



A STUDY ON DOMESTIC WASTE & ITS DISPOSAL IN NAGPUR CITY

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Abstract

Proper disposal of waste is a personal responsibility. People always want to blame governments and authorities for unclean environment and mismanagement of domestic waste and are not ready to bear this burden themselves. Certain types of waste, particularly hazardous waste, must be properly disposed of according to law set forth by the Environmental Protection Agency. Toxic waste can seep into the ground and contaminate our water supplies, and sometimes cause widespread disease. Hence we need to change our attitude toward waste management and its disposal.

This study on domestic waste involves survey asking respondents in Nagpur to reply to various questions that are concerned with awareness on domestic waste, its collection and disposal. Study also aims to know the performance of Nagpur Municipal Corporation (Abbreviated as NMC) on various parameters related to collection and disposal of domestic waste. NMC has deployed 100% door-to-door waste collection scheme using 'Swachhata Doot'. The gap between what is implemented and what is actually achieved is studied in this paper from two different perspectives: how citizens value their own waste disposal attitude and how they perceive waste collection efforts on NMC. This study was done by conducting survey of 350 citizens of Nagpur. The study also analyses collection & disposal of domestic waste, its hazardous effects, frequency of removal and opinion of Nagpurians on efficiency and attitude of Nagpur Municipal Corporation on overall waste management. There are some suggestions at the end of this paper.

Key Words: Disposal, Domestic Waste, Municipal Corporation.

Introduction

Domestic waste is usually generated as consequence of household activities such as cleaning, cooking, repairing empty container, packaging, huge use of plastic carry bags, used medicines, sanitary products, ointments, etc. Waste disposal simply involves rounding up the waste from different parts of the city, and dumping everything in a landfill. Once a landfill is completely occupied, a new landfill is discovered in a different part of the city. Landfill is nothing but a piece of land used for dumping waste.

Domestic waste poses a threat to public health and the environment if it is not stored, collected, and disposed of properly. The perception of waste as an unwanted material with no intrinsic value has dominated attitudes towards disposal. This study investigates the domestic waste disposal, and perceptions about waste and health in an urban community.

Rationale of Study

Proper disposal of waste is a personal responsibility; some kinds of waste, particularly hazardous waste, must be properly disposed of according to law set forth by the Environmental Protection Agency. Toxic waste can seep into the ground and contaminate our water supplies, and sometimes cause widespread disease. Even non-toxic waste causes pollution that contributes to global warming and a general negative impact on the public health. (Huebsch, 2015).

One of the major requisite of these rules is to establish door-to-door garbage collection system in the cities. Nagpur which is located in centre of India has taken initiative in implementing MSW Rules 2000 by introducing 100% door-to-door garbage collection. "(Agrawal, 2005) According to him NMC achieved target of 100% D2D (door to door waste collection) by employing Swachta Doot scheme.

Despite of this proactive approach by NMC, it was observed that domestic issue problem is not eradicated. Domestic waste still piles up by the sides of streets and creates unhealthy and polluted environment.

This leads the research to find out the attitude and approach of citizens of Nagpur city towards the waste disposal management at their own level and their perceptions about NMC's waste collection scheme.

Objectives

1. To study the general awareness about domestic waste & its disposal among citizens of Nagpur.
2. To know existing waste handling practices by households of Nagpur.
3. To study the awareness regarding hazardous effects of domestic wastes among citizens of Nagpur.
4. To study the perception of citizens of Nagpur towards domestic waste collection carried out by NMC.

Research Methodology

Sampling Plan

Sampling Method: Stratified Random Sampling method is selected where first stage is to create strata based on “type of house”.

Sample Size: Sample size of 336 (initial sample size considered by 350. 14 respondents did not provide responses)

Respondents are nominally grouped according to gender, income, qualification, occupation, marital status, age group and type of house.

Observational Plan

Respondents were surveyed through a close ended “questionnaire”. Survey was conducted in different regions of the city.

Statistical tools: Measures of central tendency (mode and arithmetic mean) are used along with graphical and tabular representation.

Limitations

Study was limited only to Nagpur city and the given sample size was achieved in a time frame of 3 months.

