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Current Hospital Waste Management Practices in Pakistan: Case Study and Curative Measures

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Abstract

Medical waste is hazardous and infectious which poses serious threats to environment. It requires specific pre-treatment and management prior to its final disposal. In order to minimize the threat to human life and environment, it is necessary that hospitals treat and dispose waste according to the international and national standards. The main objective of this study is to visit private and public sector hospitals visit in Rawalpindi and Islamabad region in order to investigate current hospital waste management activities and to check their alignment with the national and international standards. This study reveals both public and private sector hospitals have good hygienic conditions inside their premises. However, proper waste segregation practices, training of staff regarding BMW management practices, and standard labeling, proper dumping and transportation procedures are not up to the standards. This research concludes that proper hospital waste management practices are not being followed in light of local as well as international standards. The legislation exists but there is a lot of vacuum in implementation of the standards.

Keywords

Bio Medical Waste, Hospital, Waste Segregation, Waste Disposal

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1. Introduction

Biomedical waste can be threatening to the environment and public health in particular. It requires proper handling and treatment prior to its final disposal. With an increase in the number of hospitals and their inherited Bio Medical Waste (BMW), a large bulk of it is dumped untreated. On the average, a patient generates 1.5-2 kg of waste per day irrespective of the wards [1] governed by the "bed occupancy". On a normal day almost 75% of hospital beds are occupied by patients [1, 2]. The waste includes both the non-risk (domestic) and risk waste (Infectious, Pathological, sharps. etc.).

To cope up with this issue amicably, proper segregation and disposable of (BMW) is vital and needs to be done at the grass-root level. The health concerns pertinent to mal-handling of this waste have been brought to notice repeatedly by the electronic media. However, the authorities still haven't been able to chalk out ways to comply with, owing to new challenges in the studied cities. The rigidity which lies in implementation of the modern practices is integral to the non-availability of funds and lack of awareness related to health hazards associated with it. However, research on this critical issue in this region has been very limited, and there is a serious dearth of knowledge, planning and execution of standard procedures in biomedical waste management. Legally, the hospitals are obliged to handle and dispose all kinds of hospital waste generated according to national and international standards without deterioration of environment. There is a need of formulating a proper hospital waste management plan, which should outline the standard protocol

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along with interpretation of the legislation to achieve essential elements for establishment of a proper hospital waste management system. In developing countries like Pakistan, awareness regarding hospital waste management in terms of its segregation, collection, storage, transportation and disposal is lacking [3, 4, 5].

In Pakistan, every hospital must comply with the Waste Management Rules 2005 (Environment Protection Act 1997), of the Government of Pakistan. It also must ensure its level of service and waste management system according to international standards [5].

This study contains a survey of two major hospitals in Rawalpindi and Islamabad. The analysis highlights the current practices for biomedical waste handling, with adherence to the local and international standards. For this purpose, the hospital waste management system of two tertiary care hospitals is being analyzed and the loopholes in the whole process are discussed in detail.

2. Methodology

This study is conducted at two tertiary care teaching hospitals of good credibility in Rawalpindi/Islamabad city from 15th April 2014 to 25th May 2014. Prior permission for the visit was taken from our university (NUST) and the hospitals under consideration through official channel. The objective of study was explained to hospital authorities and verbal consent was obtained. One tertiary care hospital from the government sector and one from private sector was selected. The data is collected through presentations given by hospital administration, direct interviews from hospital staff, questioners and direct observation methods. The hospital administration is interviewed to get in-depth knowledge regarding hospital waste management policy and training of staff.

All wards, departments, and general area of both hospitals were visited. Methods of waste segregation, storage at ward or department level, internal transportation, dumping sites, external transportation including both on-site and off-site disposal techniques are studied. The existing waste segregation practices are analyzed in conformance to the international standard color coding and waste disposal protocol (Table-I). The information was obtained through literature review and online research. The questionnaire regarding the disposal of BMW waste generated is generated after extensive literature research. All data was collected in a structured format in a similar way from both hospitals to avoid any discrepancy and is analyzed.

Table-I. Shows the color codes and type of containers used for disposal of biomedical waste [1].

