

Role Of Private Sector In Domestic Waste Management And Its Impact On Health: A Case Study On Narnaul City

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ABSTRACT

The private sector takes different levels of financial and technical risk in solid waste services, from providing technical expertise in management or operation of a facility; to operating collection routes and the related equipment under a concession; to investing, owning, and operating a landfill facility, servicing nearby municipalities and companies. A variety of options can be considered to cater to the preference of the public entity and the risks and appetite of the private sector. To investigate solid waste management and its implications for health in Narnaul City. To fulfill this objective researcher used Both primary and secondary data were collected. Survey questionnaire was administered to collect primary data from the participants selected at random from Narnaul city households randomly chosen for the study. Secondary data from journal, books, periodicals and other relevant published literature were collected. Finally the conclusion of the study is to The city of Narnaul needs to take advantage of the success stories in this direction and also take initiatives on similar lines to give a better look and environmental management to this city.

Keywords: solid waste services, Landfill, Waste Management, Narnaul, Private Sector.

I. INTRODUCTION

Globally, millions of tons of municipal solid waste are generated every day. Urban waste management is drawing increasing attention, as it can easily be observed that too much garbage is lying uncollected in the streets, causing inconvenience, environmental pollution, and posing a public health risk (Zia, & Devadas, 2008). The amount of solid waste continues to increase in urban India with rapid urbanization, rising incomes, changing consumption patterns and a shift from recycling to a throw-away society. In urban areas the problem of solid waste management (SWM) is very acute due to dense development and congestion. Municipal solid waste management is an obligatory function of urban local bodies (ULBs) in India. Most ULBs are unable to cope with the challenging task of collection, transportation, recovery and disposal of solid waste. SWM generally consumes a significant proportion of municipal budgets and revenue from the services like collection of user fees from residents and/or hotels and marriage halls, waste management tax etc. are negligible. In 1997-98, on national level,

average per capita per annum revenue receipt from SWM services varied from Rs. 2.8 to Rs.10.2 and average per capita expenditure on SWM varied between Rs. 85.99 to 121.21. Thus, there is a huge gap between revenue and expenditure in SWM in India (Raghupathi, 2005). Solid waste management constitutes from 10 to 50 percent of municipal budget expenditure, depending on the income sources of the municipal authorities. The main expenditure categories under SWM head are salaries and allowances of workers; consumables like brooms; infrastructural development such as purchasing of vehicles, community bins etc; vehicle repair and maintenance; contingencies, and others. In India, it is estimated that the ULBs spend about Rs. 500/ton on solid waste collection, transport and disposal, which may rise to Rs. 1500/ton in some instances (Ghose et al., 2006). Several ULBs have received financial assistances from Government in terms of grants, loans or subsidies under various schemes like JNNURM, 12th Finance Commission etc. for SWM. Still, in general, the level of solid waste services in India appears very poor (Asnani, & Zurbrugg, 2007). Private sector has started cooperating in

solid waste management in significant ways. A FICCI (2007) report revealed that 23 cities out of 25 cities surveyed have already engaged private sector companies in their waste management activities. However, in most cases the extent of privatization is only partial, and privatization has been implemented only in few zones of the city. Even if the service is provided by private companies, the responsibility for the collection and disposal of solid wastes remains with the government. Government remains responsible to ensure that the service is provided, and it meets required standards in terms of reliability, efficiency, customer relations and environmental protection.

Also, improper waste management and illegal waste shipments can have negative impacts on both environment and public health. Negative impacts can be due to different handling and disposal activities resulting in soil, water and air pollution. Inadequately disposed of or untreated waste may cause serious health problems for populations surrounding the area of disposal. Leaks from the waste may contaminate soils and water streams, and produce air pollution through emissions of e.g. heavy metals and persistent organic pollutants (POPs), ultimately creating health hazards. Other nuisances caused by uncontrolled or mismanaged waste disposal which may affect citizens negatively include impacts at local level, such as landscape deterioration, local water and air pollution, as well as littering. Managing waste properly and in an environmentally sound way is therefore important for health reasons. Despite the increasing recycling activities, landfills and incinerators are widely used to manage the final phase of waste disposal. As a consequence, existing literature provides evidence mainly for these plants. Recently information on less severe diseases is available also in relation to waste treatment activities, such as mechanical biological treatment (MBT) plants. The conclusion of previous studies is not definitive, with some difficulties in interpreting data from primary studies due to non-homogeneous design, and lack of accurate exposure information and control of potential confounders.

This paper reports some case study of Narnaul City situated in Haryana, India on

where has the privatization of waste management reached. Based on the observations and trends, the scope and precautions in privatization of waste management activities are discussed. Also, the current study aims to investigate solid waste management and its implications for health in Narnaul City.

2. LITERATURE REVIEW

2.1 Role of Private Sector in Waste Management

Ogu, V. I. (2000) described the inadequacies of public provision for solid waste collection and disposal in Benin City (and also in other Nigerian cities) and the limitations of the privatized schemes that have sought to address these inadequacies. Its description of solid waste management in Benin City draws on the author's interviews with 591 households which revealed that three-fifths had no solid waste collection service and which highlighted the inadequacies in the services for much of the rest. The paper also describes the lack of resources available to the public agency responsible for service provision and the inadequacies in the privatization scheme set up in 1995 to address this issue. It ends by stressing the need for private provision arrangements that are tailored to the characteristics of different parts of the city and by suggesting the kinds of arrangements that should work better in the low-income areas which are generally the ones least served by conventional public sector or privatized arrangements.