Data Analysis & Interpretation

Analysis of the collected data brings forth the following interpretation. It may be noted that the information included in all the tables and figures is from the survey itself.

Table 1: Awareness on Domestic Waste

Domestic Wastes	Flats	Independent House	Row Houses	Chawls & Shanty
Non decomposable Waste	15%	15%	22%	12%
Electronic waste	15%	12%	10%	15%
Medical Waste	6%	11%	6%	10%
All of the above	25%	37%	43%	51%

Interpretation

It can be seen that majority of respondents are not ware about all types of domestic waste. Respondents are least aware about domestic waste as results showing awareness about it are 6%, 11%, 6% and 10% respectively across all four categories of respondents respectively. Respondents living in Chawls and Shanty have the most awareness about all types of domestic waste i.e. 51% and respondents living in flats have lowest awareness i.e. 25% about all types of domestic waste. Awareness about electronic waste is also below par at 15%, 12%, 10% and 15% person respectively across all four categories of respondents respectively. In general the awareness for medical waste was less compared to other types. There was no apparently significant impact of type of house on the awareness level.

Table 2: Domestic Waste Collection in Households

Parameters	Flats	Bungalow/ Independent House	Row Houses	Chawls & Shanty
Entire domestic waste in a single bin	49%	34%	62%	61%
Separate bin each for Dry/Wet/E/ Medical Waste	25%	35%	20%	14%
Separate bin for Dry waste & Wet waste	18%	22%	11%	10%
Any Other.	8%	9%	7%	15%

Interpretation

Irrespective of type of house, majority respondents tend to use single bin for all kinds of waste. It can be seen that majority of respondents residing in Flats, Row Houses and Chawls & Shanty use single bin for collection of entire domestic waste. Ratings for such waste collection method are 49%, 62% and 61% respectively.

However, majority of respondents i.e. 35% residing in Bungalow/Independent House have replied that separate bin is used by them for collecting different types of wastes. Probably this may be because they have enough space in their backyard for separate waste bins. Whereas separate bin for dry and wet waste is used by 18% , 22%, 11% and 10% respondents residing in Flats, Bungalow, Row Houses and Chawls & Shanty respectively. Few of the respondents have replied that they deploy other methods for waste collection (8%, 9%, 7% & 15% in flats, bungalows, row houses & chawls respectively).

Table 3: Disposal Method of Waste in Households

Parameters	Flats	Bungalow/ Independent House	Row Houses	Chawls & Shanty
Handover to waste collector of NMC	47%	36%	67%	63%
Primary collection by housing society for further disposal to NMC Workers	13%	11%	11%	2%
Throw it on roadside	7%	25%	4%	11%
Burn directly	6%	4%	4%	12%
Throw it in the dustbin of your area	12%	7%	7%	5%

Interpretation

Maximum respondent handover waste to MNC waste collectors - responses for flats, Bungalows/Independent Hoses, Row Houses and Chawls are 47%, 36%, 67% and 63% respectively. Use of primary collection by housing society for further disposal to NMC workers is another option which is exercised by residents of flats and row houses having responses at 13% and 11%, respectively. Second highest responses by bungalow residents is for throwing waste on roadside with 25% responses. On the other hand, burning the waste directly is the second most preferred option of residents of chawls & shanties.

Table 4: Awareness for Hazardous Effects of Domestic Waste

Parameters	Flats	Bungalow/ Independent House	Row Houses	Chawls & Shanty
Filthy smell in the surrounding	20%	20%	35%	23%
Skin infections	12%	10%	22%	2%
Blood infections	15%	11%	27%	6%
Respiratory diseases	11%	6%	14%	3%
Intestinal infections	1%	3%	3%	3%

Interpretation

Awareness is least about “intestinal infections” and maximum about “Filthy smell”. People in row houses have slightly more awareness than others. Knowledge of hazardous effect of filthy smell in the surrounding is 20%, 20%, 35% and 23% for flats, bungalow, row houses and chawls & shanty respectively. Knowledge of hazardous effect on skin infections is 12%, 10%, 22% and 2% for flats, bungalow, row houses and chawls & shanty respectively.

