

Evaluation the Improper Household Solid Waste (HSW) Management that Caused Environmental Pollution in Dhaka City

Kamal Krishna Mistry^{*(1)} Md. Harunor-Rashid⁽¹⁾ and Ratna Halder⁽¹⁾

(1). Department of Botany, Ausmatulla Ideal School and College, Solmize, Basundhara, Dhaka, Bangladesh.

(*Corresponding author: Kamal Krishna Mistry. E-Mail: kkmistryphd@yahoo.com).

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Abstract

This study was carried out with Household Solid Waste (HSW) management and environmental pollution in Dhaka City (Azimpur Colony), during May 2018 to survey waste management and disposal, and to study water supply, sanitation, HSW management, and drainage services following ranking IV, III, II, I with priority index where householders emphasized to HSW management, also, to record, the majority of people attached to solid waste management (II). In other way, to identify problems of waste disposed of indiscriminately, irregular removal of waste dustbins, waste disposed outside the dustbin and water-logging due to blockage of drains with waste by priority ranked I, II, III, IV. The priority index (0.588) with rank (I) indicated more significant to follow 'waste disposed outside the dustbin'. However, 50% of respondents preferred average rating of the municipal solid waste management system (rating based) and the maximum respondents (81%) were unsatisfactory and 19% were satisfactory regarding waste disposal of the study area.

Key words: Improper waste management, Waste disposal, Environmental pollution.

Introduction:

Environmental pollution is now a global issue in the world. Physical and biotic sources are the major cause of environmental pollution (Sengupta, 2012). So, biotic municipal solid waste (MSW) is created major environmental pollution in the living area and the absence of effective controls, harmful pollutants may be emitted into the air, land and water which may influence human health and the environment (Boadi and Kuitunen, 2014).

Environmental pollution is a non-biological decomposition of non-biodegradable pollutants that requires a combination of many factors, such as wind, water, and climate to work together to achieve the neutralization of pollutants such as air water soil and waste pollutions etc. It is found that water pollutants include insecticides and herbicides, food processing waste, pollutants from livestock operations, volatile organic compounds (VOCs), heavy metals, chemical waste and soil pollutants (Salam, 2016).

Dhaka city is the capital of Bangladesh with more than 20 million people (BBS, 2019). It is one of the densely populated countries of the world. Access to water supply, sanitation, solid waste management and other civic services is extremely limited (BBS, 2014). The 'Municipal Solid Waste' includes commercial and residential wastes generated in municipal or notified areas in either solid or semi-solid form excluding industrial hazardous wastes but including treated bio-medical wastes (Cointreau, 1987). So, the environment is polluted to consideration of all things of Dhaka city following Dhaka City wastes.

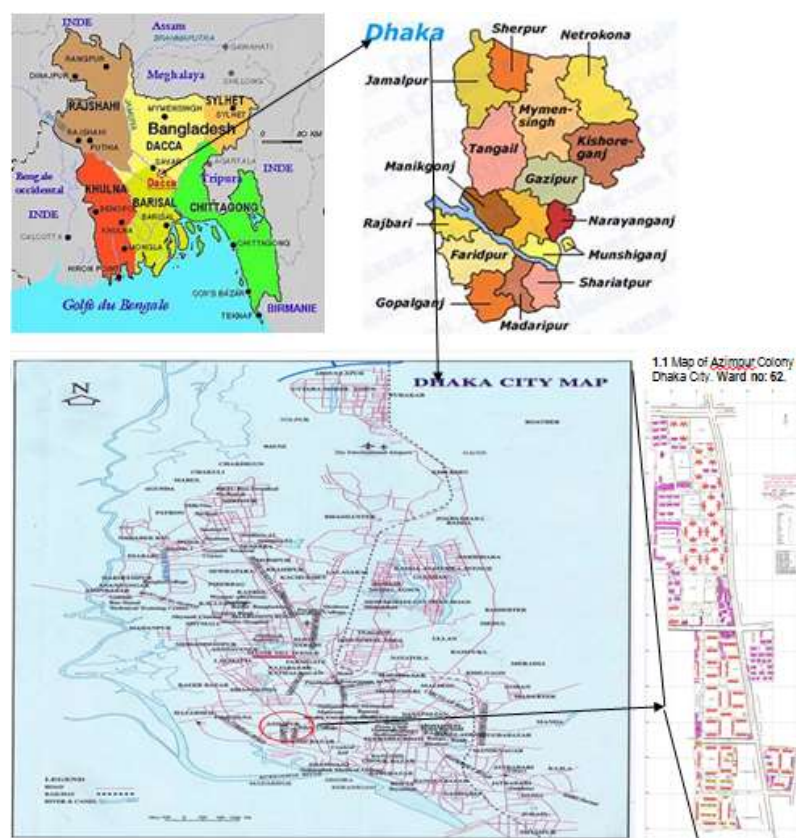
Household Solid Waste (HSW) term is used to describe non-liquid waste materials arising from domestic, trade, commercial, agricultural, industrial activities and public services (Palnitkar, 2002). However, sometimes, the