Chaturvedi, A., Arora, R., & Saluja, M. S. (2015) in their study stated that due to their size and rapid growth, large cities in developing countries are increasingly challenged by burgeoning waste generation. Waste management, however, has traditionally provided employment opportunities to the many urban poor in the informal sector. These traditional models, working largely in parallel with state-led interventions, are under pressure because they fail to address the waste management crisis. This failure, coupled with the lack of capacities of local governments, has paved the way for formal private sector participation. We examine the case of Delhi where a complex interplay of competing

approaches have accompanied efforts of urban local bodies, civil society and the private sector (informal and formal) at finding a sustainable working solution. Our analysis of the complex relationship within the private sector players, and between private and public actors, provides novel insights into potential contribution of public–private partnerships for effective waste management in developing countries.

2.2 Impact of Waste Management on Health

Alam, P., & Ahmade, K. (2013) stated in their study that urbanization and population growth are solely responsible for high increasing rate of solid waste and its proper management is a major problem of Municipal Corporation. In this study, the sources and components of solid waste were identified; type and the quantity of solid waste disposed, methods of solid waste disposal and impact of improper waste management on health were highlighted. The result shows that excreta and other liquid and solid waste from households and the community, are a serious health hazard and lead to the spread of infectious diseases.

Giusti, L. (2009) reviewed (i) the most recent information on waste arisings and waste disposal options in the world, in the European Union (EU), in Organisation for Economic Co-operation and Development (OECD) countries, and in some developing countries (notably China) and (ii) the potential direct and indirect impact of waste management activities on health. Though the main focus is primarily on municipal solid waste (MSW), exposure to bioaerosols from composting facilities and to pathogens from sewage treatment plants are considered. The reported effects of radioactive waste are also briefly reviewed. Hundreds of epidemiological studies reported on the incidence of a wide range of possible illnesses on employees of waste facilities and on the resident population. The main conclusion of the overall assessment of the literature is that the evidence of adverse health outcomes for the general population living near landfill sites, incinerators, composting facilities and nuclear installations is usually insufficient and inconclusive. There is convincing evidence of a high risk of gastrointestinal problems associated with

pathogens originating at sewage treatment plants. In order to improve the quality and usefulness of epidemiological studies applied to populations residing in areas where waste management facilities are located or planned, preference should be given to prospective cohort studies of sufficient statistical power, with access to direct human exposure measurements, and supported by data on health effect biomarkers and susceptibility biomarkers.

Rushton, L. (2003) in her study stated that different methods of waste management emit a large number of substances, most in small quantities and at extremely low levels. Raised incidence of low birth weight births has been related to residence near landfill sites, as has the occurrence of various congenital malformations. There is little evidence for an association with reproductive or developmental effects with proximity to incinerators. Studies of cancer incidence and mortality in populations around landfill sites or incinerators have been equivocal, with varying results for different cancer sites. Many of these studies lack good individual exposure information and data on potential confounders, such as socio-economic status. The inherent latency of diseases and migration of populations are often ignored. Waste management workers have been shown to have increased incidence of accidents and musculoskeletal problems. The health impacts of new waste management technologies and the increasing use of recycling and composting will require assessment and monitoring.

3. METHODOLOGY

3.1 Study Area

Narnaul town is a district headquarters of Mahendergarh district. It is located at 28.04°N 76.11°E (Falling Rain, 2021). It is located in the extreme south of the Haryana State at a distance of 140 kilometers from Delhi towards its south-west and 25 kilometers from Mahendergarh. It has an average elevation of 297 meters (977 feet). It caters the needs of surrounding rural hinter land lying both in Haryana and Rajasthan. The meter gauge railway line connects this town with Delhi, Ringus, Phulera and Ajmer. The State Highways No. 17 and 26 pass through Narnaul

and link it with Rewari, Mahendergarh, Nangal Choudhary and Singhana.

3.2 Study Design

Descriptive cross-sectional survey was used in this study. A comprehensive survey questionnaire was used to elicit the required information from the respondents. Online mode of administration was employed to gather information on demographic characteristics, domestic waste disposal, role of private firms in this, prioritization of domestic solid waste management in improving public health, etc.

3.3 Sampling

200 respondents were recruited to participate in the study and random sampling was employed to select respondents.

3.4 Data Collection

Both primary and secondary data were collected. Survey questionnaire was administered to collect primary data from the participants selected at random from Narnaul city households randomly chosen for the study. Secondary data from journal, books, periodicals and other relevant published literature were collected.

3.5 Data Analysis

The data collected were entered and analysed using Statistical Package for Social Sciences (SPSS) software. Percentages or means and standard deviations were computed for baseline characteristics of respondents which constituted descriptive analysis. Corresponding tables and graphs were also developed to show the results in a simpler manner.

