

ASSESSMENT OF KNOWLEDGE AND AWARENESS OF HEALTH CARE WORKERS REGARDING HAZARDS ASSOCIATED WITH INFECTIOUS AND NON-INFECTIOUS HOSPITAL WASTE

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ABSTRACT

Objective: To assess the awareness of healthcare workers regarding hazards associated with infectious and non-infectious hospital waste.

Study Design: Descriptive cross-sectional study.

Place and Duration of Study: Study was conducted for three months at Armed Forces institute of Cardiology and National institute of heart diseases.

Methodology: A semi-structured knowledge questionnaire was developed and filled by all nursing officers, nursing technicians and healthcare workers, included in the study, for assessment of knowledge regarding the disposal and hazards associated with biomedical waste.

Results: It was found that 140/229 (61.1%) study participants had a good knowledge and awareness about hospital waste disposal and handling, whereas 70/229 (30.5%) participants had a moderate level of knowledge, and 19/229 (8.6%) had a poor level of knowledge.

Conclusion: Our results reflected that majority of the health care workers of our institute are well aware of the hospital waste management system but still continuous supervision and monitoring mechanisms should be developed for effective implementation of HCWM in hospitals. A dedicated committee on HCWM should be formulated and regular meetings should be conducted to improve the quality. Continuous training of healthcare workers should also be organized for better results in HCWM.

Keywords: Biomedical waste, Hazards, Healthcare waste management system, Infectious waste, Non-infectious waste.

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INTRODUCTION

Healthcare waste management system remains a prime challenge in the developing countries due to the improper disposal and management of biomedical waste¹. Biomedical waste is defined as any waste including its container and any intermediate product, which is generated during diagnosis, treatment, or immunization of human beings or animals, in research pertaining there to referring especially to the waste generated by hospital². This has increased the rate of nosocomial infections as well. As per the WHO fact sheet the prevalence of health care-associated infection varies between 5.7% and 19.1% in low-

and middle-income countries³.

Lack of awareness and knowledge regarding the disposal of biomedical or hospital waste is a key challenge. This is not only hazardous for the patients or population but for the staff its self as well. It can be a source of multiple fatal diseases such as HIV/AIDS^{4,5,6}. Studies from Pakistan show that around 1.35kg of waste is produced every day for each hospital bed occupied. In Pakistan studies suggest that clinicians and staff do not follow the healthcare waste management guidelines resulting in exposure to higher risk of infections and injuries. Hospital waste in Pakistan spreads diseases and it also becomes the target of scavengers who collect used syringes which are recycled and re-sold in the market^{7,8}. The awareness and practices of healthcare workers

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regarding HCWM needs attention as they are responsible for the management of BMW from the point of collection to the point of disposal^{19,11}.

Enforcement of the healthcare waste management policy and establishment of proper guidelines for disposal of waste is necessity of time. Proper training programs should be arranged to increase the awareness among staff and proper check and balance should be maintained in this regard^{12,13}. The aim of this study was to assess the knowledge of sanitary staff regarding healthcare waste management.

METHODOLOGY

A descriptive cross-sectional study was conducted at Armed Forces institute of Cardiology and National institute of heart diseases, for three months. A semi-structured questionnaire was developed and used as an assessment tool to evaluate the knowledge of healthcare workers as well as other healthcare staff. It was distributed and collected from staff of all the departments of hospital. It consisted of 20 questions including infectious waste generation and segregation, segregation categories (infectious and non-infectious), color codes (yellow, red, blue and black) used for hospital waste disposal, they were also asked about their perception of safety from harms associated with biomedical waste as in contact with blood products to determine their knowledge in relevance to it. Their opinions regarding arrangement of workshops and seminars to enhance education and awareness for management and disposal of biomedical waste were also viewed. Data was entered into statistical analysis software (IBM SPSS version 23.0). Results were presented as numbers and percentages for categorical data while means and standard deviations were reported for continuous data. Chi square test was applied to find any associations among categorical variables. The p -value ≤ 0.05 was considered to be significant.

