

# Assessment of Knowledge, Attitude and Practices of Biomedical Waste Management among Staff of a Secondary Care Hospital in Narowal

TAHIRA ARSHAD<sup>1</sup>, ASMA SHABBIR<sup>2</sup>, MUHAMMAD IMRAN ASGHAR<sup>3</sup>, ATTIYA ARSHAD<sup>5</sup>, FAUZIA ZAHID ALI KHAN<sup>6</sup>, HUMUYAN RASHID RATHOR<sup>7</sup>, SAMIYA NAEEMULLAH<sup>8</sup>, SABA AFZAL<sup>9</sup>

## ABSTRACT

**Aim:** To identify the existing practices of Hospital Waste Disposal, to assessment of the knowledge of hospital staff regarding the Hospital Waste Management Practices and to Identify factors responsible for non compliance to good Hospital Waste Management Practices.

**Study design:** Cross Sectional Descriptive.

**Place and duration of study:** D.H.Q Hospital Narowal from August 2011 to October 2011.

**Methods:** This study was conducted on 83 staff members of a secondary care hospital in Narowal. The study population was divided into four strata and these strata were doctors, Paramedical staff including nurses, dispensers, Laboratory technicians and microbiologists, sanitary workers and administrative authorities. Non probability sampling method was used.

**Results:** Response rate was 83%, doctors (16.8%), paramedical staff (68.6%), sanitary workers (8.6%) and management staff (6%) were the study participants. Although there was overall good level of awareness about the health care waste and its management but the existing scenario regarding waste segregation, storage and disposal was totally different. Knowledge of Paramedical staff was higher than that of doctors and others. Among the management 80% were agreed that D.H.Q hospital has waste management policy and follow a plan according to this policy. Although some good practices such as use of gloves, masks, aprons, boots and separate containers during waste segregation and disposal were seen. Syringe cutters were observed in only few wards of the hospital.

**Conclusion:** Hospital waste management practices should not be neglected.

**Keywords:** Biomedical waste management, health hazards, staff, secondary care hospital.

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## INTRODUCTION

Hospital waste is a special type of waste produced in small quantities carrying a high potential of infection and injury. Inadequate and improper handling may have serious public health consequence and a significant impact on the environment. Hospital waste management means the management of waste produced by the hospital using techniques that will check the spread of diseases<sup>1</sup>. According to a WHO report 80% of the waste generated by the hospitals is of general type and 20% is considered hazardous material that may be infectious, toxic and radioactive<sup>2</sup>.

Globally approximately 1 in 12 persons worldwide or some 500 million people are living with chronic viral hepatitis<sup>3</sup>. And it is estimated that 350 million people have chronic hepatitis B in world<sup>4</sup>. Similarly during 2009 world health organization has estimated that about 33.4 million people globally have HIV/AIDS and 2.7 million new cases reported per year<sup>5</sup>.

In Pakistan it was shown that around 2.0 Kg of waste/bed/day is produced out of which 0.1-0.5kg can be categorized as risk waste. Daily about 4 to 2,000 Kg of waste is generated by various health outlets; of which 75% to 90% is non-risk produced by the health care premises, housekeeping, and administrative functions while only 10-25% is infectious and needs more careful disposal<sup>6</sup>. Health care workers have only a basic understanding of health care waste and do not perceive handling or disposal of medial waste as a hazardous work. Laboratory analysis shows existing contamination of infectious agents in the environment. Some staff members interviewed was suffering from various kinds of infectious diseases such as viral hepatitis B/C, typhoid, skin disease/allergy, diarrhea, dysentery, tuberculosis, and malaria. The study indicates that there is a need to improve the handling

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<sup>1</sup>Medical Officer, Basic Health Unit, Tehsil Shakargarh District Narowal, <sup>2</sup>Assistant Professor, Department of Pediatrics Pakistan Railways Hospital Rawalpindi.

<sup>3</sup>Assistant Professor, Department of Cardiac Surgery AFIC/NIHD Rawalpindi. <sup>4</sup>Assistant Professor, Community Medicine; Avicenna Medical College Lahore,

<sup>5</sup>Researcher, Health Services Academy Islamabad.

<sup>6</sup>Obstratration and Gynecologist, Ali Hospital Islamabad.