3.6 Ethical Issues

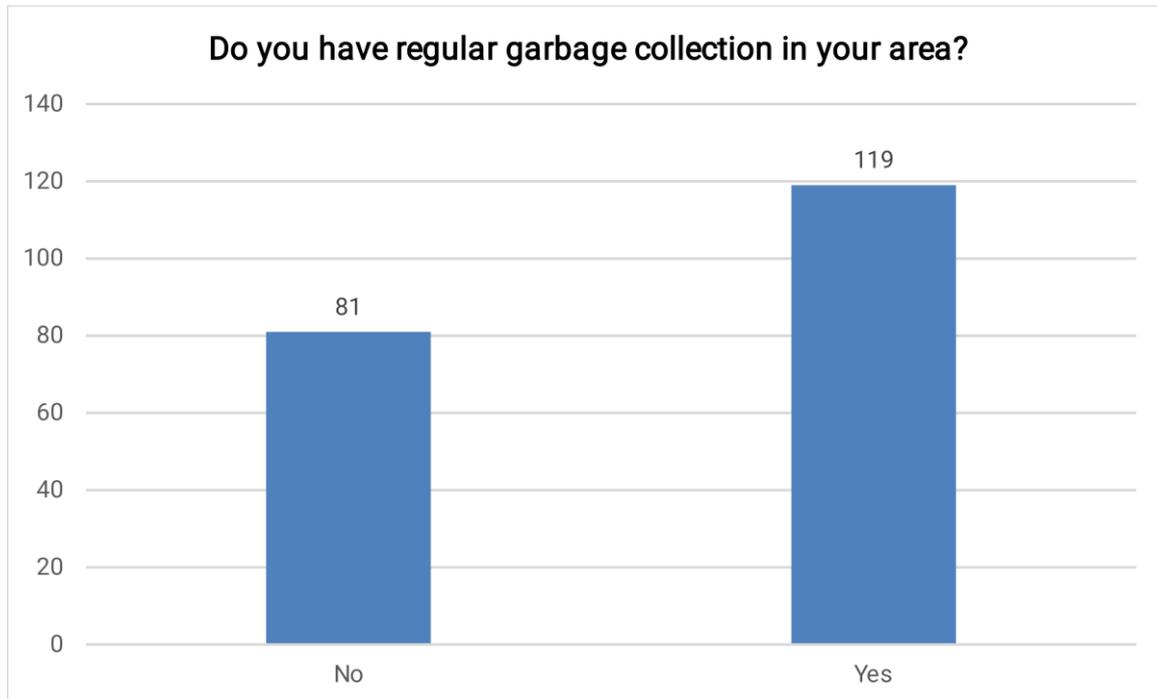
Ethical approval for the study was sought from the University Ethics Review Committee. Every respondent was well informed prior to the interview that, they are under no obligation to take part, they can with-draw at any time and all responses were treated with paramount confidentiality. Respondents were also assured that under no condition whatsoever their names or any other contacts be linked to the data analysis and dissemination of the findings of the study. Storage, analysis and reporting of all data were done in formats that do not revealed the identity of the respondents. This was done by using identification codes instead of names in the analysis and reporting process.

4. RESULTS

4.1 Role of Private Players in Domestic Waste Management

Table 1: Do you have regular garbage collection in your area

Do you have regular garbage collection in your area?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	81	40.5	40.5	40.5
	Yes	119	59.5	59.5	100.0
	Total	200	100.0	100.0	

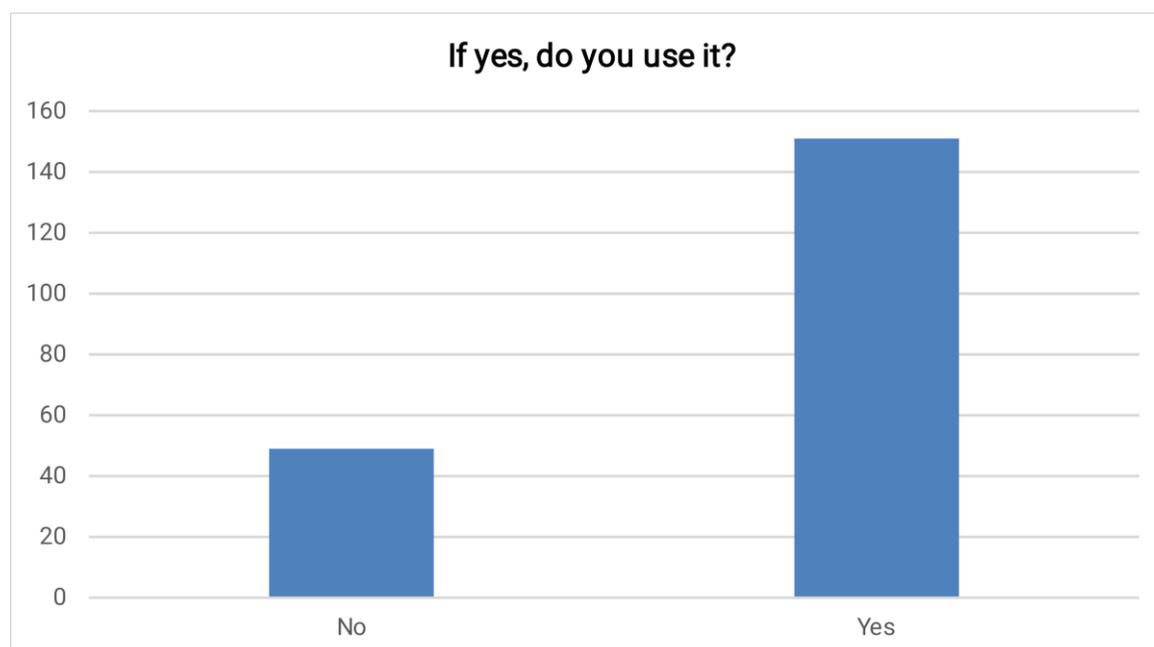


(Sources: SPSS) **Figure 1: Do you have regular garbage collection in your area**

From the above table and chart, it is visible that in the sample of 200 respondents, there are 40.5% respondents who said no and 59.5% respondents who said yes.