management of household waste is also a major issue (Anon., 2006). As a result, it is created environmental pollution. The daily average waste generation rate (WGR) per capita in Dhaka City more than 0.50 kg (DCC survey, 2004), Africa is 0.50-0.87 kg (UNEP, 2000a; ENCAPAFRICA, 2004). In Asia, it varies widely between less industrialized and industrialized regions, from an average of 0.20-0.60 kg in India [less industrialized] and 5.5 kg in Hong Kong [more industrialized]. Latin America and the Caribbean have averages of 0.3-1.0 kg per capita per day (Hokkanen and Salminen, 1997). Dhaka City generates about 3500-4000 tons of solid waste per day (DCC survey, 2004). So, an integrated waste management system and strict controls are required to prevent its negative impacts on human health and the environment (Taludhar, 1995). Hence the study was undertaken with the objectives to find out survey waste management and disposal and to study water supply, sanitation, HSW management, and drainage services.

Materials and Methods:

Study area:

This study was carried out at Azimpur Govt. Colony at Dhaka Metropolitan City in Bangladesh during dry spell



May 2018. This was one of the most

important locations in Dhaka City. Dhaka

City includes an area of 325 sq. km and

located at a latitude of 23°43' N and

longitude of 90°24' E. It is bounded by

Savar (Manikgonj) on the west, Gazipur on

the north, Munshiganj on the south and

Narayanganj on the east. Annual rainfall is

about 2,540 mm and humidity was about

80% (Anonymous, 2005) where were well

established in different categories schools,

college, community center, playground,

smooth roads, residence buildings, shops,

ponds, gardens, etc. There are about more

than ten thousand inhabitants, most of them

are literate, employed, students, and

engaged with other professions.

For the accomplishment of this study like

household solid waste collection system,

surveyed through Public Relation Activities

(PRA), analytical tool, and priority index

were done.

Fig 1. Location of Azimpur Colony in Dhaka city map (red circled) and details map of Azimpur Govt.

Colony (Map of Bangladesh, 2015; Map. 1.1 Azimpure Govt. Colony, ward no. 62)

Household solid waste collection system:

The study area located in the 62 ward number of Dhaka City and household waste was collected ward-based approached (WBA). Bags were supplied to the selected house and were deposited of household waste as well as those bags were transferred to the ward (no. 62) collector. Ward collectors collected bags from door to door daily basis with help of vehicle like 'rickshaw vans' and deposited semi dumping stations as well as waste sorting. Finally, collections of waste were carried by Dhaka City Corporation (DCC) to fall those in the central dumping station.

Survey study:

The study was conducted through the supplied questionnaire to a group of randomly selected people. The survey was done by Public Relations Activities (PRA) at Azimpur government staffs colony in Dhaka City during the dry spell, May 2018. Out of 10,000 (Approx.) populations, 150 households were selected randomly. Selective people actively expressed their opinion on the point of the questionnaire. Quantitative and qualitative data were collected from primary and secondary sources. After recording all data were analyzed by using Statistical Package for the Social Sciences (SPSS).

Analytical Tool: Statistical Program for the Social Sciences (SPSS-11.5 Version) for Windows XP with 2003 and 2007 program was a powerful statistical analysis and data management system of household solid waste and using descriptive menus and simple dialogue boxes to perform operations (Norusis, 1993) where was 27 questionnaires with some variables of Azimpur government colony, Dhaka and each was edited, coded, and put into the program to study various aspects. The software has the capability of managing large amounts of data and giving output in summary forms, tables, cross-tabulations, averages, percentages, etc. It can also transform these results into the graphic presentation.

Priority Index:

It was calculated for each problem by multiplying each priority with its relative weightage given in the parenthesis and then dividing by summation of the frequency (DCC special method). This method has been conducted to find out waste management and disposal among the living factors for Dhaka City Corporation (DCC), Bangladesh.

Results and Discussion:

The results have been studied (Table 1) that water supply, sanitation, household solid waste management and drainage services were observed following ranking IV, III, II and I respectively according to score. The priority score was summarized by ranged 0.288-0.563 (Table 1). It was found that householders were emphasized to solid waste management among different services in which priority index score was obtained 0.518 and was ranked second (II).

