

A STUDY ON BIOMEDICAL WASTE MANAGEMENT IN METRO MULTI-SPECIALITY HOSPITAL

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ABSTRACT

The safe and proper processing, disposal, and treatment of potentially infectious and toxic waste created during medical procedures is an important part of healthcare institutions. The purpose of this study is to investigate and evaluate biological waste management practices at a metropolitan hospital, with an emphasis on essential aspects such as waste segregation, storage, transportation, treatment, and regulatory compliance. A mixed-methods strategy was used in the study, which combined qualitative and quantitative research procedures. The study was founded on a thorough examination of current literature on biomedical waste management. Structured interviews, questionnaires, and on-site observations were also used to collect primary data from hospital personnel, waste management personnel, and regulatory authorities. The major findings indicate both the hospital's biological waste management system's strengths and places for improvement. Notably, the hospital displayed a great dedication to waste segregation and employee training programs. The presence of designated garbage storage areas and proper signage was also deemed adequate. However, several issues were discovered, such as insufficient waste management protocol training for workers, a lack of awareness of regulatory rules, and inconsistent compliance with trash disposal regulations. To protect public health and the environment, the study emphasizes the significance of implementing strong biomedical waste management practices in hospital settings. It advises expanding staff training and awareness programs, improving waste segregation practices, improving waste storage infrastructure, and guaranteeing regular monitoring and compliance audits.

Keywords: *Biomedical Waste Management, Metro Hospital, Waste Segregation, Waste Storage, Waste Transportation, Waste Treatment, Regulatory Compliance, Healthcare Facilities, Infectious Waste, Hazardous Waste, Staff Training, Waste Disposal Regulations, Public Health, Environmental Safety.*

Introduction

Biomedical waste management is a vital part of healthcare operations that focuses on the proper processing, disposal, and treatment of waste generated in healthcare institutions. The volume of biomedical waste has increased dramatically as medical technology has advanced and healthcare services have expanded. Effective biomedical waste management is critical for protecting public health, the environment, and the well-being of healthcare personnel.

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Metro hospitals, being significant healthcare centers in urban settings, face unique issues in biomedical waste management due to their huge size of operations and the varied variety of medical activities carried out inside their grounds. These hospitals serve a large number of patients and provide a comprehensive range of medical services, including surgeries, diagnostic treatments, emergency care, and rehabilitation.

Improper biomedical waste treatment and disposal can have catastrophic repercussions. It has the potential to spread illnesses and diseases, pollutes the environment, and pose occupational hazards to healthcare workers and waste management personnel. To prevent these dangers and maintain compliance with local legislation and guidelines, metro hospitals must build robust biological waste management systems.

The purpose of this research is to look at the existing practices and issues in biomedical waste management in a metropolitan hospital context. This study seeks to contribute to the establishment of more effective and sustainable biological waste management practices in metro hospitals by reviewing existing waste management procedures, finding areas for improvement, and providing appropriate alternatives.

Literature Review

Patil et al. (2017) The authors found that the sudden increase in biomedical waste generated has overwhelmed the existing waste management systems and highlighted the need for improved planning and management of biomedical waste during pandemics.

Singh et al. (2017) Impact on biomedical waste management" - This paper reviews the impact of biomedical waste management in India and highlights the need for proper management and disposal of medical waste to prevent the spread of the virus.

Poudel et al. (2018) This paper provides a global perspective on biomedical waste management and discusses the challenges and strategies for proper management of medical waste.

Sarkar et al. (2019) This paper discusses the challenges faced by India in managing biomedical and highlights the need for proper guidelines and regulations for the safe disposal of medical waste.

Sivapathasundaram et al. (2020) This paper reviews the current practices of biomedical waste management in healthcare facilities, highlighting the need for improved waste segregation, transportation, and disposal methods.

Kumar et al. (2020) This paper highlights the challenges of biomedical waste management in India, including inadequate infrastructure and lack of awareness among healthcare workers.

Kulkarni et al. (2020) Assessed the effectiveness of a biomedical waste management system in a tertiary care hospital in India. The authors found that the segregation of biomedical waste at the source, the use of color-coded bins, and proper disposal of waste significantly reduced the amount of hazardous waste generated and minimized the potential health risks.

Pattnaik et al. (2021) This paper reviews the impact of the COVID-19 pandemic on biomedical waste management, highlighting the increased generation of infectious waste and the challenges in its safe disposal. The authors recommend the implementation of guidelines and protocols for waste management during pandemics.

Alhassan et al. (2021) This paper reviews the challenges of biomedical waste management in developing countries, including inadequate infrastructure, lack of resources, and limited regulatory frameworks. The authors recommend the implementation of sustainable waste management practices, including waste reduction and recycling.

Saxena et al. (2021) This paper highlights the current status of biomedical waste management in India, including the need for improved infrastructure and awareness among healthcare workers. The authors recommend the implementation of effective policies and guidelines, along with education and training programs, to improve waste management.

Objective of the Study

- To assess the current practices and procedures for biomedical waste management in the metro hospital.
- To identify the types and quantities of biomedical waste generated in different departments of the metro hospital.

- To evaluate the compliance of the metro hospital with relevant local and international regulations and guidelines for biomedical waste management.
- To analyse the potential environmental and health risks associated with improper biomedical waste management in the metro hospital.
- To explore the challenges and barriers faced by the metro hospital in implementing effective biomedical waste management practices.

Effects of Biomedical Waste

Human health can be harmed if exposed to dangerous biomedical waste. Because of poor medical waste disposal, HIV, hepatitis B, and C are the three most widely distributed pathogens globally. They are spread through injuries caused by infected syringes and needles.