Table 2: If yes, do you use it

		If yes, do you use it?			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	49	24.5	24.5	24.5
	Yes	151	75.5	75.5	100.0
	Total	200	100.0	100.0	



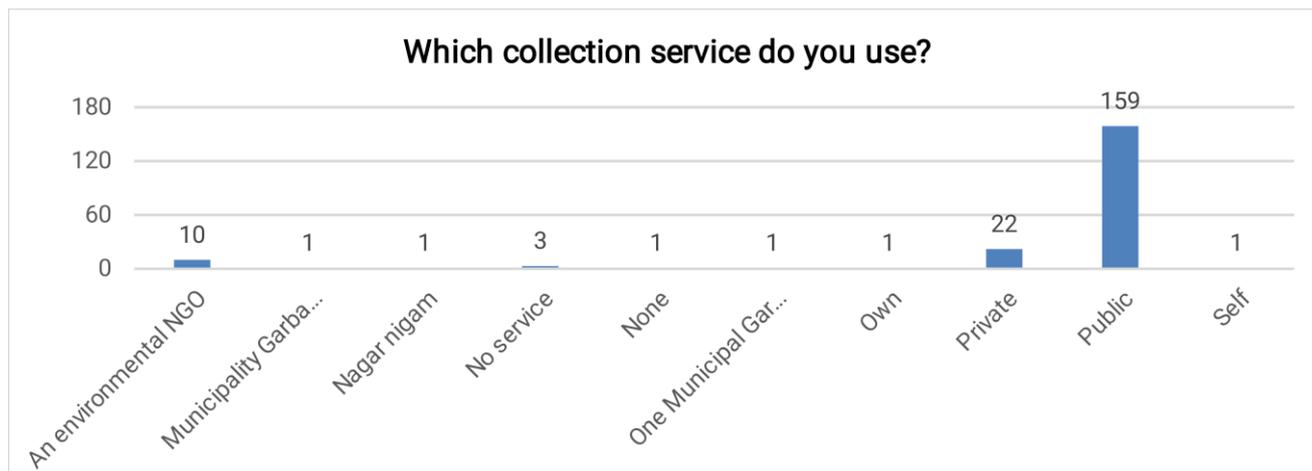
(Sources: SPSS) Figure 2: If yes, do you use it

From the above table and chart, it is visible that in the sample of 200 respondents, there

are 24.5% respondents who said yes and 75.5% respondents who said no.

Table 3: Which collection service do you use

Which collection service do you use?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	An environmental NGO	10	5.0	5.0	5.0
	Municipality Garbage collection Van	1	.5	.5	5.5
	Nagar nigam	1	.5	.5	6.0
	No service	3	1.5	1.5	7.5
	None	1	.5	.5	8.0
	One Municipal Garbage collection Van comes often in colony	1	.5	.5	8.5
	Own	1	.5	.5	9.0
	Private	22	11.0	11.0	20.0
	Public	159	79.5	79.5	99.5
	Self	1	.5	.5	100.0
Total		200	100.0	100.0	



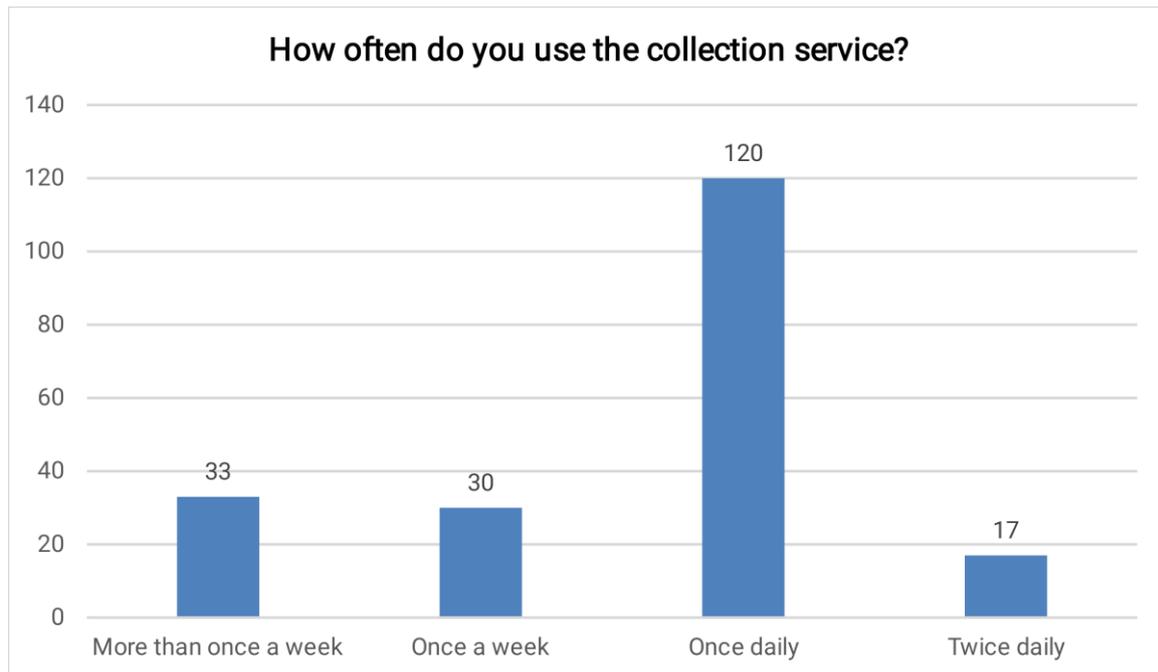
(Sources: SPSS) Figure 3: Which collection service do you use

From the above table and chart, it is visible that in the sample of 200 respondents, there are 5.0% respondents are an environmental NGO, 0.5% respondents are municipality garbage collection van, 24.0% respondents are nagar nigam, 0.5% respondents are no service, 1.5% respondents are none, 0.5%

respondents are none, 0.5% respondents are one municipal garbage collection van comes often in colony, 11.0% respondents are own, 79.5% respondents are private, 0.5% respondents are public and , 48.5% respondents are self.

