



A STUDY ON BIOMEDICAL WASTE MANAGEMENT KNOWLEDGE AMONG MEDICAL UNIVERSITIES STAFF NURSES AND NURSING STUDENTS

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Abstract

Hospitals serve as both the primary location for medical treatment and as significant sources of infectious waste production. Efficient management of Biomedical Waste (BMW) is not alone a legal requirement but also a societal obligation. The objective is to evaluate the proficiency and implementation of biomedical waste management among nursing staff and student nurses in medical universities. The research was carried out at various medical universities in Karachi. The study was a cross-sectional, descriptive, hospital-based, investigation. The present study included a total of 320 nurses, who were selected randomly from different departments. Data collection was conducted using a structured proforma already pre-designed, and, pre-tested, following the participants' informed consent. A self-developed scoring method was employed to classify the participants into categories of high, moderate, and low scores. The data was collected and processed using percentages. The assessment evaluated the general knowledge of BMW management, using a scoring system ranging from 0 to 8. The results indicated that staff nurses had a higher level of knowledge compared to student nurses. Upon evaluating the knowledge information pertaining to BMW management, it was shown that staff nurses exhibited superior proficiency compared to students. Staff nurses achieved moderate scores (6-8 right responses) in 62.5% of cases, whereas students achieved moderate scores in 37.5% of cases. While the participants demonstrated a satisfactory level of overall knowledge, they would benefit from high-quality training to enhance their existing understanding of BMW.

Keywords: Medical universities, Biomedical waste management, Student nurses, and Staff nurses.

Introduction

Throughout the years, there have been significant advancements in the healthcare system. It is paradoxical, however, that a healthcare environment, which aims to restore and sustain community health, yet poses a threat to the well-being of patients. A significant peril stems from inadequate waste management techniques, which present a substantial hazard to the well-being of the general public, patients, and professionals, and also contribute to the deterioration of the environment.¹ Global problem of biomedical waste is a pressing concern in the present day. BMW refers to waste produced during the diagnosis, treatment, or immunisation of humans or animals, as well as in research activities

related to these processes, or in the manufacture and testing of biological substances, which is contaminated with human fluids.² It should be emphasised that not all hospital waste possesses the capacity to transmit illness. Studies indicate that Pakistan generates approximately 2 kg of waste per capita every day, with a portion ranging from 0.1 to 0.5 kg being categorised as hazardous waste. Hospital trashes include both biomedical hazardous waste and non-hazardous waste. Sharps, pharmaceutical, genotoxic, chemical, radioactive, infectious, and pathological wastes are the various types of hazardous wastes. The non-hazardous waste comprises several types of refuse, such as packaging, cardboard, and food leftovers.³ Nevertheless, if the contagious elements become intermingled with the overall refuse, the entire volume of hospital waste has the potential to become infectious.⁴ Therefore, all healthcare staff are susceptible to acquiring various life-threatening illnesses such as HIV, HBV, HCV, as well as injuries caused by exposure to infectious materials.⁵ The World Health Organisation (WHO) reports that inadequate management of healthcare waste worldwide resulted in 21 million new cases of hepatitis B virus (HBV) infections (32% of all new infections), 2 million new cases of hepatitis C virus (HCV) infections (40% of all new cases), and 260,000 new cases of HIV infections (5% of all new cases). According to epidemiological research, an individual who is exposed to a needle stick injury from a needle that was used on an infected patient has a respective risk of 30%, 1.8%, and 0.3% of contracting HBV, HCV, and HIV.⁶ Ensuring the secure and efficient handling of garbage is not just a requirement dictated by the law, but also a duty that society must fulfil.⁷ Insufficient and unsuitable understanding of managing healthcare waste might result in significant health ramifications. An efficient communication plan is essential, considering the limited awareness among various staff categories at healthcare establishments about the management of biomedical waste.⁸ Nurses are essential in ensuring the proper disposal of hospital garbage within the healthcare team. They are an integral part of the initial stages in the medical waste management process. Furthermore, a comprehensive understanding of the nurse regarding the various stages of waste management is crucial for the effectiveness of any healthcare waste management initiative.

