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TITLE: HOSPITAL WASTE MANAGEMENT IN SELECTED HOSPITALS OF FARIDPUR.

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ABSTRACT

A cross-sectional study was conducted in two medical college hospitals & six clinics of Faridpur, using convenient sampling technique. To evaluate the current practices of collection, segregation approaches, storage arrangements and disposal systems in the selected hospitals of Faridpur. To determine the level of knowledge & awareness of individual involved in medical waste management. To collect information on hospital waste management. To identify the potential impact on human health & environment. The instrument of research was a self administered questionnaire, with four sections, relating to the general information of the institution, administrative information, information regarding Health Waste Management personnel and a check-list of Hospital Waste Management activities. Out of eight hospitals visited 3 (37.5%) were segregating sharps, pathological waste, chemical, infectious, pharmaceutical and pressurized containers at source. For handling potentially dangerous waste, three (37.5%) hospitals provided essential protective gears to its waste handlers. Only one (12.5%) hospital arranged training sessions for its waste handling staff regularly. Five (62.5%) hospitals had storage areas but mostly it was not protected from access of scavengers. Five (62.5%) hospitals disposed off their hazardous waste by burning in incinerators, three (37.5%) disposed off by municipal landfills and one (12.5%) was burning waste in open air without any specific treatment. No record of waste was generally maintained. Only three (37.5%) hospitals had well documented guidelines for waste management and a proper waste management team. Hospital wastes pose a significant impact on health & environment. From this study it can be said that there is an argent need for raising awareness & education on hospital waste issue. Proper waste management strategy is needed to ensure health & environment safety. For further study it is needed to collect more information on impact, disposal & management to draw clear conclusion.

Key Words: Hospital waste, Management, In selected hospitals, Faridpur.

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Introduction:

Hospital waste refers to all waste generated, discarded & not intended for further use in the hospital. "Hospital waste" Any waste generated consequent to health care activity including those at home is "Health care waste". According to Biomedical Waste (Management and Handling) Rules 1998, of India, "Biomedical Waste" (BMW) is defined as a waste generated during diagnosis, treatment, immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals^[1]. It can be categorized:

- (1) **General waste:** Largely composed of domestic / household type waste. It nonhazardous to human being, e.g. kitchen waste, packaging materials, papers, wrappers & plastics.
- (2) **Pathological waste:** Consist of tissue, organ, body part, human fetuses, body & body fluid. It is hazardous waste.
- (3) **Infectious waste:** This waste which contains pathogens in sufficient concentration or quality that could cause diseases. It is hazardous e.g. culture & stocks of infectious agent from laboratories, waste from surgery, waste originating from infectious patients.
- (4) **Sharps:** Waste material which could cause person handling it a cut or puncture of skin e.g. needles, broken glass, saws, nail, blades, scalpels.
- (5) **Pharmaceutical waste:** This includes pharmaceutical products, drugs & chemicals that have been returned from wards, have been spilled are outdated or contaminated.
- (6) **Chemical waste:** This comprises discarded solid, liquid and gaseous chemicals e.g. cleaning, house keeping, and disinfecting product.
- (7) **Radioactive waste:** It includes solid, liquid, and gaseous waste that is contaminated with radionuclides generated from in-vitro analysis of body tissues and fluid, in-vivo body organ imaging and tumour localization and therapeutic procedures^[2].

Bangladesh is the most populous country & 12 most densely populated country in the world with projected urban population growth rate from 2010-2015 is 3%. There is an increasing problem in the waste & hospital management particularly in large cities. There has been

recent development in Bangladesh to improve waste management specially in urban cities in Dhaka city corporation with support from Japan International Corporation agency (JICA) has been master plan underway to better handle waste management in Dhaka. UNICEF has also initiated recycling programme & waste control with the City Corporation & municipality. However currently there are still insufficient insensitive to improve the standard of waste management across all relevant sectors especially hospital waste^[3].