<sup>7</sup>Professor & Head Department of Entomology, Health Services Academy Islamabad. <sup>8</sup>Professor & Head Department of Pediatrics Railway Hospital Rawalpindi.

<sup>9</sup>Consultant Pediatrician, NESCOM Hospital Islamabad.

Correspondence to Dr. Tahira Arshad Medical Officer, E-mail: dr.tahira.arshad@gmail.com

and disposal methods of hospital waste in almost all the available medical facilities<sup>7</sup>. A study carried out in Thailand for future development. The important finding was the amount of medical waste was 0.41 kilogram per bed per day. Problems identified were inadequate knowledge in management, improper practices, and high incidence of sharp injury at work. Laboratory tests in dustmen showed evidence of pulmonary tuberculosis in 3.4%, parasites and intestinal pathogens in stools 5.1% and positive for HBsAg in 8.5%. Finally it was concluded that improper management of medical waste was present in all hospitals. Risks of exposure and incidence of infection related to the management were at concerned levels. Education and practice guidelines are needed<sup>8</sup>. Medical waste management is of great importance due to its infectious and hazardous nature that can cause undesirable effects on humans and the environment. A comprehensive inspection survey was conducted for 15 hospitals, 3 disposal companies and 200 patients. Field visits and a questionnaire survey method were implemented to collect information regarding different medical waste management aspects, including medical waste generation, segregation and collection, storage, training and education, transportation, disposal, and public awareness. The results indicated that the medical waste generation rate ranges from 0.5 to 0.8kg/bed day with a weighted average of 0.68 kg/bed day. The segregated collection of various types of medical waste has been conducted in 73% of the hospitals, but 20% of the hospitals still use unqualified staff for medical waste collection, and 93.3% of the hospitals have temporary storage areas. Additionally, 93.3% of the hospitals have provided training for staff; however, only 20% of the hospitals have ongoing training and education. It was found that the centralized disposal system has been constructed based on incineration technology, and the disposal cost of medical waste is about 580 US\$/ton. The results also suggested that there is not sufficient public understanding of medical waste management, and 77% of respondents think medical waste management is an important factor in selecting hospital services<sup>9</sup>.

A study done on 258 doctors (including consultants, registrars and residents), 159 nurses and 169 Para-medical staff. The awareness was significantly satisfactory among doctors and nurses whereas there is lack of knowledge and awareness among laboratory personnel and other members of the paramedical staff, which needs effective teaching and training to prevent adverse outcome on human health. It was concluded that the effective means of BMW management involves effective knowledge of the medical and paramedical staff, which needs to educate them through proper educational programs, and provision of resources involving political

intervention is vital for the better outcome in future<sup>10</sup>. Regarding practices related to biomedical waste management, sanitary staff was ignorant on all the counts. However, injury reporting was low across all the groups of health professionals. Finally it was concluded that the importance of training regarding biomedical waste management needs emphasis; lack of proper and complete knowledge about biomedical waste management impacts practices of appropriate waste disposal<sup>11</sup>. There was a significant association between knowledge and access to documents ( $p < 0.001$ ). Ease of access is therefore important in generating knowledge among health professionals about HCW management. Those with access to the documents reported good HCW management practices. Most respondents (115, 90%) treated health care risk waste differently from health care general waste; 124(97%) reported readily available bins for different types of HCW; 123 (96%) knew the various types of bins and used them appropriately and 122 (95%) always used gloves when handling HCW. Most participants (106, 82%) agreed that contact with infectious waste could lead to infectious diseases such as HIV/AIDS, hepatitis B (113, 88%) and hepatitis C (97, 76%). However, some were unsure about the risk of transmission of HIV/AIDS (6.5%), hepatitis B (6.5%) and hepatitis C (18.1%), while 16 (13%) disagreed about the risk of transmission of HIV/AIDS, hepatitis B (9.7%) and hepatitis C (13.1%) through unsafe contacts with infectious waste. Most (126, 98.5%) agreed that improper management of HCW could lead to transmission of infections among hospital workers and patients; however, 2 (1.5%) did not agree. A significant statistical difference was found in different wards about perceptions of HCW collection ( $p < 0.01$ ). Nurses were more likely than doctors to know this information. Most reported that their ward had never gone without HCW bins including sharps containers<sup>12</sup>.

