

**A CRITICAL ANALYSIS OF HOSPITAL WASTE MANAGEMENT IN THE
LALLA DED HOSPITAL SRINAGAR (JAMMU AND KASHMIR)**

Khursheed Ahmad Wani¹, Mamta K², Aashiq Hussain Bhat²

1- Department of Environmental Science, ITM University, Gwalior 474 001, MP, India

2- Department of Environmental Science, Jiwaji University, Gwalior 474 001, MP, India

ABSTRACT: A study was carried out to assess the various health risk factors among the staff members of the *Lalla Ded* hospital Srinagar. The survey was conducted for three months i.e. during April to June 2012. The data were collected by using questionnaire to the staff and waste handlers. Questionnaires were used to survey the hospital wastes in terms of collection, transportation, segregation, treatment and disposal and to collect available information for analysis of the system. The most immediate threat to human health is the careless disposal of sharps, which comprise only 10% of the waste by weight. Proper segregation and collection of these materials in rigid puncture-proof containers, which are then subject to appropriate treatment and disposal, should be a high priority. Using needle cutters and needle boxes would minimize the risk at the source of waste generation. Training on handling and management of sharps is essential. The study concludes that healthcare waste management should go beyond data compilation, enforcement of regulations and acquisition of better equipment. It should be supported through appropriate education, training and the commitment of the healthcare staff, management and healthcare managers within an effective policy and legislative framework.

KEYWORDS: Biomedical waste, Pollution, Health effects, Awareness, Management.

INTRODUCTION

The waste generated by the health care units is termed as bio-medical waste. The hospital waste has always been considered potentially hazardous and disposal of untreated bio-medical wastes poses an environmental and public health risk. It also causes occupational health hazards to the health care personnel who handle these wastes at the point of generation, and those involved with their management i.e. segregation, storage, transport, treatment and disposal ([Singh and Sarma, 1996](#)).

Medical waste management was not considered as an issue over the years. However, 1980s and 1990s, concerns about exposure to human immunodeficiency virus (HIV) and hepatitis B virus (HBV) led to questions about potential risks inherent in medical wastes. Thus, hospital waste generation has become the prime concern due to its multidimensional ramifications as a risk factor to the health of patients, hospital staff and also extending beyond the boundaries of the medical establishment to the general population ([Gordon et al., 2004](#)). The United Nations recommended appropriate procedures for collection and disposal of wastes to member countries and announced that every waste producing unit is responsible for the disposal of

its waste ([Pruss et al., 1999](#)). The WHO reveals that more than 50,000 people die every day from infectious diseases and one of the causes for increase in infectious diseases is improper waste management. HIV, hepatitis, tuberculosis, pneumonia, diarrhea diseases, tetanus, and whooping cough are the diseases spread through improper waste management (<http://www.who.ch>).

The objective of the study was to evaluate the qualitative as well as the quantitative assessment of the bio-medical waste generated in Lala Ded Hospital Srinagar and to assess the management issues and practices of bio-medical waste generated in Lala Ded Hospital Srinagar.

MATERIALS AND METHODS

2.1. Study area

The present study regarding the bio-medical waste generation and management was undertaken in one of the premier health care centres, Lala Ded maternity Hospital of Srinagar city in Jammu and Kashmir. Lala Ded Hospital established in the year 1978 is Located at Wazir Bagh Srinagar having a 500 bedding capacity.

2.2. Data Collection

The survey was conducted for three months i.e during April to June 2012. The data were collected by using questionnaire to the staff and waste handlers. Questionnaires were used to survey the hospital wastes in terms of collection, transportation, segregation, treatment and disposal and to collect available information for analysis of the system. The practice of waste segregation, the type of storage containers, the temporary storage area, collection procedures, on-site transport and treatment of wastes off-site transport and disposal of wastes were studied and the type of sewerage system used at the hospital was also assessed. The persons involved with the collection and disposal of wastes were also interviewed. The information gathered by questionnaire was verified by means of personal observations.

