Hospital Waste Management in the Teaching Hospitals of Karachi

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Abstract

Objective: To evaluate the current practices of segregation approaches, storage arrangements, collection and disposal systems in the teaching hospitals of Karachi.

Methods: A cross-sectional survey was conducted in eight teaching hospitals of Karachi, using convenient sampling technique. The instrument of research was a self administered questionnaire, with four sections, relating to the general information of the institution, administrative information, information regarding Health Waste Management personnel and a check-list of Hospital Waste Management activities.

Results: 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 two (25%) hospitals had well documented guidelines for waste management and a proper waste management team.

Conclusion: 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. The hospital waste management guidelines enacted on 7th June 2004 should be followed and regulated by law enforcement agencies rigorously (JPMA 55:192;2005).

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 consequences and a significant impact on the environment.1

Hospital waste management means the management of waste produced by hospitals using techniques that will check the spread of diseases.2 In developing countries, awareness regarding hospital waste management in terms of its segregation, collection, storage, transportation and disposal is lacking.3-6 Studies in Pakistan show that around 2.0 kg of waste/bed/day is produced out of which 0.1- 0.5 can be categorized as risk waste.7

Hospital waste includes hazardous or risk waste and non-risk waste. The different types of risk wastes are: infectious waste, pathological waste, sharps, pharmaceutical waste, genotoxic waste, chemical waste and radioactive waste. The non-risk waste comprises of other types of garbage like foodstuff leftovers, cardboards, packages, etc.7
Meeting the legal and regulatory requirements to generate, use, store, treat and dispose off can be difficult and expensive. Although the regulations are extensive and complex to implement, but complete and documented compliance with the applicable regulations is essential to demonstrate that personnel and environment safety has been assured.8,9

Individual health care establishments should prepare their own written policies and measures for waste handling appropriate to their specific requirements.10

The proper management of health-care waste depends on good administration and organization along with adequate legislation, financing and active participation of trained and informed staff.7,8 All individuals exposed to hazardous waste are potentially at risk. The main groups at risk are those belonging to medical profession, patients in the hospital, visitors to the hospital, workers in support allied to hospitals (laundry, waste handlers and transporters) and workers in waste disposal facilities such as landfills or incinerators including scavengers. The diseases which can be transmitted are numerous but the most significant ones are Hepatitis B, Hepatitis C and Acquired Immunodeficiency Syndrome (AIDS).11

The objective of this study was to assess the hospital waste management techniques employed by the teaching hospitals in Karachi and to know the policies of the hospitals regarding safe disposal of hospital waste.

**Material and Methods**

A cross-sectional study was conducted in eight teaching hospitals of Karachi through convenience sampling. Hospitals having more than 200 beds were included in the survey. The teaching hospitals were visited and the presence or absence of waste management technique was noted on a check list. The administrator of the institutions were interviewed to get in-depth knowledge regarding waste management policy and training of staff. Informed consent was obtained from the administration and strict confidentiality maintained.

Data was analyzed using percentages, proportions and standard error of proportions through the SPSS statistical package 10.

**Results**

Eight teaching hospitals were surveyed and their waste management techniques were assessed. The surveyed hospitals bed-strength ranged from 260-1760, number of out-patients ranged from 150-3000 and in-patients ranged from 140-1100.

From the eight institutions visited only two (25%) hospitals had figures on the waste generated daily, which was 2000-2500 Kg. and 1200 Kg. (Table 1). However, few hospitals maintained the amount of waste destroyed through the incinerator.

Segregation of waste at source including sharps and proper colour coding was done in two (25%) hospitals only (Table 1).

Vehicles appropriate for internal transportation were used in two hospitals only. For internal transportation of waste some of the hospitals were using wheelchair, stretcher or ambulance of the hospital. In one of the hospitals, waste was being collected manually and dumped at the storage area by the sanitary staff. It was observed that in one of the hospitals there were no buckets available at patient's bedside, patients threw waste under their beds.

