

Healthcare Waste Management: Current Knowledge, Attitude and Practices “A Study at Secondary and Tertiary Care Hospitals”

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Abstract

Background: In developing countries like Pakistan, Biomedical waste management is still considered as one of the public health challenge to control hazardous infections. Specific knowledge and awareness on proper disposal of hospital waste is required among the hospital administrators, specialists, doctors, nurses, paramedical staff and other support staff. For infection control and other safety measures, hospital waste management requires segregation, collection and proper disposal of biomedical waste from the medical facility to the disposal site.

Objective: The main purpose of the study was to know about the knowledge, attitude and practices of secondary and tertiary care hospital staff regarding biomedical waste management.

Methodology: A cross-sectional study was conducted. Data was collected through self-structured questionnaires from twin city hospitals.

Results: Most of the respondents were not confident about the knowledge of hospital waste and 61 (61%) claimed that all hospital waste were hazardous. Majority of the respondents 83 (83%) were of the opinion that their knowledge on the subject was not sufficient enough. It was also found through the study that only 26 (26%) had training and majority of the respondents 74 (74%) had never attended any training or educational seminar for biomedical waste management. There was a greater responsiveness about the attitude of waste management among the medical staff, however 61 (61%) respondents said that it's the responsibility of administration. Practices were good among nurses and sanitary workers as compared to other staff.

Conclusion: The standard of knowledge, attitude and practices in this study are far below the considerable level acceptable to assure infection safety in patients and healthcare workers. There is a need to develop a continuous educational training/awareness programs regarding safe handling and disposal of hospital waste.

Key words: Hospital waste management, biomedical waste, knowledge, attitude, practices, staff.

Introduction

Healthcare facilities provide multiple health services thereby producing huge amount of harmful biomedical waste. It is considered that one fourth waste is hazardous among biomedical waste.

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Authors Contribution

AMM conceptualized the project and data collection. AMB did the literature search, drafting, revision & writing of manuscript. Statistical analysis was done by SH.

Hospital administrators, specialists, doctors, nurses and other staff handling the waste should have knowledge specific to biomedical waste management. Similarly the staff transporting the hospital waste should be properly skilled, equipped and know the possible dangers related to it. A study in the city of Karachi showed that approximately 100 tons of hospital waste is generated per day, out of which approximately 39% is infectious and 61% is general waste. No separate waste collection containers are being used and all the collected waste is dumped in commercial bins posing serious threats to the community.¹

Major sources of biomedical waste are laboratories, blood banks, hospitals, humans and animal research institutions, mortuaries, morgues centers, while the insignificant sources includes

dental clinics, beautifying clinics, medics and memorial services.² A study in Nepal revealed that mixing of hospital toxic waste with non-toxic municipal waste becomes potentially toxic, producing harmful environment and health impacts.³

Similarly World Health Organization (WHO) also highlighted the improper methodologies adopted by many developing nations for the poor disposal of hospital waste thereby creating unfavorable impacts on the environmental wellbeing.⁴

Medical workers, particularly nurses and less likely housekeepers were marked as the staff at highest risk. Sharps, blades and recapping after using needles are considered the most common cause of the spread of blood-borne infections like HIV, Hepatitis B or C.⁵

Waste segregation into different color coded containers and then transferring to respective destinations could be a better management, causing least chance of contamination.⁶ Doctors have a better theoretical knowledge whereas nurses have a much better practical knowledge in the field of hospital waste management. Regular on-job trainings on standard working procedures and practices for the enhancement of the compliance help to prevent the transmission of various infectious diseases.⁷ Waste segregation and reduction at the source resulted in improvement of its management by getting less contact with the health workers.⁸

Medical facilities have a duty and obligation to care for the public health and for the wellbeing of environment with reference to the waste produced. In a study, clinicians with a limited vision regarding preventive care are considered as less responsible whereas, nurses because of better understanding were held responsible for the execution of waste management.⁹ The rationale of this study was to assess the knowledge, attitude and procedures of hospital staff for hospital waste management at secondary and a tertiary care hospital; Hasanabdal and Rawalpindi hospital respectively.