Material and Method

The study was carried out at various medical universities in Karachi. The study was a cross-sectional, descriptive, and hospital-based investigation. The present study involved a total of 320 participants, consisting of 160 B.Sc nursing students and 160 staff nurses. These participants were selected randomly from different departments of the hospital. The participants were provided with an explanation regarding the purpose of the study. A standardised proforma, which had been pre-designed and pre-tested, was utilised to collect data from all participants in the study. Prior to data collection, informed consent was obtained from each participant, and measures were taken to ensure confidentiality. The study proforma comprises questions pertaining to the understanding of the subject. Each accurate question earns one point. A self-designed grading system was employed to classify the participants into categories based on their performance, namely high, moderate, and low score. The data collected was inputted into Microsoft Excel 2016. The data was compiled and examined using percentages.

Knowledge and practice scoring of staff nurses and student nurses	
Scoring	Correct Answers
High	<3
Moderate	3 – 5
Low	6 – 8

Results

This survey demonstrates that just 61.87% (99) of staff nurses were aware of the BMW management/handling guidelines, whereas student nurses showed a substantially higher level of awareness with 75.62% (121) being knowledgeable about the rules. Similarly, the biohazard symbol was correctly identified by 89.37% (143) of staff nurses, however just 49.37% (79) of students recognised it accurately. It is concerning to observe that 78.12% (125) of staff nurses and just 51.25% (82) of students were aware that hospital garbage is contagious. When it comes to the components of color-coded containers, students demonstrated a higher level of understanding compared to staff nurses, with a percentage of 85% (136) and 41.87% (67) respectively. 64.37% (103) of student nurses and 88.12% (141) of staff nurses were aware of the diseases transferred by BMW if not adequately controlled. Merely 25% (40) of students and 60% (96) of staff nurses reported receiving sensitization or training on hospital waste management during their job tenure (Figure: 1).

The knowledge regarding general information about BMW management was assessed (with scores 0-8), it was found that level of knowledge was better in Staff nurses than student nurses as staff nurses scored Moderate (6-8correct answers) in more than half of the questions (62.5%).Whereas student nurses scored moderate in only 37.5% questions (Figure: 2).

