

# CHAPTER- 07

## REVIEW OF MALPRACTICES IN HANDLING BIOMEDICAL WASTE IN HOSPITALS IN PRIVATE SHCOS IN RURAL SETUPS OF RAJASTHAN: A CROSS ANALYSIS

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### INTRODUCTION

Biomedical waste encompasses any waste generated during diagnostic, therapeutic, or vaccination procedures involving humans, animals, or related biological studies. This includes materials prepared from organisms, microorganisms, or metabolic products for purposes of diagnosis, treatment, or research. Mismanagement of biomedical waste, particularly in hospitals, poses a significant risk of infection spread due to its highly infectious nature. Hence, it is crucial to adhere to precise procedures for the proper handling of biological waste. The management of clinical solid waste (CSW) remains a significant issue, especially in healthcare facilities across many developing

countries. Inappropriate disposal practices and inadequate behavior during the handling and disposal of CSW pose substantial health risks and contribute to pollution, given the infectious nature of the waste [1]. Biomedical waste has emerged as a serious health concern in several countries, India included. Negligent and unregulated disposal of such waste by healthcare and research institutions could potentially result in the transmission of hazardous diseases such as hepatitis and AIDS (HIV) among individuals directly involved in its handling as well as the broader population [2].

The estimated waste generation rate in India ranges from 0.5 to 20.0 kg per bed per day, contributing to an annual waste generation of approximately 0.33 million tonnes. Hospital solid waste is composed of infectious waste like bandages and linens, constituting 30–35 percent, followed by plastics (7–10 percent), disposable needles (0.3–0.5%), glass (3–5%), and other general wastes, including food (40–45 percent). Typically, mixed wastes are handled, transported, and disposed of together with municipal solid wastes. Many regions face challenges in establishing proper waste management systems due to factors such as a lack of suitable technologies, insufficient financial resources, and a shortage of professional expertise and training in waste management [3].

As per the World Health Organization, the categorization of hospital wastes reveals that 85 percent are non-hazardous, 10 percent are infectious, and 5 percent are non-infectious but hazardous. In the United States, approximately 15% of hospital waste is designated as infectious waste. Applying this categorization to the overall waste generated in India, the percentage of infectious waste could range from 15% to 35% [4].

## **RESEARCH QUESTIONS**

1. What was the existing process flow for BMW (Biomedical Waste) management in the hospital?
2. What gaps were identified in the process?
3. What were the causes of the identified gaps in the process?
4. What value additions could have been implemented to address the identified gaps in the process?

## **RESEARCH OBJECTIVES**

To investigate the existing process flow of biomedical waste management, highlighting gaps across various stages of the process, encompassing waste generation, collection, storage, and transportation.

## **RESEARCH METHODOLOGY**

The study was designed using non-probability convenient sampling for descriptive research conducted in various departments, including the Intensive Care Unit, Labor Ward, Wards (Medical, Surgical, Gynecology), Operation Theatre, Emergency, and Laboratories (Biochemistry, Pathology), as well as the Storage Room at the hospital. The participants included individuals from different workforce groups, with a total of 111 suitable participants selected during the research period from January to March 2021. A primary cross-sectional study with a descriptive and explorative research design was employed to gather information using a semi-structured questionnaire divided into three sub-categories (Generation, Collection and Storage, Transportation) with eighteen questions in Google Forms. The data, collected from 25th January 2021 to 25th March 2021, were analyzed using SPSS 21.0 version,

employing bivariate analysis such as chi-square and cross-tabulation. Additionally, the gaps identified in the study were explored using fishbone analysis (Ishikawa diagram).

## **RESULTS AND DISCUSSION**

In the analysis of the study, various aspects of biomedical waste management were explored through crosstabulation and statistical methods. The Chi-square test was employed to assess the association between different groups based on their understanding and attitude toward biomedical waste management. The results revealed several gaps in the participants' knowledge and practices related to waste segregation, disposal of sharp infectious waste in puncture-proof containers, handling of non-infectious (general) waste, disposal of non-sharp infectious waste in red plastic bins, and the mixing of infectious and non-infectious waste at the source of generation.

For instance, in the context of waste segregation at the site of generation, 59 out of 111 respondents were found to be unaware. Similarly, regarding the disposal of sharp infectious waste in white/blue puncture-proof containers, 42 participants exhibited a lack of awareness. The study also highlighted gaps in the disposal of non-infectious (general) waste and non-sharp infectious waste, with 72 and 69 respondents respectively being unaware of the correct procedures. Moreover, 60 participants were found to lack awareness of whether infectious and non-infectious waste were mixed at the source of generation.

In terms of the usage of personal protective gear while handling biomedical waste, 71 respondents were found to be unaware, and 64 were unaware of whether waste should be covered in a covered bin. The analysis also indicated that 37 participants were unaware of whether bins were filled beyond

3/4th level, and 38 were unaware of whether bins were cleaned with soap and disinfectant regularly. These findings underscored the need for targeted interventions and educational programs to enhance awareness and knowledge among healthcare professionals and staff regarding proper biomedical waste management practices. Additionally, the study emphasized the importance of regular training and reinforcement to bridge the identified gaps in the current biomedical waste management process.

## **CONCLUSION**

In conclusion, the observational research on the current biomedical waste management methods in rural Rajasthan, particularly in private SHCOS, utilized a gap analysis technique to identify significant shortcomings in the handling of biomedical waste. The study focused on three key aspects: production and insulation of waste, collection and storage of waste, and the carriage of waste. The research identified 11 notable gaps, including uncovered bins, incorrectly colored bags in incorrect bins, and inadequate waste color labeling. A fish bone study further revealed root causes such as broken bins, unavailability of colored plastic bags, and discrepancies in the size of trash cans and plastic bags. Additionally, issues like insufficient staff expertise, low wages, and a lack of regular checkups contributed to the identified gaps. The study suggests that addressing these root causes through enhanced training, improved infrastructure, and regular monitoring can significantly improve the biomedical waste management practices in the region, emphasizing the need for organizational awareness and proactive measures to enhance waste management efficiency.

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