

# Biomedical Waste Management—Our Experience at Guru Nanak Dev Hospital Complex, Amritsar, Punjab, India

<sup>1</sup>Gaurav Agnihotri, <sup>2</sup>Surinder Paul, <sup>3</sup>Anterpreet Arora

## ABSTRACT

**Introduction:** Biomedical waste (BMW) collection and proper disposal have become a significant concern for both the medical and the general community. Effective management of BMW is not only a legal necessity but also a social responsibility. The present research aims to assess the knowledge, attitude and practice regarding BMW in our institution.

**Materials and methods:** This study was an observational descriptive hospital-based cross-sectional study, among health care workers in different categories. The study was conducted over a period of two months in a tertiary care hospital and medical college. A structured questionnaire was formulated and validated for the study and responses were solicited from the participating study groups. The study group included the healthcare workers who were grouped into four strata/subgroups as doctors (residents), nursing staff, laboratory technicians and class IV employees.

**Results:** While the knowledge regarding general biomedical waste practices was acceptable it was surprising to note that a huge majority lacked awareness regarding disposal of expired drugs. The attitude of workforce and practice of biomedical waste management in our institution has the authors feel has improved with time. Total 70% would like to receive training. However, the majority feels that their responsibility towards BMW management is an extra burden. Only 40% are immunized against Hepatitis B and this figure needs a huge improvement.

**Conclusion:** The study provides insight regarding the 'functionality' of biomedical waste management in our institution and provides useful indicators which will make BMW management more effective and efficient. It will also provide effective and efficient adherence to rules advocated by the pollution control board.

**Keywords:** BMW management, Health care professionals, Indicators.

**How to cite this article:** Agnihotri G, Paul S, Arora A. Biomedical Waste Management—Our Experience at Guru Nanak Dev Hospital Complex, Amritsar, Punjab, India. *Curr Trends Diagn Treat* 2018;2(1):66-69.

**Source of support:** Nil

**Conflict of interest:** None

## INTRODUCTION

The BMW means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining thereto or in the production or testing of biologicals.<sup>1</sup> In the recent years, there has been a considerable increase in the number of government and private hospitals throughout the country. BMW collection and proper disposal have become a significant concern for both the medical and the general community.<sup>2</sup>

It is estimated that only 5 to 10% of this comprises of hazardous/infectious waste. According to World Health Organisation (WHO), 85% of hospital waste is non-hazardous, 10% infective and remaining 5% noninfective but hazardous.<sup>3</sup> Handling, segregation, mutilation, disinfection, storage, transportation, and final disposal are vital steps for safe and scientific management of biomedical waste in any establishment. The key to minimization and effective management of biomedical waste is segregation and identification of the waste. Though as many as 40 pathogens have been documented to be transmitted by BMW, its well documented propensity to cause transmission of three pathogens namely human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) make it essential that due care is exercised while handling and disposing of it.<sup>4-6</sup> The waste produced in the course of healthcare activities carries a higher potential for infection and injury than any other type of waste. Wherever generated, a safe and reliable method for handling of BMW is essential. Effective management of BMW is not only a legal necessity but also a social responsibility. The absence of proper waste management, lack of awareness about the health hazards from biomedical wastes, insufficient financial and human resources, and poor control of waste disposal are the most critical problems connected with healthcare waste.<sup>7</sup> Although, global awareness among health professionals

<sup>1</sup>Deputy Medical Superintendent, <sup>2</sup>Medical Superintendent, <sup>3</sup>Professor

<sup>1,2</sup>Department of Anatomy, Guru Nanak Dev Hospital Complex, Amritsar, Punjab, India

<sup>3</sup>Department of Anatomy, Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar, Punjab, India.

**Corresponding Author:** Gaurav Agnihotri, Deputy Medical Superintendent, Department of Anatomy, Guru Nanak Dev Hospital Complex, Amritsar, Punjab, India, e-mail: anatomy@gmc.edu.in

about the hazards and also appropriate management techniques but the level of awareness in India is found to be unsatisfactory.<sup>8,9</sup>

The present study was designed to assess the knowledge, attitude and practice of BMW management amongst different categories of staff in Guru Nanak Dev Hospital Complex which is an 891-bed hospital attached to Government Medical College, Amritsar. The interpretation of the observations is expected to help the administration in improving the BMW and identify the aspects which can be addressed to provide more effective and efficient adherence to rules advocated by the pollution control board.

## MATERIALS AND METHODS

This study was an observational descriptive hospital-based cross-sectional study, among health care workers in a different category. Our hospital is a tertiary care hospital with 891 beds situated in Amritsar, Punjab, India. The study was conducted over a period of two months. The study group included the healthcare workers who were grouped into four strata/subgroups as doctors (residents), nursing staff, laboratory technicians and class IV employees. All the healthcare workers working in the institution for more than six months were included in the study, and those who were not willing to participate in the study were excluded. The participants were informed about the purpose of the study, and their informed verbal consent was taken. They were assured about their confidentiality. Due permission and protocol for the study as

advocated by Baba Farid University of Health Sciences and in accordance with Government Medical College, Amritsar authorities was obtained.