Knowledge of hazardous effect on blood infections is 15%, 11%, 27% and 6% for flats, bungalow, row houses and chawls & shanty respectively. Knowledge of hazardous effect on respiratory diseases is 11%, 6%, 14% and 3% for flats, bungalow, row houses and chawls & shanty respectively. Knowledge of hazardous effect of intestinal infections is lowest at 1%, 3%, 3% and 3% for flats, bungalow, row houses and chawls & shanty respectively.

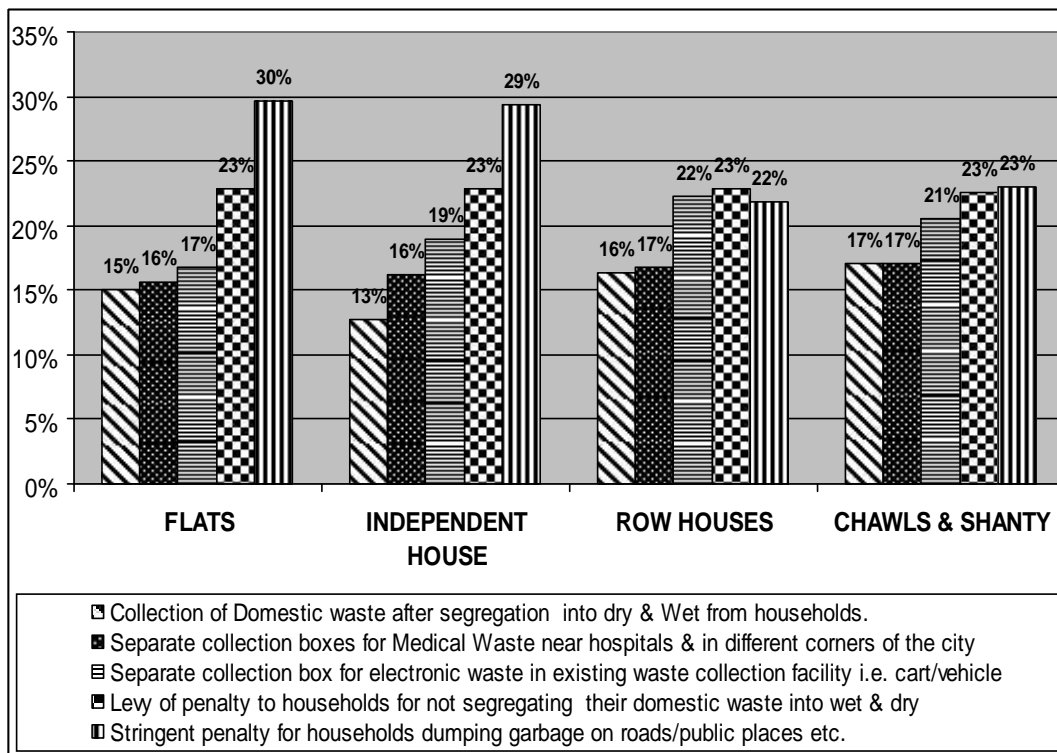
Table 5: Satisfaction Level with NMC Regarding Waste Handling Practices

Parameters	Flats	Independent House	Row Houses	Chawls & Shanty
NMC workers visit regularly in your household for waste collection	13%	9%	14%	7%
Frequency of visiting household for waste collection is appropriate	6%	5%	6%	4%
They handle domestic waste properly	16%	15%	16%	13%
Their waste disposal methods are satisfactory	18%	17%	17%	19%
Their services are impartial for entire localities	17%	20%	18%	17%
They ask for periodic tips from your household	19%	23%	18%	22%
Their behavior is erratic	11%	12%	12%	19%

Interpretation

Satisfaction level with NMC regarding waste handling was found to be not more than 23%. Rating on parameter about regularity of NMC workers is meager at 13%, 9%, 14%, and 7% for respondents residing in Flats, Independent House, Row House and Chawls & Shanty respectively. Rating on parameter about frequency of visits of NMC workers is 16%, 15%, 16%, and 13% for respondents residing in Flats, Independent House, Row House and Chawls & Shanty respectively. Rating on parameter about proper handling of domestic waste by NMC workers is meager at 13%, 9%, 14%, and 7% for respondents residing in Flats, Independent House, Row House and Chawls & Shanty respectively.

