

## WASTES MANAGEMENT PRACTICES IN SELECTED PUBLIC AND PRIVATE HOSPITALS OF PESHAWAR, KHYBER PAKHTUNKHWA

*Muhammad Ihsan Khan, Ejaz Ali Khan, Sehrish Irfan, Almas Muhammad*

Final Professional MBBS Students, Rehman Medical College, Peshawar, Khyber Pakhtunkhwa, Pakistan

### ABSTRACT

**Introduction:** Standard hospital wastes management practices are the main preventive measures for infection control, yet no study has been conducted to evaluate the wastes management at tertiary care hospitals in Peshawar, Khyber Pakhtunkhwa.

**Materials & Methods:** A cross-sectional facility survey was conducted from January to April 2015 on four tertiary care hospitals - Rehman Medical Institute (RMI) & North West General Hospital (NWGH), private sector; Lady Reading Hospital (LRH) & Hayatabad Medical Complex (HMC), public sector - of Peshawar. After taking permission from Medical Superintendents of hospitals, checklist-based observational assessment of the Housekeeping departments and relevant areas (Wards, Sanitation, Wastes Collection, Segregation, Disposal and Incineration) was done on multiple visits by the research team using modified World Health Organization (WHO) checklist and interviews, where required. Binary inputs (yes/No) were recorded for Noninfectious, Infectious, Pathological and Pharmacological wastes. Manual analysis was done for compilation and decision making; outputs were categorized into Segregation, Collection, Storage, and Handling.

**Results:** All hospitals fared poorly for Pharmacological wastes management with no segregation practices; hospitals were also poor in segregation for different types of wastes. For wastes collection, only NWGH performed adequately. The private hospitals did better than the public ones for wastes storage and handling. Overall the private sector hospitals followed the regulations of EPA and WHO compared to public sector hospitals.

**Conclusions:** Substandard practices were observed in public sector hospitals. The overall attitude of the staff towards wastes handling was different in both sectors due to different administrative monitoring.

**Keywords:** Wastes Management; Wastes Disposal Facilities; Sanitation; Healthcare Systems; Public Health.

### INTRODUCTION

Health-care wastes include all the wastes generated by health-care establishments, research facilities, and laboratories. In addition, it includes the wastes originating from “minor” or “scattered” sources such as that produced in the course of health care undertaken in home (dialysis, insulin injections, etc.). Between 75% and 90% of the wastes produced by health-care providers is non-risk or “general” health-care wastes, comparable to domestic wastes. The remaining 10-25% of healthcare wastes is regarded as hazardous and may create a variety of health risks.<sup>1</sup> Healthcare wastes can be classified into various categories like sharp wastes, infectious wastes, pathological wastes, pharmaceutical wastes, chemical, and

radioactive wastes. All individuals exposed to hazardous health-care wastes are potentially at risk, including those within health-care establishments that generate hazardous wastes, and those outside these sources who either handle such wastes or are exposed to it as a consequence of careless management.<sup>1</sup>

Healthcare wastes management (HCWM) is still a major challenge for health facilities in developing countries where the health care staff and surrounding population is exposed to risks due to poor handling of wastes.<sup>2</sup>

In general, hospitals in Pakistan, whether private or public, do not follow and oblige healthcare wastes management (HCWM) guidelines.<sup>3</sup>

One study showed that six (China, India, Brazil, Pakistan, Bangladesh and Nigeria) of the ten most populous countries were found to be facing HCWM burdens, consequently placing approximately 50% or more of the current global population at an environmental, occupational, and public health risk from poor HCWM.<sup>4</sup>

The proper management of healthcare wastes depends on good administration and organization along with adequate legislation, financing, and active participation of trained and informed staff.<sup>5</sup> A study conducted in Bahawalpur City showed that there is a lack of biomedical wastes practices within the public and private hospitals.<sup>6</sup> The absence of proper wastes management, lack of awareness about the health hazards from biomedical wastes, insufficient financial and human resources, and poor control of wastes disposal are the most critical problems connected with healthcare wastes.<sup>7</sup>

The present study was done to assess the wastes management practices (according to WHO guideline) in four selected public and private teaching hospitals of Peshawar. To the best of our knowledge, it is the first such study done in the province.

## MATERIALS & METHODS

A cross sectional facility survey was conducted from January to April 2015 on four tertiary care hospitals of Peshawar, two from public sector, i.e., Lady Reading Hospital (LRH) & Hayatabad Medical

Complex (HMC); and two from private sector i.e., Rehman Medical Institute (RMI) & North West General Hospital (NWGH). Data collection was based on observations where WHO guidelines for hospital wastes management were used as data collection tool.<sup>1</sup>

The WHO guidelines-based survey questionnaire contained sections for different aspects of hospital wastes management, including amount of wastes generated, their segregation, wastes management personnel, final disposal, treatment and standardized hospital wastes management policy. Permission was taken from the hospital administrations prior to data collection.