A study the risks associated with healthcare waste and its management has gained attention across the world in various events, local and international forums and summits. However, the need for proper healthcare waste management has been gaining recognition slowly due to the substantial disease burdens associated with poor practices, including exposure to infectious agents and toxic substances. Despite the magnitude of the problem, practices, capacities and policies in many countries in dealing with healthcare waste disposal, especially developing nations, is inadequate and requires intensification. This paper looks upon aspects to drive improvements to the existing healthcare waste management situation. The paper places recommendations based on a 12 country study reflecting the current status<sup>13</sup>. A study was carried out in the eight surgical departments only 27.4% of the

nurses, 32.1% of the housekeepers, and 36.8% of the doctors had satisfactory knowledge. Concerning practice, 18.9% of the nurses, 7.1% of the housekeepers, and none of the doctors had adequate practice. Nurses' knowledge score had a statistically significant. Based on the findings, a protocol for healthcare waste management was developed and validated. It is recommended to implement the developed waste management protocol for the surgical departments in the designed hospital, with establishment of waste management audits<sup>14</sup>. Most of the respondents preferred on-site versus off-site waste incineration. Some hospitals were using untrained casual laborers in medical waste management and general cleanliness. The knowledge level in MWM issues was low among the health workers. It is concluded that hospital waste management in Tanzania is poor. There is need for proper training and management regarding awareness and practices of medical waste management to cover all carders of health workers in the country<sup>15</sup>.

In Pakistan a study revealed about Practitioners were interviewed about injection administration and disposal of waste due to injections and other sharp material. Twenty general practitioners out of 25 were interviewed. All claimed using disposable syringes only once. None of them was disposing off syringes in sharp containers in the clinic. Of 20, 12(60%) were throwing syringes at open places and 5(25%) in municipal waste bins. Improper disposal of sharp waste needs development of cost effective methods that are applicable at a small scale. Larger studies are required to quantify the gravity of the problem<sup>16</sup>.

Study carried in Karachi to evaluate the current practices of segregation approaches, storage arrangements, collection and disposal systems in the teaching hospitals of Karachi. Out of eight hospitals visited 2(25%) were segregating sharps, pathological waste, chemical, infectious, pharmaceutical and pressurized containers at source. For handling potentially dangerous waste, two (25%) hospitals provided essential protective gears to its waste handlers. Only one (12.5%) hospital arranged training sessions for its waste handling staff regularly. Five (62.5%) hospitals had storage areas but mostly it was not protected from access of scavengers. Five (62.5%) hospitals disposed off their hazardous waste by burning in incinerators, two (25%) disposed off by municipal landfills and one (12.5%) was burning waste in open air without any specific treatment. No record of waste was generally maintained. Only 2(25%) hospitals had well documented guidelines for waste management and a proper waste management team. There should be proper training and management regarding awareness and practices of

waste disposal. Research must be undertaken to seal existing gaps in the knowledge about hospital waste management<sup>17</sup>. Factors relating to acceptance of Hepatitis B Virus Vaccination by Nursing Students in a Tertiary Hospital, Pakistan relating to, the acceptance of hepatitis B virus (HBV) vaccination by nursing students in a tertiary hospital in Pakistan. In total, 210 nursing students of Year 2 to Year 4 were invited to participate in the study; of them, 196(93.3%) returned completed questionnaires. Overall, the prevalence of acceptance of HBV vaccination among them was 75.0%. Of these, 37.2% (73/196) were completely vaccinated, and 25% (49/196) had not been vaccinated at all. More than half (27/49, 55.1%) of the unvaccinated nursing students stated that they would accept vaccination if offered. Multiple logistic regression analysis indicated three variables significantly related to acceptance of HBV vaccination: history of accidental exposure to blood or blood products, acceptable knowledge about HBV infection, and adequate budget for HBV vaccination<sup>18</sup>. Waste segregation is a fundamental and integral part of health care waste management which is not being carried out in most of the hospitals in Pakistan resulting in disposal of waste in landfill sites or open dumps without any special precautions or safety measures. District Health Quarter (DHQ) Narowal is a secondary care hospital covering three thickly populated tehsils of district Narowal, All health professionals are responsible for the segregation of the waste at its very initial stage and for this they must have updated knowledge about this. It is important to conduct a study at DHQ hospital Narowal The current study was undertaken to assess the knowledge of health professionals regarding health care waste and existing practices of hospital waste management in DHQ hospital Narowal, in order to determine the factors that influence safe or unsafe practices. This information will be useful in policy strategy formation on hospital waste management.