Table 4: How often do you use the collection service

How often do you use the collection service?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	More than once a week	33	16.5	16.5	16.5
	Once a week	30	15.0	15.0	31.5
	Once daily	120	60.0	60.0	91.5
	Twice daily	17	8.5	8.5	100.0
	Total	200	100.0	100.0	



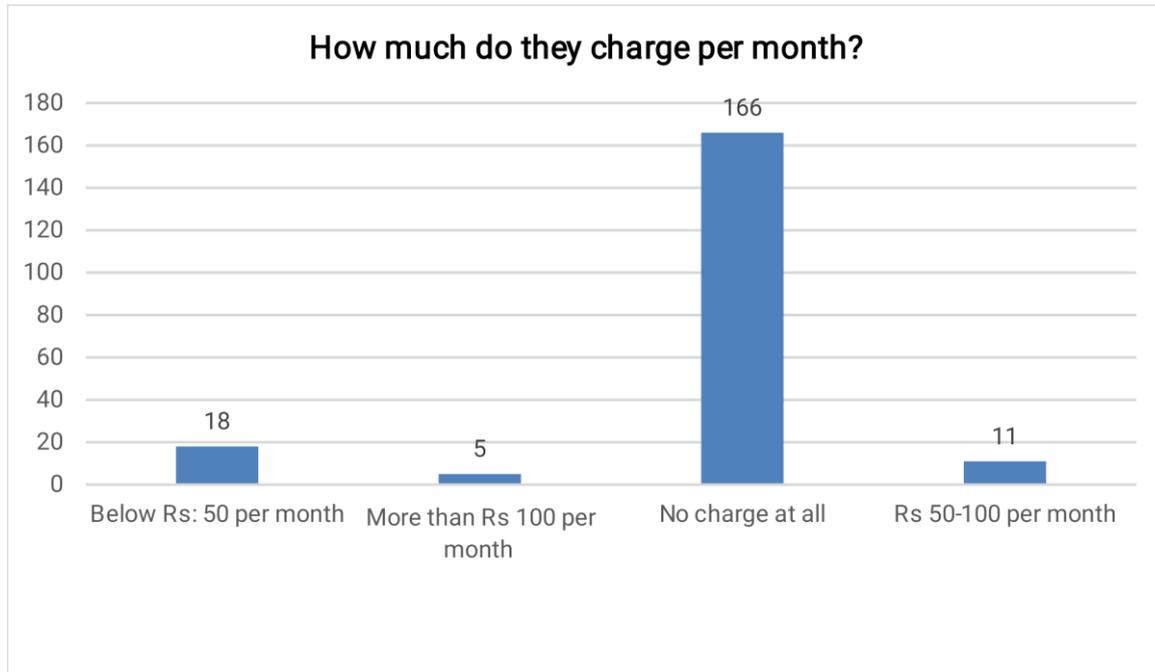
(Sources: SPSS) Figure 4: How often do you use the collection service

From the above table and chart, it is visible that in the sample of 200 respondents, there are 16.5% respondents are more than once a

week, 15.0% respondents are once a week, 60.0% respondents are once daily and 8.5% respondents are twice daily.

Table 5: How much do they charge per month

How much do they charge per month?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below Rs: 50 per month	18	9.0	9.0	9.0
	More than Rs 100 per month	5	2.5	2.5	11.5
	No charge at all	166	83.0	83.0	94.5
	Rs 50-100 per month	11	5.5	5.5	100.0
	Total	200	100.0	100.0	



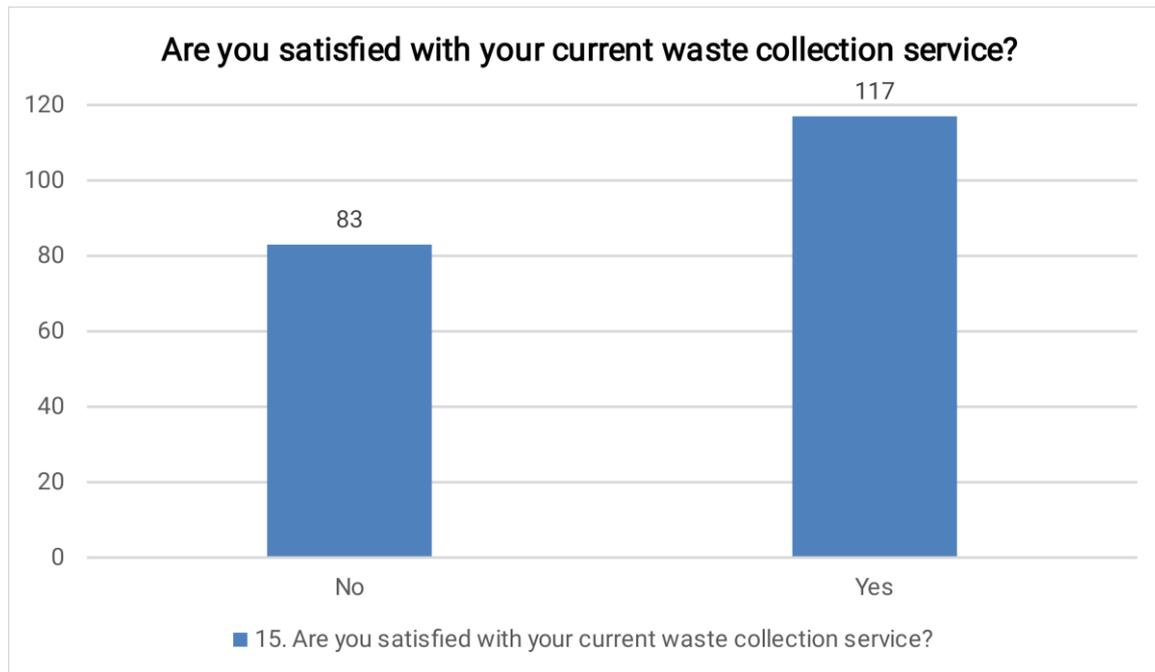
(Sources: SPSS) Figure 5: How much do they charge per month

From the above table and chart, it is visible that in the sample of 200 respondents, there are 9.0% respondents are below Rs: 50 per month, 2.5% respondents are more than Rs

100 per month, 83.0% respondents are no charge at all and 5.5% respondents are Rs 50-100 per month.