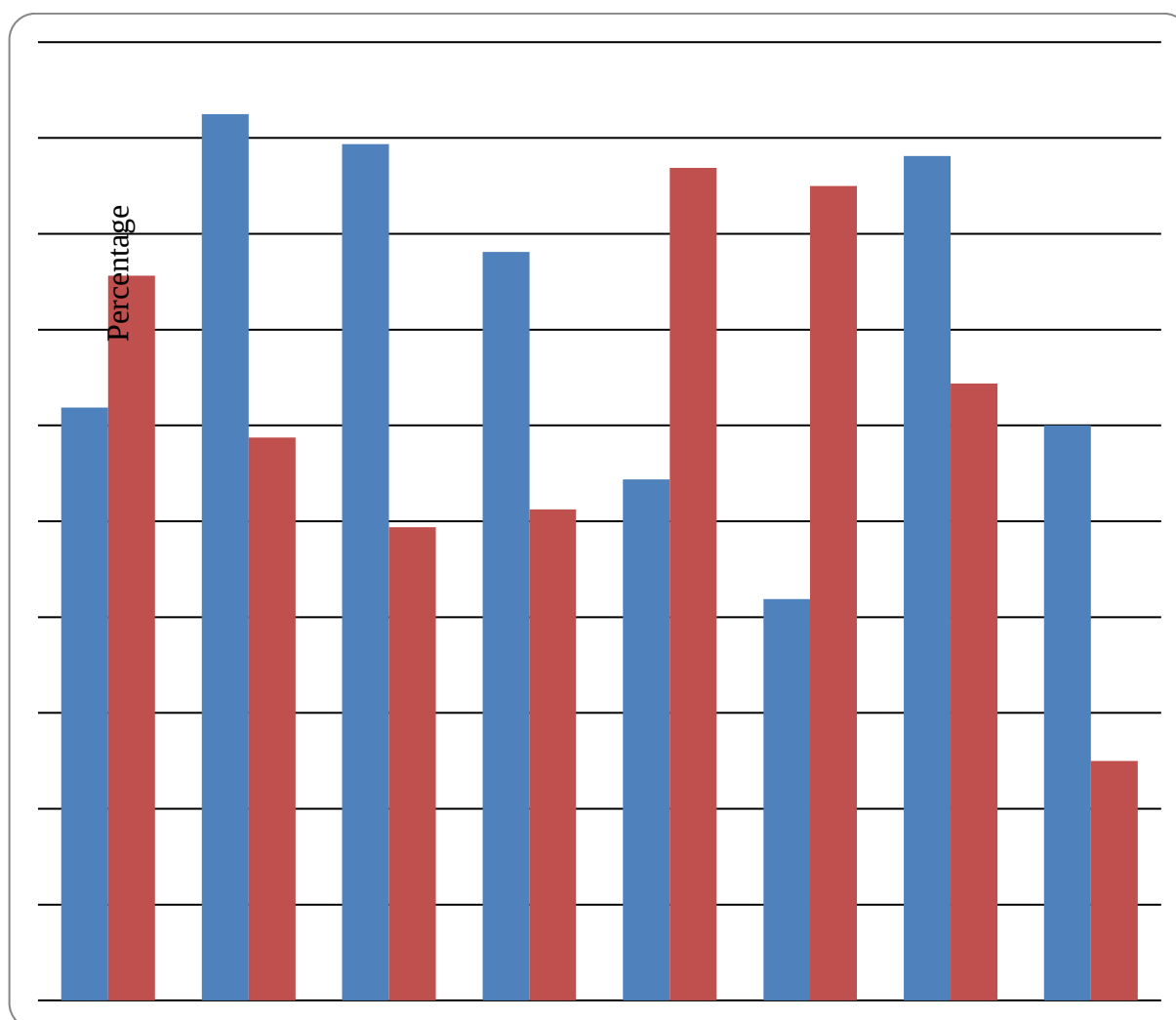


Figure: 1. Knowledge about biomedical waste management among staff and student nurses.