For the collection of bio-medical waste three dustbins of different colors according to colour coding concept i.e yellow, red and black were placed in three different wards. On the basis of this we have taken three site in the hospital, General ward (Site I) post Operative ward (Site II) and Normal delivery wards (Site III) the general description of the study sites is given in Table 1, 2, Besides, every waste generating unit was identified and categorized. The wastes collected were segregated according to infectious, non-infectious and sharps. Non-infectious and infectious wastes of out-patient and in-patient services in hospital were collected separately and weighed. The data collected through questionnaire and the quantities of infectious, non-infectious and sharp waste were tabulated and analyzed in terms of kg/bed/day and kg/day. The data were used to determine the quantities of wastes generated by each ward of the hospital.

2.3. Assessment

An assessment was made regarding planning of health care facilities, health education and publicity on waste management. Actual work practices, equipment operations and integrity were also monitored. Common regional facility for final disposal of infectious waste was also studied.

Data regarding number of OPD patients/day, outpatients/day, number of beds, awareness

about bio-medical waste produced and estimated quantity (kg/day), waste segregation, storage, transport and disposal were also examined. Besides, different literatures and data were collected for supplementation.

RESULTS AND DISCUSSION

Handling, segregation, mutilation, disinfection, storage, transportation and final disposal are vital steps for safe and scientific management of biomedical waste in any establishment ([Acharya and Meeta, 2000](#)). The unscientific disposal of biomedical waste may lead to rapid proliferation and spreading of infectious, dangerous and fatal communicable diseases like hepatitis, AIDS and several types of cancers. In urban and rural areas alike, incidence and prevalence of several such human diseases has increased the medical expenditure of the people all over the globe.

Waste generated in the hospital/ healthcare institutions should be properly segregated at the source of production, transported in covered trolleys or wheels barrows and then scientifically disposed off as per the available treatment technology. The proper Bio-Medical Waste Management in the hospital is not only the statutory (legal) obligation because of the Bio-Medical Waste (Management and Handling) Rules of 1988 and 2000 but also associated with many health and environment hazards, if not managed properly.

On an average, Lalla Ded hospital generates 400-450 kg waste per day (Table 3, 4, 5). Out of this, 50% (Table 6,7,8) of the waste is general waste/garbage which is just like the domestic waste and can be disposed off in municipal bins. 100 kg/day is the infectious waste which includes dressing material, sharps/ disposables etc. and it requires the attention of the health care professionals for its proper management. The management of infectious waste is the responsibility of the health care institutions generating the same. If this 10-15% of waste is not properly segregated at the source of generation, whole of the waste then gets mixed up, and then it is a Herculean task to dispose off the same. The mixed waste which has now become infected cannot be thrown in a municipal bin.

Table 1: General Description of site I

Floor	No. of wards	Bedding capacity	No. of patients	No. Of dustbins	Dustbin colour
1 st Floor	8	118	150	8×3=24	Black,Red,yellow
2 nd Floor	5	66	80	5×3=15	Black,Red,yellow
3 rd Floor	4	58	70	4×3=12	Black,Red,yellow

Table 2: General Description of site II and III

Study Area	No. of Wards	Bedding Capacity	No. of Patients	No. of Dustbins	Dustbin Color
Post-Operative Wards	3	55	90	3×3=9	Black, red, yellow
Normal Delivery Section	2	30	30	2×3=6	Black, red, yellow

Table 3: Amount of waste generated from three study areas in the month of April

Study Area	No. of wards	Bedding capacity	Waste generated (kg)/bed/day	Total waste kg/day
Site I	17	242	1	242
Site II	03	55	1.5	82.5
Site III	02	30	0.700	21
				Total = 345.5kg/day

Table 4: Amount of waste generated from three study areas in the month of May

Study Area	No. of wards	Bedding capacity	Waste generated (kg)/bed/day	Total waste kg/day
Site I	17	242	1.2	290.4
Site II	03	55	2	110
Site III	02	30	1	30
				Total = 430.4.5kg/day

