

# Study on Medical Waste Management of Rajshahi City in Bangladesh and Its Impact on Environment

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**ABSTRACT:** Most of the medical in Bangladesh do not follow the proper waste management system. The purpose of the study is to understand the knowledge and awareness of individuals involved in medical waste generation, their handling and disposal system. In the study it was found that the practice was unsafe and the waste management system was very unhygienic. Data were collected by field investigation and conducting interview on different selected hospital. For the convenience of the study the hospital of Rajshahi city are classified based on some criteria. The result of the study represents that most of the hospital do not follow the proper management system of medical waste and it was almost unhygienic. This paper attempts to suggest how the awareness of individuals involved in collection and disposal system can be improved.

**KEYWORDS:** Solid waste, Treatment, Segregation, Transport, Disposal, Environment

## I. INTRODUCTION

For the modern age proper hospital waste management system is one of the vital factor for better health and environment. Unfortunately it has been seen that most of the medical waste of the hospital are collected in an improper way. They are collected by Rajshahi City Corporation in a bin from the hospitals. Then those waste are transported to the open municipal dumping site by vehicle. Without proper disposal the waste are dumped into the open drain, open places and canals. This improper disposal of the medical waste causes serious bad impact on human health and environment. As a result the individuals who are engaged with the collection, transportation and disposal system are highly affected by those unhygienic waste.

The rapid increase of hospitals, clinics, diagnostic laboratories etc. in Rajshahi city exerts a tremendous impact on human health ecology. The present practice of improper handling of generated hospital wastes is playing a contributing role in spreading out the Hepatitis and HIV diseases (Iftekhar, 2004). Rahman and Ahmeduzzaman (2013) suggest that the solid waste of Rajshahi generally has a high organic content (60% to 70%) and a low proportion of combustible matter. "Nothing on earth is more international than disease", said Paul Russel. To control the diseases proper management of medical waste is needed.

The prevention, segregation, handling, transport and disposal of waste must be properly managed so as to minimize the risks to the health and safety of staff, patients, the public and the safety of the environment.

The objectives of the study is to identify the problems of waste generation, collection, transportation and disposal system; to show the current status of collection, transportation and disposal system of Rajshahi City Corporation, to recommend different methods to improve the hospital waste management system.

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Medical waste management system consist of:

- a) Waste Segregation and Packaging
- b) Colour Coding and Labelling
- c) Containers and Packaging
- d) Waste Handling
- e) Storage
- f) Transport
- g) Treatment and Disposal

## II. RELATED WORK

For the convenience of study the hospitals of Rajshahi city are classified based on the following ranges of capacity of beds:

Table 1: Types of Hospital Based on No of Beds:

Types of Hospital	No of Beds
Small	<50
Medium	50-100
Large	>100

In the first step data were collected from questionnaire interview, field observations. The person who are involved with the handling, collection and disposal system are asked several question for the study. Some of the survey questions are given below:

- i) How do you collect the medical waste?
- ii) Do you use gloves during the collection of waste?
- iii) What type of waste you usually collect from hospital?
- iv) What are the methods you used for transport it?
- v) Is there any dumping area near your hospital?
- vi) What is the waste disposal system you practice?
- vii) What is the waste disposal time?
- viii) Who monitor the waste disposal system?
- ix) What types of waste usually dump there?

From the questionnaire survey we found that before the disposal of the waste, segregation of waste is done. They use different types of bags for collecting the waste. For collecting infection and sharp waste they use plastic bin. And for other waste which are not sharp they use simple plastic bag. According to public health ministry of Bangladesh there are different rules for collecting medical waste. But unfortunately most of the hospital in Rajshahi City Corporation do not follow those rules. From the questionnaire survey we also found that the most individuals do not wear gloves, masks during the collecting and disposal of the waste.

Most of the hospital use different colour coding system for the collection of waste. For general waste collection they use green or black bags, for infection waste they use yellow bags and for sharp waste they use red bags.