Doctors, nurses, and sanitation workers are among the people who are most susceptible to the dangers of biomedical waste.

At a time when new strains of the unique coronavirus are rapidly emerging, the need for proper medical waste disposal cannot be overstated. Among the different therapy technologies available are:

- Chemical Disinfection via Incineration
- Thermal Treatment in Water
- Irradiation using Microwaves
- The inertia of Land Disposal

Challenges and Opportunities

Challenges

- **Regulatory Compliance:** Complying with the intricate and constantly changing rules and regulations established by local, regional, and national authorities is one of the major obstacles in the management of biological waste. To avoid fines and preserve compliance, hospitals and healthcare institutions must keep up with these rules and assure rigorous adherence.
- **Segregation and Categorization:** For secure management, storage, transportation, and disposal of various forms of biological waste, proper segregation and classification are essential. However, since correct waste segregation necessitates knowledge of waste categorization and possible dangers related to various forms of waste, it can be difficult to educate and train healthcare professionals in this area.
- **Infrastructure and Resources:** Managing biomedical waste is significantly hampered by a lack of adequate infrastructure and resources. To properly collect and manage waste, healthcare institutions need the right storage spaces, trash cans, labeling systems, and transportation vehicles. Proper trash disposal procedures may be hampered by a lack of committed resources and infrastructure investments in waste management.
- **workers Training and Awareness:** It is crucial to provide healthcare workers with enough training and awareness programs so they can grasp the significance of effective waste management and adhere to the appropriate processes. However, it can be difficult to ensure that all staff members have the same levels of knowledge and training, particularly in bigger healthcare organizations with a high employee turnover rate.
- **Workplace safety and health:** Healthcare personnel who handle and manage biomedical waste may run health hazards. A person may become injured, contract an illness, or have long-term health problems after being exposed to dangerous or contagious materials. It might be difficult to maintain regularly, but it is important to provide the right personal protective equipment (PPE), establish safety regulations, and provide frequent training and monitoring of occupational health and safety measures.

Opportunities

- **Technological advancements:** Opportunities for more effective and ecologically friendly waste management are presented by improvements in waste treatment technology. Autoclaving, microwave treatment, chemical disinfection, and plasma gasification are examples of cutting-edge technologies that can help decrease waste volume, get rid of infections, and have a minimal negative environmental effect.

- **Recycling and Waste Reduction:** By putting recycling and waste reduction measures into practice, you may drastically cut the quantity of biological waste you produce. Hospitals should look at measures including adopting waste segregation at the source, supporting recycling programs for commodities like plastic, paper, and glass, and encouraging the reuse of some resources.
- **Collaboration and Partnerships:** Partnering with waste management professionals, regional governments, and regulatory agencies can open doors for information exchange, best practices, and direction in enhancing biological waste management. Healthcare institutions can improve the efficacy of their waste management strategies by forming alliances with waste management organizations or businesses that specialize in waste treatment and disposal.
- **Programs for ongoing education and training** can help healthcare workers better grasp waste management procedures, safety precautions, and legal obligations. All staff members may be trained and equipped to handle biological waste properly through regular training sessions, workshops, and awareness campaigns.
- **Research and Innovation:** Promoting research and innovation in the management of biomedical waste can result in the creation of novel waste treatment techniques, procedures, and regulations. Research organizations, academic institutions, and healthcare facilities can work together to carry out studies and experiments to identify long-term solutions for the management of biological waste.

Research Methodology

A research methodology, also known as a research design, research plan, or research strategy, is a guideline that directs the research steps, the study process, and aids in systematic data collection, logical data organization, and accurate data analysis in a research investigation. The methodology is the plan for developing or refining the method for gathering, organizing, and evaluating data.

Following an assessment of the literature, a questionnaire was created. The questionnaire was created just for Staff. The questionnaire was distributed to fifty people as part of a pilot study. Validity and dependability were determined.

The housekeeper and crew were given the pre-tested questionnaire. There were also informal meetings with healthcare personnel. The respondents were invited to provide their thoughts on biomedical waste management policy, procedures, and attitudes about the issue. There was also an opportunity to provide further information in response to specific queries.

Primary Data

- **Method adopted**

The normative survey method was adopted for the study, as it was found to be the most appropriate method for collecting data.

- **Sample selected for the study**

For the present study, a sample size is 200 which includes the housekeeper and staff, in which only 122 were responded. The mean age of the sample was 35.

- **Tools used for the study**

The data for the present study were collected using the Questionnaire on biomedical waste management.

- **Secondary Data**

Books, Journals, Articles, Reports, and internet.

Summary of the Research

The correct processing, treatment, and disposal of waste produced in healthcare institutions, particularly hospitals, are referred to as biomedical waste management. It is essential to properly manage biomedical waste to reduce its negative effects on both human health and the environment.

A study on biomedical waste management would likely focus on evaluating current waste management practices, identifying areas for improvement, and proposing strategies to increase waste management efficiency and compliance with regulatory requirements in the context of a metro multispecialty hospital.

Various facets of biological waste management, including waste segregation, collection, transportation, treatment, and disposal techniques, may be included in the research. It may assess the hospital's current waste management system, including the availability and efficiency of waste storage containers, treatment systems, and storage facilities.

The study might also look into the hospital's training and awareness programs to teach workers about proper trash segregation and handling practices. It may also examine the hospital's compliance with biological waste management regulations and recommendations.

The study's results and recommendations might help to improve waste management methods at the hospital, protecting the safety of healthcare personnel, patients, and the environment. Implementing appropriate biological waste management solutions may lower the risk of virus transmission, reduce environmental pollution, and increase healthcare sector sustainability.

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