ORIGINAL ARTICLE

WASTE MANAGEMENT AT DENTAL HOSPITALS OF RAWALPINDI – ISLAMABAD REGION

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ABSTRACT

Background and Objective: Hospital waste management is a crucial environmental and public safety issue, due to the infectious and hazardous character of waste. Thus, focus of the study was to get information about methods of hospital waste segregation and ultimate disposal being used at teaching dental hospitals of Islamabad and Rawalpindi.

Methods: A questionnaire based cross sectional study conducted in November 2014, collected information from the administrators of hospitals in order to assess the medical / dental waste management practices of dental hospitals in Islamabad and Rawalpindi.

Results: Among the five teaching dental hospital of Rawalpindi and Islamabad, four responded to our questionnaire. The results revealed that the hospitals quantify and segregate medical wastes into infectious and non-infectious waste. Incineration was used as prime method of infectious waste disposal.

Conclusion: Situation of hospital waste management at teaching dental hospitals of Rawalpindi and Islamabad is satisfactory within the available limited resources; however, there is still room for improvement.

Key Words: Hospital waste, color – coded segregation, incinerators.

INTRODUCTION

Health care waste is categorized as waste which is being discarded by health care activities done on humans or animals, is potentially infectious to the humans. Hospital waste consists of hazardous and non hazardous waste.[1]

Being a part of dental setup we are primarily concerned with the waste generated at dental hospitals. Although dental hospitals generate relatively less amount of healthcare waste compared to the other health care facilities, nevertheless the waste generated can produce serious health and environmental hazards if not properly managed. Major source of hazardous dental waste includes X-ray fixers and films, chemical disinfectants, dental amalgam, sharps, scalpels, burs, orthodontic wires, blood – soaked dressings, silver, lead, various solvents and other chemicals.[2]

The hazards of exposure to infectious hospital waste can range from gastro-enteric, respiratory, and skin infections to more deadly diseases such as HIV / AIDS, and Hepatitis.[3] Also the collection of materials from the improperly disposed waste by poor scavengers, women and children for purpose of reselling make them at risk of getting infections. Addicts also collect and reuse the syringes which have known to be a cause of spread of AIDS and Hepatitis. Thus collection, resale and reuse of disposable medical items lead to further increase in disease burden.[4,5]

Hospital waste management means the management of waste produced by hospitals using techniques that will check the spread of diseases.[6,7] The key for effective and safe management of health care waste need proper segregation, handling transport and disposal.

In developing countries, awareness regarding hospital waste management in terms of its segregation, collection, storage, transportation and disposal is lacking.[8]

The situation of hospital waste management is worse in Pakistan like other developing countries of Asia. Though Pakistan has its own environmental protection agency (PEPA) situated in Islamabad along with sub divisions in each province. Nonetheless, the legislation made on hospital waste management by environmental protection agency is not fully implemented and overall situation of hospital waste management is still in its infancy.[9]

Health care organizations (including dental hospitals) are mainly concerned with providing high standard services to the community; this cannot be fulfilled unless a proper waste management policy is strictly implemented.

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Table 1: *Questionnaire used for data collection of HCWM at various colleges.*

1)	Does your hospital / institution have waste management policy?
	a) yes b) no
2)	Do you have hospital waste management team?
	a) yes b) no
3)	Do you have trained hospital waste management personnel?
	a) yes b) no
4)	Is the waste segregated at the place of its generation?
	a) yes b) no
5)	Do you have any colour coded system for segregation of waste?
	a) yes b) no
6)	Are needle cutters used in each department?
	a) yes b) no
7)	Are puncture proof boxes used for disposal of sharps (needles, blades, wires)?
	a) yes b) no
8)	Do the waste handlers wear any protective clothing while collecting and handling the waste?
	a) yes b) no
9)	Does your hospital have facility of incinerators?
	a) yes b) no
10)	If no which of the following method you use for waste disposal?
	a) Burial of waste b) Burn the waste
	c) just throw in the routine municipal garbage
	d) Send to other facilities which have incinerators
11)	If the waste is sent somewhere out, do you have proper facility of interim storage before disposal?
	a) yes b) no
12)	Do you have the record of the amount of waste generated per day?
	a) yes b) no

MATERIALS AND METHODS

A cross – sectional study was conducted by the oral pathology department of Islamic International Dental College, Islamabad during month of November 2014. Five teaching dental hospitals of Rawalpindi and Islamabad included in the study were; Islamic International Dental College (IIDC), Islamabad Medical and Dental College (IMDC), Rawal Institute of Health Sciences(RIHS), Margalla Institute of Health Sciences and Armed Forces institute of Dentistry(AFID).