RESULTS

Our study enrolled a total of 229 participants including nursing officers, nursing technicians and healthcare workers. Knowledge question-

naire tool comprised of twenty questions related to hospital waste management and disposal, each carrying one mark, with a total maximum score of²⁰. Score greater than 18 reflected good knowledge, 14-18 indicated moderate knowledge while participants scoring less than 14 were placed in poor knowledge category as shown in (table II).

It was found that 140/229 (61.1%) study par-

Table-I: Color coding for hospital waste disposal.

Color	Type of Waste Material
Red	Infectious; Blood stained waste like drip sets, blood bags, tissues, organs and infected swabs
Yellow	Sharp objects like needles, scissors, blades
Black	General waste

Table-II: Scale for knowledge assessment.

S. No.	Knowledge criteria	Score
1	Good	>18
2	Moderate	14-18
3	Poor	<14

ticipants had a good knowledge and awareness about hospital waste disposal and handling, whereas 70/229 (30.5%) participants had a moderate level of knowledge, and 19/229 (8.6%) had a

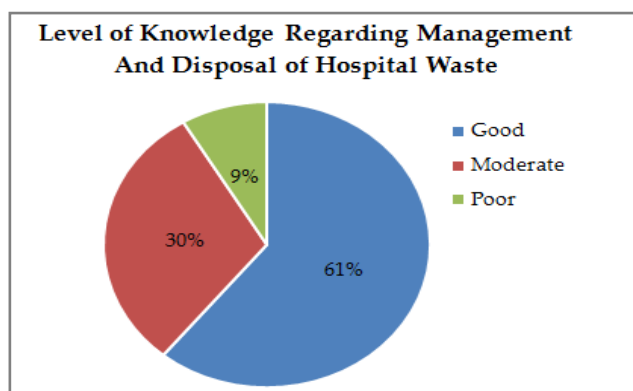


Figure: Pie chart illustrating results of questionnaire evaluation.

poor level of knowledge as they score <14 in the knowledge questionnaire (figure). Majority of the participants who belonged to poor-knowledge category included healthcare workers 10/19 (52.6%), followed by technicians 5/19 (26.3%) and officers 4/19 (21.0%). Forty three (18.8%) participants were not aware of color code of bucket used for disposing sharps, 20 out of which were

technicians, 12 were nurses and remaining 11 were lower staff members. Eight six (37.7%) study participants agreed with the statement that "safe management of health care waste is not an issue", out of which there were 21 (24.4%) officers, 31 (36.0%) technicians and 34 (39.5%) lower staff members. 93.0% study participants declared that they try to protect themselves from getting exposed to hospital waste during its handling. A significant relationship was found between number of service years and knowledge score with a *p*-value of 0.01. Study participants with more service years were well aware of hospital waste disposal as compared to those with less number of service years (mean service years of 15.1 ± 8.7 , $9.7.6 \pm 9.2$ and 5.5 ± 10.1 respectively for good, moderate and poor knowledge score).

DISCUSSION

The management and disposal of biomedical waste has always been a major challenge for any healthcare setup and can affect the quality services and patient satisfaction levels towards the services provided by health care setup. Colour coding system developed for the differential disposal of hospital waste is the safest and convenient method but its knowledge among staff is of prime importance. Discarding the waste in appropriate way can not only be beneficial for hospital, environment and staff but also can decrease the rate of hospital-acquired infections and hazards associated with it¹⁴⁻¹⁵. These type of surveys should be conducted often for the evaluation of awareness and knowledge so adequate measures and steps can be taken for 6, safe and cost effective management of the waste, and keeping their personnel informed about the advances in this area. The need of proper hospital waste management system is of prime importance and is an essential component of quality assurance in hospitals. Lack of segregation practices, results in mixing of hospital wastes with general waste making the whole waste stream hazardous. Inappropriate segregation ultimately results in an incorrect method of waste disposal. Studies from other relevant resource limited situations also reveal that trainings of hospital staff with proper