Methodology

This research is based on a descriptive study. It was conducted to assess the knowledge of health staff about hospital waste management at two public hospitals of Hasanabdal and Rawalpindi. This research was carried out at secondary care hospital, Hasanabdal and tertiary care hospital, Rawalpindi. Self-structured questionnaire was designed to collect data and was divided into four parts. Demographic data comprised of the first part followed by questions about the knowledge attitude and the current practices of the respondents regarding the subject

matter. The study was conducted with a sample size of 100 respondents from hospital operation theatres (OT), intensive treatment unit and labor room staff. It included doctors, nurses, nursing assistants, OT technicians, maids, helpers and sanitary workers. The sample size consisted of 100 respondents selected randomly. The sample size of 40 respondents from Hasanabdal and 60 from Rawalpindi hospital were selected randomly from the total population of 1100. A statistical SPSS software version 20.0 for analysis was used. This data was represented in frequency tables.

Ethical Committee of Sarhad University, Peshawar reviewed the study and granted its approval. Departmental permission to conduct the study was obtained from both hospitals and informed written consent was obtained from all subjects.

Results

One hundred respondents, forty (40) from secondary and sixty (60) from tertiary care hospital participated in the study. Forty five (45%) were male and fifty five (55%) were female. Participants were doctors (20), nurses (35), nursing assistants (10), OT technicians (10), maids (10), helpers (5) and sanitary workers (10) working in the operation theatre, labor room and intensive care unit. Eight (8%) were having post graduate qualification, 12 (12%) MBBS, 30 (30%) graduates, 5 (5%) FSc, 20 (20%) metric, 25 (25%) primary or under metric. The study revealed that only 33 (33%) had received training but majority of the respondents 77 (77%) never had any training on this subject (Table-1).

The results established a poor level of knowledge and practices among most of the health workers and most of the respondents 50 (50%) reported poor, 30 (30%) had average while only 20 (20%) had good knowledge about hospital waste management. Knowledge was highest among doctors and then among nurses in comparison with other health workers. The low level of knowledge was noted among medical assistant, OT technicians and health workers because of the less education. 79 (79%) knew about the color code of medical waste disposal bags and 53 (53%) correctly marked the symbol of biomedical waste. The study revealed that eighty (80%) doctors and fifty six (56%) of nursing staff were responsive on the protocols of hospital waste management. Paramedical and other staff 88 (88%) had a low knowledge regarding different colors of waste bins and waste disposal practices.

There was a greater responsiveness about the attitude of waste management among the medical staff. All had a positive attitude towards waste management but most of the respondents 61

Table 1: Frequency distribution of respondents of the two hospitals.

Variables	Secondary Care Hospital, Hasanabdal			Tertiary Care Hospital, Rawalpindi		
	N = 40	Freq	%	N = 60	Freq	%
Knowledge Assessment						
Knowledge about the hazardousness of hospital waste - Whether Hazardous	Yes	22	55	Yes	39	65
	No	18	45	No	21	35
Knowledge about OT waste	Yes	33	82	Yes	50	83
	No	7	19	No	10	17
Know segregation, collection, storage, and handling	Yes	32	80	Yes	54	90
	No	8	20	No	6	10
Know the color coding of hospital waste	Yes	37	93	Yes	42	70
	No	3	8	No	18	30
Knowledge about the container or bag colors	Yes	36	90	Yes	45	75
	No	4	10	No	15	25
Knowledge about the symbol of biomedical waste	Correct	22	55	Correct	31	52
	Wrong	18	45	Wrong	29	48
Attitude Assessment						
Attitude about the collection of waste	Positive	40	100	Positive	60	100
	Negative	0	0	Negative	0	0
Disposal should be a priority	Yes	40	100	Yes	60	100
	No	0	0	No	0	0
Waste disposal responsibility	Everyone	16	40	Everyone	23	38
	Admin	24	60	Admin	37	62
Attitude about safe disposal of waste	Yes	40	100	Yes	60	100
	No	0	0	No	0	0
Knowledge of OT waste management	Yes	14	35	Yes	19	32
	No	26	65	No	41	68
Practices Assessment						
Practices of separate collection	Yes	35	88	Yes	42	70
	No	5	12	No	18	30
Practices of labeling infectious and non-infectious on waste bins	Yes	32	80	Yes	48	80
	No	8	20	No	12	20
Practices of disposed of items contaminated by blood	Red Bag	3	8	Red Bag	10	17
	Yellow bag	29	73	Yellow bag	36	60
	White bag	8	20	White bag	10	17
	Black bag	0	0	Black bag	2	3
	Puncture proof	0	0	Puncture proof	2	3
Practices to cut needles and head of syringes before disposal	Yes	40	100	Yes	60	100
	No	0	0	No	0	0
Provision of personal protective items by the hospital	Yes	34	85	Yes	46	77
	No	6	15	No	14	23
Hands washing practice	Yes	40	100	Yes	60	100
	No	0	0	No	0	0
Washing of waste collection containers	Daily	9	23	Daily	20	33
	Weekly	26	65	Weekly	35	58
	When required	5	13	When required	5	8
Method used to wash waste collection containers	Water	2	5	Water	7	12
	Soda	1	3	Soda	9	15
	Detergents	37	93	Detergents	44	73

