

Situation Analysis of Biomedical Waste Management in a Tertiary Care Hospital

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Abstract:

Background: The waste produced in the course of healthcare activities carries a higher potential for infection and injury than any other type of waste. ⁹ Improper management of biomedical waste poses a significant threat to the patients and personnel who handle them as well as had adverse environmental impact.

Objective: To evaluate the status of biomedical waste management in a tertiary care hospital.

Method: A descriptive study was conducted at tertiary care hospital had 1150 beds. Total 36 area of patient care including 06 ICU, 16 wards, 12 operation theatres, 02 casualties were evaluated. A check list of 25 items was prepared according to biomedical waste management guideline 2016. Each area was assessed monthly for 6 months on random dates. In order to obtain the score, the marks attained in 6 visits were summated and the mean percentage score was calculated for all categories of biomedical waste management and for all the areas.

Results: Mean score for biomedical waste management of tertiary care hospital was 89.37%. Overall mean percentage score for category of biomedical waste management such as condition of waste containers, segregation of waste, storage and transportation and others was 91.41%, 87.50%, 86.25%, and 92.32% respectively. Overall mean percentage score for ICU, ward, OTs and casualties were 92.68%, 88.75%, 91.32% and 84.76% respectively.

Conclusion: Mean percentage score of all biomedical waste management is satisfactory in all categories and for all patient care areas. Overall score of hospital in biomedical waste management is nearly 90%.

Keywords: Biomedical waste management, Patient care, Tertiary care hospital.

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Introduction

Health care waste is a unique category of waste by the quality of its composition, source of generation, its hazardous nature and the need for appropriate protection during handling, treatment and disposal. [1] Healthcare activities like medical treatments, diagnostic tests, immunization, and laboratory examinations restore health and save lives. At the same time health services may generate large quantity of wastes and by products that need to be handled safely and disposed of properly. [2]

The waste produced in the course of healthcare activities carries a higher potential for infection and injury than any other type of waste. [3] Biomedical waste produced in India is about 1.5-2 kg/bed/day. [4] BMW include anatomical waste, sharps, laboratory waste and others which if not carefully segregated, can be fatal. Additionally, inappropriate

segregation of dirty plastic, a cytotoxic and recyclable material, might harm our ecosystem. [5]

More than 40 pathogens have been documented to be transmitted by BMW, its well documented propensity to cause transmission of 3 pathogens namely Human HIV, Hepatitis B Virus and Hepatitis C Virus makes it essential that due care is exercised while handling and disposing it. [6] For prevention of such hazards, The enacted legislations in various countries have made it mandatory for a healthcare facility to manage its waste properly. In India, On 20 July 1998, BMW (Management and Handling) Rules were framed. [7] On March 28, 2016, under the Environment (Protection) Act, 1986, the Ministry of Environment and Forest (MoEF) implemented the

new BMW Rules (2016) and replaced the earlier one. [8]

According to rule, Biomedical waste management is the process of segregation, collection, storage, treatment, transport and disposal, and other safety measures of waste in health institutions. [9] Improper management of biomedical waste poses a significant threat to the patients and personnel who handle them as well as had adverse environmental impact.

Aim: To evaluate the status of biomedical waste management in a tertiary care hospital.

Material and Methods:

Study design: A Descriptive study.

Study setting: A 1150 bedded tertiary care hospital. Total 36 area of patient care including 06 ICU, 16 wards, 12 operation theaters, 02 casualties were evaluated.

Study Duration: April to September 2023.

Study Tool: A check list of 25 items was prepared according to biomedical waste management guideline 2016. [8] Checklist containing the condition of waste containers, segregation of waste, biomedical symbol, flex of BMW information at place, maintenance of BMW register, storage and transportation of waste

Methods

Each area was assessed monthly for 6 months on random dates. Areas were visited during morning hours between 9 am and 11 am making a total of 6 visits to each area. The chosen timings were such that patient's blood samples were withdrawn for lab diagnostic tests and maximum biomedical waste was generated in a patient care area. Prepare checklist was filled at each visits. Each desirable observation was assigned '1' mark and each

undesirable observation was assigned '0' mark. There were some parameters, observations which could be in part desirable and in part undesirable in a given area, such observation was assigned '0.5' mark. All observations were made by same researcher. In order to obtain the score, the marks attained in 6 visits were summated and the mean percentage score was calculated for all categories of biomedical waste management and for all the areas.

Ethical Consideration: Ethical clearance from institute's ethics committee and permission from Medical Superintendent to collect data from various patient care areas was taken before the study. To keep confidentiality, name of hospital was not mentioned in paper.

Results

Permission from state pollution control board was taken by hospital in 2021. Hospital waste management policy and committee was observed in hospital. Meeting of hospital waste management committee was organized in second week of every month and records of meeting and meeting minutes were maintained by in registered. Majority of the health care workers (78%) were trained in biomedical waste management. Overall mean percentage score for category of biomedical waste management such as condition of waste containers, segregation of waste, storage and transportation and others was 91.41%, 87.50%, 86.25%, and 92.32% respectively. Overall mean percentage score for ICU, ward, OTs and casualties were 92.68%, 88.75%, 91.32% and 84.76% respectively. Mean score for biomedical waste management of tertiary care hospital was 89.37%. Proportion of doctors, nurses, laboratory technicians and other staff immunized for Hepatitis B vaccine was 89%, 92%, 84% and 68% respectively.