The study population included 100 doctors (residents), 100 nursing staff, 25 laboratory technicians and 100 class IV employees. The stratified random sampling method was used. The data were coded, and double checked into a worksheet on microsoft excel 2013. Their knowledge, attitude and practice regarding BMW were assessed by using a questionnaire constructed and validated by the authors. Data were analyzed using proportions and percentages.

## RESULTS

The results are depicted in Tables 1 to 3. These tables provide information pertaining to the knowledge, attitude, and practice of biomedical waste management in our institution. Table 1 provides quantification of correct responses respectively obtained from the study pool. It is imperative that every institution should make efforts to increase this knowledge of correct disposal amongst staff to be able to achieve 'ideal' BMW in the institution. While the knowledge regarding general BMW practices was acceptable in our institution, it was surprising to note that a huge majority lacked awareness regarding disposal of expired drugs. Table 2 shows the attitude of the workforce and practice of BMW in our institution. The authors feel this has improved with time. 70% of participants would like to receive training. However, the majority feels that their responsibility towards biomedical

**Table 1:** Knowledge regarding biomedical waste management (correct responses)

Item	Number of Correct responses				Total percentage of correct responses (N = 300)
	Doctors (N = 100)	Nurses (N = 100)	Class IV employees	Lab. technicians	
IV drip set	75	70	40 (53%)	15 (60%)	66.7
Expired drugs	50	48	30 (40%)	10 (40%)	46
Urine bags	75	80	42 (56%)	14 (56%)	70
Waste food Items	90	95	58 (77)	21 (84%)	88
Infected polythene	80	87	57 (76)	16 (64%)	80
Cotton	76	81	52 (69)	14 (56%)	74
Gloves	82	84	60 (80%)	13 (52%)	80
Infected linens	75	85	61 (81%)	13 (52%)	78
Broken glass	72	74	64 (85%)	15 (60%)	75
Human body parts	82	82	64 (85%)	14 (56%)	81

**Table 2:** Attitude regarding biomedical waste management

Questions	Yes response	No response
Do you believe biomedical waste management is your responsibility?	95%	5%
Do you believe biomedical waste management is an extra burden for you other than your day to day responsibilities?	80%	20%
Would you like to update/take training regarding effective biomedical waste management?	70%	30%
Are you willing to provide suggestion to improve biomedical waste management in your institution? If yes provide suggestions under yes response	65%	35%

**Table 3:** Practice regarding biomedical waste management in institution

Questions	Yes response	No response
Do you believe biomedical waste management is being properly implemented in your ward/area?	75%	25%
Do you discard used needles in needle destroyer/segregate biomedical waste in proper containers?	80%	20%
Have you undergone training regarding biomedical waste management?	32%	68%
Are you immunized against Hepatitis B?	40%	60%

waste management is an extra burden. Table 3 indicates the practice of BMW in our institution. 80% of discard used needles in needle destroyer and segregate BMW in proper containers. Only 40% are immunized against Hepatitis B, and this figure needs a huge improvement.

## DISCUSSION

As India was a signatory to Aarhus convention and Stockholm convention, it became crucial to phase out the then existing BMW (management and handling) rules, 1998 to the current BMW rules, 2016. As the BMW rules, 2016 got notified on March 28, 2016, most of the healthcare facilities (HCFs) started implementing the new rules.<sup>10</sup> In the process of implementing the new rules, the occupiers faced implementation challenges, and there were certain grey areas in the rules. One of the biggest challenges the government hospitals face, during the implementation of BMW 2016 rules is lack of funds.<sup>11</sup> The other major issue is to sensitize the staff and make them aware regarding the significance of proper BMW in the institution. The present study provides an in-depth analysis regarding the knowledge, attitude, and practice of BMW at a premier tertiary level government hospital attached to a medical college at Amritsar, Punjab, India.

While the knowledge regarding general BMW practices was acceptable and comparable with the outcomes in other institutions, it was surprising to note that a huge majority lacked awareness regarding disposal of expired drugs. Out of the four groups, it is evident from the tables that the lab technicians need to be made more aware of general BMW guidelines.