(61%) said that it is the responsibility of administration to safely and properly dispose of operation theatre wastes, 39 (39%) were of the opinion that its everyone's responsibility to take care of waste at all stages of its segregation, collection, transfer and disposal. Sixty seven (67%) respondents said that they don't have good knowledge of the subject and need regular on job training to improve it.

The practices of waste management were found good among nurses and sanitary workers, may be due to their daily practice to carry it out themselves whereas it was found deficient among

doctors and poorest among the medical assistants and OT technicians. For color coding of bins, 65 (65%) were correct about the disposal of infected cotton, gauze and other items but it was again the medical assistants and the OT technicians who were found deficient in this knowledge. Practice about the washing of containers was again correctly provided by the nurses and sanitary workers, whereas doctors, medical assistants and the OT technicians were poor about it.

Eighty one (81%) respondents were correct to answer about the use of detergents for the washing of the containers.

Table 2: Frequency distribution of respondents about hospital waste management.

<i>Variable</i>	<i>N = 100</i>	<i>Frequency</i>	<i>%</i>
Knowledge Assessment			
Knowledge about the hazardousness of hospital waste - Whether Hazardous	Yes	61	61
	No	39	39
Knowledge about OT waste	Yes	83	83
	No	17	17
Know segregation, collection, storage, and handling	Yes	86	86
	No	14	14
Know the color coding of hospital waste	Yes	79	79
	No	21	21
Knowledge about the container or bag colors	Yes	81	81
	No	19	19
Knowledge about the symbol of biomedical waste	Correct	53	53
	Wrong	47	47
Attitude Assessment			
Attitude about the collection of waste	Positive	100	100
	Negative	0	0
Disposal should be a priority	Yes	100	100
	No	0	0
Waste disposal responsibility	Everyone	39	39
	Admin	61	61
Attitude about safe disposal of waste	Yes	100	100
	No	0	0
Knowledge of OT waste management	Yes	33	33
	No	67	67
Practices Assessment			
Practices of separate collection	Yes	77	77
	No	23	23
Practices of labeling infectious and non-infectious on waste bins	Yes	80	80
	No	20	20
Practices of disposed of items contaminated by blood	Red Bag	13	13
	Yellow bag	65	65
	White bag	18	18
	Black bag	2	2
	Puncture proof	2	2
Practices to cut needles and head of syringes before disposal	Yes	100	100
	No	0	0
Provision of personal protective items by the hospital	Yes	80	80
	No	20	20
Hands washing practice	Yes	100	100
	No	0	0
Washing of waste collection containers	Daily	29	29
	Weekly	61	61
	When required	10	10
Method used to wash waste collection containers	Water	9	9
	Soda	10	10
	Detergents	81	81

Discussion

This study paper was written with the objectives to evaluate the practices and to find out about the management of hospital waste (having risk for health) in the secondary and tertiary care public hospitals of Hasanabdal and Rawalpindi respectively, which requires consideration for betterment. The waste management system was found to be the same as that in the other parts of the country and third world hospitals due to lack of the proper training, organization and management.