## MATERIAL AND METHODS

It was a cross sectional descriptive study design to assess the existing situation of waste management, knowledge of hospital staff which included hospital management, doctors, nurses, other paramedical staff and sanitary workers. The study was carried out at D.H.Q Hospital Narowal, a secondary care hospital providing preventive, curative and diagnostic services. The study population was administrative, medical, paramedical, sanitary and supporting staff of DHQ Hospital Narowal. The participated health professionals were from the Different departments of

hospital i.e., indoor, outdoor, and emergency, laboratory, EPI center and operation theaters. The study population was divided into four strata and these strata were doctors, Paramedical staff including nurses, dispensers, Laboratory technicians and microbiologists, sanitary workers and administrative authorities. Non probability sampling method was used due to small number of sampling frame. Inclusion and Exclusion criteria as all registered Doctors, Paramedical staff, sanitary works and Administrative authorities having experience more than one year were included in the present study. All absent staff, on leave, new inductions less than one year duration and those who are not directly concerned with hospital waste management i.e., Chowkidar, peons, clerks were not eligible for the study. Data Collection Tool four semi structured questionnaires were designed for the collection of data. Doctors, Paramedical staff, Managers and Sanitary workers were administered with different questionnaires. Questionnaires were built in with questions according to the requirements of the study. Urdu translation of the questioners was printed for those who were unable to read English version.

One questionnaire was designed for the collection of actual position of the hospital waste management and that was used in comparison with the situation reported by the study participants. The questions were related to knowledge, current practices regarding hospital waste management. Pre testing of this questioner was done. Information from hospital records was used to see any data available on hospital waste disposal system. Data sheet was generated on Statistical Package for Social Sciences (SPSS). Complete descriptive analysis was done. The frequencies of all variables were calculated using SPSS 16.0 version.

**RESULTS**

A total of 83 out of 100 questionnaires were completed by the sample frame and response rate was calculated 83%. The current study had targeted almost all the health professionals related to waste management. It included doctors, paramedical staff, sanitary workers and Managers Table 1.

Table 1 Socio-demographic characteristics of the study participants

Study Participants	Doctors	Paramedical Staff	Sanitary worker	Managers
Mean Age	38 years	28 years	30 years	36 years
Males	11	21	5	5
Females	3	36	2	0
Mean Experience	9.82years	10 years	7 years	12 years

The proportions of the study participant are in the following Table 2.

Table 2: Designation of participants

Doctors Designation	Paramedical Staff		Sanitary worker		Managers	
	%age	Designation	%age	Designation	%age	Designation %age
MO	57.1% (8)	Nurses	89.4% (51)	Sweepers	100% (7)	MS 20% (1)
Child specialist	7.14% (1)	Head Nurse	3.5% (2)			MLO 20% (1)
Gynecologist	14.2% (2)	Microbiologist	3.5% (2)			DCONP 20% (1)
Surgeon	7.14% (1)	Lab technician	3.5% (2)			SMO 20% (1)
Anesthetic	7.14% (1)					MO (MPH) 20% (1)
Dental Surgeon	7.14% (1)					
Overall percentage	16.8%		68.6%		8.4%	6.2%

**DISCUSSION**

Overall management of the hospital waste was not satisfactory at District Head Quarter hospital, Narowal. The wards displayed improper implementation of rules and regulations of health care waste segregation and disposal. Emergency department had better implementation as compared to other wards i.e. combined female ward, family planning ward, Operation Theater and labor room. In all selected wards, waste was segregated partially at source of generation. Operation Theater and FP ward didn't have separate containers for risk and non risk waste. Color coding was fully implemented in emergency

ward only. There was partial labeling of infectious and non infectious waste. Syringe cutters were observed in only emergency room. Health care workers in all selected wards did not cut needles after use. Containers were removed regularly from all sections when filled 3/4. Hospital waste was removed in trolley or closed bags. Only labor room and Operation Theater removed in tightly closed bags. There was no uniform schedule for collection of waste in all the departments of the hospital. Emergency ward had a storage place outside the ward.

