Awareness of Homemakers on Municipal Solid Waste Management

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Abstract:

Across India, Urban Local Bodies are grappling with the problem of Municipal Solid Waste (MSW), which has reached critical dimensions. The continuous growth in population, urbanization, industrialization, and excessive consumption lead to large quantity of waste being generated. Inadequate regulations, lack of awareness, concern and cooperation from urban households combined with public pressure and legislation are forcing diversion from landfills through sustainable waste management. Thus, this study was conducted to find out the Knowledge of homemakers on waste generated at household level. The objectives of the study were to assess the homemaker's view of the neighborhood conditions, to find out the type of waste generated by households, to know the ways adopted to dispose the waste, and awareness about the waste management by municipality. A survey method was used to collect the necessary information from 35 homemakers working in Metrological Office, Bangalore using an interview schedule.

It was observed that, about 37 % of the homemakers were in the age group of 31-40 and 41- 50 years of age. It was also observed that 51% of them were post graduates. 63% of them belonged to nuclear families with 2-4 members in 68% of the households. The annual income ranged from rupees 3-5 lakhs and more than 5 lakhs in 37% each of the households. The Garbage management was rated as good by 43% and fair by 34% of the homemakers. The type of waste generated varied from household kitchen waste, newspapers, tins bottles, cans, old books, garden and electronic waste. Sixty percent of the homemakers used plastic covers to dispose waste along the road side. The waste was disposed everyday by 80% of the households. Above 90% of the homemakers had knowledge on waste reduction methods and also felt that waste causes environmental problems.

Keywords: Neighborhood Condition, Type of waste, Waste segregation, Knowledge on wasteDisposal, Attitude level.

Introduction

Municipal Solid Waste Management (MSWM) is a challenging problem for developing countries. The quality and quantity of MSW generated by a particular community will vary according totheir socio-economic status, cultural habits, urban structure, population and commercial activities. Asian countries are facing MSWM problems due to the rapid growth in MSW generation rate. The total quantity of waste generated by 23 metro cities in India was 30,000 tpd in 1999, which has increased considerably to about 52,000 tpd[1].

Solid Waste management is not an isolated phenomenon that can be easily compartmentalized and solved with innovative technology or engineering. It is particularly an urban issue that is closely related, directly or indirectly to a number of issues such as urban life styles, resource consumption patterns, jobs and income levels and other socio-economic and cultural issues. All these issues have to be brought together on a common platform in order to ensure a long-term solution to urban waste. Modern society is becoming a "waste society" rather than a well to-do society. The waste that people produce litters our streets [4]. In India, about 90% of waste is currently disposed of by open dumping. The result is either collected waste that is burned or disposed of in uncontrolled dumpsites; and uncollected waste (typically, 33-66% of waste generated is not collected) that is dumped in streets and drains, contributing to polluted waterways, flooding, and breeding of insect and rodent vectors [9]. City officials often have limited access to practical, affordable and effective solutions to overcome the collection, transportation, treatment and disposal of municipal solid waste. Though there are no one-size-fits all solutions, waste management approaches around the region can be examined and adapted to fit local contexts. Innovative approaches include community-based primary waste collection schemes and the use of films to create SWM awareness[2].

One of the crucial elements of a successful Municipal solid waste policy is that the competent local authority (municipality) has to be able to link the environment to the economy, reinforcing that they are not mutually exclusive. In this sense, municipal solid waste has to be seen as a resource [3]. Moreover, it is essential to investigate social factors affecting the public's behavior during their implementation {10, 7]

Materials and Methods

In the light of the theoretical analysis performed, the principal aim of this paper is to find out the opinions and awareness of homemakers on domestic separation and

collection of Municipal solid waste by means of interview schedule in Bangalore city. The objectives of the research were as follows;

1. To assess the homemaker's views on the neighborhood conditions,
2. To find out the types of waste generated in the households.
3. To know the ways adopted to dispose the waste, and
4. To identify the awareness of homemakers on different waste management practices adopted by municipality.

