

Household satisfaction on solid waste collection services conducted by NGOs in Mymensingh Municipality, Bangladesh

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ABSTRACT

The present study was conducted on solid waste management of Mymensingh municipality to find out the household satisfaction of solid waste collection services conducted by NGOs and to find out the factors associated with household satisfaction of waste collection. The study was performed with 120 respondents from ward no 4, 6 and 8 (NGOs working area) and ward no 18 (non NGOs area) of Mymensingh municipality. Data were collected using a questionnaire. The most of the respondents in the study areas were middle (13-50) aged with highest educational qualification at graduate level. Frequency of waste collection was regular. Results showed that 87.5% of the respondents were willing to pay service charge. The higher satisfaction rate for household waste collection service was observed in male (79.01%), old aged (82.05%), illiterate (80%), business person (83.34%) with medium income (80.35%) groups. The findings also showed that age, education, occupation, income status had significant ($p < 0.05$) positive correlation with the satisfaction of solid waste collection services. Maximum satisfaction level was observed in MATI NGO's working areas whereas minimum satisfaction level was observed in the non NGO's area. From this study it is recommended that solid waste collection time should be properly maintained and NGOs showed increase manpower, labor cost, and transport. NGOs or other organization (government and private) should take more effective steps for increasing service availability in the study area.

Key words: Household satisfaction, management practice, solid waste, municipal area, Mymensingh.

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INTRODUCTION

Municipal solid waste management (MSWM) is the major problem being faced by municipalities especially in developing countries because it involves a huge expenditure and receives scant attention (Bhide and Sundersan, 1983). Quantity and composition of MSW depend on population density, source diversity and the income of the people in the locality (Mian et al, 2010). Bangladesh is a densely populated country (1,099.3/km²), a huge population is producing a lot of wastes every day without given attention to its

management. So, waste management is considered to be one of the most serious problems in Bangladesh. Due to high population growth and limited job opportunity in rural areas, people migrated to urban areas. The problems of solid waste in developing countries have been worsened with rapid urbanization and growing numbers of slums resulting in major problems relating to public health, environmental pollution and aesthetic nuisance (Katusiimeh et al, 2012).

Normally waste is considered as a matter in the wrong place. However, waste may be defined as

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the damaged defective or superfluous material produced by a manufacturing process, discarded material from agriculture and forestry, non-edible material from kitchen, refuse available from the place of human and animal habitation, which are allowed to escape without utilized or are under utilized on the site (Varshney, 1987). According to WHO (1971), solid waste is defined as useless, unwanted or discard materials and are not free flowing. Solid waste also can be defined as useless, unwanted and discarded materials coming from production and consumption (Ahmed and Rahman, 2000). Waste generation from human and other anthropogenic activities and its dispersed through handling, storing, collecting and disposing creates risks to the environment and to public health. This fact has been acknowledged by most governments, however many municipalities are struggling to provide even the most basic services (Jones and Pisa, 2000). Solid waste management remains a major challenge to most governments in developing countries in view of the increasing volumes of waste materials generated and disposed to the environment in urban areas (Akaateba and Yakubu, 2013). As a result, many governments have embraced public-private partnerships to improve the effectiveness and efficiency in the delivery of waste management services. Solid waste management is a chain comprising primary storage, primary collection, secondary storage, secondary collection, processing, and disposal. The most challenging stage of SWM in the city estates has been primary collection, whereby households do not deliver all wastes to the designated points from where they can be collected (Augustine & Odhiambo, 2009). Residential waste collection from municipalities are strongly inter correlated to public health and environment (Williams and Kelly, 2003). Tariq bin Yousuf (2007) reported that community based solid waste management are credible reliable having legitimacy. The services also ensured the satisfaction of municipal communities (Tariq bin Yousuf, 2007).

Mymensingh is one of the biggest cities in Bangladesh. The whole Mymensingh municipality area is divided into 21 Wards. The main sources of waste materials generation in Mymensingh municipalities are urban dwellers where 214.91 kg/day waste was produced in April 2005

(Khanom, 2005). Recently Urban Governance, German Technical Cooperation (GTZ), Bangladesh has taken a big project to handle the solid wastes of Mymensingh Municipality. GTZ has involved a few NGOs to do this work. NGOs have appointed workers to collect household wastes. Household collection of wastes would satisfy the housewives if the collection is done regularly (every day), in time, in proper manner with disciplined way. MATI (Motivation, Awareness, Training and Implementation), SBSUS (Sheora Bohumukhi Samaj Kalyan Unnayan Sangsta), TUS (Trinomul Unnayan Sangsta) etc. NGOs working at Mymensingh municipality have been involved in solid waste collection approaches under GTZ guidance. The present work was undertaken to evaluate the household satisfaction in the working area at Mymensingh Municipality with the following objectives: i. to determine the characteristics of the household respondents and ii. to assess the satisfaction of household respondents on solid waste collection services conducted by NGOs and non NGOs.