Five (62.5%) hospitals had storage location for waste to be removed or incinerated, out of which only two observed to the laid down standards, while three (37.5%)

<table>
<thead>
<tr>
<th>Safety measures</th>
<th>Yes</th>
<th>No</th>
<th>Std. error of proportion presence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protective gears for waste handlers</td>
<td>2</td>
<td>6</td>
<td>0.1530 &lt;0.05</td>
</tr>
<tr>
<td>Appropriate internal transportation vehicle used</td>
<td>2</td>
<td>6</td>
<td>0.1530 &lt;0.05</td>
</tr>
<tr>
<td>Proper storage facility before disposal</td>
<td>2</td>
<td>6</td>
<td>0.1530 &lt;0.05</td>
</tr>
<tr>
<td>Use of incinerator</td>
<td>6</td>
<td>3</td>
<td>0.1711 &lt;0.05</td>
</tr>
</tbody>
</table>
hospitals dumped their waste openly inside or outside the hospital premises prior to off-site transportation by the municipality vehicles, which was on daily or weekly basis. Only two (25%) hospitals had properly designed storage areas with hard floors, good drainage and water supply, proper locking system to prevent access to unauthorized persons, inaccessible to animals, birds, insects and had a ventilation system (Table 2).

Plastic waste material and empty vials were taken by the sanitary staff for sale to waste pickers. In one of the hospitals, waste pickers collected the waste from the pharmacy where it was piled up.

For handling the potentially dangerous waste, only two (25%) hospitals were providing essential protective gears to its waste handlers. Incinerators were used by five institutions, and two were putting hazardous segregated waste in the incinerators (Table 2).

Only two hospitals (25%) had well documented waste management plans as well as waste management teams (Table 3).

Table 3. Administrative aspect of health waste management.

<table>
<thead>
<tr>
<th>Administrative responsibilities</th>
<th>Yes</th>
<th>No.</th>
<th>%</th>
<th>Std. error of proportion</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existence of HWMT</td>
<td>2</td>
<td>25</td>
<td>75</td>
<td>0.1530</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Trained HWM personnel</td>
<td>1</td>
<td>12.5</td>
<td>87.5</td>
<td>0.1169</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>HWM duties in job description</td>
<td>1</td>
<td>12.5</td>
<td>87.5</td>
<td>0.1169</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Training of newly appointed staff</td>
<td>1</td>
<td>12.5</td>
<td>87.5</td>
<td>0.1169</td>
<td>&lt;0.05</td>
</tr>
</tbody>
</table>

HWMT = Hospital waste management team  
HWM = Hospital waste management

Trained personnel were appointed and training of newly appointed staff, regarding handling of hospital waste was not given only in one of the hospitals (12.5%). Health Waste Management duties were included in the job descriptions of the staff in only one hospital (Table 3).

**Discussion**

The generator of waste is responsible for ensuring proper disposal. Hospitals are socially obliged to maintain a clean environment and dispose medical waste in order to prevent pollution and infection within and near the hospital.10,12

The hospital waste management plan outlines the interpretation of the legislation or a standard protocol to achieve essential elements for establishment of a proper hospital waste management system. In the current study it was found that only two hospitals had well documented waste management plans as well as proper waste management team.

There is lack of awareness of the management regarding detailed laws and regulations governing health care waste management. This encourages reuse and unhygienic recycling of waste material.

Pakistan is in a phase of creating awareness and implementing hospital waste management techniques. The concerted efforts needed might fall short, if the attitudes of the staff and the public towards this, is not changed.13

The director-general of Sindh Environmental Protection Agency (SEPA), under the provision of the Pakistan Environmental Protection Act-1997, issued guidelines for the management of hospital waste on Monday, 7th June 2004. These guidelines are applicable to all the hospitals, clinics, dispensaries, maternity centres, dental clinics, pathological laboratories, blood banks, nursing homes, research institutes, veterinary institutions other health care facilities including temporary medical camps which might cause adverse impact on human health and environment. The guidelines provide procedures for establishment of waste management systems, besides techniques for segregation, handling, storage, transportation and disposal of hospital waste in a safe manner. It was further stated that heavy penalties shall be imposed on the institutions found to be negligent.14

**Conclusion**

If the overall goal of waste management is to prevent disease transmission from waste products, therefore the emphasis should be placed on the "Management" aspect of the process and not on the "technological fix" which is expensive diversion rather than an effective solution. Technology should fit the situation and work in the management system to achieve the final goal as part of the overall system, not as a replacement for the system. Technology choices should be made to meet local needs and conditions. National standards for operating acceptable treatment technologies should be set which should match the international standards practiced in the developed countries.

**References**