Descriptive statistics were manually calculated to enable making decisions about wastes management practices of public and private sector hospitals.

## RESULTS

Standard procedures for collection of Noninfectious wastes (including sharp wastes) were observed in RMI and NWGH (Table 1); LRH and HMC were not following standard protocols. In RMI and NWGH, these wastes were stored in the specified central storage area while in LRH and HMC, these wastes were stored in an open area. Standard protective measures were taken while handling such wastes in RMI and NWGH, but in LRH and HMC the protective measures were not satisfactory.

**Table 1: Segregation, collection, storage, and handling on Noninfectious wastes**

Hospital	Segregation			Collection		Storage		Handling
	Point of generation	Point of disposal	Not at all	Specified yellow container	Plastic bin	Central storage area	Open place	Good protective measures
RMI	Yes	No	-	Yes	No	Yes	No	Yes
NWGH	Yes	No	-	Yes	No	Yes	No	Yes
LRH	No	No	Yes	No	Yes	No	Yes	No
HMC	No	Yes	-	No	Yes	No	Yes	No

RMI = Rehman Medical Institute; NWGH = Northwest General Hospital; LRH = Lady Reading Hospital; HMC = Hayatabad Medical Complex

Three hospitals (RMI, LRH & HMC) were not segregating infectious wastes (Table 2); in RMI and NWGH, infectious wastes were stored in the specified central storage area while in LRH and HMC infectious wastes were stored in an open

area. Standard protective measures were taken in RMI and NWGH while handling infectious wastes. In LRH and HMC the protective measures were not satisfactory.

**Table 2: Segregation, collection, storage, and handling of Infectious wastes**

Hospital	Segregation			Collection		Storage		Handling
	Point of generation	Point of disposal	Not at all	Specified yellow container	Plastic bin	Central storage area	Open place	Good protective measures
RMI	No	No	Yes	No	Yes	Yes	No	Yes
NWGH	Yes	No	-	Yes	No	Yes	No	Yes
LRH	No	No	Yes	No	Yes	No	Yes	No
HMC	No	No	Yes	No	Yes	No	Yes	No

RMI = Rehman Medical Institute; NWGH = Northwest General Hospital; LRH = Lady Reading Hospital; HMC = Hayatabad Medical Complex

North West General Hospital was the only one which segregated the pathological wastes, while the other three selected hospitals were not segregating pathological wastes (Table 3). Only in NWGH pathological wastes were collected in yellow colored strong leak-proof containers which was according to the standards of WHO; in RMI the collection of pathological wastes were not collected separately in yellow containers. In

addition the storage of pathological wastes was done at specified central storage area in NWGH and RMI while in LRH and HMC the pathological wastes were stored in an open area. Standard protective measures were taken while handling the pathological wastes in RMI and NWGH. In LRH and HMC the protective measures were not satisfactory.

**Table 3: Segregation, collection, storage, and handling of Pathological wastes**

Hospital	Segregation			Collection		Storage		Handling
	Point of generation	Point of disposal	Not at all	Specified container	Plastic bin	Central storage area	Open place	Good protective measures
RMI	No	No	Yes	No	Yes	Yes	No	Yes
NWGH	Yes	No	-	Yes	No	Yes	No	Yes
LRH	No	No	Yes	No	Yes	No	Yes	No
HMC	No	No	Yes	No	Yes	No	Yes	No

RMI = Rehman Medical Institute; NWGH = Northwest General Hospital; LRH = Lady Reading Hospital; HMC = Hayatabad Medical Complex

Pharmaceutical wastes must be collected in brown color plastic bags. None of the hospitals were following standard procedure (Table 4). In RMI and NWGH, storage was done in central storage area while in LRH and HMC storage was done in

an open area. Standard protective measures were taken in RMI and NWGH while in LRH and HMC the protective measures were not satisfactory.

**Table 4: Segregation, collection, storage, and handling of Pharmaceutical wastes**

Hospital	Segregation			Collection		Storage		Handling
	Point of generation	Point of disposal	Not at all	Specified brown container	Plastic bin	Central storage area	Open place	Good protective measures
RMI	No	No	Yes	No	Yes	Yes	No	Yes
NWGH	No	No	Yes	No	Yes	Yes	No	Yes
LRH	No	No	Yes	No	Yes	No	Yes	No
HMC	No	No	Yes	No	Yes	No	Yes	No

RMI = Rehman Medical Institute; NWGH = Northwest General Hospital; LRH = Lady Reading Hospital; HMC = Hayatabad Medical Complex

### Comparison of Waste Handling in public and private tertiary care hospitals of Peshawar

In Rehman Medical Institute, sharps were the only wastes which were segregated in a yellow colored special sharp container at the operating room. Wastes were handled by housekeepers with standard protective measures. In North West General Hospital, sharp, infectious, and pathological wastes were segregated with their proper color coding at the operating room. Housekeepers were handling the wastes with standard protective measures. In both these private hospitals, well-designed trolleys were used for collection and internal transport of wastes. Until final disposal, the wastes were stored in central storage area. Finally all wastes, including infectious and pathological, were incinerated.