Table 6: Are you satisfied with your current waste collection service

Are you satisfied with your current waste collection service?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	83	41.5	41.5	41.5
	Yes	117	58.5	58.5	100.0
	Total	200	100.0	100.0	



(Sources: SPSS) **Figure 6: Are you satisfied with your current waste collection service?**

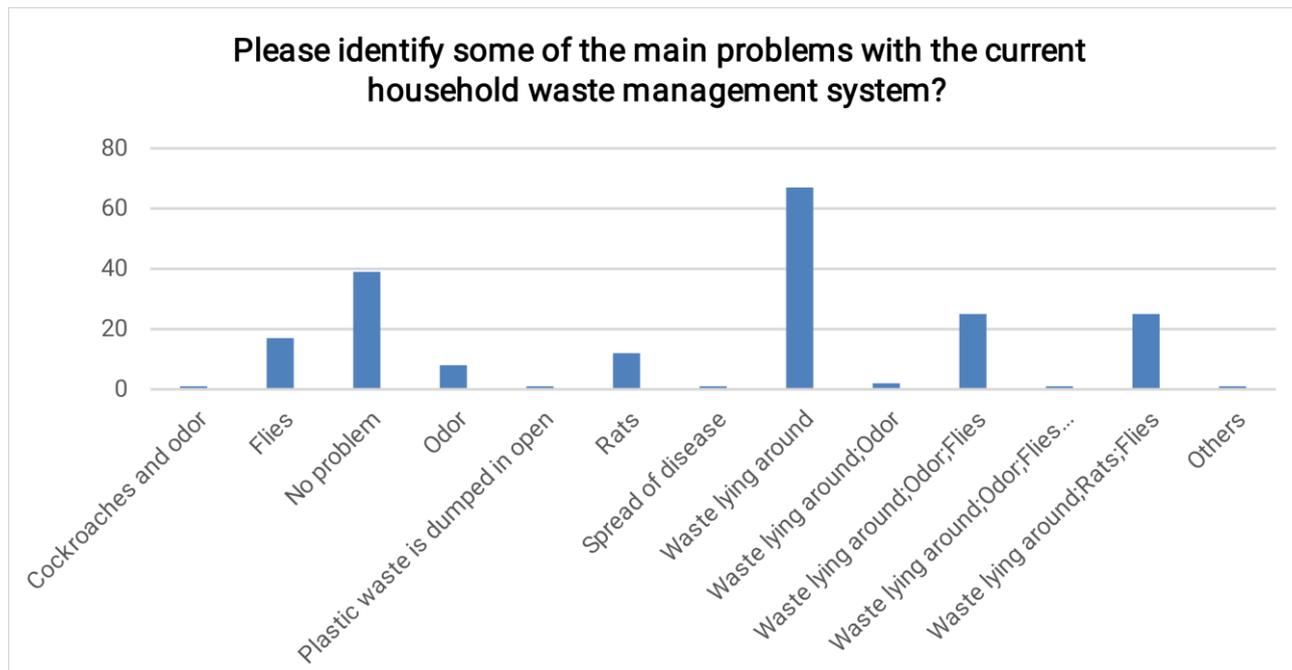
From the above table and chart, it is visible that in the sample of 200 respondents, there are 41.5% respondents who said yes and 58.5% respondents who said no.

4.2 Impact of Waste on the Health of the People

Table 7: Please identify some of the main problems with the current household waste management system

Please identify some of the main problems with the current household waste management system?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Cockroaches and odor	1	.5	.5	.5
	Flies	17	8.5	8.5	9.0
	No problem	39	19.5	19.5	28.5
	Odor	8	4.0	4.0	32.5
	Plastic waste is dumped in open	1	.5	.5	33.5
	Rats	12	6.0	6.0	39.5
	Spread of disease	1	.5	.5	40.0
	Waste lying around	67	33.5	33.5	73.5
	Waste lying around; Odor	2	1.0	1.0	74.5
	Waste lying around; Odor; Flies	25	12.5	12.5	87.0
	Waste lying around; Odor; Flies; Plastic, lead and other metals	1	.5	.5	87.5
Waste lying around; Rats; Flies	25	12.5	12.5	100.0	

	Others	1	.5	.5	33.0
	Total	200	100.0	100.0	



(Sources: SPSS) Figure 7: Please identify some of the main problems with the current household waste management system

From the above table and chart, it is visible that in the sample of 200 respondents, there are 0.5% respondents are Cockroaches and odour, 8.5% respondents are Flies, 19.5% respondents are No problem, 4.0% respondents are Odour, 0.5% respondents are Plastic waste is dumped in open, 6.0% respondents are Rats, 0.5% respondents are Spread of disease, 33.5% respondents are Waste lying around, 1.0% respondents are Waste lying around; Odor, 12.5%

respondents are Waste lying around; Odor; Flies, 0.5% respondents are Waste lying around; Odor; Flies; Plastic, lead and other metals, 12.5% respondents are Waste lying around; Rats; Flies and 0.5% respondents are Others.