The research design used was survey method. The questionnaire was administered to 35 homemakers employed in metrological office in Bangalore city through random sampling technique. The questionnaire divided into seven parts consisting 24 questions. The first part of the questionnaire consisted of basic questions like, personal details such as age, sex, marital status, occupation and educational level and family composition, type of building. The second part consisted questions specific to various issues like opinion on different problems in the city, facilities in the neighborhood, type and quantity of waste generated by the households, different waste management practices followed, awareness on waste segregation and disposal and suggestions for improvement in waste management.

Results and Discussion:

Characteristics of respondents' household and investigated areas: The average age of the respondents was found to be 45 years with 37 percent each in the age group of 31-40 years and41-50 years of age. A high percentage that is, 51 percent of the respondents were post graduates. Most of the households were nuclear families (63%) with a household size of 2-4 members (69%). The annual income ranged from `1-3 lakhsand <` 3-5 lakhs in 37 percent each of the households. With regards to the type of the house, 57 percent of them were residing in independent houses and a majority of them expressed that the condition of the street was in good state (86%). While rating the garbage management in their areas, 43 percent of the respondents rated it as good and fair by 34 percent of them.

Table 1: Problems & Degree of SeriousnessN=35

Sl.No.	Problems	Degree of Seriousness (%)				
		Extreme	Very	Moderate	Not very	Total
1	Safety & Security	22.9	25.7	40.0	11.4	100
2	Portable Water	20.0	28.6	34.3	17.1	100
3	Solid Waste Management	20.0	28.6	31.4	20.0	100
4	Liquid Waste Management	14.3	14.3	45.7	25.7	100
5	Noise Pollution	37.1	34.3	20.0	8.6	100
6	Air Pollution	42.9	31.4	14.3	11.4	100
7	Poor Housing Condition	2.9	28.6	37.1	31.4	100
8	Traffic Congestion	51.4	25.7	14.3	8.6	100
9	Crime	28.6	31.4	25.7	14.3	100

Source: Field Survey

The respondents when asked about their views on various problems in the city and the degree of seriousness on a 4-point scale, most of them remarked air pollution (42.9%) and traffic congestion (51.4%) as extremely serious. Noise pollution and crime was found to be very serious by 31 percent each of the respondents. Liquid waste management (46%), safety and security (40%), poor housing condition (37%), and portable water (34%) were considered as moderately serious followed by solid waste management (31%).

Table 2: Type of Waste Generated in HouseN=35

Sl. No.	Type of Waste	Opinion on Waste Generated (%)					
		Too much	Moderate	Little	Rarely	Not at all	Total
1	Vegetables	32.0	28.0	28.0	12.0	0.0	100
2	Plastic	11.4	74.3	11.4	2.9	0.0	100
3	Textiles	0.0	11.4	17.1	62.9	8.6	100
4	Metal	0.0	8.6	11.4	77.1	2.9	100
5	Tins	5.7	0.0	5.7	85.7	2.9	100
6	Cans	2.9	8.6	5.7	80.0	2.9	100
7	Glass	0.0	5.7	5.7	85.7	2.9	100
8	Ceramics	0.0	5.7	0.0	85.7	8.6	100
9	Paper	11.4	48.6	22.9	17.1	0.0	100
10	Books	0.0	40.0	14.3	45.7	0.0	100
11	Newspaper	0.0	80.0	11.4	8.6	0.0	100
12	Garden	0.0	11.4	20.0	54.3	14.3	100
13	Electronic	2.9	11.4	11.4	54.3	20.0	100

Source: Field Survey

Table 2 reveals the type of waste generated and opinion of the homemakers. It was found that 32 percent of the homemakers felt that too much of vegetable waste was generated. Newspaper (80%), plastic (74%), paper (49%) and books (40%) were rated as moderate. Glass, ceramics and tins (86%) each, metal (77%), textiles (62%) followed

by garden and electronic waste by 54 percent each was rarely generated by the households.