Figure 6: Suggestions by Various Households on NMC's Waste Collection Activity





Interpretation

Above figure shows the response of respondents in respect various suggestions with which NMC can improve its performance. Rating on suggestion of collecting domestic waste after segregation into dry and wet waste is 5%, 16%, and 18% for respondents who have qualification of Below H.S.C., are graduates and post graduates respectively.

Rating on suggestion of separate collection boxes for Medical waste around city is 15%, 17% and 17% for respondents who have qualification of Below H.S.C., are graduates and post graduates respectively.

Rating on suggestion of separate collection boxes for electronic waste in existing waste collection facility is 23%, 19%, and 17% for respondents who have qualification of Below H.S.C., are graduates and post graduates respectively.

Rating on suggestion of levy of penalty to households for not segregating domestic waste into dry and wet is 20%, 20%, and 23% for respondents who have qualification of Below H.S.C., are graduates and post graduates respectively.

Rating on suggestion of stringent penalty for households dumping garbage on roads/public places is 29%, 27% and 24% for respondents who have qualification of Below H.S.C., are graduates and post graduates respectively.

Findings

On the basis of their responses & data analysis, findings can be stated as under:

1. On Awareness About Types of Domestic Waste

While majority of respondents are aware about all types of domestic wastes, the percentage got lower in case of respondents residing in a flat and Independent Houses. It emerged from the survey that respondents are least aware about medical waste followed by electronic waste. Apart from the respondents knowing all kinds of domestic wastes, most respondents were aware about decomposable and non decomposable waste. (Figure 1).

2. On Methods of Domestic Waste Collection

Majority of respondents replied that collection of entire domestic waste in a single bin was the method deployed in their homes for collecting domestic waste, implying that they are not aware about ill environmental effects of collecting entire waste in single bin.

At second rank was the method of using separate bins for collecting different kinds of domestic waste. Third most popular method appeared to be the use of separate bin for Dry & Wet waste. Whereas, minority of respondents replied that they use other method of waste collection for their domestic waste. (Figure 2).

3. On Methods of Waste Disposal

Majority of respondents across all categories replied that they hand over the entire domestic waste to the officials of NMC. Whereas for other categories of respondents except those living in chawls and shanty, collection by housing society for further disposal to NMC was the second most preferred choice. Burning the waste directly was the second most preferred method in case of residents of chawls and shanty and least preferred method in case of other categories of respondents. Remaining methods were used by only limited number of respondents. (Figure 3).

4. On Hazardous Effects of Domestic Waste

Majority of respondents across all categories replied that they knew all the hazardous effects of domestic waste, except those living in row houses. While the awareness was highest in case of respondents living in chawls & shanty at 62%, it was abysmal (0%) for those living in row houses.

Filthy smell in the surrounding was the most commonly hazard across all categories, followed by blood infections. Whereas, awareness for intestinal infections was lowest across all categories. Knowledge about Skin Infections and Respiratory disease was moderate to low across different categories of respondents.

5. On Frequency of Waste Removal In Households

Majority of respondents across all categories replied that waste is removed daily from their households. Removal of waste on weekly basis was the second most preferred method of waste removal across all categories except respondents living in row houses who preferred to remove waste once in every two days. For remaining respondents, removal of waste once every two days was the most preferred method to remove domestic waste.



6. On Satisfaction Level of Respondents on Working of NMC & its Officials

This study was conducted by asking respondents about their satisfaction level on seven parameters with respect to working of NMC. Respondents were broadly divided on three main categories based on the type of their residence, number of family members in the family and their qualification level.

It appears there is strong discontent over the working pattern of NMC in respect of their waste handling methods and overall approach.

Statement 1: NMC Workers are Regular in Visiting Household for Waste Collection

Highest rating provided to NMC on this parameter 14%, 12% and 12% by the respondents living in a row houses, family having 8-12 members and respondents who are graduate respectively. Thus it can be concluded there is immense dissatisfaction over respondents on this parameter.

