

# Biomedical waste management at tertiary level hospital–Rajindra Hospital [Government Medical College], Patiala-A situational analysis

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## Abstract

**Background:** Studies in India and other developing countries has shown poor practice of Biomedical waste management [BMW]. Hence this study was undertaken to situation of BMW in our hospital, to identify the gaps and to take necessary steps for rectification. **Materials & Methods:** This was an observational descriptive hospital based cross sectional study. All sites where biomedical waste is generated, were visited during 3 months. The collection point was visited continuously for a week after collection of data from sites. The data, thus generated, were compiled, analyzed and inferences were drawn. **Results:** It showed that all Indoor site [100%] had a system for segregation and appropriate display as per guidelines was present. In OPDs the buckets were kept according to the waste type being generated i.e. not all colored buckets were kept. At 10% of sites the display was not to the standards desired. Among the remaining sites, 5 sites i.e. of sites the color coding guidelines were not followed. 37 such staff members recently assigned were found untrained **Conclusions:** This study revealed that there is the need for the training programme and proper implementation of guidelines for BMW.

**Keyword:** Bio-medical waste, Management, Tertiary hospital

## Introduction

The growing population and its requirement for health care has generated many supplementary issues. One such issue is of Biomedical Waste Management; a major challenges which is haunting the community and service providers from the day, man has started seeking health care. Improvement and advancement in healthcare as well as load of patients has increased the per capita generation as well as total amount of waste generated many folds. Indiscriminate disposal of BMW or hospital waste and exposure to such waste possess serious threat to environment and to human health that requires specific treatment and management prior to its final disposal [1, 2]. Waste generated in the process of health care are composed of variety of wastes including hypodermic needles, scalpels, blades, surgical cottons, gloves, bandages, clothes, discarded medicine and body

fluids, human tissues and organs, chemicals etc., Other wastes generated in healthcare settings include radioactive wastes, mercury containing instruments, PVC plastics etc., These are the most environmentally sensitive healthcare by products and needs a greater attention which has to be monitored [3, 4].

According to WHO, the waste generated during the delivery of health care services carries a high potential of infection and injury than any other type of waste and 10-25% of them are infectious in nature. This range is dependent on the total amount of waste generated [4, 5].

India generates around three million tonnes of medical wastes every year and the amount is expected to grow at eight per cent annually [6]. A multicentric study conducted in 20 states across India showed that most of the healthcare centres had unsatisfactory practices with respect to BMW management. At the global level 16-

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84% of the hospitals did not stick to norms. This has been attributed to lack of awareness, inadequate resources and poor disposal mechanisms [7].

To increase healthcare accessibility to population, the healthcare facilities are situated within the municipal cooperation limits near residential areas in most cases. Hence the Biomedical waste generated from these facilities will pose for a major public health and environment disaster if not managed properly.

Health and environmental effects, uncertainty regarding regulations and negative perceptions by waste handlers are some important concerns in health care waste management in a country [3].

The Government has introduced legislative framework for bio-medical waste management [BMWM] in the country more than a decade ago in 1998 and now updated and revised it via "Bio-Medical Waste Management. Rules, 2016" [2]. This study has been conducted prior to implementation of this revised Act to determine situation of the biomedical waste segregation and handling at Tertiary care hospital Rajindra Hospital attached to Government Medical College Patiala.

## Aims and Objectives

1. To study the existing pattern of Biomedical Waste Management in Rajindra Hospital
2. To find out the gaps between the existing status in collection, segregation and final disposal of Biomedical Waste Management
3. To make recommendations for different levels of management for bridging the gaps, if any.

## Observations and Results

Biomedical waste is generated at 79 sites in Rajindra Hospital which include OPDs, IPDs of all Specialties & Super Specialties, Emergency, Operation Theatres, Drug store, mortuary etc.

All Indoor site [100%] had a system for segregation and appropriate display as per guidelines was present. The basic principle of segregation of the biomedical waste at the point of generation is being followed at all of these indoor sites. In OPDs the buckets were kept according to the waste type being generated i.e. not all colored buckets were kept. At 10% of sites the display was not to the standards desired.

Among the remaining sites, 5 sites i.e. [6.3%] of sites the color coding guidelines were not followed. The in charges of the sites were immediately informed about discrepancies and corrective measures were instructed. The waste generated at various sites is not weighed at the sites and is measured in terms of buckets [bucket contained all the tied BMW segregated bags] only while weighing of the bags/buckets occurred at collection point only.

The generation, sitewise varies from just  $\frac{1}{2}$  -  $2\frac{1}{2}$  buckets per day. Majority of the sites 43 sites generate only less than a bucket, a day. The average collection of BMW per site per day is summarized in table 1.

## Material and Methods

**Place of Study:** The present study was conducted at Rajindra Hospital of Government Medical College, Patiala.

**Type of Study:** Cross Sectional Observational Descriptive Study.

**Duration of study:** 6 months

**Sampling Method:** All the departments located within the complex of the hospital were visited during 3 months for getting the first-hand information about biomedical waste management.

**Sample Collection:** The nodal persons assigned the responsibility of biomedical waste management at each site were contacted and the information was collected on the pre-tested proforma.

Three visits were made every week in the morning before the routine functioning of the departments started. Another visit to the site was made in case of non-availability of the nodal person on the day of visit. All sites where biomedical waste is generated, were visited during 3 months. The collection point was visited continuously for a week after collection of data from sites.