Table 5: Amount of waste generated from three study areas in the month of June

Study Area	No. of wards	Bedding capacity	Waste generated (kg)/bed/day	Total waste kg/day
Site I	17	242	1.4	338.8
Site II	03	55	1.8	99
Site III	02	30	1.2	36
				Total = 473.8.5kg/day

Table 6: Waste categorization in the month of April

Study Area	Waste generated /bed/day			
	Domestic waste (gm)	Recyclable waste (gm)	Infectious Waste (gm)	Disposable Waste (gm)
Site I	500	300	200	90
Site II	00	1000	300	250
Site III	150	100	100	350

Table 7: Waste categorization in the month of May

Study Area	Waste generated /bed/day			
	Domestic waste (gm)	Recyclable waste (gm)	Infectious Waste (gm)	Disposable Waste (gm)
Site I	600	250	150	200
Site II	00	1000	300	700
Site III	600	100	50	250

Table 8: Waste categorization in the month of June

Study Area	Waste generated /bed/day			
	Domestic waste (gm)	Recyclable waste (gm)	Infectious Waste (gm)	Disposable Waste (gm)
Site I	700	300	100	300
Site II	00	1200	200	400
Site III	800	150	100	150

Table 9: Occupational health risk factors among LD Staff

Health Problems	Hospital staff		
	Waste Handlers (N= 52)	Doctors (N= 105)	Nurses (N= 120)
Injury	13 (25)	2 (1.9)	4 (3.9)
Gastritis	42 (80.7)	0	7 (5.8)
Others	32 (61)	0	10 (8.3)

Values in parenthesis represent the percentage

At present, most of the health care institutions in our state except for some associated hospitals of Medical Colleges and some district hospitals are not able to do the proper/ scientific disposal of the hospital waste. The main reason for this is not the financial crunch or lack of resource but, is the lack of awareness/ knowledge of scientific waste management practices. The Lalla Ded Hospital does not practice segregation of

infectious and non-infectious waste and there is no mechanism for waste segregation. The waste from wards, which include used cotton, dressing materials, blood, bottles, PVC drip sets, needles, syringes and their covers, are thrown in the same dust bin instead of throwing in the separate dustbins according to color coding concept. It has been found that no waste source segregation is being practiced but the waste

from the wards is collected in front of the hospital premises and is then segregated. The waste handlers during segregation of waste do not use Personal Protective Equipments and are thus exposed to various health hazards like injuries, Gastritis, vomiting, headache, skin infections etc. Injury was found among 25% of the waste handlers due to non use of Personal Protective Equipments. Gastritis was found among 80% (Table 9) of the waste handlers in *Lalla Ded* Hospital due to obnoxious smell of the Bio Medical waste.

The infectious waste like blood, cotton pads contaminated with blood, puss and body fluids and placenta is mixed up in the same dust bin without any treatment.

The waste handlers are not Government employs and are not having any knowledge about the bio medical waste, its characteristics, potential health and the proper procedure of the different steps involved in the management of bio medical waste. They are not being paid any salary by the hospital management, however, they are allowed to take the recyclable items like glucose bottles, discarded water bottles drips etc and thus more attention is being paid to the recyclable material and other type of waste is being kept as such.

There are huge waste piles in *Lalla Ded* Hospital, usually located on the roadside. These waste piles are frequently visited by rag packers, who collect the recyclable items such as plastics and polythene. Disposal of human parts and organs from the hospital amputated human parts such as limbs, organs surgically removed or residual pieces of intestines and bowel are either packed in bags or PVC jars, preserved in formaldehyde and transported to pathology labs for further studies. When these organs are not useful and are not considered for pathological studies, they are thrown in the waste pile or disposed of in the municipal garbage.

