

Biomedical Waste Management Practices in a Tertiary Care Teaching Hospital in Accordance with BMW Rules 2016

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ABSTRACT

The amount of biomedical waste generated per day is increasing day by day with increase in the health care facilities. This paper presents an analysis study of the generation pattern of biomedical waste in different departments of the hospital and also to examine the process of collection, segregation and transport of different types of waste generated in different departments of the hospital in accordance with BMW rules 2016. Majority of anatomical waste is generated in operating rooms, followed by Cath-ward, EMD, Nephrology wards, Oncology. It is observed that dialysis units, EMD, OT's, ICU's, nephrology wards, are generating large amount of plastic waste. Colour coded bins were provided only in 77pc of wards, rest were lacking one / two bins. The segregation percentage was 55% which is very low. Hospital administrators may need to formulate and implement a plan for providing appropriate training to HCW's especially nursing staff and workers so as to address the deficiencies observed in the study.

Key words: biomedical waste, healthcare, waste segregation, knowledge, practice.

INTRODUCTION

Health care waste refers to all the waste generated by a health care establishment. It is estimated that 10-25% of health care waste is hazardous, with the potential for creating a variety of health problems. ^[1] (Mohandasundaram, 2003) as well as environmental degradation through

production of chemical waste which alters the natural ecological environment of bacterial. Though bio-medical waste a by-product of healthcare institutes - constitutes a small portion of the municipal waste, yet they need special handling due to their highly toxic and infectious nature, which may pose a serious threat to human health as well as the environment if not managed properly (Mohandasundaram, 2003; Manasi et al., 2014; Adhikari and Supakankunit, 2014). Pandit et al. ^[2] reported that proper hospital waste management was not being practiced. Every concerned health personnel is expected to have proper knowledge, practice, and capacity to guide others for waste collection and management, and proper handling techniques. ^[3] The risk group includes doctors, nurses, auxiliaries, hospital staffs, and workers handling and disposing such waste. ^[4]

In many developing countries, management of these healthcare wastes has become one of the major problems due to increase in the use of disposable items.. In most of countries, especially in India, unsegregated and untreated hazardous waste are openly dumped into municipal dumping sites and roads or are being incompletely burnt in the open (Ghura and Kutty).

The rapid increase of waste generation has exceeded the earth's carrying capacity by 30 per cent thereby contributing to pollution (Odum and Odum, 2006). Cities experiencing rapid urbanisation and

population growth often face the lack of financial resources and institutional capacity to satisfy the need for adequate solid waste management infrastructure. All biomedical waste collection under the guideline of Biomedical Waste Rules 2016, Bio medical waste cannot store more than 24 hours in ordinary room temperature. [5-7]

Aim: To review the waste management practices in NIMS and to give suitable recommendations keeping in view the ministry of environment and forests notification 2016.

Objectives

- To study the generation pattern of biomedical waste in different departments of the hospital.
- To examine the process of collection, segregation and transport of different types of waste generated in different departments of the hospital in accordance with BMW rules 2016

METHODOLOGY

The study was conducted between February and June 2019. No sampling was done and all patient care areas of 1500-bedded hospital were included in study. These areas were: Emergency Areas, Waste Collection Points of Wards, (Treatment Rooms of Wards, Intensive Care Units and Operation Theatres). Areas were visited during morning hours between 8 am to 10 am and evening hours of the same day

between 2 pm and 4 pm. Thus a total of 12 visits were made to each area. The chosen timings were such when maximum BMW is generated in a patient care area as this was the time when blood samples of patients were taken and medication injections were given.


All the observations were made by me. Study tool data were recorded on a checklist covering various aspects of BMW management at source of generation of waste. Primarily, 4 broad functions are carried out at source viz.