Recently PRISM (Project in Agriculture, Rural Industry, and Science & Medicine) Bangladesh a reputed national NGO is working for medical waste management in association with Dhaka city corporation with financial & technical support from water & sanitation program (WSP). PRISM Bangladesh carried out a survey on the medical waste management in Dhaka city. Subsequently PRISM Bangladesh with the financial support from Canadian international development agency (CIDA) has recently developed disposal facilities for the low cost medical waste treatment & management treatment in Dhaka city. The DCC has allocated one acre (0.405 hector) of land in Matuail, a dumpsite near the city limit for the final disposal of medical waste^[4].

There is no such system develop in Faridpur. Faridpur is the center of Bangladesh and it is a District of Dhaka division situated on the of bank of river padma. Its total area is 2072.72 squire/km. Its total population is 1.75 million. Faridpur district consist of 8 upazilla four municipality, 79 union parisad, 36 ward, 92 mahallah & 1859 village. Faridpur town stands on both side of river Kumar. Faridpur municipality was established 1869, the town consist of 9 wards, 35 mahalla. The area of the town is 20.23 squire/km. Population of the town is 99634, male population 51.73% female 48.27%, density of population 4925/squire/km, literacy rate is 66.6%. Faridpur has two medical college, one university college, 7 govt. college, 41 non-govt. college 25 clinic & diagnostic center, 10 NGOs, 6 health center hospital 8 upazilla health complex, 77 family planning center, 37 satellite clinic. There is no good hospital waste management in Faridpur pourasava is maintaining general waste & hospital waste management in Faridpur town^[5].



One estimate show that some 5.2 million people (including 4 million children) die each year from waste related disease. Globally the amount of municipal waste generated will double by the year 2000 & quadruple by the year 2025 (Haque, 1994 in Akter et. al. 1999) ^[6].



In Faridpur all types of waste that are generated in most urban & rural areas are disposed of by open dumping in either low

depressions or high areas. Waste decomposition occurs by means of natural degradation. One type of waste that have been completely ignored in Bangladesh is medical waste. These wastes are a source of contamination & pollution to both humans & the natural environment. There is not much study done on medical waste disposal in Faridpur. A survey was conducted by Dr. Salim Rashid (1996) & his students from North South University on Medical Waste Disposal in Dhaka City. The survey found that government hospital placed all waste in open dustbins (i.e. open waste container that are accessible to the general public) & the waste were left in open for one to two days. Other hospital left their waste outside the open dustbins for two to three days at the time before a municipal truck could remove them ^[7].

Hospital waste management means the management of waste produced by hospitals using techniques that will check the spread of diseases. In developing countries, awareness regarding hospital waste management in terms of its segregation, collection, storage, transportation and disposal is lacking.³⁻⁶ Studies in Bangladesh show that around 2.0 kg of waste/bed/day is produced out of which 0.1- 0.5 can be categorized as risk waste. Hospital waste includes hazardous or risk waste and non-risk waste ^[8]. All individuals exposed to hazardous waste are potentially at risk. The main groups at risk are those belonging to medical profession, patients in the hospital, visitors to the hospital, workers in support allied to hospitals (laundry, waste handlers and transporters) and workers in waste disposal facilities such as landfills or incinerators including scavengers. The diseases which can be transmitted are numerous but the most significant ones are Hepatitis B, Hepatitis C and Acquired Immunodeficiency Syndrome (AIDS) ^[9].

Material and Methods

A cross-sectional study was conducted in eight hospitals of Faridpur (two medical college hospitals & six clinics) through convenience sampling. Hospitals having more than 200 beds were included in the survey. The teaching hospitals were visited and the presence or absence of waste management technique was noted on a check list. The administrator of the institutions was interviewed to get in-depth knowledge regarding waste management policy and training of staff. Informed consent was obtained from the administration and strict confidentiality maintained. Question were asked about Collection, segregation, color coding, Transportation, Safety measure, Training of the staff, Management & administration, CoOrdination with other agency about hospital waste management.

Results

Eight hospitals were surveyed and their waste management techniques were assessed. The surveyed hospitals bed-strength ranged from 250-500, number of out-patients ranged from 1000-2000 and in- patients ranged from 300-500.

