Hospital Waste Management in Nonteaching Hospitals of Lucknow City, India

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Abstract

Objective: To assess hospital waste management in nonteaching hospitals of Lucknow city. Materials and Methods: A cross-sectional, descriptive study was conducted on the staffs of nonteaching hospitals of Lucknow from September 2012 to March 2013. A total of eight hospitals were chosen as the study sample size. Simple random sampling technique was used for the selection of the nonteaching hospitals. A pre-structured and pre-tested interview questionnaire was used to collect necessary information regarding the hospitals and biomedical waste (BMW) management of the hospitals. The general information about the selected hospitals/employees of the hospitals was collected. Results: Mean hospital waste generated in the eight nonteaching hospitals of Lucknow was 0.56 kg/bed/day. About 50.5% of the hospitals did not have BMW department and colored dustbins. In 37.5% of the hospitals, there were no BMW records and segregation at source. Incinerator was used only by hospital A for treatment of BMW. Hospital G and hospital H had no facilities for BMW treatment. Conclusion: There is a need for appropriate training of staffs, strict implementation of rules, and continuous surveillance of the hospitals of Lucknow to improve the BMW management and handling practices.

Keywords: Hospital waste management, India, Lucknow city, nonteaching hospitals

Introduction

The Ministry of Environment and Forests (MoEF), Government of India notified Biomedical Waste (Management and Handling) Rules (BMWM Rules) in the year 1998 under the Environment (Protection) Act, 1986 for the safe handling, segregation, storage, transportation, treatment, and disposal of biomedical waste (BMW) generated from the healthcare establishments (HCEs)/healthcare facilities (HCFs). These rules were amended in 2000 and 2003 so as to fill the gaps as felt necessary at that time. These rules are comprehensive and have stipulated duties for every BMW generator, occupier, transporter, and common treatment facilities (CTF) operator to maintain source-separated waste, pack, store, treat, and dispose these wastes as per the 35 laid down provisions. The State Pollution Control Board (SPCB)/Pollution Control Committee (PCC) has been notified as the prescribed authority for implementing the provisions of these rules in the respective states/UTs (MoEF, 2010).

At the global level, 18–64% of HCFs are reported to have unsatisfactory BMW management; predictors include lack of awareness, insufficient resources, and poor disposal. BMW is especially dangerous as along with causing environmental pollution, it contains large quantities of hazardous material. About 75–80% of waste produced by healthcare providers is nonhazardous or general waste and the remaining 20–25% is hazardous waste. A number of studies have indicated that the inappropriate handling and disposal of hospital waste poses health risks to health workers who may be directly exposed to them and to people near the health facilities, particularly children and scavengers, who may become exposed to infectious wastes and is associated with a higher risk of diseases such as hepatitis and HIV/AIDS.

A primary health care (PHC) is a medical facility that delivers medical care to outpatients and on occasion may participate in large-scale immunization programs. PHCs generally produce limited quantities of waste. So, hospital waste management is also important for primary care physicians. In a study it was found that the processes of BMW management were poor and unacceptable across the levels of health facilities, and it was poorest in primary care settings as compared to secondary and
tertiary care settings. All domains in BMW processes of the primary care settings required improvement.\textsuperscript{[9]}

The management of BMW has been a neglected issue till date. The objective of the study was to assess hospital waste management in nonteaching hospitals. This assessment will help to develop a strategy to improve BMW management in nonteaching hospitals and all levels of healthcare facilities (primary, secondary, and tertiary levels).

**Materials and Methods**

A cross-sectional, descriptive study was conducted on the staffs of nonteaching hospitals of Lucknow from September 2012 to March 2013. There are a total of 147 nonteaching hospitals in the list provided by the SPCB office. Out of these 147 hospitals, 5 hospitals have more than 500 beds, 5 have 200–499 beds, 22 have 50–199 beds, and the remaining 115 hospitals have below 50 beds. A total of 5\% of the above hospitals (8) were chosen as the study sample size. Simple random sampling technique was used for the selection of the hospitals. The selected hospitals were coded as hospital A, B, C, D, E, F, G, and H, respectively. In this study, all levels of hospitals (primary, secondary, and tertiary levels) were included.