Data was collected from medical administrators of teaching dental hospitals by a self – designed questionnaire.

The questionnaire comprised of 12 questions which were designed to assess the administrative aspect of HCWM (Health Care Waste Management) and techniques being used in segregation, handling and disposal of hospital waste (Table 1).

RESULTS

A total of 5 hospitals were included in survey out of which only MIHS refused to give the feedback. According to the responses received from administrators of different colleges, all the colleges have their own hospital waste management policy and trained staff. Moreover, all of them also observed segregation technique with help of color – coded disposable bags, use of puncture proof boxes for sharps and needle cutters. The most crucial part of this study was to evaluate how different colleges ultimately dispose hospital waste. It was a pleasant surprise to know that all the colleges incinerate the infectious waste regardless of the fact they own an incinerator or not. IMDC and RIHS have their own incinerator facility, AFID shared the incine-

Table 2: *Response of different colleges regarding HWM.*

	IIDC	*AFID*	*RIHS*	*IMDC*
Hospital Waste Management Policy	Yes	Yes	Yes	Yes
Existence of HWMT	Yes	Yes	Yes	Yes
Trained HWMT	Yes	Yes	Yes	Yes
Record of Waste Generated	Approx. 15 kg/day	Yes but not gave the amount	Approx. 35 kg/day	No
Seggregation at Place	Yes	Yes	Yes	Yes
Use of Colour Coded System for Seggregation	Yes	Yes	Yes	Yes
Use of Puncture Proof Boxes for Sharp Disposal	Yes	Yes	Yes	Yes
Use of Needle Cutters	Yes	Yes	Yes	Yes
Use of Protective Clothing by Waste Handlers	Yes	Yes	Yes	Yes

Facility of Incinerators	No	No	Yes	Yes
Facility of Interim Storage	Yes	Sent Daily	N/A	N/A
Sent to External Incinerator	Sent to Attock Oil Refinery Incinerator	Sent to CMH Incinerator	N/A	N/A

rator of Combined Military Hospital and send the waste on daily basis, thus not needed an interim storage area. IIDC used outsource incinerator facility of (Attock Oil Refinery) that would pick the infectious waste from IIDC twice a week, thus an interim storage area under lock was also allocated. The detailed results are shown in Table 2.

DISCUSSION

Biomedical waste management has recently emerged as an issue of major concern not only to hospitals, nursing home authorities but also to the environment and its proper management is one of the most concerned topics worldwide today. Hazards of poor management of biomedical waste have aroused the concern in the light of its far reaching effects on human health and the environment.[10]

The Ministry of Environment, Government of Pakistan has issued a notification about the hospital waste management disposal. This notification gives guidelines regarding hospital waste management policy, presence of waste management team and their responsibilities.[11] All the hospitals included in our study follow a waste management plan made by their administration. They also hold a well trained team supervised by administrator of the hospital. While in contrast few studies carried out in dental hospitals indicate that they do not hold any such policy.[1,6] A study carried by Khatri, et al,[12] among dental practicioners of different hospitals of Puna reported that majority of practicioners were registered with local governing bodies**.**

To avoid the mixing of biomedical waste with regular domestic waste, it is highly essential to segregate the biomedical / hazardous waste at source of its origin. Color coded bags or containers are recommended for different types of infections waste so it can be traced from point of origin to point of disposal**.**

Although it was not asked which color codes were being followed but all the hospitals use color coded segregation system for infectious and non infectious waste. In our hospital we use yellow color codes for infectious and blue color bags for non infectious waste. Puncture proof well labeled boxes are also used for sharps. All the hospitals included in our study used their customized color coded system for segregation. Results of our study were in accordance to that of, Hashim R et al,[1] R.O. Darwish[8] and Khatri, et al.[12]

Medical waste should be handled as little as possible before disposal and waste handlers should be provided with proper protective gears to help them protect from getting injuries from the waste collected. The waste handlers should wear heavy duty gloves, face masks, protective eye wear, industrial aprons and heavy duty boots.[11] All the hospitals involved in the present study reported that they have provided the protective clothing to the waste handlers. In comparison a study conducted in Karachi reported that 2 out of 8 hospitals have provided protective clothings to waste handlers.[13] Whilst Mushtaq A et al,[6] stated that no proper protective clothing was provided by hospital management.

