

Laboratory Waste management - is there a need to reinforce the knowledge?

Kavita G U¹, Shashikala P², Anisha P Bindagi³

¹Professor, Department of Pathology and Member Department of Medical Education.

²Professor and Head, Dept. of Pathology, ³Student, MBBS Phase III.

S.S. Institute of Medical Sciences & Research Centre, Davangere, Karnataka

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ABSTRACT

Background: Practices of waste management in most of our hospitals and laboratories have not yet achieved the designed standards even after several years of enforcement of the law. In the view of this, the present study was carried out in our tertiary care centre and teaching hospital.

Aim: To assess the knowledge regarding laboratory waste management among hospital staff.

Methodology: Data collection was done using a pre-tested questionnaire with a set of five questions related to knowledge of laboratory waste management.

Results: The analysis of the responses to questionnaires provided to five categories of people, that is, consultants, technicians, nurses, interns and sanitary workers, was done and it was observed that sanitary workers had poor knowledge about laboratory waste disposal.

Conclusion : This study highlights the need for teaching about laboratory waste disposal. In addition to Medical students, technicians, paramedical staff and sanitary workers have to be provided with this knowledge.

Introduction

Major part of the biomedical hospital wastes are generated from the laboratories. These wastes comprise of sharps like needles, broken glass, swabs containing infective material, blood soaked gauze material etc. Increased use of disposables to prevent the transmission of dreadful diseases has indirectly contributed to the spread of diseases in the sense that these are inappropriately recycled and there is unauthorized and illegal reuse of the same. Medical and laboratory wastes are costly to dispose and carry the risk of infection hazardous diseases like Human Immunodeficiency Virus (HIV) and Hepatitis B. The last decade has witnessed significant increase of public concern regarding medical waste disposal. Safe disposal and subsequent destruction of medical waste is a key step in reduction of illness or injury through contact with this potentially hazardous material and in the prevention of environmental contamination.¹ Many hospitals are yet to implement the proper disposal of health care wastes and continue to dump the wastes generated from the hospital and laboratories in municipal garbage dumps without any segregation.

Practices of waste management in most of our hospitals and laboratories have not yet achieved the designed standards even after several years of enforcement of the law. In the view of this, the present study was carried out

in our tertiary care centre and teaching hospital with the aim of assessing knowledge regarding laboratory waste management, thereby to prepare a teaching module and decide about implementing this in curriculum of Pathology.

Methodology :

This study is a cross sectional hospital based study conducted on the staffs of central laboratory of a tertiary care hospital which is attached to a Medical College and Research Centre. Data collection was done using a pre-tested questionnaire with a set of five questions related to knowledge of laboratory waste management. The questions were of two types, closed ended and open ended. For closed-ended questions of multiple choice types, respondents were asked to select and mark the most appropriate responses provided with the questions. For open ended questions, responses were in their own words. The questionnaire was given to five categories of laboratory personnel which included about twenty four consultants, twenty seven technicians, nine nurses, seventeen sanitary workers and twenty eight interns who were posted to central laboratory during the study period. All the 105 health care personnel responded to the questionnaire. The responses were analyzed as appropriate and inappropriate where options were provided. The percentage of appropriate and inappropriate responses per group were calculated and used to draw the statistical status of the groups.

Correspondence:

Dr. Kavita G.U.

Professor, Department of Pathology
S.S Institute of Medical Sciences and Research Centre
Mob. : 9886055699 Email : drkavitagu@yahoo.co.in

Access this article online

Website : www.jermt.org

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Responses of the other questions were also analyzed and percentages were tabulated. Statistical data was presented in numbers and percentages.

Observation and Results :

To assess the knowledge, five questions were devised and the results were as follows:

Table1: Discarding of blood/ body fluids of known HIV and Hepatitis B positive patients (open ended question)

Responses	Technicians N=27	Doctors N=24	Sanitary workers N=17	Interns N=28	Nurses N=9	Total N=105
Given to waste collector after treating with hypochlorous acid	15 (56%)	15 (63%)	13(76%)	16(57%)	6(67%)	65 (62%)
Discarded in sink after disinfection with hypochlorous acid	2 (7%)	5(21%)	1 (6%)	4(14%)	3(33%)	15 (14%)
Not aware	10(37%)	4(16%)	3(18%)	8(29%)	-	25(24%)

Of the 105 participants who answered to this open ended question, 65 (62%) of them responded that the blood/body fluids of HIV/Hepatitis B positive patients must be disinfected with hypochlorous acid and given to

biomedical waste collectors and 15(14%) of them responded that it may be discarded into the sink after treating with hypochlorous acid while 25(24%) of them were unaware of the method of discarding.

