



Assessment of Knowledge on Health Care Waste Management among Health Care Professionals

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

Editor(s):

(1) Dr. Asmaa Fathi Moustafa Hamouda, Jazan University, Saudi Arabia.

Reviewers:

(1) Moniruzzaman, Bangladesh Reference Institute for Chemical Measurements (BRiCM), Bangladesh.

(2) Satya Prakash Mehra, India.

Complete Peer review History: <https://www.sdiarticle4.com/review-history/73092>

Original Research Article

Received 18 June 2021
Accepted 22 August 2021
Published 26 August 2021

ABSTRACT

Medical waste is contagious and potentially dangerous. It causes substantial health risks to the environment and requires special treatment and care before being disposed of. With an ever-increasing number of hospitals, clinics, and diagnostic laboratories, the problem is getting worse. The goal of this study was to see how well health workers in a tertiary care hospital knew about health care waste management (HWM). Sixty health care professionals (HCPs), including nurses, pharmacists, lab technicians, and non-medical health workers, were chosen using a purposive sampling technique. The researchers created a self-administered questionnaire based on the WHO guide on the health care waste management protocol. Nurses had the most expertise of biomedical waste management (64.58%), followed by lab technicians (46.41%), and non-medical health workers had the least (38.73%). Colour coding awareness was the greatest with the features among the survey participants. At $p = 0.05$, the amount of understanding of health-care waste

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management was highly associated to profession, level of education, and receiving health-care waste management training. The study suggests that healthcare professionals, particularly nursing personnel, require ongoing training, which should be made mandatory.

Keywords: Knowledge; health care waste management; health care professionals; nurses; pharmacists; lab technicians; non – medical health workers.

1. INTRODUCTION

Medical waste is contagious and potentially dangerous. It causes substantial health risks to the environment and requires special treatment and care before being disposed of. With an ever-increasing number of hospitals, clinics, and diagnostic laboratories, the problem is getting worse. Medical waste poses a severe threat to environmental health due to its hazardous material composition [1-2]. Pathological and infectious materials, sharps, and chemical wastes are among the hazardous substances [3-6]. Various therapeutic procedures (such as cobalt therapy, chemotherapy, dialysis, surgery, delivery, resection of gangrenous organs, autopsy, biopsy, para clinical test, injections, and so on) are performed in hospitals, resulting in the production of infectious wastes, sharp objects, radioactive wastes, and chemical materials [7].

Medical waste could contain germs that cause diseases like hepatitis B and AIDS. Medical waste has received less attention in underdeveloped nations, and it is disposed of alongside residential waste [8-9]. In Bangladesh, poor medical waste management is frightening and poses a severe threat to public health. Controlling and avoiding diseases, such as communicable diseases, is a common goal for healthcare providers. However, the development of hazardous and nonhazardous waste in the course of activities poses an environmental danger to healthcare personnel, the general public, and the environment at large [10].

As a result of fast population expansion in developing nations, the amount of healthcare waste has increased dramatically in recent years, increasing the need for health services [11]. According to a WHO survey from 1995, most healthcare facilities lack a waste management plan or method. There is no legislation in various countries. Waste management guidelines are also lacking [12]. As a result, medical waste management is a global public health issue; if ignored, the effects of medical waste can harm public health and the environment. Despite the fact that medical waste management is governed

by laws, regulations, and guidelines, it appears to be inadequately managed from collection through disposal.

Clinical personnel in developing nations are unaware of the spread of hospital-acquired illnesses caused by poor healthcare waste management, a lack of staff commitment to hospital discipline, and insufficient HWM (Healthcare Waste Management) training [13]. Waste handlers (workers), health-care professionals such as nurses, doctors, paramedical staff, laboratory technicians, pharmacists, or dispensary technicians, as well as patients, waste scavengers, and the general population as a whole, can all suffer serious health consequences if health-care waste is not properly managed.

In the present health care facility, there is no organized system of healthcare waste management. Wastes that cannot be processed on site were picked up by medical waste disposal companies. The waste is then treated before being deposited in landfills which is been designated by the government authorities. Therefore, this study was conducted to assess the level of knowledge of health care waste management (HWM) among health professionals in a tertiary care hospital with the secondary objective to improve the practice of health care workers related to HWM.

2. MATERIALS AND METHODS

In this study, a cross-sectional study design was used to assess the level of knowledge of health care waste management (HWM) among health professionals in a tertiary care hospital. Using purposive sampling technique, 60 health care professionals (HCP) including nurses, pharmacists, lab technicians and non – medical health workers were selected for the study. A self administered questionnaire was developed by the researchers based on the WHO guide on the health care waste management protocol. The questionnaire consists of the Personal protective equipments, categories of waste, colour coding, segregation of waste, methods of waste disposal

and Infection and bio-hazards of health care waste. The tool included demographic variables of the HCPs as well. Ethical clearance was obtained from the hospital and informed consent from the participants was also taken. The study was conducted between Feb.' 2021 to May'2021. The descriptive and inferential statistics was used to analyse the data.

3. RESULTS AND DISCUSSION

A total of 60 health-care professionals were included in the study. Female employees accounted for the biggest proportion of respondents (38), according to the gender distribution (63.3 percent). According to the age distribution of the respondents, the bulk of the participants (31.7%) were between the ages of 31 and 35. Thirty one (32.7%) were nurses, while 12 (20%) were pharmacists. Regarding the education status, 29 (48.3%) were diplomas and 20% had master's degree while 63.3 % were having the work experience of more than 5 years (Table 1).