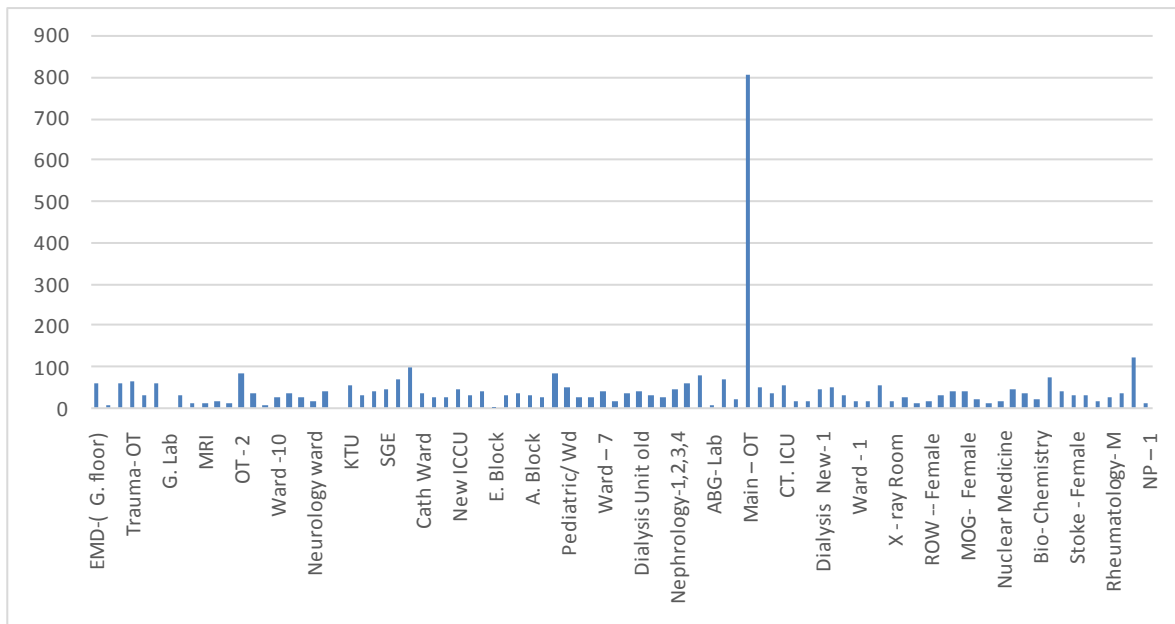
- (i) placement of 4 colour-coded i.e. black, yellow, red and blue waste bins which are lined on inner side by similarly colored waste bags;
- (ii) segregation of waste in such waste bags
- (iii) mutilation of recyclable waste like disposable syringes, plastic dextrose bottles, plastic tubing's and hypodermic needles and
- (iv) disinfection of certain categories of waste notably plastics and sharps.

Each desirable observation was assigned marks from 1 to 5 (bad, ok, good, very good, excellent) and each undesirable observation was assigned '0' mark.

RESULTS AND DISCUSSION

Depicted below is the biomedical waste segregation chart with disposal options in accordance with biomedical waste management rules 2016.

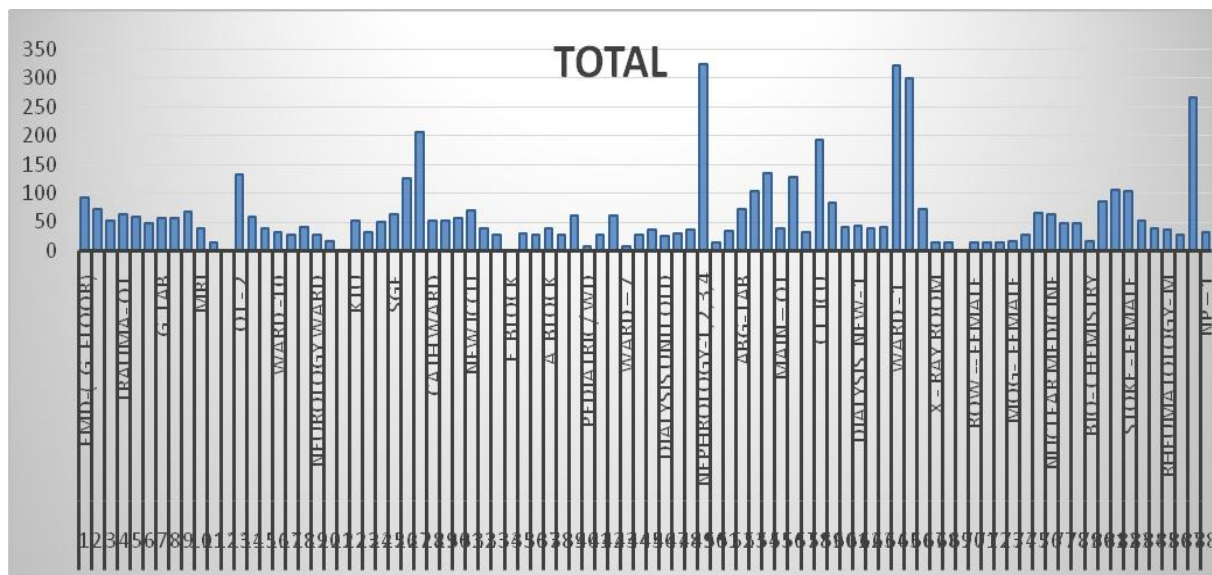
Cat.	Type of Bag/ Container used	TYPE OF WASTE	Treatment /Disposal options
Yellow 	non-chlorinated plastic bags Separate collection system leading to effluent treatment system	a) Human Anatomical Waste b) Animal Anatomical Waste c) Soiled Waste d) Expired or Discarded Medicines e) Chemical Waste f) Micro, Bio-t and other clinical lab waste g) Chemical Liquid Waste	Incineration or Plasma Pyrolysis or deep burial*
Red 	non-chlorinated plastic bags or containers	Contaminated Waste (Recyclable) tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves.	Auto/ Micro/Hydro and then sent for recycling. not be sent to landfill
White 	(Translucent) Puncture, Leak, tamper proof containers	Waste sharps including Metals	Auto or Dry Heat Sterilization followed by shredding or mutilation or encapsulation
Blue 	Cardboard boxes with blue colored marking	Glassware	Disinfection or auto/ Micro/hydro and then sent for recycling.