MATERIALS AND METHODS:

The study was conducted in 4 wards of Mymensingh Municipality. The numbers of the wards were selected at random and those were 4, 6, 8 and 18. The areas of those wards were Shankipara, Cantonment road, Amlapara, Swadeshibazar, Chotobazar, Barabazar, Trankportti and Kristopur, respectively for the study purpose. The study areas are located about 5-6 km North West and South East from the BAU Campus.

Sampling procedure and development of a survey schedule

The people of municipality areas constituted the population and the population of the study area constituted 120 households. Out of 120 households, 30 households were selected from ward no.4 where waste collection was being conducted by MATI NGO, 30 households were selected from ward no. 6 where waste collection was being conducted by SBSUS, 30 household were selected from ward no. 8 where waste collection was being conducted by TUS and 30

households were selected from word no. 18 where waste collection was being conducted by nonNGOs. Data were collected by systematic random sampling technique. In order to collect relevant information a survey schedule/questionnaire was prepared to collect the various socio-economic aspects and performance about waste collection services and household satisfaction.

Data collection and tabulation of the data

In order to collect the required information on various aspects of the study, an interview schedule was carefully prepared to satisfy the objectives of the research. Direct question, open questions and different scales were used to obtain reliable information. The questions were arranged systematically and presented clearly before the respondent. The data were collected from 120 respondents from July to October 2010. The author collected information through personal interview from the individual respondent at their home. Questions were asked systematically and explanations were made wherever it was felt necessary. The information supplied by the respondents was recorded directly on the interview schedule. After completion of field survey all the interview schedules were set for its data tabulation for coding and reduction. All the individual variables of the interview schedules were transferred to a master sheet.

Selection of variables of the study

Resident's satisfaction on the solid waste collection service was the main focus of this study. Adequate care was taken in selecting the dependent and independent variables of the study. The following variables were selected for the study:

Socio demographic and economic characteristics of respondents

The Socio-economic and demographic characteristics of respondents were the independent variables in this study. The selected characteristics were the gender, age, educational qualification, occupation of the respondents, income level of the respondent, family size of the

respondent and description of household patterns. Educational level of a respondent was measured by the number of year of schooling he or she completed. The main income source of respondent a year was assessed as his occupation. A score of 1 was given when his occupation was business, for housewife was 2, for service it was 3, for labour that was 4, for retired person that was 5. The family incomes were divided into three broader levels low, medium and high income groups. The family size of respondent women refers to the total member of individuals of the family including husband, wife, children and other dependents. The household pattern was measured by the area of the raised land in which the household has its entire dwelling unit. It includes Kutcha, ground floor pucca, multihousing, slums. For kutcha the score was 1, for ground floor pucca the score was 2, for multi housing was 3, for slum the score was 4.

Measurement of dependent variable

Household satisfaction of solid waste collection services conducted by MATI, SBSUS, TUS NGO's and nonNGOs in Mymensingh municipality was the dependent variable of this study. It was selected statements.

A rating scale was used for measuring the household satisfaction of solid waste collection services conducted by NGOs. The scale contained 8 selected characteristics related to NGOs in which the households expressed them of satisfaction. Each household indicated the extent of satisfaction and dissatisfaction was 2 and 1, respectively.

Solid waste collection services

The respondents were actually taken the offer from different organizations for waste collection services.

Satisfaction factor about frequency of waste collection

According to the respondents, for waste collection after 1-2 days the score was 1, for daily waste collection the score was 2 and for waste collection after few days the score was 3.

Satisfaction factor about time of waste collection

According to the respondents for morning times of waste collection from door to door the score was 1, for noon the score was 2 and for afternoon that was scored 3.

Willing to pay service charge

According to the respondent the agreement for pay service charge the score was 1 and disagree to pay service charge that was scored 2.

Data processing and analysis

Data collections for this study were compiled tabulated and analyzed in accordance with the objectives of the study. Qualitative data were converted into quantitative data by means of suitable scoring where even necessary. Descriptive statistics and correlation such as number and percentage distribution, range, mean, standard deviation and value of 'r' were used in describing the variables and their relationship of the study.