Knowledge about biomedical waste management rules among the technically qualified personnel like the doctors, nurses, paramedical, maids and sanitary staff were tested and the results were found similar to the observations from other studies.^{10,11} The results of this study established a poor level of knowledge and practices of most of the health workers. The higher proportion of doctors who had more knowledge than other medical staff was also equally observed. A similar study conducted also pointed out that medical practitioners have a tubular vision and focuses on patient care mostly and lacked the attitude required

for proper hospital waste management. The same study also reported that nurses were more responsible and had better understanding in the implementation of the hospital waste management procedures, whereas paramedical staff had poor understanding but good practical application of its various aspects. Similar results were found in this study and, it was found that the hospital waste management (HWM) was deficient among doctors and poorest among the medical assistants and OT technicians.

The satisfactory practices of waste management were found among nurses and sanitary workers may be due to their daily practice to carry out this work themselves. A similar study revealed that the attitude regarding bio-waste management among hospital staff and students was high but knowledge and practice of the subject remained low.¹¹ This study highlighted that the training of healthcare staff from recognized institutes is necessary for the continuous learning and for observing correct bio-waste management procedures. It was pointed out in a study that gaps of poor knowledge among staff nurses was because of lack of training.¹² Another study of tertiary care hospitals in Pakistan concluded that the non-availability of resources and lack of training of worker's resulted in poor hospital waste management and this could only be improved with continuous training programs, updating Standard Operating Procedures (SOPs), equipment, monitoring and keen supervision.¹³

Similar study was conducted among hospitals with bed capacity of >100, where it was found that doctors, nurses, and laboratory technicians had good knowledge than other paramedical staff about biomedical waste management. However, awareness concerning the different types of waste containers and their attitude towards waste disposal methods was found to be optimum in nurses and staff working as compared to doctors. Sanitary staff were ignorant concerning the practices about biomedical waste management.¹⁰ A study to measure the practices of waste management was conducted in a tertiary care health center. The study highlighted that negligence and lack of proper equipments, awareness, training and coordination are some important factors that directly or indirectly affected the waste management practices of any hospital.¹⁴ Our study also revealed similar factors affecting the HWM practices. It was also found in our study that in hospitals not only periodic training but positive attitude and continuous supervision is necessary to keep the staff well connected and motivated for proper HWM.

A similar study conducted in Pakistan revealed that the doctors and nursing staff were more responsive on the protocols of hazardous waste management just as was found in our study. Doctors and nursing staff being more knowledgeable regarding hazardous waste management were found high in their practices as compare to other staff. This education and knowledge difference could be reduced with periodic training sessions. Similarly our study found that the paramedical and sanitary staff had lower knowledge of HWM owing to their low education background but proper training could bring positive change in the attitude to practice HWM properly.¹⁵

In view of the above discussions following recommendations are suggested to improve the hospital waste management system in Pakistan. Hospital waste management plan should be documented in accordance with the guidelines of WHO 2016 and Policy of Pakistan. The deployment of an infection control in-charge in the hospital vicinity for all kind of waste management is important. All waste collection sites must be properly labeled with waste disposal protocols. Workers physically loading and unloading infectious waste should be instructed to wear the protective items. Hospitals should conduct periodic waste management workshops for the training of staff. Key Performance Indicators (KPI) of all medical staff should include waste management and cleanliness marks. Strict actions should be taken for any non-compliance and disobedience.

In the light of the conducted study it was concluded that the Pakistan hospital waste management guidelines and Hospital Waste Management Rules do exist since 1998, but hospital waste management implementation policies are very weak. The lack in implementation and management of hospital waste is due to the fact that hospital administrations do not take the matter seriously.

Although there are proper systems for the collection, storage, transportation and disposal of waste but there is a need to supervise these activities. Comprehensive supervision and training needs to be implemented for good management and periodic training could improve the knowledge and practices of those lacking it. There is a need to develop integrated efforts and, it is the responsibility of everyone to contribute in it economically, socially and physically.

Doctors, nursing and other staff should develop an insight about their role in the wellness and safety of the environment. Periodic, and continuous training programs and motivational sessions,

implementation of strict rules and regulations is the possible answer to achieve this goal.

Conflict of interest: None declared.

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