It has been observed that the majority of people attached second priority (II) to solid waste management for the community. So, it might be told that solid waste management was a very important activity among waste services of the community because waste is more hazardous than those that are not hygienic not only for the family environment but also is created environmental pollution may be like local area and atmosphere. For those reasons, people of that area were given more emphasis on the management of household solid waste. These findings are supported by Fleming *et al.*, (2002) who reported that household waste management accomplished to emphasize the different wastes. A similar trend was mentioned by Agunwamba, (1998) in Nigeria.

Table 1. Priority-based services for the improvement of household waste of the steady area

Service	Priority					Sum (Total frequency)	Priority Index	Rank
	No (0)	1 st (1)	2 nd (0.75)	3 rd (0.5)	4 th (0.25)			
Water Supply	0	0	0	23	127	150		
Score	0	0	0	11.5	31.75	43.25	0.288	IV
Sanitation	0	0	7	71	72	150		
Score	0	0	5.25	35.5	18	58.75	0.392	III
Solid Waste Management	0	3	36	80	31	150		
Score	0	3	27	40	7.75	77.75	0.518	II
Drainage	0	0	55	78	17	150		
Score	0	0	41.25	39	4.25	84.50	0.563	I

It has been studied (Table 1) that different kinds of waste problems were identified and was found that drainage,

sanitation, and water supply were obtained ranks I, III, IV respectively as well as Priority index was recorded 0.563, 0.392, 0.288 followed by rank I, II, and IV. Solid waste disposed of indiscriminately, irregular removal of waste dustbins, waste disposed outside the dustbin and water-logging due to blockage of drains with waste that priority ranked I, II, III, and IV respectively and Priority index ranged 0.288-0.563.

Table 2. Problems due to improper disposal of household solid waste of the study area

Problems	Priority					Sum	Priority Index	Rank
	No	1 st	2 nd	3 rd	4 th			
	(0)	(1.0)	(0.75)	(0.5)	(0.25)			
Waste disposed indiscriminately	31	36	20	17	46	150		
Score	0	36	15	8.5	11.5	71	0.473	III
Irregular removal of waste dustbins	31	31	54	24	10	150		
Score	0	31	40.5	12	2.5	86	0.573	II
Waste disposed outside the dustbin	31	45	26	47	1	150		
Score	0	45	19.5	23.5	0.25	88.25	0.588	I
Water logging due to blockage of drains with waste	31	7	33	30	49	150		
Score	0	7	24.75	15	12.25	59	0.393	IV

It has been studied (Table 2) that different kinds of waste problems were identified and was found waste disposed of indiscriminately, irregular removal of waste dustbins, waste disposed outside the dustbin and water-logging due to blockage of drains with waste those priorities ranked I, II, III, IV respectively. Priority index ranged 0.393-0.588 following ranked I to IV. The priority index (0.588) with rank (I) indicated more significant following 'waste disposed outside the dustbin' that means people were more habituated waste disposal outside the dustbin. It may be found that in some cause, people are thrown the waste into the dustbin for disposal but it was not stored into dustbin properly. It might be a lack of awareness, distraught communication to reach dustbins, shortage of time, climatic problems, etc. As a result, due to these acts problems are created surrounding the environment. A similar trend was reported by Tsiliyannis, (1999).

Simultaneously, it has been shown (Table 2) that the minimum priority index 0.393 with ranked IV was obtained problem 'water logging due to blockage of drains with waste'. So, it may be called secondary issues of the waste problem. Because, if the waste is stored inside the dustbins and there is no probability of water logging due to blockage of drains with waste. These lines are agreed with the finding of Omran and Gavrilesco, (2008) who reported that municipal solid wastes management in developing countries is difficult with perspective issues but may be solved if the people are more sensitive about perspective issues like environmental pollution. Similar observations have been reported by Agunwamba, (1998).

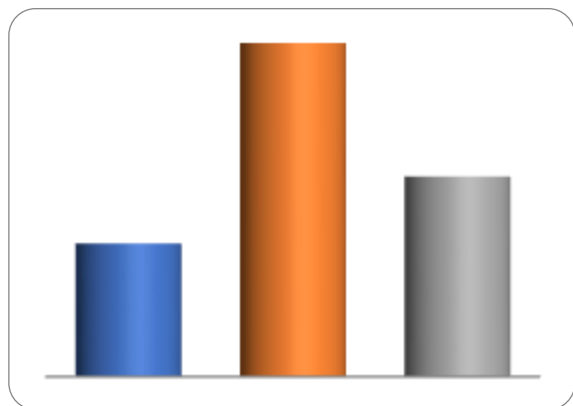


Fig. 1. Rating of municipal waste management service.