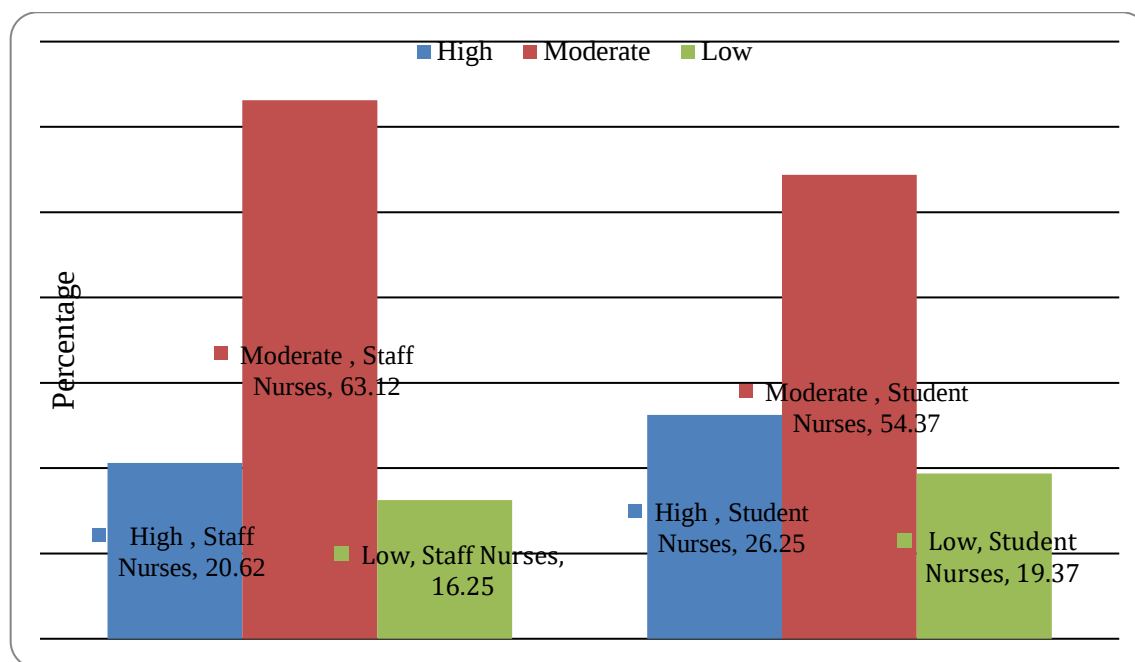


Figure: 2. Association between grades of staff and student nurses on the basis of knowledge.

Discussion

This study aimed to evaluate the knowledge, about hospital waste management through a cross-sectional approach. The limited understanding of hospital waste management can directly affect the entire process of safely disposing of hospital waste, perhaps resulting in the transmission of diseases to the population. While the participants demonstrated a satisfactory level of knowledge, they would benefit from high-quality training to enhance their existing understanding of BMW. The findings indicated that the staff had a higher level of knowledge compared to the student nurses. Upon investigation, it was shown that the individuals had a comprehensive understanding of the concept due to the inclusion of BMW management in their curriculum. While Staff nurses had received regular training on the topic to refresh their knowledge and stay informed, hence maintaining high standards.

Conclusion

This investigation unveiled that while the participants demonstrated a satisfactory level of knowledge, they would benefit from high-quality training to enhance their existing understanding of BMW. The lack of information regarding hospital waste management can directly affect the overall process of safely disposing of hospital trash. To address this, it is necessary to implement regular and rigorous training programmes to continuously educate and update all staff and student nurses. Incentives and compensations can have a significant impact on motivating and teaching nurses in the proper handling of BMWs. There should be an internal regulatory authority within the hospital to monitor and enforce compliance with BMW regulations. Regular instructive sessions should be conducted to educate individuals on the latest methods of scientifically, safely, and cost-effectively managing waste, as well as to raise awareness about the requirements of BMW management in hospitals.

Reference

1. Narang, R. S., Manchanda, A., Singh, S., Verma, N., & Padda, S. (2012). Awareness of biomedical waste management among dental professionals and auxiliary staff in Amritsar, India. *Oral health and dental management*, 11(4), 162-168.
2. Das, N. K., Prasad, S., & Jayaram, K. (2001). A TQM approach to implementation of handling and management of hospital waste in Tata Main Hospitals. *Health Administrator*, 11(12), 75-78.

3. Hashmi, S. K., & Shahab, S. (2003). Hospital and biomedical waste management. *Community medicine and public health*. 4th ed. Karachi: Time Publishers, 426-37.
4. <http://pib.nic.in/infonug/infaug.99/i30089991.html>. [accessed on May 25th, 2008. Info Nugget. 2003 Hospital waste management and bio-degradable waste].
5. Saraf, Y., Shinde, M., & Tiwari, S. C. (2006). Study of awareness status about hospital waste management among personnel and quantification. *Indian Journal of Community Medicine*, 31(2), 111.
6. Srivastava, J. (2016). Knowledge regarding biomedical waste management among the staff nurses. *Int J Sci Res*, 5(7), 2319-7064.
7. Mathur, V., Dwivedi, S., Hassan, M. A., & Misra, R. P. (2011). Knowledge, attitude, and practices about biomedical waste management among healthcare personnel: A cross-sectional study. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, 36(2), 143.
8. Haider, S., Kumari, S., Kashyap, V., Sunderam, S., & Singh, S. B. (2015). A study on knowledge and practice regarding biomedical waste management among staff nurses and nursing students of Rajendra Institute of Medical Sciences, Ranchi. *Indian Journal of Community Health*, 27(1), 135-138.