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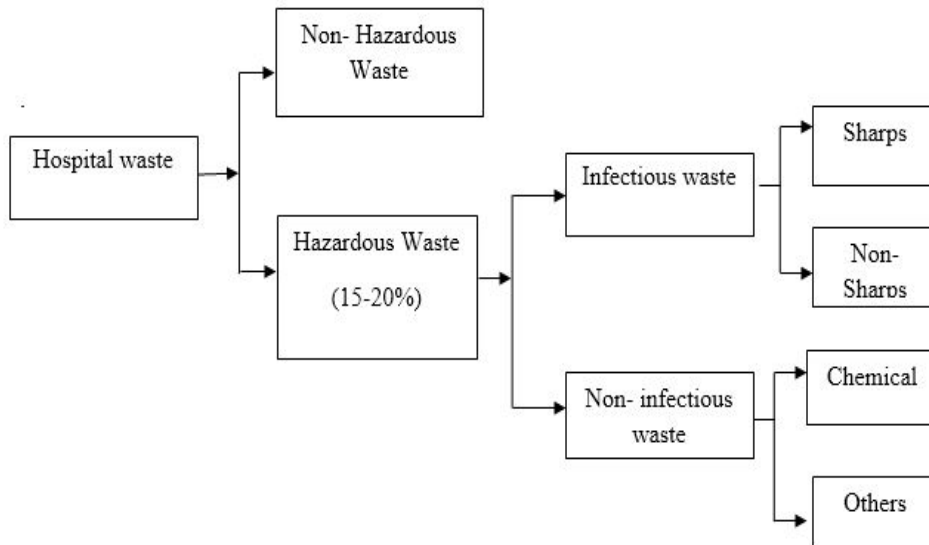


Fig 1: Different Types of Hospital Waste



Fig 2: Waste Collection from Christian Mission Hospital per Day

Fig 2. Shows the waste collection from Christian Mission Hospital per day. The waste generated in CMH per day are mainly saline bottle, catheder, saline set, blood bag.

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Fig 3: Waste Collection from Al-Medina Clinic

Fig 3. Shows the waste collection from Al-Medina Clinic per day. The waste generated in AMC per day are mainly saline bottle, injection ampoules, saline set, blood bottle.



Fig 4. Waste Collection from Mohanogor Clinic

Fig 4. Shows the waste collection from Mohanogor Clinic per day. The waste generated in MC per day are mainly saline bag, injection syringes, bottles, gloves.

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Fig 5. Waste Collection from Rajshahi Dental College

Fig 5. Shows the waste collection from Rajshahi Dental College per day. The waste generated in RDC per day are mainly saline bottle, injection syringes.



Fig 6. Waste Collection from Popular Diagnostic Center

Fig 6. Shows the waste collection from Popular Diagnostic Center per day. The waste generated in PDC per day are mainly plain tube, EDTA tube, urine pot, glass plate.

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### III. DATA COLLECTION

Table 2: Percentage of waste generated from selected hospital:

Hospital Name	Waste Type	Quantity of Waste (kg)	% of waste generation
Rajshahi Medical College Hospital (RMCH)	Saline Packet	201	27
	Catheder	65	8
	Injection Ampoule	85	11
	Syringe with niddles	220	30
	Saline set	122	17
	Blood Bag	51	7
Christian Mission Hospital (CMH)	Saline Packet	2.5	21
	Catheder	4.5	38
	Injection Ampoule	0.890	7
	Syringe with niddles	1.5	13
	Saline Set	1.6	13
	Blood Bag	0.970	8
Al-Medina Clinic (AMC)	Saline Bottle	0.500	19
	Saline Bag	0.800	30
	Injection Ampoule	0.350	13
	Saline set	0.600	22
	Blood Bottle	0.450	16
Mohanogor Clinic (MC)	Saline Bags	0.950	32
	Injection Syringes	0.800	27
	Bottles	0.630	21
	Gloves	0.620	20
Rajshahi Dental College (RDC)	Injection Syringe	0.750	47
	Saline Bottle	0.850	53
Popular Diagnostic Centre (PDC)	Plain Tube	8	32
	EDTA Tube	3	12
	Urine Pot	7.5	30
	Glass Plate & ESR Tube	6.5	26

Table 3: Treatment of Wastes from Selected Hospitals

Hospitals Name	Treatment and Disposal	Collection Frequency
RMCH	Incineration	Two days per week
CMH	Landfill	One Day per Week
AMC	Waste collected and disposed by RCC vehicle	One Day per Week
MC	Waste collected and disposed by RCC vehicle	Everyday
RDC	Incineration	Everyday
PDC	Waste collected and disposed by RCC vehicle	Everyday

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## IV. EXPERIMENTAL RESULTS

Figures shows the results of percentage of waste generated from selected hospital in Rajshahi City Corporation. Fig 7. Shows that percentage of saline packet produce by RMCH is greater than CMH. On the other hand percentage of catheder is used more on CMH than RMCH.

