

KNOWLEDGE, ATTITUDE, AND PRACTICE REGARDING BIOMEDICAL WASTE MANAGEMENT AMONG HEALTH CARE PROVIDERS AT A TEACHING HOSPITAL, LAHORE

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ABSTRACT

Objectives: To check the knowledge, attitude, and practice among health care providers regarding biomedical waste management in Government Teaching Hospital Shahdara Lahore.

Material and Methods: A cross-sectional study was conducted at Government Teaching Hospital Shahdara, Lahore, Pakistan, from 15 March to 31 June 2020. A stratified random sampling technique was used to select samples. One hundred subjects, 58 nurses, 26 doctors, and 16 paramedical staff were selected by the WHO formula. Departmental and ethical permission was taken. Data were collected from health care providers (doctors, nurses, and paramedics) through a self-administered questionnaire.

Results: Results revealed that nurses have higher knowledge than doctors and paramedical staff regarding biomedical waste management as nurses have 66%, doctors 45%, and paramedics have only 26% scores. Furthermore, nurses have a positive attitude regarding biomedical waste management. On the contrary, a negative attitude was found among doctors and paramedical staff. Good practice was found among nurses; scores were 87%, followed by doctors and paramedics with the same score as 34%.

Conclusion: The risks of injuries or occupational hazards are increased due to a lack of knowledge about standard protocols and guidelines of biomedical waste management.

Keywords: Paramedics, Segregation, Biomedical Waste

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INTRODUCTION

Waste generated during the treatment, diagnosis and immunization of human beings and animals is called biomedical waste. Biomedical waste increases day by day with the increase in health care facilities. About 0.33 million biomedical waste is generated annually in India. 10% to 25% of waste is biohazard waste, and 75% to 85% is general or domestic waste. Each bed generated 0.5 to 2.0kg of waste in India¹. Biomedical waste management and handling rules were first passed in 1998. The main aim of these rules is proper handling and segregation

of infectious and non-infectious waste. Globally a rise in health institutions and hospitals has also increased the burden of biomedical waste due to excessive usage of disposable medical items. The risk of illness increases among health care providers due to improper handling of biomedical waste². In 2019, WHO stated that highly developed countries generate 0.5kg of infectious waste per day and underdeveloped countries 2.0kg per day per bed³. Biomedical waste handling is an important issue. If infectious isolation and end disposal waste are not handled correctly, it can cause severe illness and environmental problems⁴. Improper handling and transmission of biomedical waste are the reason to generate diseases like HIV/AIDS, hepatitis B, and hepatitis C⁵.

Healthcare providers, including doctors, nurses, and janitorial staff, are at greater risk of being infected with biomedical waste. About 59 million people worldwide work as health care workers. These large numbers of people are at risk of occupational hazards⁶. These peo-

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ple's higher risk are due to their more extensive exposure to healthcare waste, inability to manage waste properly by hospitals and no awareness by the health personnel regarding their health hazards ⁷. According to the WHO, about 500 million people globally are getting infected with either Hepatitis B or Hepatitis C⁸. These hazards are due to a lack of knowledge, awareness, and practice of biomedical waste and non-implementation of handling rules and regulations given by World Health Organization and Centers for Disease Control and Prevention (CDC) ⁹.

MATERIAL AND METHODS

A cross-sectional study was conducted in the Emergency, gynae, ICU, medical and surgical department of Government Teaching Hospital Shahdra Lahore, Pakistan, from 15 March to 31 June 2020. A stratified random sampling technique was used to collect data from participants. Three strata were made, one for doctors, the second for nurses, and the third for paramedical staff. A list of total doctors, nurses, and paramedical staff was made. The total population was 927, from which 540 nurses, 240 doctors, and 147 paramedical staff was included. The sample size was selected by WHO proportional formula.⁸ According to the formula, 58 nurses, 26 doctors, and 16 paramedical staff was selected Health care professionals who have more than 3 years of experience and working in the emergency, ICU, gynae, medical and surgical departments of hospitals were included in this study. A self-administered questionnaire was used to collect data from participants that consist of four sections, 1st demographic

data, 2nd knowledge, 3rd attitude, 4th practice regarding biomedical waste among health care providers.⁹ Data collection was completed within three months. The questionnaires were delivered to all the participants, and it was assured that their information would be kept confidential. Data collection was started 1st April-15 May 2020. SPSS version 20 was used to analyze data. Frequency and percentage were used to interpret data.

