Assessment of knowledge, attitude, and practices regarding biomedical waste management among operation room personnel in a tertiary care center

Tejesh C. Aanandaswamy, Geetha C. Rajappa, Narendranath Venkatachala¹, Ramachandra Kamath¹

Department of Anaesthesiology, MS Ramaiah Medical College, ¹Department of Hospital Administration, MS Ramaiah Medical College and Hospital, Bangalore, Karnataka, India

Abstract

Background and Aims: Biomedical waste management is an important issue of concern to all healthcare personnel as inappropriate management has the potential for serious infections and noninfectious injury to patients and care providers. Operation room is a department in the hospital wherein large amounts of waste are generated on a daily basis. This study aims to evaluate the knowledge, attitude, and practice regarding biomedical waste among operation room personnel.

Material and Methods: This is a cross-sectional study done among various strata of operation room personnel with a questionnaire to evaluate the knowledge, attitude, and practice with respect to biomedical waste management.

Results: This study revealed gaps in knowledge and practices among all strata of operation room personnel regarding biomedical waste management.

Conclusion: This study highlights the need for appropriate training of all operation room personnel about appropriate waste management practices.

Keywords: Attitude and practice, biomedical waste, knowledge, operation room personnel

Introduction

Biomedical waste (BMW) management is an issue of major concern of all healthcare providers and healthcare establishments as the waste produced during the course of healthcare activities carries potential for infection and injury than any other type of waste.

According to Biomedical waste (Management and handling) Rules, 1998 of India, “biomedical waste” means any waste that is generated during diagnosis, treatment, or immunization of human beings or animals, or in research activities pertaining thereto in the production or testing of biological, and including categories as mentioned in schedule I.¹ These rules prescribe the appropriate methods of managing various categories of biomedical waste (BMW) and also provide the legal framework for the same in our country. Several studies have revealed the risk and impact of disorganized and improper BMW management on healthcare personnel, patients, and hospital environment.²⁻⁴ World Health Organization (WHO) estimated that in 2000, 21 million people were infected with hepatitis B, 2 million people with hepatitis C, and at least 2600,000 people with human immunodeficiency virus due to injections with contaminated syringes.⁵

Appropriate waste management should be an integral feature of any healthcare facility. According to WHO, the generation
of hazardous waste is about 0.5 and 0.2 kg per hospital bed per day for high-income and low-income countries, respectively. Among the various departments in the hospital operation room is a place where large amounts of BMW are generated on a daily basis. It is estimated that operating rooms account for 20%–33% of the total hospital waste. Proper management of waste in the operating room may have a significant impact on the overall hospital waste management. Hence, this study aims to assess the knowledge, attitude, and practices of BMW among operation room personnel.

Material and Methods

This cross-sectional study was conducted in the operation room at a tertiary care hospital after obtaining ethical committee clearance. All strata of operation room healthcare personnel consenting to co-operate and participate were included in the study. Personnel who could not understand and follow instructions and those not willing to participate were excluded. The strata of personnel included were consultants, residents, interns, nurses, technicians, and housekeeping staff, who were given a predesigned questionnaire containing questions pertaining to knowledge, attitude, and practices with reference to BMW management. The questionnaire contained five questions each regarding knowledge, attitude, and practices of BMW management. Questions related to knowledge were in the form of multiple choice questions with one correct response. The knowledge score could range from 0 to 5. Attitude questions were in the form of statements with five options for each and scored from 1 to 5 (strongly disagree 1, disagree 2, no comments 3, agree 4, and strongly agree 5). Therefore, the attitude score for an individual could range from a minimum of 5 to a maximum of 25. Questions related to practice were in the form of statements with yes or no responses. The practice score could range from 0 to 5. The knowledge, attitude, and practice scores were in turn converted into percentage before analysis of results. It was assumed that the various strata of healthcare personnel should secure at least 75% score in each category of the questionnaire to satisfactorily manage the BMW generated in the operation room. The data were analyzed using IBM SPSS software version 18.0 (IBM Corp, USA, 2010). Chi-square test was used for comparison of scores between various groups of personnel.

Results

The questionnaire was distributed among a total of 270 operation room personnel from various categories which resulted in 253 respondents, amounting to a response rate of 93.7%, among whom only 159 (62.9%) had received some form of formal training regarding BMW management [Table 1]. The majority of operation room nurses and technicians had received training, whereas other personnel lacked formal training, with least being among consultants. The mean overall scores and satisfactory scores among healthcare personnel under various categories are shown in Tables 2 and 3, respectively. The attitude scores were satisfactory among all strata of personnel; however, it did not translate into better practices or satisfactory knowledge. Comparison of scores under various categories revealed no difference between the groups of personnel.