All the selected wards incinerate their waste. Incinerator was present in side the hospital premises and was open from all sides. The inner walls and the

door of the incinerator were cracked due to some pressurized container showing lack of segregation practices at the source of generation. There was no proper central storage room; a hospital wash room was being used for this purpose. It was a small sized room which was overfilled. The hospital waste was dumped in a veranda not under key and lock and was accessible to animals, rodents, birds and human beings. None of the study participant was aware of the maximum temperature achieved by the incinerator leading to hazardous gas emissions in the surroundings. The ash from the incinerator was being removed manually and dumped in a landfill near the incinerator. In Pakistan majority of the hospitals do not follow the standard procedures.

This study had targeted the health professionals related to hospital waste management. It was identified that Paramedical staff had better knowledge about hospital waste. All doctors and nurses knew about the hospital waste but some of the doctors did not know exactly about its management steps. Paramedical staff is completely aware about the types of waste i.e., infectious or non infectious as compare to doctors. Status of hepatitis B vaccination was not satisfactory.

Similar results have been identified by some other published studies in Pakistan. We can see a similar observation has shown the picture of some other hospitals of Pakistan. In this study the current practices of the waste management were identified in eight hospitals of Karachi. Out of eight hospitals visited 2(25%) have shown satisfactory implementation of the practices i.e., segregating sharps, pathological waste, chemical, infectious, pharmaceutical and pressurized containers at source. For handling potentially dangerous waste, 2(25%) hospitals provide essential protective gears to its waste handlers. Five (62.5%) hospitals had storage areas but mostly it was not protected from access of scavengers. Five (62.5%) hospitals disposed off their hazardous waste by burning in incinerators, 2(25%) disposed of by municipal landfills and one (12.5%) was burning waste in open air without any specific treatment<sup>18</sup>. From Pakistan we have limited results regarding the awareness of doctors and paramedical staff. We can compare our results with some other countries i.e., in Bangladesh many doctors and nurses are not fully aware about what constitutes as medical waste. Health care workers (Doctors and Nurses) have only a basic understanding of health care and do not perceive handling or disposal of medical waste as a hazardous work<sup>8</sup>. A study in Thailand has also published similar problems of inadequate knowledge in management, improper practices, and high incidence of sharp injury at work<sup>9</sup>.

## CONCLUSION

Knowledge of the hospital staff was adequate about hospital waste management but the practices of all the necessary steps in waste management were unsatisfactory specifically the segregation of the waste. Paramedic's staff had better knowledge as compared to other categories. Level of vaccination against HBV was unsatisfactory in a categories the participants had not received any formal trainings on HWM. Rapid appraisal of different departments through an observatory check list showed poor segregation, collection and storage of hospital waste along with a lack of necessary equipment required for Hospital waste disposal. Incinerator was under poorly operated and was not maintained up to the required standards due to lack of training to operate the machinery and budget for the maintenance.

## RECOMMENDATIONS

- The national guide lines on hospital waste management must be implemented on immediate basis. There should be a documented and approved waste management protocol and it should be followed strictly.
- Management should monitor and supervise the implementations of the proper steps of waste management and doctors should be targeted for improving knowledge by arranging different educational trainings regarding hospital waste management. Paramedical staff and sanitary workers have knowledge but implementation is limited which should be improved. Management should design a Policy and everyone should have easy access.
- Behavior change communication is the strategy which can be used for the motivation of the hospital staff specifically for segregation of the waste.
- Hospital should allocate proper site for it and should update the incinerator according to recommended setting. Different treatment should be applied to disinfect the infectious waste.
- Hospital management should provide the complete vaccination against infectious diseases to all employees directly involved in managing hospital waste.
- Separate budget allocation is the responsibility of the management for hospital wastes management, so that smooth working of waste disposal can be carried out without any hindrance.
- The staff or team for hospital waste management should be appointed working

under the supervision of waste management officer.

- Stake holders' interaction and cooperation is the key factor which can improve the scenario regarding hospital waste management at D.H.Q hospital Narowal.

**Acknowledgement:** We are thankful to all those who gave us permission to conduct the research as well as all the participants participated in the study inspite of their busy working schedule.

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