In Public Sector (LRH and HMC), waste segregation was not done. All categories of wastes were kept altogether. Improper and overfilled trolleys were used for collection and internal transport of wastes. Sweepers were handling the wastes with poor protective measures. Wastes were stored in an open area until final disposal. Incinerator was not in proper working condition. Wastes were stored in an open area until final disposal. Moreover, in HMC segregation of sharps was done when the wastes were awaiting final disposal, thereby endangering the lives of the workers. Some portion of the infected hospital wastes were handed over to the PDA for disposal.

### Comparison of Personnel involved in hospital wastes management

Both in RMI & NWGH, housekeeping managers are responsible at hospital administration level for organization and management of waste collection, handling, storage and disposal. However in RMI, his qualification was MBA and he had no training regarding waste management. In NWGH, a properly qualified Safety and Environment Officer was responsible for organization and management of wastes collection, handling, storage and disposal.

On the other hand, in LRH, Sanitary Inspector is responsible for organization and management of wastes collection, handling, storage and disposal at hospital administration level. He had a diploma in sanitary inspection and attended a three-day workshop on hospital wastes management. In HMC, Chief Sanitary Inspector is responsible for organization and management of wastes collection, handling, storage and disposal at hospital administration level. He was a law graduate. He had three month training on hospital wastes management.

### Persons involved in collection, handling and storage of hospital wastes

In RMI and NWGH there were 135 and 130 housekeepers respectively involved in waste management; they had 2-3 years' experience and one week training in waste management. They

were clear about their job description and tasks. In LRH and HMC there were 220 and 100 sweepers respectively with no training, and no experience at time of recruitment.

### **Hospital wastes management plan and team**

Both private sector hospitals were having wastes management plans, but in NWGH it was according to the regulations of EPA. There were clearly defined procedures for collection and handling of wastes from specified units in RMI and NWGH. Waste management responsibilities were not included in job description of hospital supervisory staff.

In public sector hospitals, the wastes management plans and the wastes management teams were according to the regulations of EPA; wastes management responsibilities were not included in job description of hospital supervisory staff.

## **DISCUSSION**

The population of Peshawar city is growing at a high pace. Since it is the provincial capital of Khyber Pakhtunkhwa there is an influx of large number of people every day for various purposes, one of which is seeking medical services since most of the tertiary care hospitals of the province are located here. Proper hygienic service of these hospitals is of great importance for the community of Peshawar. One important aspect of good hospital-based healthcare practice is to provide better services to the community through standardized wastes management policy, plans and practices.

Findings of the present study are similar to a study conducted in Islamabad which revealed that the practices of segregation, collection, transportation, storage and disposal of hospital wastes are better in Shifa International Hospital (private) than Pakistan Institute of Medical Sciences (public).<sup>8</sup>

All the hospitals in which we conducted the study were using incinerators for final disposal of

wastes, but incineration is considered a relatively poor technology from point of view of environmental safety and long term cost. It is necessary that still more focus is laid on proper segregation of wastes so that wastes not meant for incineration like plastic material etc. could be prevented from being mixed into the waste stream meant for incineration. Autoclaving of the infectious wastes and rendering it harmless is the most effective process in reducing the hazards of healthcare wastes.<sup>9</sup>

A study conducted in Karachi revealed that out of eight hospitals visited 02(25%) were segregating sharps, pathological wastes, chemical, infectious, pharmaceutical and pressurized containers at source.<sup>10</sup> For handling potentially dangerous wastes, 02(25%) hospitals provided essential protective gears to its waste handlers. Only 01(12.5%) hospital arranged training sessions for its waste handling staff regularly. Five (62.5%) hospitals had storage areas but mostly these were not protected from access of scavengers. Five (62.5%) hospitals disposed off their hazardous wastes by burning in incinerators, 02(25%) by municipal landfills and 01(12.5%) by burning wastes in open air without any specific treatment. Only 02(25%) hospitals had well-documented guidelines for wastes management and a proper wastes management team.

This study is closely similar to another study conducted in the hospitals of Dhaka city, Bangladesh, where also there were no proper, systematic management of medical wastes except in a few private health care establishments (HCE) that segregated their infectious wastes.<sup>11</sup> In current study, the private hospitals were found to have good wastes management practices. Segregation was found in the private hospitals while it was not done in the public hospitals. Since all the hospitals had guidelines for wastes management, the differences in practices emphasize the roles of administrative monitoring which was found to be good in the private hospitals.