Above graph explains regarding biomedical waste generation pattern of yellow category.

- Source of biomedical waste is represented on X axis.
- Avg weight of waste produced is represented on Y axis.
- The majority of anatomical waste is generated in operating rooms, followed by cath-ward, EMD, nephrology wards, Oncology etc

Generation pattern of biomedical waste of red category is shown below:



It is observed that dialysis units, EMD, OT's, ICU's, nephrology wards, are generating large amount of plastic waste.

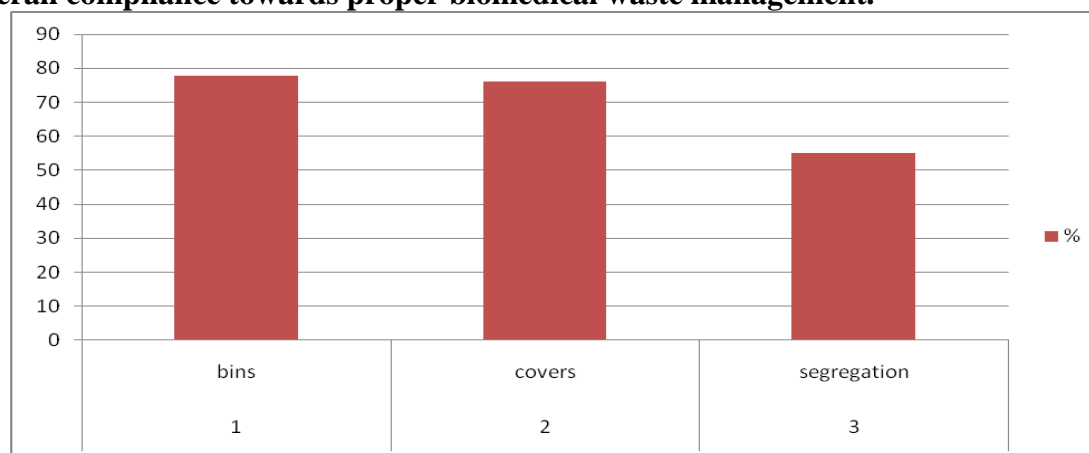
Average weight of biomedical waste generated per month

According to the orders issued by the pollution control board, the hospital is authorised for handling of biomedical waste as per the current bed capacity which is exceeded significantly as depicted in the table below:

Type of waste category	Quantity permitted for handling	Avg Biomedical waste generated per month
Yellow	5610kg/month	7440kg/month
Red	1785kg/month	5850kg/ month
White (translucent)	127.5kg/month	456kg/month
Blue	127.5kg/month	1050kg/month

From the above table it is evident that appropriate measures have to be taken to contain unnecessary waste generation.

Overall compliance towards proper biomedical waste management.



- The above graph shows the percentage of bins and covers provided in hospital and the percentage of segregation of biomedical waste as per BMW rules 2016.
- It is observed that 77.7% of hospital has been provided colour coded bins. Rest of the areas have bins but colour's were not as per the guidelines and few bins are without lids.
- In all areas except few wards, blue bins are not maintained.
- In most of the areas blue covers have not been provided, that led the covers percentage to 76.2%.
- It is observed that proper segregation of biomedical waste is shown as 55%.

CONCLUSION

The present study was done to evaluate the practices of biomedical waste management amongst different patient care areas in NIMS. It was found that more emphasis needs to be laid for mutilation of recyclable waste and disinfection of waste especially in 'Treatment Room of wards' which are exclusively used by nurses and

resident doctors. The segregation percentage was 55% which is very low. Hospital administrators may need to formulate and implement a plan for providing appropriate training to HCW's especially nursing staff and workers so as to address the deficiencies observed in the study. The institute also lacks in house sewage treatment plant to treat the liquid wastes and bar-coding for real time tracking of bio medical waste disposal.

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