**Statistical Analysis:** The data, thus generated, were compiled and analyzed using excel; percentages/means were used for description. The inferences were drawn and discussed.

It is collected at one point within the hospital complex and weighed there from where the hired agency named Sebbramkey Environment from Ludhiana city takes it away on daily basis.

The daily generation of biomedical waste by the institution on working days varies from 130 kg to 160 kg while on non-working days, it ranges from 70-100 kg only with an average of 141.78kg [on the basis of weeks' collection]

Only 26 staff members dealing with biomedical waste management received training on biomedical waste management during less than 6 months while 16 staff members were trained during the period of less than 1 year. 37 such staff members recently assigned were found untrained but were on the list of trainees for the next batch of proposed training in biomedical waste management.

**Table-1: Quantity wise Generation of Biomedical Waste.**

Average Buckets [containing all segregated bags from site] collection per day [on basis of weeks collection]	Average number of bags in bucket per site [in buckets submitted]	Average Total bags collected per day [on basis of weeks collection]	Number of Sites	Average No. of buckets	Categories of Weight of buckets containing all bags collected from site in Kg per day	Average weight [on basis of weeks collection]	Average weight generated
1/4	2	34	17	4 1/4	0.250-0.750	0.612	10.40
1/2	2	26	13	6 1/2	0.750-1.250	1.12	14.56
3/4	2	26	13	9 3/4	1.250-1.750	1.61	20.93
1	3	33	11	11	1.750-2.250	1.84	20.24
1 1/4	3	27	9	11 1/4	2.250-2.500	2.31	20.79
1 1/2	3	24	8	12	2.750-3.250	2.87	22.96
1 3/4	4	16	4	7	3.250-3.750	3.45	13.80
2	4	8	2	4	3.750-4.250	4.13	8.26
2 1/4	4	4	1	2 1/4	4.250-4.750	4.62	4.62
2 1/2	5	5	1	2 1/2	4.750-5.250	5.22	5.22
		203	79	70 1/2			141.78

**Table-2: Sites Segregating Biomedical Waste at the Point of Generation.**

Segregation	No. of Sites	%age
No	12	15 %
Yes	67	85 %
<b>Total</b>	<b>79</b>	

**Table-3: Sites Having the Guidelines Displayed.**

Status of Instructions	No. of Sites	%age
Displayed	71	90%
Not Displayed as per instructions	8	10%
<b>Total</b>	<b>79</b>	100%

**Table-4: Sites Having Manpower Trained in BMW Management.**

Status of Trained Manpower with Time of Training held	No. of Sites	%age
Less than 6 months	26	32.9
6 months- 1 year	16	20.3
No training	37	46.8
<b>Total</b>	<b>79</b>	100

## Discussions

The average total waste generated is approximately 141.78 kg in our institute which is much more than the average waste 87.1 Kg in tertiary care institutes in India as per study conducted by Inclen [7]. This may be attributed to the vast turnover of patients in the institute since it has a vast coverage area extending in majority of Malwa belt of Punjab and adjoining districts of Haryana.

The institute does not have an exclusive officer from staff, Municipal cooperation or Pollution board for management of BMW. The system is maintained/handled by Officer Additional charge for the institute with the help of nodal officers for each collecting unit. This officer Incharge in concurrence with Principal and Medical Superintendent maintains a close working relation with Punjab Pollution Control Board and Municipal Cooperation of the City of Patiala for the smooth functioning of BMW disposal system. This officer and nodal officers have an additional duty and as a result his priorities and time devoted in management of BMW is a matter of concern/ consideration.

There was a lack of display of BMW segregation procedures at 10% of collection sites. None of the sites had the new recently approved guidelines displayed. Although the investigator was informed that new displays will be available shortly.

There were no displays in Public places to increase public awareness regarding BMW

There was no facility for weighing the BMW at site hence they use the bag fill record to keep record of the BMW. It is prudent that weighing facility should be provided at each site if feasible to maintain good reproducible records

Handling, segregation, mutilation, disinfection, storage, transportation and final disposal are vital steps for safe and scientific management of biomedical waste in any

Establishment (8). The training of staff handling BMW is on the other hand much desired. Only 50.2% of staff managing had received training less than a year which is less than national average among tertiary hospitals of 66.7% as reported by Inclen.

Based on observations and discussions the following are recommended:

- Government guidelines modified from time to time included latest 2016 guidelines are required to be circulated to all the departments and to be discussed in departmental meetings.
- The primary responsibility of Health administrators to manage hospital waste in most safe and eco-friendly manner [5]
- Sensitization of all categories of staff regarding health hazards/risks from biomedical waste required urgently and their regular training on IMEP at least once in a years must be ensured.
- Segregation of Biomedical waste as per color coding, its weighing at the generating site and transportation in closed trolleys is required to be ensured.
- Regular monitoring committee has to be constituted at various levels to ensure BMW management process is adhering to given guidelines.
- Common bio waste treatment facility in each city/town with strict monitoring of these facilities by regulatory agency should be implemented [9]

## Conclusion

Although being an important primer hospital, still it has lacunae in actions to dispose of its waste and uphold its statutory responsibilities. A policy/ system needs to be formulated/developed based on 'training, educating, creating awareness, reduce, recover, reuse and dispose'. The study concurs with study conducted by K.V Radha et al in concluding that healthcare waste management should go beyond data compilation, enforcement of regulations and acquisition of better equipment. It

should be supported through appropriate education, training and the commitment of the healthcare staff, management and healthcare managers within an effective policy and legislative framework [10].

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