The attitude towards BMW the authors feel has improved with time, and the majority now feel that it is their own responsibility to tackle the BMW generated in the institute. It is also important to note that the majority feel that their responsibility towards BMW is an extra burden. This can be attributed to the fact that there is a staff crunch in our institution with a number of vacant posts for each cadre. Every year many from workforce retire, and there is insufficient replenishment by new recruitment to fill the work gap. When asked to provide suggestions for improvement of BMW set up in the institute, most of the staff advocated that there should be a separate set of personnel involved in

looking after the BMW on the pattern of postgraduate institute (PGI), Chandigarh. Also, there is a gap vis-à-vis training for BMW in our institute. Seventy percent would like to receive training, and only 32% have received training. This percentage of persons who have received training would have reduced further if the sample size for the present study was more. Recently, a team from Ramiah Medical College, Bangalore has started training our staff by organizing workshops under the United Nations Industrial Development Organization (UNIDO) project. The authors believe that those trained now should become trainers for effective and optimum BMW in the institution.

The practice of BMW in our institution has improved in the previous few years and is now comparable to data available from other tertiary care institutions.<sup>12-16</sup> It is pertinent to mention here that it is always easier to manage a smaller set up compared to a huge tertiary care institution. Protection of those who provide patient care is also an important issue. Only 40% are immunized against hepatitis B, and this figure needs a huge improvement.

Over the past few years in Punjab, the efforts of Punjab Pollution Board have been highly commendable. Not only have they been strict regarding effective BMW they have also been cooperative enough to understand the problems in a tertiary care Government institution. They have provided sound advice and support by collaborating with United Nations Industrial Development Organization (UNIDO) resulting in more effective biomedical waste management in our institution. The hospital administration and higher government authorities have now also placed the BMW in the top priority list. The present study is also an attempt to understand the BMW practices in our institution to ensure better management in the times to come.

## ACKNOWLEDGMENTS

The authors would like to thank the staff members who participated in the study. They would also like to thank Er Vinod Kumar, Er Piyush Jindal and Er Sukhdev Singh from Punjab Pollution Control Board interactions with who encouraged the authors to formulate and process the study.

## REFERENCES

1. Malini A and Eshwar B. Knowledge, Attitude and Practice of Biomedical waste management among health care personnel in a tertiary care hospital in Puducherry .International Journal of Biomedical Research 2015;6(03):172-176.
2. Gayathri VP, Kamala P. Biomedical solid waste management in an Indian hospital, A case study. Waste Management . 2005;25: 592-599
3. Lohani N, Dixit S. Biomedical waste management practices in a tertiary care hospital: a descriptive study in Srinagar, Garhwal, India. International Journal of Community Medicine and Public Health. 2017;4(2):465-470.
4. Collins CH, Kennedy DA. Microbiological hazards of occupation needle stick and sharps injuries. J Appl Bacteriol 1987;62:385-402.
5. Pruss A, Cirouit E, Rushbrook P. Definition and Characterization of Health-Care Waste. In Safe Management of Wastes From Health-Care Activities. Geneva: WHO; 1999:2-46.
6. Srivastav S, Kariwal P, Singh AK, Shrotriya VP. Evaluation of Biomedical Waste Management Practices in Multi-Speciality Tertiary Hospital. Indian Journal of Community Health 2010;21:46-50.
7. Journal of Evolution of Medical and Dental Sciences/ Volume2/Issue29/July 22, 2013 Page 5360-5365.
8. Rao PH. Report: Hospital waste management--awareness and practices: A study of three states in India. Waste Manage Res. 2008; 26:297-303.
9. Kishore J, Goel P, Sagar B, Joshi TK. Awareness about biomedical waste management and infection control among dentists of a teaching hospital in New Delhi, India. Indian J Dent Res. 2000;11:157-161
10. Datta P, Mohi GK, Chander J. Biomedical waste management in India:Critical appraisal.J Lab Physicians.2018;10:6-14.
11. Capoor MR, Bhowmik KT. Current perspectives on biomedical waste management: Rules, conventions and treatment technologies. Indian J Med Microbiol 2017;35:157-164.
12. Kumar R, Gupta AK, Aggarwal AK, Kumar A. A descriptive study on evaluation of bio-medical waste management in a tertiary care public hospital of North India. Journal of Environmental Health Science and Engineering . 2014;12:69.
13. Das SK, Biswas R. Awareness and practice of biomedical waste management among healthcare providers in a Tertiary Care Hospital of West Bengal, India. Int J Med Public Health. 2016; 6:19-25.
14. Gupta V, Mohapatra D, Kumar V. Study To Assess The Knowledge, Attitude And Practices Of Biomedical Waste Management Among Health Care Personnel At Tertiary Care Hospital In Haryana Int J Basic Applied Med Sci. 2015;5(2):102-107.
15. Bansal M, Mishra A, Gautam P, Changulani R, Srivastava D, Gour NS.Knowledge and awareness regarding biomedical waste management among employees of a tertiary care hospital IJCM. 2013; 25(1):86-88.
16. Nema S, Singh A. Awareness and practices about health care waste management among hospital staff of a medical college hospital in Bhopal, Central India. Int J Recent Adv Multidisciplinary Res. 2015;2(7):518-521.