Color Coding	Type of Container	Waste Category	Treatment Options
Yellow	Plastic Bags	Human and animal wastes, Microbial and Biological wastes and soiled wastes (Cat 1,2,3 and 6)	Incineration / Deep Burial
Red	Disinfected container/ Plastic bags	Microbiological and Biological wastes, Soiled wastes, Solid wastes (Cat 3,6,7)	Autoclave / Microwave / Chemical Treatment)
Blue/ White/ Transparent	Plastic bag, Puncture proof container	Waste sharps and solid waste (Cat 4 &7)	Autoclave / Microwave / Chemical Treatment Destruction and Shredding
Black	Plastic bag	Discarded medicines, Cytotoxic drugs, Incineration ash and chemical waste (Cat 5,9 & 10)	Disposal in secured land fills
Green	Plastic Container	General waste such as office waste, food waste & garden waste	Disposed in secured landfills

3. Results and Observations

Both hospitals have good cleanliness and hygiene maintained inside their premises. The atmosphere in general is healthy and periodic mopping is functional. The operation theatre has high standard of cleanliness and sterilization system in both hospitals.

The private sector hospital has no waste management department/committee contrary to the other. However none of them have any standard operating procedures or written protocols for the waste handling. Both the hospitals observe primary segregation of waste inside the wards. The public sector hospital has somewhat reasonable procedure to treat waste from the point of generation to the point of dumping. Conversely, the private sector is rated below the satisfactory level on the basis of certain indicators decided in our research methodology.

The used syringes, drug ampoules and sharps are being disposed of properly in both hospitals.

The waste is being segregated but the color coding for waste bags are not followed as suggested by Hospital Waste Management Rules 2005. Instead the practice is the use of red and blue tapes on the local polythene bags which are liable to tear damage easily. Moreover, the collection, and transportation from wards to dumping site are not being carried out as per international standards in both the hospitals. The staff does not follow proper protection during collection, segregation and transportation in both hospitals. No Storage place exists in private hospital and the waste is eventually

dumped in a pit situated in the backyard of hospital premises which by all means is an improper practice.

Both hospitals neither have their own incinerator nor have any alternative method of treatment of wastes at local level. The waste is transported to another far away place for incineration twice a week on the minimum in both hospitals.

The hospitals try to segregate the waste from the start where it is generated. However there is no system to check or verify the correct segregation of waste at the later stages. Both hospitals have no system in operation to handle and treat the infected or hazardous waste before disposal.

Regarding training of staff, no system is identified which properly train or aware the staff about biomedical waste hazards and segregation. Further formal interviews from the concerned authority, medical, paramedical and sanitary staff reveals that there is a lack of gross level awareness among sanitary staff and paramedical staff regarding biomedical waste management and handling in both hospitals. No proper evidence of regular medical checkup of sanitary staff directly involved with waste handling is found in both hospitals. Similarly, proper incident reporting system or mechanism is missing in both hospitals (Table-II).

Table-II. Check list of BMW protocol.

		Government Sector Hospital	Private Sector Hospital
Cleanliness	General area	Yes	Yes
	Wards	Yes	Yes
	Departments	Yes	Yes
Waste management (WM)			
W M committee exists		Yes	No
Segregation at site of production (wards/departments)		Not proper, but better than private	Not Proper
Waste containers are proper		Yes	Yes
Transportation to damping site in proper way (Trolley/cart)		Yes	No
Initial storage site in wards		Improper	Improper
Proper dumping site		No	No
Segregation of waste at dumping site		Improper	Improper
Transportation to final site		Proper	Improper
Final disposal site		Proper	Proper
Incinerator facilities		No	No
Waste Management Staff			
Had training in handling waste		No	No
Using protective gears		No	No
Had proper knowledge of waste management		Basic	Average
Having regular training sessions		No	No
Having medical examination		Yes	No
Infectious waste treatment			
Disinfected before disposal		No	No
Handling by special staff		No	No
Special barrier clothing		No	No
Incident report procedure		No	No

4. Discussion

Bio Medical Waste (BMW) management is of great importance due to its public health risks and potential environmental hazards. The improper disposal of waste imposes serious complications to environment and the people living near. The exposed waste may lead to an epidemic disease and can also contaminate the water and soil. The contaminated water may be found at a far distance causing infectious diseases [3, 6]. The hospital laboratory waste, if not treated according to the standards can lead to serious cause consequences. It may contaminate the water body nearby and cause hazardous threats causing water borne diseases [7]. In past, the BMW was often mixed with municipal solid waste and mostly disposed of in residential waste landfills especially in developing and underdeveloped countries. Due to increase in awareness, in recent years, efforts have been made by waste generators and environmental regulatory agencies to manage BMW in a

proper way [3, 4].

Sanitary staff and janitors when handling waste, wear protective clothing at all times including face masks, industrial aprons, leg protectors, industrial boots and disposable or heavy duty gloves, as required. Sanitary staff and sweepers must ensure that waste is collected at least once daily and all waste bags are labeled before removal, indicating the point of production, ward, hospital and contents. They must also ensure that the removed waste bags and containers are immediately replaced with new ones of the same type and where a waste bag is removed from a container, the container is properly cleaned before a new bag is fitted therein [1]. None of these practices were being observed in both private and government sector hospitals.

