

Survey Among Nurses for Biomedical Waste Management

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Abstract:

Background: Biomedical waste management is crucial for maintaining a safe healthcare environment. Nurses play an essential role in managing biomedical waste to prevent risks to both patients and healthcare workers. However, knowledge gaps in this area may lead to unsafe practices and occupational hazards. **Objectives:** This study aimed to assess the awareness and practices of nurses regarding biomedical waste management, including their knowledge of needle stick injury protocols and the perceived need for regular training and certification. **Materials and Methods:** A cross-sectional survey was conducted among 267 nurses working in a tertiary care hospital. A structured questionnaire was used to evaluate the level of awareness about biomedical waste management, including waste segregation, disposal methods, and procedures for managing needle stick injuries. Data were analyzed using descriptive statistics. **Results:** Of the 267 nurses surveyed, 83% provided correct answers to all questions, indicating a high level of awareness. While 88% of nurses understood the importance of biomedical waste management, only 17% were knowledgeable about the correct procedure for handling needle stick injuries. Furthermore, 92% of nurses expressed the need for annual training and certification in biomedical waste management. The sample included 78% General Nursing and Midwifery (GNM) nurses and 22% BSc Nursing graduates. **Conclusion:** The study revealed that while nurses generally understand the importance of biomedical waste management, there are significant gaps in knowledge regarding needle stick injury protocols. Regular, comprehensive training and certification are essential for ensuring that nurses are equipped with the knowledge to manage biomedical waste safely and reduce health risks.

Keywords: Biomedical waste, Certification, Nurses, Needle stick injury, Training.

Introduction:

Biomedical waste (BMW) refers to waste generated during healthcare activities, such as diagnosis, treatment, immunization, or research. Improper management of biomedical waste can have severe consequences for both public health and the environment.^[1-5] When biomedical waste is not properly disposed of, it can lead to contamination, infections, and even environmental pollution. Hospitals, clinics, and other healthcare facilities are often the largest producers of biomedical waste. These settings pose heightened risks, especially for healthcare workers like nurses who handle potentially hazardous waste on a daily basis.^[6]

Nurses, as critical members of the healthcare team, are responsible for managing biomedical waste in a safe and efficient manner. This includes correctly segregating, storing, and disposing of various types of biomedical waste, such as sharps, infectious waste, and pharmaceutical

waste. Mismanagement of biomedical waste can lead to occupational health risks, such as exposure to bloodborne pathogens through needle stick injuries, and it can contribute to the spread of infectious diseases. As healthcare environments continue to evolve, so do the guidelines and protocols for managing biomedical waste. Nurses must stay updated on these practices to ensure that they are adhering to safety guidelines and effectively mitigating any risks.

Globally, organizations like the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC) advocate for continuous education and regular training for healthcare workers on the proper handling of biomedical waste. However, research suggests that while many nurses receive initial training in biomedical waste management, continuous education is often inadequate, leading to lapses in knowledge and practices.^[7] Nurses' awareness of the importance of biomedical waste management can differ depending on factors like their educational background, previous experience, and the frequency of their training. In some countries, particularly in developing regions, there is often a lack of sufficient resources and standardized protocols, which can contribute to improper biomedical waste management.^[8-10]

This study investigates the level of awareness and knowledge regarding biomedical waste management among nurses in a healthcare facility. The research specifically focuses on how well nurses understand the importance of waste management, their awareness of needle stick injury protocols, and their views on the necessity of ongoing training. The study also seeks to identify the differences in awareness based on the nurses' educational qualifications (GNM vs. BSc Nursing). The results of this study can help inform strategies for improving biomedical waste management practices and nursing education in healthcare institutions.

Materials and Methodology:

The study was a cross-sectional survey conducted among nurses working in a tertiary care hospital. The primary aim of the study was to assess the level of knowledge and awareness among nurses regarding biomedical waste management, with a focus on their understanding of correct waste segregation, disposal methods, and needle stick injury protocols. A structured questionnaire was developed, comprising multiple-choice questions (MCQs) and Likert scale items that assessed the key areas of biomedical waste management knowledge. The questionnaire was pretested for clarity, reliability, and validity, ensuring that it accurately measured the intended variables.

A total of 267 nurses participated in the study, selected using stratified random sampling to ensure representation from various departments within the hospital. Inclusion criteria for the study were as follows: nurses who had been employed at the facility for at least six months and those involved directly in patient care and biomedical waste management. Exclusion criteria included nurses on extended leave (maternity or sick leave) during the study period or those not involved in waste management tasks.

Data collection was conducted over a period of three months. The nurses were informed about the objectives of the study and provided written informed consent before participating. The data were collected anonymously, with strict confidentiality maintained throughout the process. Once the questionnaires were completed, the responses were analyzed using descriptive statistics to determine the overall level of knowledge among the participants. The study aimed to assess whether nurses understood the importance of biomedical waste management, their familiarity with needle stick injury procedures, and their attitudes toward ongoing training and certification.