RESULTS

In this study, 58 nurses, 26 doctors, and 16 paramedics have participated. According to criteria, it was considered good if responses were above 60%. 50% of responses were assessed at an average level, and below 50% were regarded as poor knowledge. The present study results revealed that nurses with 66% scores have good knowledge, followed by doctors having average knowledge with 45% scores on analysis, and the paramedics have poor knowledge with 26% scores regarding biomedical waste management. The attitude of nurses regarding biomedical waste was positive (60%), but it was shown that doctors and

paramedics have a negative attitude with scores of 30% and 21%, respectively. The practice of biomedical waste management was found excellent in nurses as results showed 87% scores. Still, doctors and paramedical staff had a meager practice of BM waste management as results were 34% and 34%.

Table 1: Distribution of subjects according to Knowledge, Attitude, and practice scores

Categories	Knowledge	Attitude	Practice
Doctors	45%	30%	34%
Nurses	66%	60%	87%
Paramedics	26%	21%	34%

Table 2: Knowledge regarding biomedical waste management among healthcare providers (n=100)

Questions	Doctors (n=26)	Nurses (n=58)	Paramedics (n=16)
Do you know about BM waste generation and legislation?			
Yes	17(65%)	50(86%)	4 (25.0%)
No	5(19%)	5(8.0%)	6(37.5%)
Don't know	4(16%)	3(5.1%)	6(37.5%)
What agency (ies) regulate(s) wastes generated at health care facilities?			
Yes	15(57.6%)	12(20%)	2(13%)
No	8(30.5%)	36(62%)	10(62%)
Don't know	3(11.5%)	10(17%)	4(25%)
Do you know about the color-coding segregation of BM waste?			
Yes	12(46%)	49(84%)	8(50%)
No	10(38%)	6(11%)	5(31%)
Don't know	4(16%)	3(5%)	3(19%)
Biomedical Waste (Management & Handling) Rules were first proposed in:			
Yes	19(73%)	41(70%)	1(6%)

No	3(11.5%)	7(12%)	10(63%)
Don't know	4(15%)	10(18%)	5(31%)
Modifications to the Biomedical Waste (Management & Handling) Rules were made in:			
Yes	6(23%)	41(70%)	5(31%)
No	12(46%)	10(18%)	8(50%)
Don't know	8(31%)	7(12%)	3(19%)
Which statement describes one type of BM waste?			
Yes	8(30%)	42(72%)	6(37%)
No	12(46%)	14(24%)	7(44%)
Don't know	6(24%)	2(4%)	3(19%)
Do you need a separate permit to transport biomedical waste?			
Yes	7(26%)	38(65%)	4(25%)
No	14(54%)	8(14%)	8(50%)
Don't know	5(20%)	12(20%)	4(25%)

Table 2: Knowledge regarding biomedical waste management among healthcare providers (n=100)

Questions	Doctors (n=26)	Nurses (n=58)	Paramedic (n=16)
Do you think it is important to know about BM waste generation, hazards, and legislation?			
Yes	10(38%)	39(67%)	8(50%)
No	9(35%)	8(14%)	6(38%)
Don't know	7(27%)	11(19%)	2(12%)
Safe management of health care waste is not an issue at all.			
Yes	20(76%)	45 (77%)	5 (31%)
No	4(15%)	8(14%)	5(31%)
Don't know	2(8%)	5(9%)	6(38%)
Is the waste disposal practice correct in your hospital?			
Yes	9 (34%)	47 (81%)	7(43%)
No	7(27%)	5(9%)	3(19%)
Don't know	10(39%)	6(10%)	6(38%)
Do you think Objects that may be capable of causing punctures or cuts, that may have been exposed to blood or body fluids including scalpels, needles, glass ampoules, test tubes, and slides, are considered biomedical waste?			
Yes	4(15%)	40(68%)	1(6%)
No	18(70%)	11(19%)	9(56%)
Don't know	4(15%)	7(13%)	6(38%)
The color code for the BM waste to be autoclaved disinfected is:			
Yes	8(30%)	27(46%)	0 (0%)
No	9(35%)	15(26%)	7(44%)
Don't know	9(35%)	16(28%)	9(56%)
Are you satisfied with the team of waste management in your hospital?			
Yes	10(38%)	48(82%)	2 (12%)
No	11(42%)	6(10%)	11(69%)
Don't know	5(19%)	4(7%)	3(19%)
All of the following statements about hazardous waste containers are true, except for:			
Yes	4(15%)	36(62%)	5 (31%)
No	15(58%)	14(24%)	8(50%)
Don't know	7(27%)	8(14%)	3(19%)