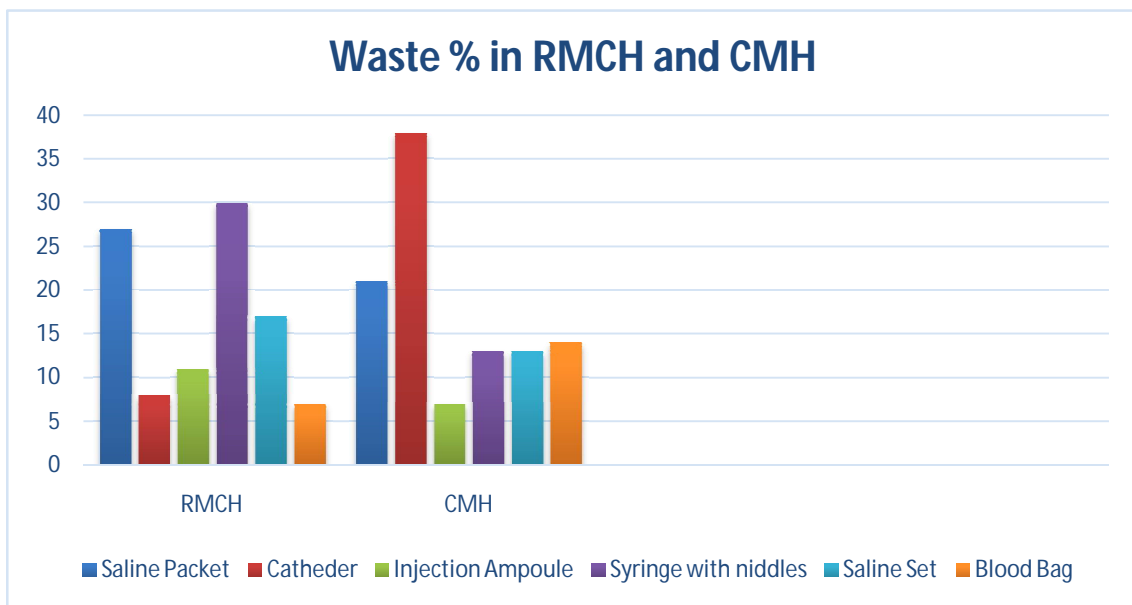


Fig 7. Waste percentage in Rajshahi Medical College Hospital (RMCH) and Christian Mission Hospital (CMH)

Fig 8 & Fig 9. Shows that in Al-Medina Clinic and Mohanogor Clinic the number of saline bag is produce greater than any other waste.

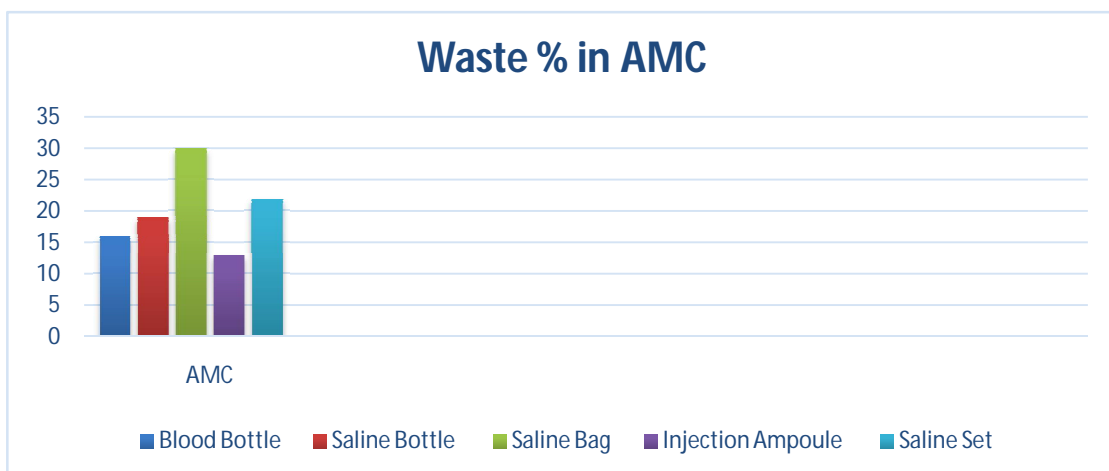


Fig 8. Waste percentage in Al-Medina Clinic (AMC)

