, 54% of housewives is having positive, average and negative attitude level respectively; and 20%, 20%, 60% of housewives having good, average, and poor practices score respectively. There is significant association between the knowledge of the housewives regarding household solid waste disposal and their selected demographic variable that is age, source of information and family's socioeconomic status and no association with others. Also there is significant association between the attitude of the housewives regarding household solid waste disposal and their selected demographic variable that is age only and no others. There is no association between all demographic variable and the practices score. This shows that knowledge regarding household waste disposal in the most of Housewives was found good. In spite of good knowledge, the Housewives having

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poor practices regarding household solid waste disposal.

Recommendations

The following recommendations have been made on the basis of findings, a similar study can be conducted with a large sample size for generalization of the study findings. A similar study can be conducted in different setting in different areas. An experimental study can be done by assessing the effect of health education or instructional manual. A comparative study can be done between urban and rural area about knowledge and practices on household waste management.

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