Discussion

An appropriate BMW management system is essential for prevention of hospital-borne infection, to safeguard the environment and public health at large. It is also an essential component of hospital quality assurance. Recognizing the importance of this issue, the Government of India notified the Biomedical waste (Management and handling) Rules, 1998,

| Personnel (n) | Knowledge (%) | Attitude (%) | Practice (%) |
|---------------|---------------|--------------|--------------|
| Consultant (n=58) | 59.7 | 95.2 | 62.1 |
| Resident (n=83) | 57.3 | 92.3 | 62.9 |
| Intern (n=36) | 57.2 | 93.4 | 53.3 |
| Nurse (n=47) | 57.9 | 91.6 | 68.1 |
| Technician (n=19) | 65.3 | 91.2 | 67.4 |
| Housekeeping (n=10) | 50.0 | 85.6 | 58.0 |

"P>0.05 for comparison of scores between various groups of personnel"
which were further amended in 2003. Infection prevention practices and hospital waste management systems need to be in place for assured quality of care in hospitals. Proper handling, treatment, and disposal of BMW are important elements of healthcare infection control program. Statutory public health guidelines of BMW management and close monitoring of its compliance alone cannot achieve the ultimate goal if it is not accompanied with social science approach of education, motivation, and change in mindset in all strata of healthcare personnel. Any system of treatment and disposal that is operated by well-trained and well-motivated staff can provide more protection for staff, patients, and the community than an expensive or sophisticated system that is managed by staff who do not understand the risks and the importance of their contribution. The knowledge and practices of healthcare personnel regarding appropriate management of BMW have a serious impact on public health.

Studies done at some centers\[6,7\] report the knowledge about BMW management to be better among doctors compared with other personnel, while some report it to be better among housekeeping staff.\[8\]

This cross-sectional study identified deficiencies in the knowledge and practices of BMW management and also the lack of training among various categories of operation room personnel. Although this study found the attitude to be favourable among all healthcare personnel, they were not armed with appropriate and adequate knowledge to translate into favorable and right practices with respect to BMW. Inappropriate practices can lead to various infectious and noninfectious hazards to hospital staff and to patients. It can lead to an increased incidence of hospital-acquired infections. In the operation room setting, these infections can sometimes be fatal. It is also important to understand that all healthcare personnel are legally bound to follow appropriate practices as prescribed by the Biomedical waste management rules, 1998.

Anesthesiologists have been among the pioneers of patient and hospital safety. Anesthesiologists in the present day are not only responsible for administering anesthesia but also are assuming leadership role of perioperative directors and managers of operating rooms. They have the vantage point of working and coordinating with physicians and nurses of multiple specialities in the operating room. Anesthesiologists have to take responsibility for initiating and continuing waste management methods. By involving themselves in waste auditing, waste planning, and training of personnel working in the operating room, anesthesiologists can contribute not only to environmental benefit but also to economic benefit of the institution. They should be an integral part of hospital waste management and infection control committees.

In conclusion, this study highlights the need to train and reorient all the operation room personnel regarding BMW management. Correct waste management is not only a moral and ethical duty for all healthcare personnel but also a legal binding. It may be appropriate to train the operation room personnel through orientation program before induction to their job to bridge the gaps and increase compliance. Continuous surveillance and monitoring may help maintain a favorable behavior toward BMW management.

Acknowledgement
The authors thank Prof. Dr. Hemanth, Department of Community Medicine, for guidance in preparation of questionnaire.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

References
1. Biomedical Waste (Management and Handling) Rules 1998. New Delhi: Ministry of Environment and Forests Notification; 2000.
2. Massrouje HTN. Medical waste and health workers in Gaza governorates. East Mediterr Health J 2001;7:1017-27.
3. Tamplin SA, Davidson D, Powis B, O'Leary A. Issues and option for the safe destruction and disposal of used injection materials. Waste Manage 2005;25:655-65.
4. Patwary MA, O'Hare WT, Street G, Elahi KM, Hossain SS, Sarke MH. A country report: Quantitative assessment of medical waste generation in the capital city of Bangladesh. Waste Manage 2009;29:2392-7.
5. Waste from health-care activities. Fact sheet No. 253, November 2011. World Health Organisation [online factsheet]. Available from: http://www.who.int/mediacentre/factsheets/fs253/en/#. [Last accessed on 2015 Oct 11].
6. Mathur V, Dwivedi S, Hassan MA, Misra RP. Knowledge, attitude and practices about biomedical waste management among healthcare personnel: A cross-sectional study. Indian J Community Med 2011;36:143-5.
7. Singh A, Nath SR. Knowledge, attitude and practices of bio-medical waste management amongst staff of institutional trauma centre level II. Int J Res Health Sci 2013;1:62-8.
8. Hakin SA, Mohsen A, Bakr I. Knowledge, attitudes and practices of health-care personnel towards waste disposal management at Ain Shams University Hospitals, Cairo. East Mediterr Health J 2014;20:347-54.