Table 3: Type of container and Person disposing WasteN=35

Sl. No.	Reasons	Frequency (%)				
		Always	Occasionally	Rarely	Never	Total
	Type of Container					
1	Old carton box	2.9	17.1	77.1	2.9	100
2	Bamboo Basket	0.0	2.9	97.1	0.0	100
3	Old Bucket	17.1	20.0	62.9	0.0	100
4	Plastic	60.0	22.9	17.1	0.0	100
5	Tin	0.0.	0.0	97.1	2.9	100
6	Can	8.6	0.0	91.4	0.0	100
	Person Disposing waste					
1	Homemaker	54.3	11.4	31.4	2.9	100
2	House Master	11.4	20.0	62.9	5.7	100
3	Children	0.0	14.3	82.9	2.9	100
4	Paid helper	31.4	20.0	48.6	0.0	100

Source: Field Survey

According to table 3, plastic was always used by 60 percent of the households to dispose the waste followed by old buckets (20%), and old carton boxes (17%) occasionally. It was interesting to note that in 11 percent of the household's men were always in charge of putting the waste outside the house followed by homemakers (54%) and paid help (31%).

Table 4: Segregation of Waste

Sl. No.	Reasons **Segregating**	Frequency of Segregation (%)				
		Always	Occasionally	Rarely	Never	Total
1	Easy to dispose	42.9	31.4	11.4	14.3	100
2	Reuse	11.4	31.4	25.7	31.4	100
3	Sell	14.3	37.1	20.0	28.6	100
4	During Functions	8.6	22.9	17.1	51.4	100
5	When Ever Have Time	8.6	14.3	28.6	48.6	100
	Not Segregating					
1	If, Incentives are Given	11.4	11.4	17.1	60.0	100
2	Difficult to do	60.0	20.0	17.1	2.9	100
3	No Space	77.1	5.7	14.3	2.9	100
4	Don't Know	60.0	11.4	22.9	5.7	100
5	No Use	71.4	5.7	14.3	8.6	100
6	Does not make difference	74.3	8.6	11.4	5.7	100

Source: Field Survey

Table 4 gives the reasons for segregation and not segregation of waste. It was observed that 42.9 percent of them always segregated the waste as it was easy to dispose. Occasionally waste was segregated by 37 percent of the households as it was easy to sell.

With regards to reasons for not segregating waste, a majority always gave reasons like no space (77%), does not make any difference (74%), no use (71%), and difficult to do and don't know how to segregate by 60 percent each of the homemakers.

Table 5: Association between Age and Attitude level on Safe Disposal of Biodegradable Waste
N=35

Age group (Years)	Respondents Attitude								χ^2 Value
	Good		Average		Poor		Total		
	N	%	N	%	N	%	N	%	
31-40	5	38.5	4	30.8	4	30.7	13	100.0	
41-50	8	61.5	2	15.4	3	23.1	13	100.0	4.80
51-60	3	33.3	5	55.6	1	11.1	9	100.0	NS
Total	16	45.7	11	31.4	8	22.9	35	100.0	

NS: Non-Significant. χ^2 (0.05,4df) = 9.480

As shown in table 5,the attitude of homemakers in the age group of 45-50 years (61%) towards the safe disposal of biodegradable waste was good. About 56 percent of homemakers in the age group of 51-60 years considered waste disposal as average. The result of chi-square test of independence suggested non-significant difference between age and attitude level of homemakers on safe disposal of bio-degradable waste.