Table 2: Discarding human operated tissue wastes (closed ended question)

Human operated tissue discarding procedure	Technicians N=27	Doctors N=24	Sanitary workers N= 17	Interns N=28	Nurses N=9	Total N=105
Incineration/ deep burial	5(18%)	19(79%)	8(47%)	21(75%)	5(56%)	58(55%)
Autoclaving	4(15%)	3(13%)	2(12%)	-	1(11%)	10(10%)
Do not know	18(67%)	2(8%)	7(41%)	7(25%)	3(33%)	37(35%)

58(55%) of them responded that the human operated wastes must be either incinerated or buried deep in the ground, while 10(10 %) of them responded that it must

be autoclaved and 37(35%) did not know the method to be adopted.

Table 3: Storage of infectious wastes (open ended question)

Storage of Infectious Waste	Technicians N=27	Doctors N=24	Sanitary workers N=17	Interns N=28	Nurses N=9	Total N=105
2 Days	5(19%)	8(33%)	9(60%)	8(29%)	6(67%)	36(34%)
3-4 Days	16(60%)	8(33%)	6(35%)	13(46%)	3(33%)	46(44%)
1-2 weeks	4(14%)	4(17%)	2(12%)	5(18%)	-	15(14%)
Nearly equal to or more than one month	2(7%)	4(17%)	-	2(7%)	-	8(8%)

Infectious wastes were stored for 3-4 days according to 46(44%) of the respondents, while 8(8%) of them opined that it is stored for a period of nearly a month or more. 36(34%) said that it is stored for two days.

Approximate amount of waste generated in the laboratory per day per department. The responses by all the respondents to the open ended question related to the approximate amount of waste generated in the laboratory varied between 5 kg per day to 15 kg per day

per department. No one had exact knowledge about the quantity of waste generated in the laboratory.

Knowledge about discarding of non-infectious wastes (open ended question) Responses of 58 (55%) of the participants was that the noninfectious wastes must be thrown in blue bin, while 47(45%) opined that it should be burnt. Doctors had better knowledge as compared to other category of people regarding disposal of noninfectious wastes.

Discussion:

The present study conducted in a tertiary care centre, showed that sanitary workers had poor knowledge of laboratory waste management. These results are consistent with the findings of the study on the waste disposal of health care facility by Sultana Habibulla, where 71.4% of the sanitary workers had poor knowledge of waste management as well as study on infectious waste management at Allied hospital, Faisalabad^{2,3}.

Though our study is mainly concerned with knowledge about laboratory generated waste the statistics are comparable to the hospital generated waste management as regards disposal of wastes since laboratory generated wastes form a major bulk of biomedical wastes and infectious in nature. Lack of knowledge may be attributed to inadequate training programs for sanitary workers and also due to the fact that they do their job due to socio-economic reasons. The routine method followed in our setup for samples remaining after performing the investigations, was to disinfect by treating with hypochlorite or formalin for one hour or autoclaving it in a separate autoclave and later drain it in the sink. In the blood bank, the blood bags of positive samples are injected with hypochlorite solution and left for an hour and even autoclaved before sending it to the waste collectors of the hospital.

Few authors prefer to select the procedure of autoclaving as against chemical disinfection as further autoclaving/incineration of chemically disinfected samples release toxic gases into the atmosphere.⁴

Similarly formalin fixed tissue waste from histopathology are free from living organisms. Hence washing of tissues to remove formalin is recommended before further sending it for incineration/burial. Though burial is suggested in Bio Medical Waste rules, washing of tissues allows biodegradation in buried specimen. For sentimental and aesthetic reasons, burial is not acceptable to some people. Accidental exposure of the human parts in burial pits due to improper burial have also at times contributed to uninvited troubles to hospital authorities and fear among general public. Hence the process needs to be properly monitored.

Human anatomical wastes are usually generated in operation theatres and a number of specimens are sent for histopathology. Hence it is the liability of the laboratory to dispose the tissue appropriately. The personnel directly involved in this process are the sanitary workers.

In our study only 9(53%) of the sanitary workers had proper knowledge about operated tissue waste disposal procedure. This may be attributable to lack of proper training to educate them.

It is recommended not to store infected wastes for long number of days and to clear infected wastes in the laboratory on daily basis as they are unsafe. The staff must ensure proper segregation of infectious solid wastes and sharps and noninfectious wastes. No attempt must be made to correct errors of segregation by removing from one bag and or bin after disposal. If general and hazardous wastes are accidentally mixed, the mixture should be treated as hazardous health care waste.⁵

It is advisable to consider all the samples as infectious and handle accordingly, irrespective of whether serological tests are positive or negative. According to some, laboratory waste management is the responsibility of the sanitary staff only. This reveals that there still exists in our health care system a reluctant attitude of not contributing towards development of a system of good patient care activity.

Conclusion:

This study highlights the need for teaching about laboratory waste disposal. In addition to Medical students, technicians, paramedical staff and sanitary workers have to be provided with this knowledge as "Knowledge is power" & this improves their performance in managing laboratory waste disposal properly, thereby preventing health hazards. Who, how and when this has to be taught, needs to be decided. This is the policy matter of Medical school & departmental affairs.

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