RESULTS AND DISCUSSION

Socio-economic and demographic characteristics of respondents

Solid waste management system in the community is too much crucial for the consideration of socio-economic status. Out of the total 120 respondents reached, the male populations were 67.5% and female populations were 32.5%. The satisfaction rate was higher in males (79.01%) than in females (66.6%) (Table 1). Male can not realized the problems of waste collection because they do not stay in their house when waste collected. That is why males were satisfied. Most of the family (79.2%) of municipality area were medium sized (family members 3-6), followed by small (up to 3) (17.5%) and large family (>6 persons) (3.3%). Housing pattern of respondents were several categories. The maximum (50.8%) households were of multi-housing system, 35.8% were pacca, 9.2% were slums while the minimum numbers (4.2%) of houses were katcha.

Relationship between age and household satisfaction of solid waste collection services

The majority (47.5%) of respondents were middle aged people (age within 31-50 yrs) followed by young (within the ages of 15-30) (20%) and old (>50 yrs) (32.5%). Among these three age groups, the highest satisfaction rate was in old aged people (82.05%) followed by middle aged (70.17%) and young groups (66.67%) (Table 1). The relationship between age of the household and their satisfaction of the solid waste collection services was measured by testing the following null hypothesis. "There is no relationship between age of the household and their satisfaction of solid waste collection services. The concerned value of 'r' ($r=0.267$) was found to be greater than the table value (Table 2). The relationship showed a tendency in the positive direction with the age group. Based on the above findings, a null hypothesis was rejected and hence it was concluded that the age of the respondents had highly significant and positive relationship with their satisfaction of the solid waste collection services (Fig. 1). The highest percentage of satisfaction rate was found in old group because old people don't know about new technology, so they are satisfied only on waste collection.

Educational status of the respondents and its relationship with satisfaction of solid waste collection services

Education level of the respondents was categorized into five broad categories. There was no education (illiterates), primary level, SSC level, HSC level, also graduate and above. Of the interviewed persons, the highest portion was graduate and above (45%), and the lowest was illiterate (39.0%) (Table 1). The satisfaction among the illiterate, primary, SSC, HSC and graduate groups were 80%, 60%, 59.09%, 79.31% and 66.67%, respectively (Table 1). The observed 'r' value was 0.276 (Table 2). The relationship showed a tendency in the positive direction between the connected variables (Fig 2). The highest satisfaction rate was found in illiterate level (80%), because illiterate people have no enough knowledge about waste collection. The findings indicate that resident education level had highly significant and positive relationship with

their satisfaction of the solid waste collection services conducted by NGO's. This finding is similar with the Katusiimeh et al. (2012).

Relationship between occupation and satisfaction of solid waste collection services

The occupations of the respondents were classified into 5 categories. There is the business, service, housewife, student and jobless (retrieved). A large number of the respondents in the study areas were associated with business (45.0%) and a small number were retrieved people (5.0%) (Table 1). Satisfaction among the business, service housewife, labour and retrieved persons were 83.34%, 63.15%, 74.19%, 70.00% and 66.67%, respectively. In null hypothesis the observed 'r' value was 0.312 (Table 2). Occupation of household owner had a positive relationship with their satisfaction towards waste collection services conducted by NGO's (Fig 3). High satisfaction rate was found in business person (Table 1). Because they stay all time out of home and they have not face any problem for waste collection services.

Relationship between family income and satisfaction of solid waste collection services

Income level changes from one area to another area, because socio economic condition is closely related to level of income. In urban areas living rate is higher than rural areas. The amount of monthly income of different income group is not equal in municipal area. For this study purpose, the family incomes are divided into three broader levels in municipality areas, where low income group had monthly income <10000 Taka, medium income group had monthly 10001/- 19000/- and high income group had >19000 Taka per month (Table 1). The satisfaction among the low, medium and high income groups were 76.67%, 80.35% and 66.27%, respectively. High satisfaction about waste collection services was found among medium income group (Table 1). The present findings contradicts the findings of Ezebilo and Animasaun (2011), they reported that higher income householders have relatively higher levels of satisfaction with waste collection services. The present study justified that residents who have more money are less likely to be

satisfied with solid waste management. Because high income people are willing to pay more money and want better solid waste management.