In contrast to the present study, in which only one out the four hospitals (25%) had an environmental health expert, a study conducted in the hospitals of Tehran showed that most of the selected hospitals (84.7%) had environmental health experts responsible for the wastes management status in the hospital.<sup>12</sup> Based on the results of the present study, the one hospital with the environmental health expert (NWGH) had the best wastes management practices. This shows that administrative monitoring is of prime importance and environmental health expert provides additional benefit for wastes handling.

A study conducted in Allahabad, India<sup>13</sup> showed that the sanitary staff of the hospitals was ignorant on all accounts of the hospital wastes management; similar findings were found in the public hospitals of the present study as well.

## Conclusion

Administrative monitoring, including availability of Environmental Health Officers is of prime importance for proper hospital waste management. The private hospitals performed better waste management due to good monitoring of their wastes managing staff and practices.

## REFERENCES

1. Pruss A, Giroult E, Rushbrook P. Safe management of wastes from health-care activities, 1999. World Health Organization Geneva. ISBN 92 4 154525 9 (NLM classification: WA 790).
2. Hossain MS, Santhanam A, Nik Norulaini NA, Omar AK. Clinical solid wastes management practices and its impact on human health and environment-A review. *Wastes Manag.* 2011 Apr;31(4):754-66.
3. Kumar R, Khan EA, Ahmad J, Khan Z, Magan M, Nousheen, Mughal MI. Healthcare wastes management in Pakistan: current situation and training options. *J Ayub Med Coll Abbottabad* 2010;22(4):101-6.
4. Harhay MO, Halpern SD, Harhay JS, Oliaro PL. Health care wastes management: a neglected and growing public health problem worldwide. *Trop Med Int Health.* 2009 Nov;14(11):1414-7.
5. Hashmi SK, Shahab S. Hospital and biomedical wastes management. In: Ilyas M (Editor). *Community Medicine and Public Health*. 4th ed. Karachi: Time Publishers, 2003, pp. 426-37.
6. Badar S, Saeed MA, Yasmeen S, Hussain W, Amjad MA, Abbas H. Health Care Wastes Management Practices in Public and Private Sector Hospitals. *Journal of Rawalpindi Medical College.* 2014;18(1):145-7.
7. Plianbangchang S. A Report on Alternative Treatment and Non-Burn Disposal Practices, Safe Management of Bio-medical Sharps Wastes in India. 2005. World Health Organization (WHO).
8. Ahmad E. Review of current wastes management strategies at public and private sector hospitals of Islamabad. 2011. Health Services Academy.
9. Ferdowsi A, Ferdosi M, Mehrani M. Incineration or Autoclave? A Comparative Study in Isfahan Hospitals Wastes Management System (2010). *Mater Sociomed.* 2013;25(1):48-51.
10. Rasheed S, Iqbal S, Baig LA, Mufti K. Hospital wastes management in the teaching hospitals of Karachi. *JPMA* 2005 May;55(5):192-5.
11. Hassan MM, Ahmed SA, Rahman KA, Biswas TK. Pattern of medical wastes management: existing scenario in Dhaka City, Bangladesh. *BMC Public Health.* 2008;8:36.
12. Malekhamdi F, Yunesian M, Yaghmaeian K, Nadafi K. Analysis of the healthcare wastes management status in Tehran hospitals. *J Environ Health Sci Eng.* 2014;12(1):116.
13. Mathur V, Dwivedi S, Hassan MA, Misra RP. Knowledge, attitude, and practices about biomedical wastes management among healthcare personnel: A cross-sectional study. *Indian J Community Medicine.* 2011 Apr-Jun;36(2):143-5.



---

**Corresponding Author**

Muhammad Ihsan Khan, Final Professional MBBS student, Rehman Medical College, Peshawar, Khyber Pakhtunkhwa, Pakistan.

Email: [ihsan.khan-11@rmi.edu.pk](mailto:ihsan.khan-11@rmi.edu.pk)

---

Submitted for Publication: February 12, 2016

The authors declared no conflict of interest and agreed 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

All authors contributed substantially to the planning of research, questionnaire design, data collection, data analysis and write-up of the article as part of a student research team at RMC.

The research work was supervised by Mr. Sher Bahadur, Senior Research Officer, Department of Medical Research at RMC.

---

This article may be cited as:

Khan MI, Khan EA, Irfan S, Muhammad A. Wastes management practices in selected public and private hospitals of Peshawar, Khyber Pakhtunkhwa. *Journal of Medical Students*. 2016;2(1):5-11.

---