Table 4: Practice regarding biomedical waste management among healthcare Providers (n=100)

Questions	Doctors (n=26)	Nurses (n=58)	Paramedics (n=16)
The approximate proportion of infectious waste among total waste generated from a health care facility is:			
Yes	8(31%)	46(79%)	4(25%)
No	10(38%)	8(14%)	10(63%)
Don't know	8(31%)	4(7%)	2(12%)
Is there proper segregation of BM waste in your institution?			
Yes	9(34%)	49(84%)	7(43%)
No	12(46%)	4(7%)	5(31%)
Don't know	5(19%)	3(5%)	4(25%)
Is the infectious waste sterilized by autoclaving before shredding and disposal in your institution?			
Yes	10(38%)	50(86%)	6(37%)
No	9(35%)	5(9%)	3(19%)
Don't know	7(27%)	3(5%)	7(44%)
Safe management efforts by the hospital increase the financial burden on management.			
Yes	8(30%)	38(65%)	8(50%)
No	11(42%)	18(31%)	6(38%)
Don't know	7(65%)	2(4%)	2(13%)
Do Containers labeled before filling it with waste in your institution?			
Yes	6(24%)	39(67%)	3(18%)
No	10(38%)	7(12%)	9(56%)
Don't know	10(38%)	12(21%)	4(25%)
Do you follow color-coding for BM waste?			
Yes	10(38%)	52(89%)	7(43%)
No	12(46%)	4(7%)	6(38%)
Don't know	4(15%)	2(4%)	3(19%)
Have you attended voluntarily programs that enhance and upgrade your knowledge about waste management?			
Yes	13(50%)	29(50%)	0(0%)
No	8(31%)	17(29%)	10(63%)
Don't know	5(19%)	12(21%)	6(17%)
Is the waste disposal practice correct in your hospital?			
Yes	6(23%)	38(65%)	4(25%)
No	12(46%)	8(14%)	8(50%)
Don't know	8(31%)	10(17%)	4(25%)

DISCUSSION

This study was conducted at Government Teaching Hospital Shahdra Lahore to evaluate the knowledge, attitude, and practice of biomedical waste management among health care providers, including doctors, nurses, and paramedical staff. The present study results showed that nurses with 66% scores had good knowledge, followed by doctors having average knowledge with 45% scores on analysis, and the paramedics have poor knowledge with 26% scores regarding biomedical waste management. The attitude of nurses regarding biomedical waste was positive 60% while doctors and paramedics had lower scores of 30% and 21%, respectively. The prac-

tice of biomedical waste management was found excellent in nurses as results showed 87% scores. Still, doctors and paramedical staff had a meager practice of BM waste management as results were 34% and 34% respectively.

The current study revealed the same results as one previous study where the nurses had more knowledge than others, in our study too, with 66% nurses were in the lead in knowledge about biomedical waste management ¹⁰. Appropriate awareness regarding biomedical waste is essential because it has hazardous effects on health, severely destroying health and the environment. The present study contradicts the results of a previous study ¹¹ that doctors have good knowledge of biomedical waste

disposal because only 45% of doctors have knowledge about waste disposal in this study. Still, it was found that nurses have good knowledge about BM waste management because 66% of nurses responded correctly. This study's results were also in similarity with one previous study¹² that paramedical staff have less knowledge about BM waste management because our results showed that only 26% of paramedics know BM waste management.

Furthermore, the current study assessed the attitude of health care workers towards the safe management of biomedical waste, which revealed that nurses have the highest attitude regarding BM waste management as results showed 60% of nurses showing a good attitude toward safe management of BM waste. The results of the present study opposed the results of one previous study (2) that doctors have a good attitude regarding BM waste management. Whereas another study conducted^{13, 14} in India had the same results as this study revealing that paramedical staff had a lower attitude regarding BM waste management.

Healthcare professionals in various facilities practice unsafe and inappropriate means of biomedical waste. The results of this study were in line with one previous study¹ that hazardous waste was not properly collected, segregated, and disposed off in an appropriate manner. This study is also in compliance with the results of one previous study (14) that nurses have good practice of BM waste management followed by doctors, but due to poor knowledge and attitude, paramedical staff have less practice of biomedical waste segregation and disposal.