A pre-structured and pre-tested questionnaire was used to collect necessary information regarding the hospitals and their BMW management. The information and data on waste generation, disposal, and storage, transportation, and treatment facilities, and the problems faced by the waste management staffs in the hospitals was collected from the hospital records and interviews with OT in-charges, nurses, medical officers, and medical superintendents, and also by physical checks. The general information about the selected hospitals was also taken. The BMW generation figures were estimated based on the average dry weight of waste collected from different wards for a period of 1 week.

Informed consent was taken from the respective superintendent of the hospitals.

**Statistical analysis**

Data entry was done in Microsoft Excel 2007 and data analysis was done using SPSS software version 17 (233 South Wacker Drive, 11th Floor, Chicago).

**Results**

All the hospitals included in the study were multispecialty hospitals. BMW generation was minimum in hospital D (0.20 kg/bed/day) and maximum in hospital F (0.86 kg/bed/day). Mean hospital waste generated in eight nonteaching hospitals of Lucknow was 0.56 kg/bed/day [Table 1].

BMW generation (kg/bed/day) in the eight surveyed hospitals was calculated and is shown in Figure 1. This was found to be higher in small-bedded hospitals as compared to large-bedded hospitals. Out of the eight hospitals, four hospitals (50.5\%) did not have BMW department and colored dustbins. Also, three hospitals (37.5\%) did not have BMW records and segregation at source [Table 2].

Incinerator was used only by hospital A for treatment of BMW. Hospital G and hospital H had no facilities for BMW treatment. Expenditure on BMW was maximum in hospital A. It spent Rs. 20,000 per month. There were no BMW-related accidents in any of the hospitals [Table 3].

**Discussion**

In the present study, the mean hospital waste in eight nonteaching hospitals of Lucknow was 0.56 kg/bed/day. In a study from Lucknow, the average quantity of waste generation in the hospital was reported to be 0.5 kg/bed/day.\textsuperscript{[8,9]}

Segregation of BMW is considered one of the most important steps in BMW management.\textsuperscript{[3,8]} Color coding of bags is the method used for segregation of BMW. In the present study, of the eight nonteaching hospitals, in four hospitals (50\%) BMW department and colored dustbins were not found. Three hospitals did not have records of BMW and segregation of waste at source. In a study, it was found that Balrampur Hospital does not practice segregation of infectious and non-infectious waste. There is no mechanism for waste segregation. The waste from wards, which includes used cotton, dressing materials, blood, bottles, PVC drip sets,

**Table 1: No of beds available and biomedical waste generated (per day) in hospitals**

| Name of the hospital | Beds available (no.) | BMW generated (kg/day) | BMW generation (kg/bed/day) |
|----------------------|----------------------|------------------------|----------------------------|
| Hospital A           | 650                  | 180                    | 0.28                       |
| Hospital B           | 100                  | 40                     | 0.40                       |
| Hospital C           | 100                  | 30                     | 0.30                       |
| Hospital D           | 100                  | 20                     | 0.20                       |
| Hospital E           | 20                   | 15                     | 0.75                       |
| Hospital F           | 14                   | 12                     | 0.86                       |
| Hospital G           | 12                   | 10                     | 0.83                       |
| Hospital H           | 12                   | 10                     | 0.83                       |
| Total                | 1008                 | 317                    | 0.56                       |

BMW: Biomedical waste

**Figure 1: Biomedical Waste generation in different hospitals**
needles, syringes, and their covers, is thrown on the floor by the doctors, nurses, and attendants alike. These wastes are spread all around and swept to a remote corner or under the stairs. There are huge waste piles in Balrampur Hospital, usually located on the roadside. [9]

Treatment facilities for BMW were not found in two hospitals. In nonteaching hospitals, the fund allotted for BMW management was insufficient. Similar findings were reported in different studies.[8,10]

Conclusions

In the present study, it was found that BMWM Rules of 1998 were not implemented effectively in the nonteaching hospitals of Lucknow.[11] This could be due to lack of education, awareness, and trained personnel to manage the waste in the hospitals, as well as deficiency of funds to create a proper waste management system. There is a need for appropriate training of staffs, strict implementation of the rules, and continuous surveillance of the hospitals of Lucknow to improve the BMW management and handling practices.

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