After the proper segregation, the dental / medical waste should be safely transported to temporary storage area before final disposal. This area should be well sustained, secured and accessible only to authorized personals. According to Ministry of Environment Government of Pakistan, storage room shall be located near hospital premises close to incinerator, easy to clean with proper ventilation and drainage system. No waste should be stored for more than 24 hours.[11] However, this is not practically possible for majority of institutions because of limited available resources and thus usually interim storage time exceeds more than 24 hours up to 48 – 72 hours, as discussed later.

Two of the hospitals having their own incinerator incinerate waste on regular basis thus no interim storage is required while among the rest two one has the facility of interim storage and other send their waste immediately for incineration.

The ultimate disposal of infectious and non infectious waste is of prime concern. If the medical / dental waste after going through whole paradigm of waste management is ultimately thrown into municipal garbage or open land, the effort will end up in nothing but just wasting the time, energy and financial resources followed by exposure of the environment and people to all hazardous effects of infectious medical / dental waste.[3]

After proper segregation of the hospital waste, the amount of infectious waste should ideally be measured and record should be maintained; as this may affect the method to be used for ultimate disposal. For instance, small health care facilities which generate only a small amount of infectious waste, can hand over or send the waste to some other facility for disposal and pay a relatively small amount as compared to installing expensive incinerator and vice versa.

The waste disposal is done either using incineration or non incineration technique. Other technologies included are autoclaving, microwaving, hydroclaving,

deep burial, shredding.[10,14] Various types of methods are adopted for different kind of waste in underdeveloped countries including Pakistan, incineration or deep burial of waste are widely adopted and are favorable methods.[5]

In current study 2 out of 4 hospitals posses their own incinerators. In fact we had a chance to visit and inspect incinerator installed at roof top of Rawal Institute of Health Sciences, in case we can share their facility for incineration of hospital waste produced at our institute. However, that liaison could not work and our institute share incinerator facility with Attock oil refinery who charge a reasonable amount to transport the waste twice a week along with incineration. Moreover, Armed Forces Institute of Dentistry share the central incineration plant of Combined Military Hospital. Details regarding the incineration at Islamabad Medical and Dental College were not shared. Study of Mushtaq et al, states that Punjab Dental Hospital sends its waste to Children Hospital, Lahore for incineration. A special truck collects waste bags from the Punjab Dental Hospital twice a week.[6] Thus, here is the practical example of our own institution and the Punjab Dental Hospital who share external incinerator facility twice weekly thus have to store the waste for more than 24 hours which is contrary to the guidelines provided; but still it is better to store it for more time rather to throw in open garbage. Similarly study carried out in Karachi reveals that 5 out of 8 hospitals use method of incineration for final disposal.[13]

Facility of incineration can be shared among different hospitals provided the amount of infectious waste is small and proper transport system is available. If not it's better to at least design custom made oil or drum incinerator which would be a far better option than to throw hospital waste in routine municipal garbage or to open burning or dumping.

In short all health care systems should try to work out the deficiencies regarding hospital waste management and implement current and affective methods to improve health care facilities in their respective domains.

It is ***concluded*** that the picture of hospital waste management shown in this study is quite promising; however there is still room for improvement in terms of strict implementation and maintenance of the system. However, this was a mini study carried out in dental colleges of Islamabad and Rawalpindi based on the responses of the administration only but getting responses from the paramedical staff and doctors should also be done in order to make it more authentic as to know how far they think, the things are being implemented in reality. Moreover self – observation could have been made to practically monitor the system and to make results more reliable.

CONTRIBUTION OF AUTHORS

Each author contributed in the work as follows.
N. Z.: Data collection and manuscript write-up.
N. U.: Literature search and manuscript write-up.
R. M.: Questionnaire preparation.

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