For waste handling in wards the protective gear must be used by the personnel who are handling the waste to avoid any direct contact with BMW. For this purpose specialized skin fitted rubber gloves of bright yellow color should be used. The gloves should be washed twice after handling the waste with carbolic soap and a disinfectant [8,9]. To prevent contamination of clothing and for protection of skin, aprons made of cloth or impermeable material such as plastic should be used [10].

Boots that are rubber soled and antiskid should be long enough to cover legs, and be able provide greater skin protection especially when splashes or large quantities of infected waste have to be handled for example at Operation Theater. Various types of masks, goggles and face shields should be use alone or in combination depending upon the situation and waste material [2,10]. There is a gross lack of all these facilities in both hospitals especially in private sector hospital.

Risk waste is separated from non-risk waste at the ward bedside, operation theatre, laboratory, or any other room in the hospital where the waste is generated by a doctor, nurse, or other person generating the waste. Staff interview and direct observation shows the lack of proper awareness of staff regarding handling and segregation of waste at the place of generation in both institutions. However, the key to effective management to minimize the hazard of biomedical waste is the identification and segregation at the point of generation. It is recommended that it must be kept away from direct contact with humans, animals, insects, and environmental elements, such as rain and wind. It is recommended that the limited access should be granted only to trained and authorized personals that are trained to handle this waste [11, 7].

Regarding the disposal of hazardous waste, literature recommends that the sharps should be kept in rigid, unbreakable, leak and puncture-resistant containers which are tightly lidded and labeled during handling, storage and transport. The other BM waste, excluding sharps, should be dispose off in leak-proof plastic bags which are strong enough to prevent tearing, ripping, bursting or breaking under normal conditions of use. For this purpose rigid plastic, single-use or approved multiple-use containers may also be used [1, 12]. Puncture proof boxes to dispose sharps were being used in both the hospitals.

The BM waste should be transported to dumping site either in trolleys or in covered wheelbarrow. Manual loading should be avoided as far as far as possible. The Container containing BMWs should be lidded before transportation. Before transporting the bag containing BMWs, it should be accompanied with a signed document by Nurse/Doctor mentioning date, shift, quantity and destination. Special vehicles must be used so as to prevent direct contact with the waste by the transportation operators, the scavengers and the public. The transport containers should be properly enclosed. The effects of traffic accidents should be considered in the design, and the driver must be trained in the procedures he must follow in case of an accidental spillage. It should also be possible to wash the interior of the containers thoroughly [7, 11]. Private hospital is using manual transportation of waste to the dumping site that is highly discouraged. Government hospital has a good system for transporting the BMW to the dumping site that do not involve any manual transportation. Both hospitals however lack the proper labeling procedures that are required before disposing off the waste.

The treatment processes use the chemical which act as disinfectants e.g., chlorine di oxide, Sodium hypochlorite, peracetic acid, H_2O_2, dry inorganic chemical and O_3. Most chemical processes are water-intensive and require neutralizing agents [9]. We have not observed any treatment process being done or mentioned by both hospital authorities.

Proper management of BMW plays a vital role in preventing any outbreak of infectious diseases in society. It causes reduction in the cost of medical expenses by preventing spread of diseases. It helps in maintaining hygienic and healthy environment in medical centres. In addition it has low detrimental impact on ecological system; low incidence of community and occupational health hazards [8, 13]. BMW management leads to improved public health, better quality of life and cleaner environment.

In developed countries, there is a committee in each hospital that develops a plan for recycling or waste minimization. Health professionals; such as doctors, nurses and waste handlers, are given regular training on waste management practices. Their programs include segregation, collection, handling, transportation, treatment and disposal of waste, as well as occupational health and safety issues. The committee

is also responsible for developing a plan for treatment and disposal of chemical and pharmaceutical waste

Therefore, a proper BMW management system should be introduced in hospitals of developing countries like Pakistan, which offers proper training to the staff. Instead of just one site the authority should introduce multiple sites for segregating the waste, making it more convenient for the waste treatment authorities to collect waste easily.

5. Conclusion and Recommendations

The analysis of this study shows that segregation of various medical wastes in the hospitals is not being conducted properly. Furthermore the need for training and capacity building programs of all employees involved in the medical waste management is required.

The Hospital waste management policy and standard operating procedures need to be implemented in accordance to the local and international legislation in true spirit.

Overlooking this aspect can lead to potential health hazards to inmates and people living nearby. Severity of this problem can only be addressed by massive awareness drives at all levels.

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