In this study, knowledge about biomedical waste management was highest among nurses (64.58 percent), followed by lab technicians (46.41 percent), and lowest among non-medical health workers (38.73 percent), and awareness of colour coding was highest among the study participants. Similar study findings were found in the study by Bansal et al., on "Biomedical waste management: awareness and practices in a district of Madhya Pradesh," awareness about biomedical waste was highest among doctors (100%), followed by para-medical workers (95.83%), and lowest among non-medical workers (43.10%), and awareness of colour coding and segregation was highest among paramedical workers [14].

As per the present study, the overall knowledge among the paramedical staff of the hospital was below average except the nurses who had 64.58% of knowledge. As a whole, the knowledge level among the paramedical work force of the hospital was not adequate and it highlights the need for adequate and periodic training among them.

Table 1. Distribution of demographic variables of the HCPs

Variables	No.	%
Age (years)		
20–25	14	23.3
26-30	11	18.3
31-35	19	31.7
>36	16	26.7
Sex		
Male	22	36.7
Female	38	63.3
Work Experience		
< 5 years	23	38.3
> 10 years	37	61.7
Profession		
Nurses	31	51.7
Pharmacists	12	20
Lab Technician	7	11.7
Non – medical Health Worker	10	16.7
Level of Education		
Diploma	29	48.3
Bachelor degree	19	31.7
Master's Degree	12	20

This study found that type of profession, level of education and getting health care waste management training, were all strongly linked to the level of knowledge of health-care waste management practices at p =0.05. The other variables such as age, sex, work experience did not show any significant relationship with the level of knowledge of health-care waste management practices at p =0.05.

Table 2. Level of Knowledge of HCPs on HWM

Knowledge Assessed	Nurses (%)	Pharmacists (%)	Lab Technician (%)	Non-medical Health Worker (%)
Personal protective equipments	63	45.2	44.7	37.7
Categories of waste	63.3	41.8	47.2	32.7
Colour Coding	69.1	51.4	53.0	41.6
Segregation of waste	66.4	43.8	38.8	40.5
Methods of waste disposal	61	42.3	43.2	43.3
Infection and bio-hazards of HW	64.7	44.3	52.6	36.6
Overall Knowledge	64.58	44.8	46.41	38.73

4. CONCLUSION

HCPs have limited knowledge of hospital waste and how to manage it. Because they lack appropriate expertise of medical waste storage and disposal, they are unable to handle it effectively. This study suggests that continuous training for healthcare employees, particularly nursing staff, should be made mandatory.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Klangsin P, Harding A. Medical waste treatment and disposal methods used by hospitals in Oregon, Washington and Idaho. *Journal of the Air and Waste Management Association*. 1998; 48:516-526.
2. Levendis Y, Atal A, Carlson J, Quintana M. PAH and soot emissions from burning components of medical waste: examination/ surgical gloves and cotton pads. *Chemosphere*. 2001;42:775-783.
3. Askarian M, Vakili M, Kabir G. Results of a hospital waste survey in private hospitals in Fars province, Iran. *Waste management*. 2004;24:347-352.
4. Mato RRAM, Kaseva ME: Critical review of industrial and medical waste practices in Dar es Salaam City. *Resources, Conservation & Recycling*. 1999;25:271-287.
5. Or I, Akgill M: An optimisation approach for locating a hazardous waste disposal facility in Istanbul province. *Waste Management Research Journal*. 1994;12(6):495-506.
6. Henry G, Heinke GW: *Environmental Science and Engineering* 2nd edition. Englewood: Prentice-Hall; 1996.
7. Prüss A, Giroult E, Rushbrook D. *Safe Management of Wastes from Health-care Activities* World Health Organization: Geneva; 1999.
8. Almuneef M, Memish ZA. Effective medical waste management: it can be done. *American Journal of Infection Control*. 2003;31(3):188-192.
9. Patil GV, Pokhrel K. Biomedical solid waste management in an Indian hospital: a case study. *Waste management*. 2005;25:592-599.
10. Azage M, Kumie A. "Healthcare waste generation and its management system: the case of health centers in West Gojjam Zone, Amhara Region, Ethiopia," *Ethiopian Journal of Health Development*. 2010;24(2):119-126.
11. Tesfahun E, Kumie A, Legesse W, Kloos H, Beyene A. Assessment of composition and generation rate of healthcare wastes in selected public and private hospitals of Ethiopia, *Waste Management & Research*. 2014;32(3):215-220.
12. Nessa K, Quaiyum MA. *Barkat-e-Khuda. Waste Management in Healthcare Facilities: A Review*. ICDDR, B Working Paper No. 144.
13. Kumar R, Khan EA, Ahmed J, Khan Z, Magan M, Mughal MI. "Healthcare waste management (HCWM) in Pakistan: current situation and training options.," *Journal of Ayub Medical College, Abbottabad*. 2010;22(4):101-105.
14. Bansal M, Mishra A, Gautam P, et al. Biomedical waste management: awareness and practices in a district of Madhya Pradesh. *National J Community Medicine*. 2011;2(3):452-6.

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Peer-review history:
The peer review history for this paper can be accessed here:
<https://www.sdiarticle4.com/review-history/73092>