Results:

Out of 267 nurses surveyed, 83% provided correct responses to all the questions posed in the questionnaire. This result suggests that the majority of nurses possess a sound understanding of biomedical waste management principles. However, while many nurses understood the importance of waste management, only 17% of them were aware of the correct procedures to follow in the event of a needle stick injury. This gap in knowledge regarding needle stick injury protocols is particularly concerning, as such injuries pose significant health risks, including the transmission of bloodborne diseases like HIV, hepatitis B, and hepatitis C.

Regarding the importance of biomedical waste management, 88% of nurses recognized the need for proper waste segregation and disposal. They understood that incorrect disposal of biomedical waste can lead to contamination, infections, and environmental hazards. These findings indicate that most nurses are aware of the potential dangers associated with improper biomedical waste management, although the knowledge does not always translate into the application of correct practices.

Furthermore, the survey results revealed that 92% of nurses felt that biomedical waste management training should be conducted on an annual basis. They also believed that nurses should receive certification to ensure their competency in handling biomedical waste safely. These responses suggest a strong belief among nurses that continuous education and certification are necessary for maintaining up-to-date knowledge and ensuring safe waste disposal practices.

The survey also examined the educational background of the nurses. Of the 267 participants, 78% were General Nursing and Midwifery (GNM) nurses, while 22% were BSc Nursing graduates. This breakdown suggests that most of the nurses had completed diploma-level training, while a smaller proportion had received a more advanced degree. Differences in the educational background may account for variations in the level of knowledge and understanding of biomedical waste management. Nurses with a BSc in Nursing may have received more in-depth training on infection control and biomedical waste handling during their academic coursework, which could explain the higher levels of awareness in some areas.

Discussion:

The results of this study show a generally high level of awareness regarding the importance of biomedical waste management among nurses. With 88% of nurses acknowledging the significance of proper waste disposal, it is evident that many understand the potential risks associated with improper management. Given that nurses are at the forefront of patient care, their awareness and proactive approach to biomedical waste management are essential for ensuring the safety of both patients and healthcare workers.

However, the study also revealed a significant gap in knowledge, particularly regarding needle stick injuries. Despite the high number of nurses who understood the importance of biomedical waste management, only 17% were familiar with the correct procedure to follow after sustaining a needle stick injury. This finding highlights the critical need for targeted training on this specific issue. Needle stick injuries are a common occupational hazard in healthcare settings, and improper handling of these injuries can result in serious health consequences. It is essential that healthcare institutions integrate comprehensive training on needle stick injury management into their regular educational programs to ensure that nurses are prepared to respond promptly and correctly in such situations. ^[11]

The overwhelming support (92%) for annual training and certification underscores the need for continuous education in this field. Regular training can ensure that nurses are not only up-to-date with the latest waste management guidelines but are also familiar with new risks and protocols that may arise. Certification serves as a useful tool to assess nurses' competency and ensures that they are qualified to handle biomedical waste safely. It is evident from the study that nurses see value in such initiatives and would likely benefit from more frequent, focused training. The difference in awareness based on educational background—where 78% of nurses were GNM-trained and 22% were BSc Nursing graduates—indicates that more advanced nursing programs may include more detailed education on infection control and biomedical waste management. This suggests that nursing curricula at both diploma and degree levels should be reviewed and potentially revised to ensure that all nurses, regardless of their educational qualifications, receive sufficient training on biomedical waste management.

The study also highlights the need for healthcare institutions to review their current training programs. While many nurses expressed awareness of the importance of biomedical waste management, the gap in knowledge related to specific procedures, such as needle stick injury management, suggests that training is not being applied effectively or consistently. Regular workshops, hands-on training sessions, and mock drills could provide nurses with the opportunity to practice proper waste management techniques and respond to emergency situations with confidence.

Limitations of the study:

One of the main limitations of this study is that it was conducted in a single healthcare facility, which may not reflect the experiences or knowledge of nurses in other regions or institutions. The sample size, although large, was limited to one geographical area, which could impact the generalizability of the findings. Additionally, the study relied on self-reported data, which may be subject to bias as nurses may have provided responses they felt were expected, rather than an honest reflection of their knowledge or practices. Finally, the study did not assess the practical application of the knowledge gained through training. Future studies should focus on evaluating nurses' actual performance in managing biomedical waste to provide a more comprehensive assessment of their competencies.

Conclusion:

This study highlights the high level of awareness among nurses regarding the importance of biomedical waste management, yet it also reveals critical gaps in knowledge, particularly in the management of needle stick injuries. The overwhelming demand for annual training and certification indicates a strong desire among nurses to stay informed and ensure safe practices. Healthcare institutions must prioritize continuous education and regular certification to improve knowledge and practice in biomedical waste management. Enhancing the training curricula and ensuring that all nursing staff, irrespective of their qualifications, receive comprehensive education on these issues is essential for reducing risks and promoting a safer healthcare environment.

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Submitted: 19/12/2023

Revised: 10/12/2023

Accepted: 13/12/2023

Published: 29/12/2023

Cite this article:

Dr.Tushar Kashinath Bhopale. Dr. Sachin S Kandakur. Survey Among Nurses for Biomedical Waste Management. Jour Med Dent Fron 2024;1(1):59-64