Household satisfaction level conducted by MATI NGO, SBSUS, TUS and non NGO

From the respondent's opinion household satisfaction level was categorized into three classes: high, medium and low response about waste collection services. Table 3 shows that, 36.66% of the respondents had high satisfaction, 53.34% of the respondents had medium satisfaction and 10% respondents had low satisfaction of the solid waste collection services by MATI NGO. On the other hand, 23.34% respondents had high satisfaction, 46.66% of the respondents had medium satisfaction and 30% had low satisfaction of the solid waste collection services by TUS. In case of services by SBSUS, 16.66%, 43.34% and 40% of the respondents had high, medium, and low satisfaction on the solid waste collection, respectively. On the other side, in case of solid waste collection services by non-NGOs, 13.34%, 30%, and 56.66% of the respondents had high, medium, and low satisfaction, respectively (Table 3). So this result showed that, satisfaction level of MATI NGO's was maximum, and the non-NGOs was minimum. These findings are consistent with findings by Kasim and Ali (2006) and Katusiimeh et al (2012) who reported that households are satisfied with the frequency of services provided by private waste collection firms but contrary to findings by Awortwi (2004); and Longe *et al.* (2009) who reported that most residents were dissatisfied with solid waste management services provided by the private sector.

Household owner faced some problems from solid waste collection services conducted by MATI NGO. Household owners commented that lack of vehicle, inadequate land to dump solid waste and inadequate number of manpower for waste collection services were the common problems. In rainy season, if the waste was not collected from the house, household owner faced serious health problem and also solid waste causes water pollution. Waste materials also emit some gaseous substances and air pollution, and ultimately green house effect occurs.

Table 1
Household satisfaction on waste collection services according to sex, age, educational status, occupation and income level of the respondents.

Parameter	Categories	Frequency	Percent	No. of satisfied household	Satisfied households (%)
Sex	Male	81	67.5	64	79.01
	Female	39	32.5	26	66.67
Age	Young age (15-30)	24	20	16	66.67
	Middle age (31-50)	57	47.5	40	70.17
	Old age (>50)	39	32.5	32	82.05
Education	Illiterate	5	4.17	2	80
	Primary level	10	8.33	6	60
	SSC	22	18.3	13	59.09
	HSC	29	24.2	23	79.31
Occupation	Graduate and above	54	45.0	36	66.67
	Business	54	45	45	83.34
	Service	19	15.82	12	63.15
	Housewife	31	25.84	23	74.19
	Labour	10	8.34	7	70.00
Income level	Retired	6	5	4	66.67
	Low	27	22.5	27	76.27
	Medium	56	46.67	45	80.35
	High	37	30.83	18	66.67

Table 2
Relationship between dependent and independent variables.

Dependent variable	Independent variables	Value of 'r'	Table value of 'r'	
			0.05	0.01
Household satisfaction of waste collection services conducted by NGO's and non NGO	Age	0.267*		
	Education	0.276*		
	Occupation	0.312*	0.194	0.254
	Income	0.373*		

* Correlation is significant at the 0.05 level of probability

** Correlation is significant at the 0.01 level of probability

Table 3
Household satisfaction level conducted by MATI NGO, SBSUS, TUS and non NGO.

Categories	Level of satisfaction (Frequency)			Total
	High (%)	Medium (%)	Low (%)	
MATI	11 (36.66)	16 (53.34)	3 (10)	30
TUS	7 (23.34)	14 (46.66)	9 (30)	30
SBSUS	5 (16.66)	13 (43.34)	12 (40)	30
Non NGO	4 (13.34)	9 (30.00)	17 (56.66)	30
Total	100	100	100	120

Table 4
Time interval and collection time of the day of solid waste collection in Mymensingh municipality.

Categories		Frequency	Percent
Time interval of waste collection	Daily	52	43.34
	After 1-2 days	39	32.5
	Few days	29	24.16
Waste collection time of a day	Morning	17	14.2
	Noon	75	62.5
	After noon	14	11.7
	No fixed time	14	11.7

Table 5
Respondents willingness to pay service charge and the amount of service charge they wanted to pay.

Categories		Frequency	Percent
Willing to pay	Yes	105	87.5
	No	15	12.5
Amount of money	10-20 Tk	17	14.2
	21-30 Tk	50	41.7
	31-40 Tk	39	32.5
	41-50 Tk	14	11.7

Time interval and collection time of the day of solid waste collection

The service availability from all NGOs from SBSS were 25%. The daily waste collection was 43.34%, whereas 32.5% of waste was collected after 1-2 days and 24.16% of waste was collected even after few days later of waste production. The waste collection from door to door was varied. From this study it is recognized that 14.2% waste was collected at the morning, 62.5% at the noon, 11.7% in the evening, and 1.7% in the no fixed time (Table 4). Maximum waste was collected from door to door at noon (12:00-4:00pm). Houholders recommended that labour should come regularly and in time, most preferred noon as collection time for solid waste collection. They opinioned that time should be properly maintained, punishment for braking role should be implemented.