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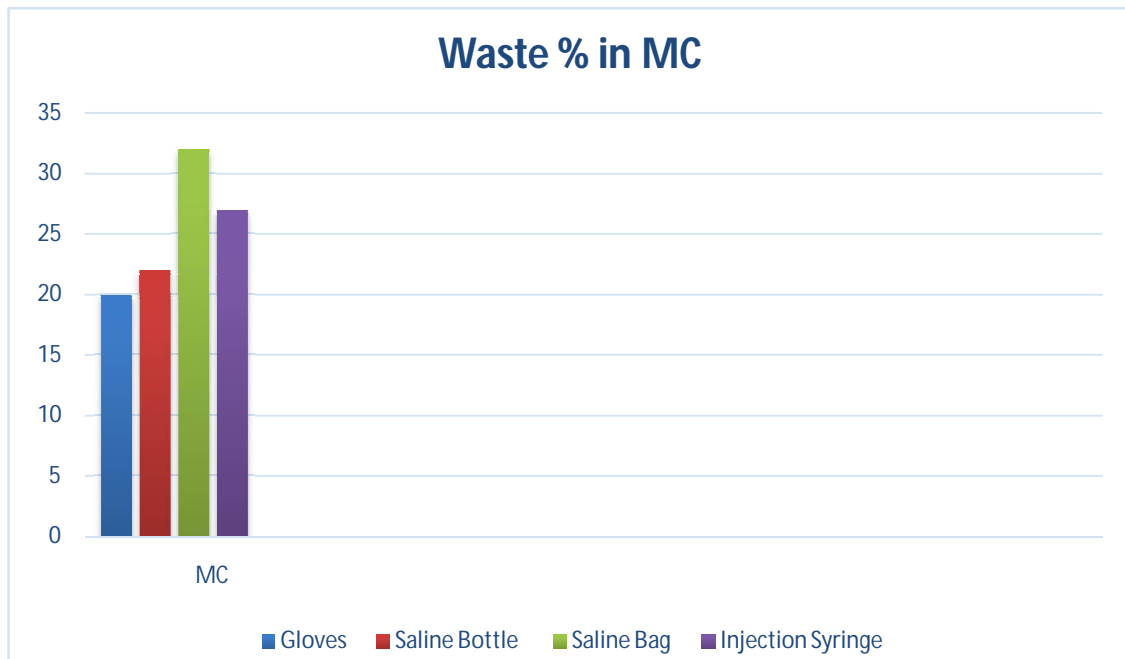


Fig 9. Waste percentage in Mohanogor Clinic (MC)

Fig 10. Shows that in Rajshahi Dental College high percentage of waste produce is saline bottle. 47% waste generated is injection springes