follow up can lead to improved HCWM practices within the health facilities¹⁶⁻¹⁸. Health care waste is a heterogeneous mixture, which is very difficult to manage as such. But the problem can be simplified and its dimension reduced considerably if a proper management system is planned. The segregation of waste at source is the key step and reduction, reuse and recycling should be considered in proper perspectives. This important issue should be given importance and necessary steps should be taken for the implementation of healthcare waste management policy, which will not only benefit the health managers but will also be favorable in the interest of community. The semi-structured questionnaire developed served to be an effective assessment tool for the evaluation of knowledge of our healthcare staff regarding the color coding system and disposal of waste. Majority of healthcare staff at our study setting were well aware and further enhancement of knowledge by conduction of seminars will further enhance the quality of our setup.

CONCLUSION

Our results reflected that majority of the healthcare workers of our institute are well aware of the hospital waste management system but still Continuous supervision and monitoring mechanisms should be developed for effective implementation of HCWM in hospitals, a dedicated committee on HCWM should be formulated and regularly meetings should be organized at facility level to improve the quality. Continuous training of Health Care workers should be organized for better results in HCWM.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

REFERENCES

1. Chadha A, Dikshit RK. Hospital Waste Management-Principles and Practice: A WHO project report on Hospital Waste Management
2. Hossain MS, Santhanam A, Nik Norulaini NA, Omar AK. Clinical solid waste management practices and its impact on human health and environment-A review. *Waste Manag* 2011; 31(4): 754-6.
3. World Health Organization. Health-care waste management. 2011.

4. Paudel R, Pradhan B. Health care waste management practice in a hospital. *J Nepal Health Res Counc* 2010; 8(17): 86-90.
 5. Bello AI, Asiedu EN, Adegoke BO, Quartey JN. Nosocomial infections: knowledge and source of information among clinical health care students in Ghana. *Int J Gen Med* 2011; 4(1): 571-4.
 6. Usmani RA, Rana MS, Wazir MS, Sarwer H, Fazli H, Pervaiz MA, et al. Assessment of hepatitis B vaccination status in doctors of services hospital, Lahore. *J Ayub Med Coll Abbottabad* 2010; 22(2): 36-39.
 7. Khan MR, Fareedi F, Rashid B. Techno-economic disposal of hospital wastes in Pakistan. *Pak J Med Res* 2006; 45: 41-5.
 8. Mujeeb SA, Adil MM, Altaf A, Hutin Y, Luby S. Recycling of Injection Equipment in Pakistan 2003; 24(2): 145-6.
 9. Recycling of injection equipment in Pakistan. *Infect Control HospEpidemiol.* 2003; 24(2): 145-6.
 10. Mahmood SS, Malik R, Azim W. A study of waste generation, collection and disposal in a tertiary hospital in Pakistan. *Pakistan J Med Res* 2001; 40: 13-7.
 11. Ministry of Environment. Hospital Waste Management Issues and Steps Taken by the Government of Pakistan. 2006.
 12. Brusafferro S, Calligaris L, Farneti F, Gubian F, Londero C, Baldo V. Educational programmes and sharps injuries in health care workers. *Occup Med (Lond)* 2009; 59(9): 512-4.
 13. Government of Pakistan. Hospital Waste Management Rules 2005: Ministry of Environment 2005.
 14. Acharya DB, Singh M. The text book of hospital waste management. Minerva Press; 2000
 15. Chandrorkar AG, Nagoba BS. Hospital Waste Management. 1st ed. Hyderabad: Paras Medical Publisher; 2003.
 16. Zamoner M. [Model for evaluating plans for health service waste management (MPHSW) for use by local health and environmental protection authorities]. *Cien Saude Colet* 2008; 13(1): 1945-52.
 17. Tudor TL, Marsh CL, Butler S, Van Horn JA, Jenkin LE. Realising resource efficiency in the management of healthcare waste from the Cornwall National Health Service (NHS) in the UK. *Waste Manag.* 2008; 28(7): 1209-18.
 18. Rasheed S, Iqbal S, Baig LA, Mufti K. Hospital waste management in the teaching hospitals of Karachi. *J Pak Med Assoc* 2005; 55(5): 192-5.
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