CONCLUSION

Biomedical waste management puts healthcare providers at significant risk for infectious diseases. The present study outlines a substantial gap in knowledge, awareness, and practices in the execution of biomedical waste management rules by health care professionals. In addition, the lack of regular training and updates on occupational safety measures was also found. There was also poor management of collection, segregation, transportation, and biomedical waste disposal.

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REFERENCES

1. Anozie OB, Lawani LO, Eze JN, Mamah EJ, Onoh RC, Ogah EO, et al. Knowledge, attitude, and practice of healthcare managers to medical waste management and occupational safety practices: Findings from Southeast Nigeria. *Journal of clinical and diagnostic research: JCDR*. 2017;11(3):IC01.
2. Balushi A, Ullah MM, Makhamri A, Alawi F, Khalid M, Ghafri H. Knowledge, Attitude and Practice of biomedical waste management among Health Care Personnel in a secondary care hospital of Al Buraimi Governorate, Sultanate of Oman. *Global Journal of Health Science*. 2018;10(3):70.
3. Devi A, Ravindra K, Kaur M, Kumar R. Evaluation of biomedical waste management practices in public and private sector of health care facilities in India. *Environmental Science and Pollution Research*. 2019;26(25):26082-9.
4. Anand P. Correspondence: Knowledge, Attitude and Practice of Healthcare Managers to Medical Waste Management and Occupational Safety Practices: Findings from Southeast Nigeria. *Journal of Clinical and Diagnostic Research: Jcdr*. 2017;11(8):IL03.
5. Al Balushi A, Ullah M, Makhamri A, Al Alawi F, Khalid M, Al Ghafri H. Knowledge, Attitude and Practice of biomedical waste management among Health Care Personnel in a secondary care hospital of Al Buraimi Governorate, Sultanate of Oman. *Global Journal of Health Science*. 2018;10(3):70.
6. Joseph B, Joseph M. The health of the healthcare workers. *Indian journal of occupational and environmental medicine*. 2016;20(2):71.
7. Indupalli AS, Motakpalli K, Giri PA, Bendigiri N. Knowledge, Attitude & Practices regarding Biomedical Waste Management amongst Nursing Staff of Khaja Banda Nawaz Institute of Medical Sciences, Kalburgi, Karnataka. *Ntl J of Community Med*. 2015;6(4):562-5.
8. Yizengaw E, Getahun T, Geta M, Mulu W, Ashagrie M, Hailu D, et al. Sero-prevalence of hepatitis B virus infection and associated factors among health care workers and medical waste handlers in primary hospitals of North-west Ethiopia. *BMC research notes*. 2018;11(1):1-6.
9. Dehghani MH, Rahmatinia M. Dataset on the knowledge, attitude, and practices of biomedical waste management among Tehran hospital's healthcare personnel. *Data in brief*. 2018;20:219-25.
10. Mugabi B, Hattings S, Chima S. Assessing knowledge, attitudes, and practices of healthcare workers regarding medical waste management at a tertiary hospital in Botswana: A cross-sectional quantitative study. *Nigerian Journal of Clinical Practice*. 2018;21(12):1627-38.
11. Dolma Y, Singh P, Kapoor A, Sangra S. Knowledge attitude and practice regarding biomedical waste management and handling rules at associated hospital of government medical college kathua. *International Journal of Scientific Research*. 2020;8(12).
12. Gupta NK, Shukla M, Tyagi S. Knowledge, attitude and practices of biomedical waste management among health care personnel in selected primary health care

centres in Lucknow. *International Journal of Community Medicine and Public Health*. 2016;3(1):309-13.

13. Mannocci A, di Bella O, Barbato D, Castellani F, La Torre G, De Giusti M, et al. Assessing knowledge, attitude, and practice of healthcare personnel regarding biomedical waste management: a systematic review of available tools. *Waste Management & Research*. 2020:0734242X20922590.
14. Kumar M, Kumari M, Singh G, Kumari R. Knowledge, Awareness and Attitude regarding Biomedical Waste Management among Medical Students in a tertiary health Care centre: A Cross Sectional Study. *Indian J Med Res [serie en internet]*. 2017:611-4.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Shaheen M: Concept and design of study

Yousaf N: Concept and design of study

Bibi T: Manuscript writing

Shaheen S: Writing, review, and references management

Rehman A: literature search, data collection and review

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.