Statement 2: Frequency of NMC Workers for Visiting Household is Appropriate

Performance of NMC on this parameter is even poorer as highest rating in favor of NMC is only 6%, 9% and 6% by respondents living in flats & row houses, family having 8-12 members and respondents who are below H.S.C. & graduate respectively. Again, the reply highlights apathy of NMC workers on parameter of frequency of visits for waste collection in households.

Statement 3: NMC Workers Handle Waste Properly

Performance of NMC on this parameter is slightly better as compared to previous parameters. Highest rating in favor of NMC is 16%, 32% and 19% by respondents living in flats & row houses, family having 1-4 & 4-8 members and respondents who are below H.S.C. in qualification respectively.

Statement 4: NMC Workers Dispose Waste Properly

Performance of NMC on this parameter is again poor. Respondents in its favor are 19%, 14% and 18% who are living in chawls & shanty, family having 8-12 members and respondents who are graduates respectively. On this parameter also, there is a lot to be desired from NMC officials and workers.

Statement 5: Services of NMC Workers are Impartial for Entire Locality

Performance of NMC on this parameter is much better than previous parameters. At maximum, 20%, 14% and 19% respondents living in an independent house, family having 8-12 members and respondents who are post graduates respectively have responded in this manner. Since remaining respondents have replied in a lower percentage as compared to those stated above, it can be safely concluded that majority of respondents believe that services of NMC workers are impartial within a locality.

Statement 6: NMC Workers ask for Periodic Tips from Households

Performance of NMC workers on this parameter is again good as compared to previous parameters. At maximum, 23%, 14% and 18% respondents living in an independent house, family having 8-12 members and respondents who are post graduates & below H.S.C. respectively have responded in this manner. Thus, it can be concluded that majority of respondents are of the view that NMC workers do not demand tips from households.

Statement 7: NMC Workers Behave Erratically

Performance of NMC workers on this parameter is again good as compared to previous parameters. At maximum, 19%, 18% and 22% respondents living in chawls & shanty, family having 1-4 members and respondents who are graduates & below H.S.C. respectively have responded in this manner. Thus, it can be concluded that majority of respondents believe that behavior of NMC workers is not erratic.

Conclusion

Although majority of respondents across all categories knew about all types of domestic wastes, the percentage was lower in case of residents of Flats and Independent Houses. This implied that people living in shanties were more aware about all types of domestic wastes. Moreover, there was least awareness about medical and electronic waste.

Another disturbing trend was that most of the respondent preferred to dump all kind of domestic waste in a single bin which makes it highly difficult to segregate and is detrimental to the environment. Surprisingly, "throwing the waste on the roadside" was second highest rated answer of respondents residing in independent homes.



Majority respondents living in row houses were not fully aware of all the hazardous effects of domestic waste, whereas, majority respondents living in chawls and shanties were aware about all the bad effects of domestic waste.

Overall, it can be concluded that awareness level about domestic waste is far from satisfactory on certain parameters. It is astonishing to note that people who are better off i.e. those living in independent houses have poor awareness in comparison to those living in chawls and shanties.

It was also found that respondents across all categories were highly dissatisfied on attendance of NMC officials, their frequency of visits and domestic waste handling and disposal practices.

On a positive side for NMC, most of the respondents have agreed that NMC officials are impartial in their services; they behave well and do not ask for periodic tips. Thus, it can be safely concluded that performance of NMC is mixed at present and can be better if necessary improvements are done.

Suggestions

It must be an endeavor of state government & NMC to bring about necessary initiatives to create awareness about ill effects of improper domestic waste management. Awareness campaigns must be conducted at school, college and corporate level to make the children and adults both aware about the domestic waste and its hazardous effects. With respect to waste disposal methods, there must be stringent action on those throwing garbage on roadside or burning it directly.

Several specific suggestions that have been made by the respondents in respect of NMC include separate collection boxes for electronic and medical waste. Frequency of waste collection should be increased by NMC. Training sessions may be arranged for waste collection personnel of NMC not scientific methods of waste collection and disposal.

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