From the eight institutions visited only three (37.5%) hospitals had figures on the waste generated daily, which was 2000-2500 Kg. and 1200 Kg. (Table 1). However, few hospitals maintained the amount of waste destroyed through the incinerator. A number of specific question were ask to the hospital manager, doctor, nurse, ward boy, cleaner, aya to elect their knowledge. The collected data were analyzed using percentage, proportion & standard error of proportion through the spss statistical packaging 14.

Finding of the study

A questionnaire was designed following the objective of this study. The questionnaire mainly address the issue of

- Types of generated hospital waste.
- Source of medical waste.
- Amount of generated waste.
- Existing waste management.

Among the interview are 60% ware female & 40% ware male respondents. Among the respondents ware cleaner, aya, nurse, doctor, word boy, technician. Average age of the respondents is 30-35 years. The study also had informal discussion with the patient for their understanding about the existing medical waste management. The study group found the following : There has been no formal & informal training of stuff about hospital waste & its management & treatment. There is no safety measures observed in dealing with waste management or laboratory analysis of infectious or hazardous disease. The study finding indicates that there is a need to improve medical waste handling & disposal method. Most of the hospital visited there ware disposing waste in an appropriate manner. Overall finding of the study that there is poor awareness about the risk of injury related to the medical waste handling & carrying by waste haulers/cleaner. Our field survey also shows that there is poor coordination between hospital authority, municipality & department of environment. The study also shows that there is no national policy on medical waste management & proper scientific management of medical waste. Most of the hospital they don't follow the proper technique for hospital management. Only Faridpur municipality is the sole agency for disposal of waste management. There is no involvement of JAICA, UNICEF & PRISM found in Faridpur.

Table 1. Techniques used in the handling of waste in the hospitals of Faridpur.

Technique (n = 8)	Yes		No	
	No	%	No	%
Segregation at source	3	37.5	5	62.5
Color coding	3	37.5	5	62.5
Sharp segregation	3	37.5	5	62.5
Record of waste generated	3	37.5	5	62.5

P. value < 0.05

Segregation of waste at source including sharps and proper color coding was done in three (37.5%) hospitals only (Table 1).

Vehicles appropriate for internal transportation were used in two hospitals only. For internal transportation of waste some of the hospitals were using wheelchair, stretcher or ambulance of the hospital. In one of the hospitals, waste was being collected manually and dumped at the storage area by the sanitary staff. It was observed that in one of the hospitals there were no buckets available at patient's bedside, patients threw waste under their beds.

Five (62.5%) hospitals had storage location for waste to be removed or incinerated, out of which only two observed to the laid down standards, while three (37.5%)

Table 2. Waste handling safety measures and disposal.

Safety measures (n = 8)	Yes		No	
	No	%	No	%
Protective gears for waste handlers	3	37.5	5	62.5
Appropriate internal transportation vehicle used.	3	37.5	5	62.5
Proper storage facility before disposal	2	25	5	62.5
Use of incinerator	2	25	6	62.5

P. value < 0.05

hospitals dumped their waste openly inside or outside the hospital premises prior to off-site transportation by the municipality vehicles, which was on daily or weekly basis. Only two (25%) hospitals had properly designed storage areas with hard floors, good drainage and water supply, proper locking system to

prevent access to unauthorized persons, inaccessible to animals, birds, insects and had a ventilation system (Table 2).

Plastic waste material and empty vials were taken by the sanitary staff for sale to waste pickers. In one of the hospitals, waste pickers collected the waste from the pharmacy where it was piled up.

For handling the potentially dangerous waste, only two (25%) hospitals were providing essential protective gears to its waste handlers. Incinerators were used by two institutions, and two were putting hazardous segregated waste in the incinerators (Table 2).

Table 3. Administrative aspect of health waste management.

Administrative responsibilities (n = 8)	Yes		No	
	No	%	No	%
Existence of HWMT	2	25	6	75
Trained HWM personnel	1	12.5	7	87.5
HWM duties in job description	1	12.5	7	87.5
Training of newly appointed staff	1	12.5	7	87.5

P. value < 0.05

HWMT = Hospital waste management team.
HWM = Hospital waste management.