Table 6: Association between Education and Attitude towards Waste ManagementN=35

Educational level	Respondents Attitude								χ^2 Value
	Good		Average		Poor		Total		
	N	%	N	%	N	%	N	%	
PUC	3	75.0	1	25.0	0	0.0	4	100.0	
Graduate	4	44.5	3	33.3	2	22.2	9	100.0	6.80
PG	8	44.5	4	22.2	6	33.3	18	100.0	NS
Professional	1	25.0	3	75.0	0	0.0	4	100.0	
Total	16	45.7	11	31.4	8	22.9	35	100.0	

NS: Non-Significant. χ^2 (0.05,6df) = 12.592

The above table shows that as the education level of the homemakers increases the attitude towards waste management differs. It was observed that 75 percent of PUC educated homemakers rated waste management in their area as good while a similar percentage of them with professional background rated as average. The highlighted attitude is not strange because [4], in a nearby area, found that a high education level does not necessarily involve a high level of environmental awareness and/or more propensities to accept municipal solid waste facilities. Statistical analysis through chi-square test between educational level of the homemakers and their attitude towards

waste management in the area reveals that there is no significant association between respondents' attitude and education (table 6).

Table 7: Association between Household size and Attitude towards Safe Disposal of Biodegradable Waste, N=35

Household size (members)	Respondents Attitude								χ^2 Value
	Good		Average		Poor		Total		
	N	%	N	%	N	%	N	%	
2-4	13	24	9	54.2	2	37.5	8.3	100.0	9.14*
5-6	3	11	2	27.3	6	18.2	54.5	100.0	
Total	16	45.7	11	31.4	8	22.9	35	100.0	

*Significant at 5% Level. χ^2 (0.05,2df) = 5.991

As the household size increased the attitude towards the waste management varied. The results of a chi-square test of independence suggested a significant association between the household size and the attitude towards safe disposal of biodegradable waste.

Table 8: Association between Income and Attitude towards Safe Disposal of Biodegradable Waste, N=35

Income level (Annual)	Respondents Attitude								χ^2 Value
	Good		Average		Poor		Total		
	N	%	N	%	N	%	N	%	
1-3 lakhs	7	77.8	2	22.2	0	0.0	9	100.0	9.49*
3-5 lakhs	3	23.1	4	30.8	6	46.1	13	100.0	
>5 lakhs	6	46.1	5	38.5	2	15.4	13	100.0	
Total	16	45.7	11	31.4	8	22.9	35	100.0	

*Significant at 5% Level. χ^2 (0.05,4df) = 9.48

Analysis of income and attitude of homemakers towards safe disposal of waste showed significant association. Households with lower income had good attitude (77.8%) while as the income increased to above `5 lakhs, the attitude was from average to fair.

Table 9: Association between Type of family and Attitude on Safe Disposal of Biodegradable Waste, N=35

Type of Family	Respondents Attitude								χ^2 Value
	Good		Average		Poor		Total		
	N	%	N	%	N	%	N	%	
Nuclear	11	50.0	9	40.9	2	9.1	22	100.0	6.84*
Joint	5	38.5	2	15.4	6	46.1	13	100.0	
Total	16	45.7	11	31.4	8	22.9	35	100.0	

*Significant at 5% Level. χ^2 (0.05,2df) = 5.991

Table 9 shows the association between family type and attitude on safe disposal of biodegradable waste. About 50 percent of them living in nuclear family rated the waste disposal as good while 40.9 percent of them rated it as average. Chi-square analysis to find out the association between family type and attitude revealed that the family type had significant difference on attitude of homemakers on safe disposal of biodegradable waste.

Conclusion

Rapid growth in population has added unmatched burdens to the urban municipal systems currently collecting and disposing solid waste. The current waste managementcan be viewed under two spheres,one pertaining to within households and the other outside within the community. The waste disposal habits of the communitycause the deterioration of the urban environment. This requires Solid waste education and communication focusing to raise awareness within the community about the need for better solid waste management [10]. Education aims to contribute to the public's knowledge on inappropriate SWM as a problem for the community in order to start working towards solving the waste problem. The education program builds on the knowledge, values, skills, experiences, and determination of human capacity needed to work on solving waste management issues at an individual and community level [12]. Thus, a suitable approach in MSW management should be an integrated approach that could deliver both environmental and economic sustainability. With increasing environmental concerns, the integrated municipal solid waste management system has a potential to maximize the useable waste materials as well as produce energy as a by-product.

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