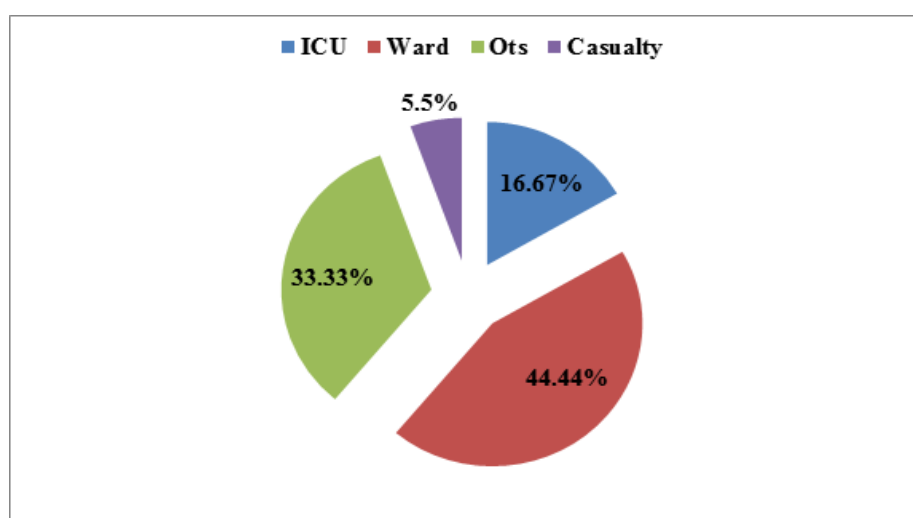


Figure 1: Patients care area in tertiary care hospital.

Table 1: Mean percentage score of various patient care areas.

Category of Biomedical waste management	ICU (n=06) (%)	Wards (n=16) (%)	OT (n=12) (%)	Casualty (n=02) (%)	Overall score of category of Biomedical waste management (n=36)
Condition of waste containers	92.70	87.50	95.83	89.58	91.41
Segregation of waste	95.83	90.28	81.94	81.94	87.50
Storage and Transportation	85.0	88.33	91.67	80.0	86.25
Others*	97.22	88.89	95.83	87.5	92.32
Overall score of the area	92.68	88.75	91.32	84.76	89.37

*Others- BMW symbol, flex of BMW information at place, maintenance of BMW register.

Discussion

Acceptable management of biomedical waste management begins from the initial stage of generation of waste, segregation at the source, storage at the site, disinfection and transfer to the terminal disposal site plays a critical role in the disposal of waste. [10,11] The major problem associated with biomedical waste includes non-compliance of Bio-medical waste regulation and disposal. Improper segregation, results in mixing of hospital wastes with general waste making the whole system hazardous. [12] All healthcare workers involved in dealing with BMW shoulder the responsibility of its proper segregation and disposal.

In present hospital, training of biomedical waste management was attended by 78% of health care workers within two years. Hepatitis B vaccination was found maximum in nurses 92% followed by doctors (89%), laboratory technicians (84%) and other staff (68%). A cross-sectional study conducted by P A Anchawale et al [13] on 250 health care workers at multispecialty teaching hospital, Ahmednagar found that 92% of resident doctors, 98% of nurses and 92% of the technicians had undergone training regarding BMWM and 95% of the staff is vaccinated for Hepatitis B. Javeed Ahamed Golandaj et al [14] conducted a cross sectional Study in public health-care institutes of Karnataka and found that out of 273 study participants, majority (54%) of them have not received any training pertaining to BMW and for hepatitis-B vaccination was very poor amongst waste handlers (43%).

In present study, mean score for biomedical waste management was 89.37%. For sub category of biomedical waste management such as condition of waste containers, segregation of waste, storage and transportation the mean percentage score was 91.41%, 87.50% and 86.25%, respectively. Study carried out by Rajiv Kumar et al [6] in PGIMER, Chandigarh to find out biomedical waste management condition of associated hospital. He found that overall mean percentage score for BMW management at source of generation of waste was

88%. Category-wise, the mean percentage score of condition of receptacles, waste segregation, mutilation of recyclable waste and disinfection of waste was 87%, 96%, 88% and 81% respectively. In a study done by Nataraj G et al [15] in 1800-bedded tertiary care hospital in Mumbai and they found that satisfactory waste segregation was only in 40.3% of areas in spite of continuous monitoring and counseling of HCWs. In a study conducted at Lucknow in a 350-bedded polyclinic and another study carried out at Belgaum in 574-bedded tertiary care medical institute, the waste segregation practices were found to be good. [16,17] However, the authors did not mention the exact percentage of areas where segregation practices were found good.

Conclusion: Mean percentage score of all biomedical waste management is above 85% in all categories and for all patient care areas. Overall score of hospital in biomedical waste management is nearly 90%. In spite of this fact, appropriate and repeated training of health care workers is required to tackle the deficiencies detected in the study.

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