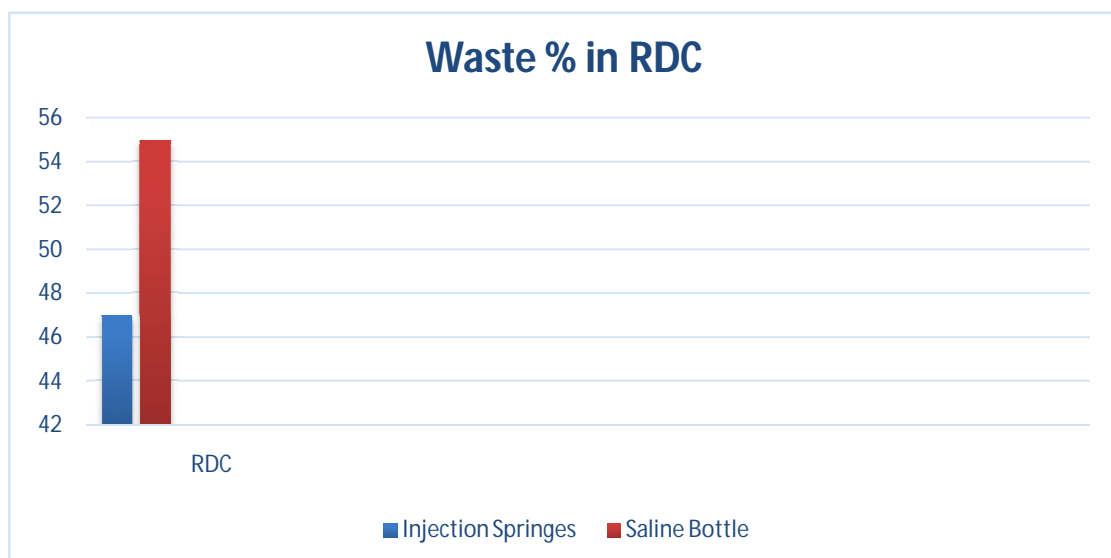


Fig 10. Waste percentage inRajshahi Dental College (RDC)



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Fig 11. Shows that in Popular Diagnostic Centre high percentage of waste produce is plain tube. Other high percentage waste generated is urine pot and glass plate.

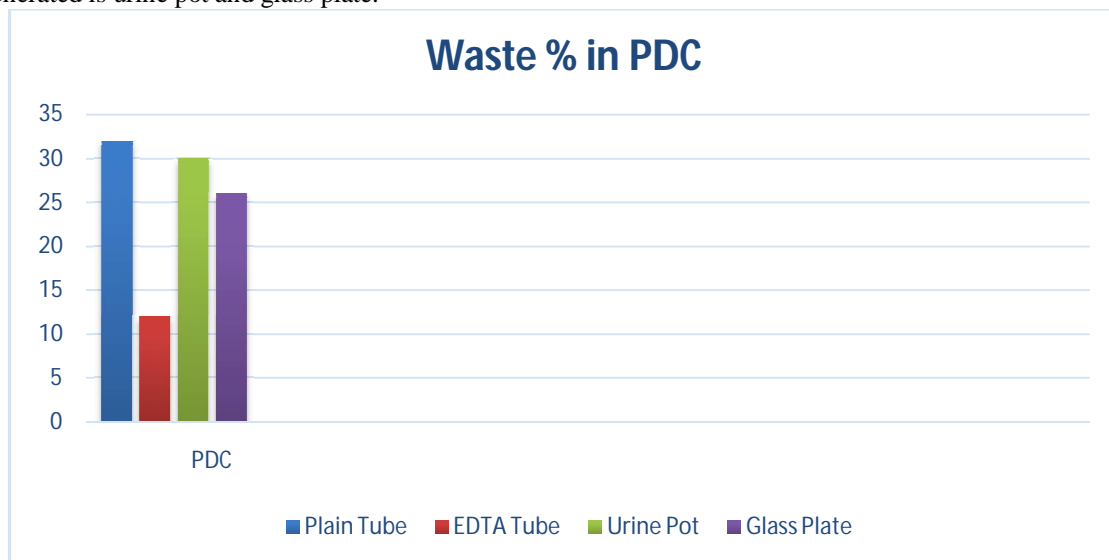


Fig 11. Waste percentage in Popular Diagnostic Centre (PDC)

### V. CONCLUSION

Medical waste plays a significant role on health and environment. Open air dumping creates unhygienic and poses dangerous threat to the human being. Gases are produced in the landfills through aerobic and anaerobic decomposition of organic compounds, which are threat to the environment. Carbon dioxide and methane produced from medical waste are extremely harmful for environment. It is found that medical waste disposal of Rajshahi City Corporation is not perfect.

Therefore, there is a high risk to spread diseases on the surrounding area. Moreover, open dumping cause's serious bad effect on environment. Proper medical waste disposal system can help to control diseases and make environment free from excess carbon dioxide and methane. To improve medical waste management system some necessary steps should be taken immediately. Some recommendations are given below:

- i) Awareness of all the individuals involved in medical waste management system should be increased. They should use gloves and masks during the collection and disposal of the medical waste.
- ii) Advanced training program for all the cleaners and waste collector should be arranged by the City Corporation.
- iii) Proper method should be used for collection, transportation and disposal of medical waste.
- iv) Dumping of the medical waste should not be on open area. It should be dumped far away from the community.
- v) Audit section should audit the hospital and clinic frequently.

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