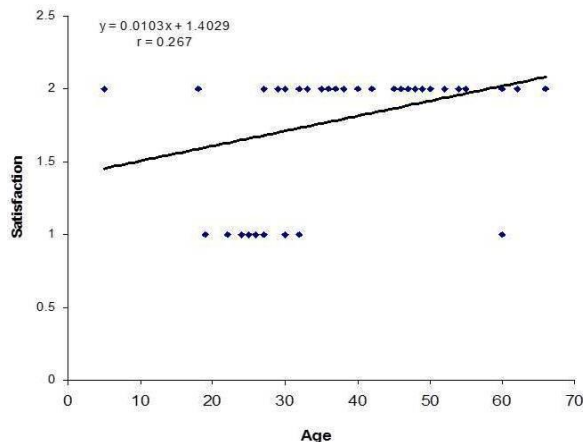


Figure 1
Relationship between age of the respondents and their satisfaction.

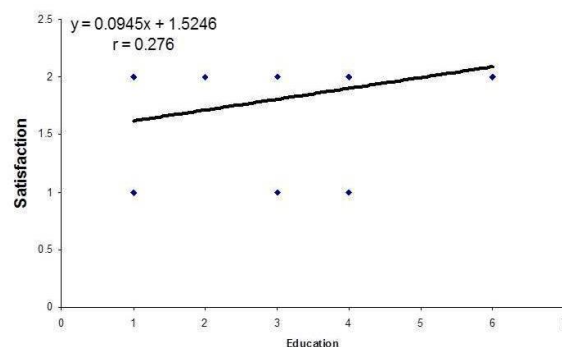


Figure 2
Relationship between education of the respondents and their satisfaction.

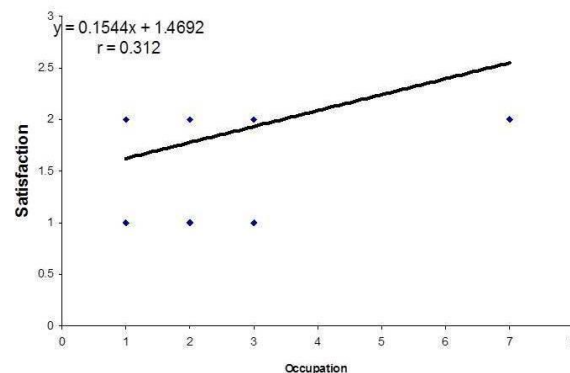


Figure 3
Relationship between occupation of the respondents and their satisfaction.

The willingness of the housholders to pay and the amount of taka they wanted to pay

Among the respondents, 87.5% of the respondent was willing to pay service charge for waste collection as it was small amount hence they were satisfied, 12.5% of the respondent disagree to pay service charge to the NGO or other organization because they disposed their wastes into the pond, backside of their house or disposed into the nearby dustbin by themselves (Table 5). According to the respondents, 14.2% of the respondent wanted to pay 10-20 taka, 41.7% of the respondents wanted to pay 21-30 Taka, 32.5% respondent wanted to pay 31-40 taka and 11.7% of the respondent wanted to pay 41-50 taka, respectively (Table 5). Most of the respondents (87.5%) wanted to pay because they are aware about the harmful effects of waste accumulation and unhealthy environment created by waste (Katusiimeh et al. 1012),

Overall, MATI NGO wanted to increase man power in future for collection services if householders supports them. They already have taken necessary steps to reuse of waste after recycling the solid waste from the household of ward no. of 4, 6 and 8. The GTZ (German cooperation technique) put in to execute the MATI NGO for collection of waste from ward 4, 6 and 8 and creating awareness and motivation of the household. Other NGO's and private organization need to take into account their field staff's education, meeting, training etc. NGO's and non NGO should increase labor cost. NGO or other organization should take effective steps for increasing manpower, vehicle and drain cleaning because drain cleaning is important for healthy environment.

CONCLUSION

The following conclusion may be made on the basis of the findings of the study and logical interpretation. From the study, it was evident that residents were generally satisfied in solid waste collection services conducted by NGO. Finally among three NGO's and non NGO, MATI NGO's performance was the best. In particular residents were satisfied with the cleaners. Improvements to the service would be one step towards encouraging household to reuse

of waste, recycling and act more environmentally. About two thirds of the household owner was even willing to pay service charge for effective solid waste collection services. The finding also showed that age, education, occupation, income status had significant positive correlation with the satisfaction of the solid waste collection services conducted by NGO. Here the continuous study on solid waste may be highly recommended to ensure sound environment. Problem faced by the household owners if monitored and solved by the NGO may play an effective role in solid waste collection services. From this study it is recommended that solid waste collection time should be properly maintained and NGOs showed increase manpower, labor cost, and transport. NGOs or other organization (government and private) should take more effective steps for increasing service availability in the study areas, they should increase awareness level to people.

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