Only two hospitals (25%) had well documented waste management plans as well as waste management teams (Table 3). Trained personnel were appointed and training of newly appointed staff, regarding handling of hospital waste was not given only in one of the hospitals (12.5%). Health Waste Management duties were included in the job descriptions of the staff in only one hospital (Table 3).

Discussion

The study revealed that most of the hospital of Faridpur there is no system of segregation of waste at the source. They used various methods of dispose hospital waste. It is also revealed there is no system & facilities for sharp segregation. One study conducted by (Akhter-et-all 1999) also had similar type of facts & finding^[10].

Regarding color coding & transport & disposal of waste most of the hospital & clinics do not follow the color coding system. They carry the waste in open bucket they dispose the medical waste in municipal dustbin, pin near hospital, open field, road side, canal, water, open net house most waste dispose of the municipal bins 60% without any treatment & segregation.

The study also found that there has been no formal training of the staff to collect segregate, treatment & disposal of waste. Medical officer & nurse & cleaner are aware about medical waste & disposal but ward boy aye, cleaner, swapper, don't have formal & informal training. A study conducted by Dr. Selim Rosid at all in 1996 the study found that govt. hospital place all waste in open dustbin (Open waste containers that are accumulate to the general public place. The wastes were left for 2-3 days before municipal track removed. The study also revealed that lack of awareness all different level were for waste management were found. A study conducted by (akter-at-all) in 1999. In his study he found that 88% responded were unaware & unclear about the constituent of hospital waste^[11].

The study also found that most of the staff who are related to the waste collection, segregation, transport & final disposal they don't have any safety measures. One study conducted by (Dr. Rashid et all) in 1996 medical waste disposal in Dhaka city. They found similar type of picture in his study. The generator of waste is responsible for ensuring

proper disposal. Hospitals are socially obliged to maintain a clean environment and dispose medical waste in order to prevent pollution and infection within and near the hospital^[12].

The hospital waste management plan outlines the interpretation of the legislation or a standard protocol to achieve essential elements for establishment of a proper hospital waste management system. In the current study it was found that only two hospitals had well documented waste management plans as well as proper waste management team. There is lack of awareness of the management regarding detailed laws and regulations governing health care waste management. This encourages reuse and unhygienic recycling of waste material.

The study found that most of the hospital in Faridpur used their won system to disposed hospital waste. There was no clear guidance to segregates waste & ensure their proper disposal. Most hospital collected all waste together & dump in a common place. This place are road side & municipal dust been & open place inside the campus. Study conducted by Akter et al found similar type of picture^[13].

Bangladesh Environmental Protection Act-1997, issued guidelines for the management of hospital waste on Monday, 7th June 2004. These guidelines are applicable to all the hospitals, clinics, dispensaries, maternity centers, dental clinics, pathological laboratories, blood banks, nursing homes, research institutes, veterinary institutions other health care facilities including temporary medical camps which might cause adverse impact on human health and environment. The guidelines provide procedures for establishment of waste management systems, besides techniques for segregation, handling, storage, transportation and disposal of hospital waste in a safe manner. It was further stated that heavy penalties shall be imposed on the institutions found to be negligent^[14 & 15].

Conclusion

If the overall goal of waste management is to prevent disease transmission from waste products, therefore the emphasis should be placed on the "Management" aspect of the process and not on the "technological fix" which is expensive diversion rather than an effective solution. Technology should fit the situation and work in the management system to achieve the final goal as part of the overall system, not as a replacement for the system. Technology choices should be made to meet local needs and conditions. National standards for operating acceptable treatment technologies should be set which should match the international standards practiced in the developed countries.

Recommendation

1. There should strong national policy on hospital waste management.
2. Government should give priority to formulate policy & law to hospital to handle disposal of hospital waste properly.
3. There should be strong coordination between hospital authority, municipality, department of environment & other waste disposal agency.
4. People should be aware the risk of hospital waste & about the health hazards of medical waste.
5. Each & every hospital must have a plant awareness & training program for all category & personnel including health manager.
6. All the generators of biomedical waste should adopt appropriate safety measures while doing hospital waste.
7. Workers should be protected by vaccination (tetanus, hepatitis – B, AIDS & other infection).
8. Colour coding system should be strictly follows at the segregation of waste.

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