Table 8: Please identify some of the main problems with the current household waste management system

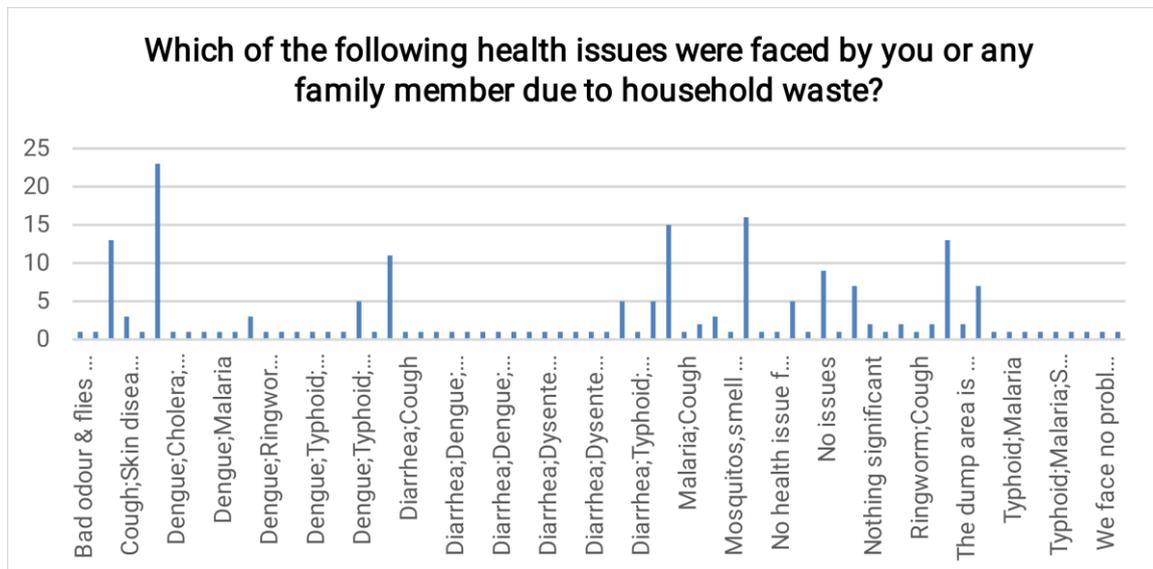
Which of the following health issues were faced by you or any family member due to household waste?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Bad odour & flies invites many disease	1	.5	.5	.5
	Cannot say	1	.5	.5	1.0

Cough	13	6.5	6.5	7.5
Cough; Skin disease	3	1.5	1.5	9.0
Covid	1	.5	.5	9.5
Dengue	23	11.5	11.5	21.0
Dengue; Cholera; Malaria; Skin disease	1	.5	.5	21.5
Dengue; Cough	1	.5	.5	22.0
Dengue; Cough; Skin disease	1	.5	.5	22.5
Dengue; Malaria	1	.5	.5	23.0
Dengue; Malaria; Cough; Skin disease	1	.5	.5	23.5
Dengue; Malaria; Skin disease	3	1.5	1.5	25.0
Dengue; Ringworm; Malaria; Cough; Skin disease	1	.5	.5	25.5
Dengue; Typhoid	1	.5	.5	26.0
Dengue; Typhoid; Malaria	1	.5	.5	26.5
Dengue; Typhoid; Malaria; Cough	1	.5	.5	27.0
Dengue; Typhoid; Malaria; Cough; Skin disease	1	.5	.5	27.5
Dengue; Typhoid; Malaria; Skin disease	1	.5	.5	28.0
Dengue; Typhoid; Ringworm	5	2.5	2.5	30.5
Dengue; Typhoid; Ringworm; Malaria; Skin disease	1	.5	.5	31.0
Diarrhea	11	5.5	5.5	36.5
Diarrhea; Cough	1	.5	.5	37.0
Diarrhea; Dengue; Malaria; Cough	1	.5	.5	37.5
Diarrhea; Dengue; Malaria; Cough; Skin disease	1	.5	.5	38.0

Diarrhea; Dengue; Typhoid; Cholera; Cough; Skin disease	1	.5	.5	38.5
Diarrhea; Dengue; Typhoid; Cholera; Malaria; Skin disease	1	.5	.5	39.0
Diarrhea; Dengue; Typhoid; Malaria; Cough	1	.5	.5	39.5
Diarrhea; Dengue; Typhoid; Malaria; Skin disease	1	.5	.5	40.0
Diarrhea; Dengue; Typhoid; Ringworm; Cholera; Malaria; Cough; Skin disease	1	.5	.5	40.5
Diarrhea; Dysentery	1	.5	.5	41.0
Diarrhea; Dysentery; Cough; Skin disease	1	.5	.5	41.5
Diarrhea; Dysentery; Dengue; Cholera; Skin disease	1	.5	.5	42.0
Diarrhea; Dysentery; Dengue; Typhoid; Ringworm; Scabies; Cholera; Malaria; Cough; Skin disease	1	.5	.5	42.5
Diarrhea; Dysentery; Dengue; Typhoid; Ringworm; Scabies; Cholera; Malaria; Skin disease	1	.5	.5	43.0
Diarrhea; Dysentery; Typhoid	1	.5	.5	43.5
Diarrhea; Malaria	5	2.5	2.5	46.0
Diarrhea; Typhoid; Malaria; Cough; Skin disease	1	.5	.5	46.5
Dysentery	5	2.5	2.5	49.0
Malaria	15	7.5	7.5	56.5
Malaria; Cough	1	.5	.5	57.0
Malaria; Cough; Skin disease	2	1.0	1.0	58.0
Malaria; Skin disease	3	1.5	1.5	59.5
Mosquitos, smell and untidy area	1	.5	.5	60.0
No	16	8.0	8.0	68.0
No any disease	1	.5	.5	68.5
No health issue face	1	.5	.5	69.0