Disposals from pathology, microbiology, anatomy, biochemistry and pharmacology and general garbage are mostly collected in bins and disposed of in garbage pits or burned in the open. The remnants of human organs preserved in formaldehyde for pathological examination are subsequently buried in the backyard of the department at least 3 feet under the ground. Unused blood specimens, sera, full bottles of expired blood after intermittently practiced chemical disinfection are washed down the drains and are mixed with the sewage. Glass culture plates, pipettes, enzyme-linked immunosorbent assay plates and other contaminated bacteriological and virological material are either chemically disinfected or

autoclaved. The glass items are washed and reused.

The staff working in *Lalla Ded* hospital should be made aware of the scientific management of Bio-Medical Waste through various training programmes / work shops, etc. at various levels. The stress has to be laid down on proper segregation practices, which is the core of success for implementation of this programme.

The indiscriminate disposal of sharps within and outside institutions leading to occupational hazards like needle stick injuries, cuts, and infections among hospital employees, municipal workers and ragpickers. It has been seen that the workers in *Lalla Ded* are not using personal protective equipments thus are exposed to various healthrisk disorders. Injuries due to the sharp especially among ragpickers and hospital / municipal workers increases the incidence of Hepatitis B, C, E and HIV among these groups who transmit these diseases to others in the community and also succumb to such fatal diseases. It has been found that no warning singals are present in *Lalla Ded* Hospital as described in Bio medical waste management and handling rules.

Needles were being destroyed at source, however most of the needle destroyers were non-functional and physical mutilation was being resorted that may prove dangerous for health care worker (HCW). Onsite incinerator is available; however, it remains non functional most of the time resulting in all the infectious waste finding its place in main municipality dump. Local municipal body as well as state Pollution Control Board does not check existing waste disposal arrangements of this hospital. The *Lalla Ded* hospital has implemented common regional facility for final disposal of biomedical waste generated by health care establishments at Lasipora Pulwama. It has appointed Kashmir Health Care plant to, offer the services of handling BMW on pay and use basis. The services include provision of bags, collection of bags containing infectious waste from all the hospitals with more than 20 beds, their transportation to the incinerator site, its incineration and final disposal of ash.

Approximately 450 kg per day collection of waste is made with the help of two modified trucks. Two incinerators of twin chamber variety with approved chimney size with a total capacity of 100 kg/hr and 750 kg/hr burning capacity are functional. They are charging Rs.3.5 / bed/day waste. Billing is done through *Lalla Ded* hospital and facility is being monitored by Municipality / State Pollution Control Board regularly. However, the vehicles do not reach

regularly in the hospital for transporting the waste that cause bad smell around the area.

It was observed that this premier hospital is severely lacking in actions to dispose of its waste and uphold its statutory responsibilities. This is due to lack of education, awareness and trained personnel to manage the waste in the hospital, as well as the paucity of funds available to create a proper waste management system. The State Pollution Control Board has also failed to implement the relevant legal provisions. The board has not been able to enforce the legal provisions and make healthcare establishments legally responsible for the safety of all concerned. The hospital should also undertake a detailed risk assessment of the waste. A policy needs to be formulated based on 'reduce, reuse, recover and dispose'.

There should be a proper budget allocation for this activity. Media should be used effectively to create awareness among the general public. The private sector should be encouraged to enter the waste management sector to increase the capacity and effectiveness of the disposal and recycling of waste. This should also be a suitable case for presenting public- private partnership.

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REFERENCES

- Acharya DB, Meeta S. The book of Hospital Waste Management. Minerva Press, New Delhi 2000;15:47.
- Gordon JG, Reinhardt PA, Denys GA. Medical waste management. In: Mayhall CG (Ed.). Hospital epidemiology and infection control, Lippincott Williams and Wilkins Publication 2004;pp:1773-85.
- <http://www.who.ch>
- Pruss A, Giroult E, Rushbrook D. Safe Management of Wastes from Healthcare Activities, World Health Organization, Geneva 1999.
- Singh IB, Sarma RK. Hospital Waste Disposal System and Technology. Journal of Academy of Hospital Administration 1996;8(2):44-8.