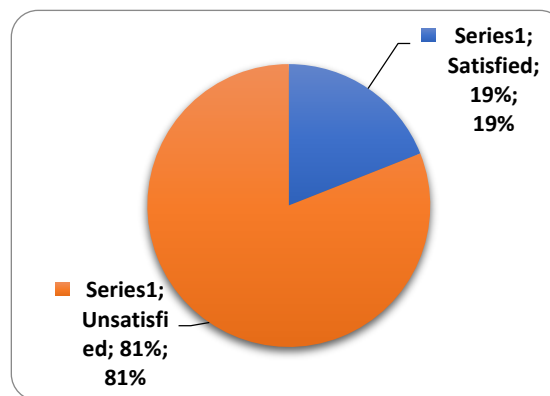


Fig.2. People respondent in accordance with waste disposal system.

Figure (1), shows the results on the rating of the municipal solid waste management system have been studied and were revealed that 50% of respondents were preferred average rating, 20% was good and 30% was unsatisfactory. These results are in line with the finding of Palnitkar, (2002) who stated that the rating of municipal waste management. Similar findings were mentioned by Tsiliyannis (1999). Simultaneously, figure (2) shown that the maximum respondents (81%) were unsatisfactory and 19% was satisfactory regarding waste disposal of the steady area. This finding is agreed by ENCAPAFRICA, (2004) who reported on solid waste disposal in Africa.

Conclusions:

In this study, household solid waste management are accomplished priority-based and kept keen attention to dustbins as well as waste throw into it according to routine works. Emphasis or priority is given of household waste management among different kinds of wastes. Sometimes, problems create due to improper management and disposal waste. Waste deposits inside dustbins due to proper management. These facts, living areas are kept clean. So, people should be careful about these activities and saved the environment of the study area.

Recommendations:

The finding of the study was found that water supply, sanitation, household solid waste management and drainage services were recorded following ranks and Priority index to emphasize on household solid waste management where found that rank I (0.588) was significant among those ranking. In another way, it was found that 50% of people were preferred average rating of municipal solid wastes service and the maximum respondents (81%) were unsatisfactory following waste disposal. So, this situation suggests that (i). timely solid waste management, (ii). waste should be disposed inside the dustbins, (iii). training should be arranged due to proper disposal of waste, (iv). kept attention to the pollution-free environment by waste management (v). More activities should be taken on waste management and disposal need-based.

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تقييم إدارة مخلفات المنازل الصلبة غير الملائمة المسببة للتلوث البيئي في مدينة دكا

كمال كريشنا ميستري*⁽¹⁾ وهارونر-رشيد⁽¹⁾ وراتنا هالدر⁽¹⁾

(1). قسم النبات، الكلية والمدرسة المثالية الأوسماتولا، سولمير، باسندهارا، دكا، بنغلادش.
*للمراسلة: الباحث كمال كريشنا ميستري. البريد الإلكتروني: kkmistryphd@yahoo.com.

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الملخص

نفذت هذه الدراسة بهدف إدارة النفايات الصلبة المنزلية (HSW) والتلوث البيئي في مدينة دكا (مستعمرة أزمبور)، خلال شهر أيار مايو 2018 لمسح إدارة النفايات والتخلص منها، ودراسة إمدادات المياه والصرف الصحي وإدارة النفايات الصلبة، بالإضافة لخدمات الصرف التي تتبع الترتيب الرابع والثالث والثاني والأول مع مؤشر الأولوية، حيث أكد أصحاب المنازل على إدارة HSW، وسجل غالبية الأشخاص المرتبطين بإدارة النفايات الصلبة الترتيب (II). بطريقة أخرى، لتحديد مشاكل النفايات التي يتم التخلص منها بشكل عشوائي، والإزالة غير المنتظمة لحاويات القمامة، والنفايات التي يتم التخلص منها خارج سلة المهملات، وتسجيل حالات انسداد المصارف مع النفايات رتبت حسب الأولوية: ا، II، III، IV. ويشير مؤشر الأولوية (0.588) بالرتبة (I) إلى أهمية أكبر لمتابعة النفايات التي يتم التخلص منها خارج سلة المهملات. ومع ذلك، فضّل 50% من المشاركين متوسط الترتيب المتوسط لنظام إدارة النفايات الصلبة (اعتماداً على التصنيف) وكان معظم المشاركين بنسبة (81%) غير راضٍ و19% كانوا راضين عن الخدمة فيما يتعلق بالتخلص من النفايات في منطقة الدراسة.

الكلمات المفتاحية: إدارة المخلفات غير الملائمة، التخلص من النفايات، التلوث البيئي.