No health issue faced	5	2.5	2.5	71.5
No health issue was faced	1	.5	.5	72.0
No issues	9	4.5	4.5	76.5
No such issues	1	.5	.5	77.0
None	7	3.5	3.5	80.5
Nothing significant	2	1.0	1.0	81.5
Others	1	.5	.5	82.0
Ringworm	2	1.0	1.0	83.0
Ringworm; Cough	1	.5	.5	83.5
Scabies	2	1.0	1.0	84.5
Skin disease	13	6.5	6.5	91.0
The dump area is outside so exactly no effect in colony but yes it is on road so it creates problem to the road traffic. And also cause Oder	2	1.0	1.0	92.0
Typhoid	7	3.5	3.5	95.5
Typhoid; Cough	1	.5	.5	96.0
Typhoid; Malaria	1	.5	.5	96.5
Typhoid; Malaria; Cough; Skin disease	1	.5	.5	97.0
Typhoid; Malaria; Not only us but also affect stray cows and dogs.	1	.5	.5	97.5
Typhoid; Malaria; Skin disease	1	.5	.5	98.0
Typhoid; Scabies; Cough; Skin disease	1	.5	.5	98.5
Typhoid; Skin disease	1	.5	.5	99.0
We face no problem	1	.5	.5	99.5

	Weak ness	1	.5	.5	100.0
	Total	200	100.0	100.0	



(Sources: SPSS) **Figure 8: Please identify some of the main problems with the current household waste management system**

5. DISCUSSION

Through this study, we found out that garbage is being collected regularly. Also, people are vociferously using the garbage collecting services. The reason can be increasing waste generation. Also, we found out that people use the garbage collecting services almost daily. Chaturvedi, A., Arora, R., & Saluja, M. S. (2015) in their study stated that due to their size and rapid growth, large cities in developing countries are increasingly challenged by burgeoning waste generation. Similarly, Alam, P., & Ahmade, K. (2013) stated in their study that urbanization and population growth are solely responsible for high increasing rate of solid waste and its proper management is a major problem of Municipal Corporation.

Through this study, we also found out that garbage collective services are dominated by public sector but private sector does have a sliver of market share. We also found out that as garbage collection is public service, most people don't pay anything for it. Most of those who opt for private garbage collection players pay around Rs. 50 per month. The reason can

be that some people are not satisfied with public waste management services. Ogu, V. I. (2000) described the inadequacies of public provision for solid waste collection and disposal in Benin City (and also in other Nigerian cities) and the limitations of the privatized schemes that have sought to address these inadequacies. Ogu, V. I. (2000) also described the lack of resources available to the public agency responsible for service provision and the inadequacies in the privatization scheme set up in 1995 to address this issue. Also, Chaturvedi, A., Arora, R., & Saluja, M. S. (2015) in their study stated traditional models, working largely in parallel with state-led interventions, are under pressure because they fail to address the waste management crisis. This failure, coupled with the lack of capacities of local governments, has paved the way for formal private sector participation. Ogu, V. I. (2000) stressed on the need for private provision arrangements that are tailored to the characteristics of different parts of the city and by suggesting the kinds of arrangements that should work better in the low-income areas which are generally the ones

least served by conventional public sector or privatized arrangements.

Through this study, we also found out that people are not fully satisfied with waste management around them. They are worried about waste lying around of roads, bad odour in the air, increase in rats and flies in the area, etc. All this is leading to diseases like, dengue, diarrhoea, malaria, skin diseases, etc. This is in agreement with Alam, P., & Ahmade, K. (2013) who showed that excreta and other liquid and solid waste from households and the community, are a serious health hazard and lead to the spread of infectious diseases. Also, Giusti, L. (2009) found out that there is convincing evidence of a high risk of gastrointestinal problems associated with pathogens originating at sewage treatment plants. Similarly, Rushton, L. (2003) in her study stated that different methods of waste management emit a large number of substances, most in small quantities and at extremely low levels. Rushton, L. (2003) in her study also stated that raised incidence of low birth weight births has been related to residence near landfill sites, as has the occurrence of various congenital malformations. In addition, Rushton, L. (2003) in her study stated that waste management workers have been shown to have increased incidence of accidents and musculoskeletal problems. Though, Giusti, L. (2009) also found out that the evidence of adverse health outcomes for the general population living near landfill sites, incinerators, composting facilities and nuclear installations is usually insufficient and inconclusive. Also, Rushton, L. (2003) in her study stated that there is little evidence for an association with reproductive or developmental effects with proximity to incinerators.

6. CONCLUSION

The available published works/reports reveal that there is an increasing trend of privatization in solid waste management in India. Government generally lacks necessary funds and sources for the purpose. ULBs should act a regulator and facilitator of services. Most of the services in SWM can be privatized because now a days private sector or NGO's are playing important role in handling of MSWM related operations in some

of the Indian cities. Sometimes all the SWM activities are not cost effective so government needs to give the support in the form of grant, land or in other way to start the facility for MSWM. Tax exemption in the initial period may be given to private players and award of contract should be of longer duration so that private sector may invest sufficient fund in waste management activities. Role of informal sector is very important for segregation and reduction of MSW, so there interest should be taken care of when planning any waste management system. The city of Narnaul needs to take advantage of the success stories in this direction and also take initiatives on similar lines to give a better look and environmental management to this city.

On the other hand, there are many impacts associated with municipal solid wastes where the impacts on environment and human health are to be considered most as these two aspects are not ignored at any cost. Any municipal solid waste management systems should focus on these issues and reduce the impacts, thus we can protect environment and human health. Landfills and Dumpsites should be properly located using scientific methods and effectively managed to minimize their effects on the environment. There should be a follow up in the functioning of the dumpsites to avoid environment pollution and health hazards. Municipalities should open dumpsites on remote areas with no residents closer to them to avoid the effect of the dumpsite on the nearby residents and monitor the dumpsite properly. They also have to control the litter and monitor their volume. People need to be educated by health motivators about the effects of dumpsites on their health. This will limit the effect of the dumpsite on the residents. There should also be a follow-up to make sure that what they teach the residents. Plastic waste, E-waste and hazardous waste should be handled properly with scientific methods by following safety measures.

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