

# Evaluation of Biomedical Waste Management Practices in Multispeciality Tertiary Hospital

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## Abstract

**Background:** Biomedical waste collection and proper disposal has become significant concern for medical and general community. The scientific hospital waste management is a vital importance as its improper management poses risk to healthcare workers, waste handlers, patients, community in general and largely the environment.

**Aims and Objectives:** (i.)To assess current practices of biomedical waste management including generation, collection, transportation, storage, treatment and disposal technologies in tertiary health care center. (ii.)To assess health and safety practices for health care personal involved in biomedical waste management.

**Material and Method:** Waste management practices in tertiary care center was study during in May 2016 to June 2016 the information/data regarding biomedical waste management practices and safety was collected by way of semi-structured interview, proforma being the one used for waste AUDITING QUESTIONNAIRE. The information collected was verified by personal observations of waste management practices in each ward of hospital.

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**Results:** MMCH (Muzaffarnagar medical college and hospital) generates 1.25 kg wastes per bed per day and maximum waste is generated in wards. The hospital has got separate colour coded bins in each ward for collection of waste but segregation practices need to be more refined.

The safety measure taken by health care workers was not satisfactory, it was not due to unavailability of personal protective measures but because un-awareness of health hazards which may occur due to improper waste management practices.

Thus it concluded that there should be strict implementation of waste management policy set up in the hospital, training and motivation must be given paramount impotence to meet the current needs and standards of biomedical waste-management.

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## Introduction

During the last few decades, the need for better health-care has been felt globally and to cater the needs and demands of the increasing population a rapid mushrooming of hospitals both in private and government sector has occurred.

Consequently there has been a proportionate increase in the quantum of waste generated by these health care centers. Ironically the hospitals hoped to bring relief to the sick are themselves creating health hazards to the community due to improper management of waste generated in the course of health care activities.

Health care waste refers to all the waste generated by health care establishments. It is estimated that 10-25% of health care waste is hazardous, with the potential for creating a variety of health problems also known as biomedical waste according to Biomedical Waste (Management and Handling) Rule, 2008 of India means any waste which is generated during diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological and including categories mentioned in schedule.

Though 75-90% of waste produced by health care institutions is non-risk being generated from administrative and housekeeping/maintenance of health care establishment, the remaining 10-25% waste is regarded as "hazardous" and may create a variety of health risks. According to WHO 85% of hospital waste is non-hazardous, 10% infective and remaining 5% non infective but hazardous.

## Rationale of Study

The scientific "Hospital Waste Management " is of vital importance as its improper management poses risks to the health care workers, waste handlers, patients, community in general and largely the environment. Keeping this in view, bio-medical waste management at this tertiary care was studied.

## Methodology

The study was carried out in 550 bedded private medical college of Muzaffarnagar Medical College.

**Study Type:** Observational study

**Duration of Study:** 1<sup>st</sup> May to 15<sup>th</sup> June 2016

## Data Collection

- (i) The information/data regarding bio-medical waste management practices and safety was collected by way of structured interview, with the house-keeping in charge of hospital, proforma being the one used for waste auditing questionnaire.
- (ii) Information derived from interview was verified by personal observations of biomedical waste management practices in each ward of hospital, starting from source, handling, collection, transportation and final disposal.

Results are shown in terms of percentages

## Results

Biomedical waste generation in MMCH Hospital depends on different sites, which includes:

**Table 1. Record of biomedical waste generated/per day in kg**

S. NO.	Dept.	Black bag	Yellow bag	Red bag	Blue bag
1	TB caste	26	--	--	03
2	Gynae ward	11	--	--	10
3	Gynae OT/Labour room	06	08	20	04
4	Ortho ward	28	--	09	18
5	Paediatric ward	23	--	06	06
6	NICU/PICU	05	--	05	03
7	Cardiac/Cath. lab	14	--	--	06
8	Medical ward	29	--	16	13
9	ICU	34	--	13	13
10	OT	32	16	10	17
11	Central lab	13	--	05	07
12	OPDs	11	--	06	05
13	Blood bank	09	--	09	05
14	Others	124	22	99	100
15	Total	820 Kg/day			

Waste produced per bed per day = mean waste generated per day/no.of beds =1.5 kg This is in support of previous studies which suggest that hospitals in India

generate 1-2 kg per day, except the tertiary care hospitals which produce on higher side. The patient areas contribute to 71.6% of waste generated.

**Table 2.Observation at level of segregation of waste**

Dept.	Black bag	Yellow bag	Red bag	Blue bag
Located at right place	yes	yes	yes	yes
Placed on stand	NO	yes	NO	yes
Contains waste as in schedule I	NO			
Respective bins fitted with closed fitting cover	NO			
Labelling of bags as in schedule III	yes			
Daily disinfection of bins with 1% hypochlorite solution	NO			
Collected daily	yes			

The color coded bins were placed on stand in respective wards but closed fitting covers on them were missing. The bins were labelled accordingly as schedule III. However bins are disinfected once in 3-4 days. The

waste generated in each ward was collected by in service sanitation staff (sweeper) about 3-4 sweeper in each ward. The segregation practices of waste were not satisfactory as it was primarily done by sweepers only.

**Table 3.Observation at level of transportation of bag**

1	Separate route for transportation of waste	NO
2	Separate timing for transportation of BMW and general waste to avoid mixing of waste	YES
3	Covered wheeled trolleys used for transportation of bags	NO
4	Trolleys used transportation of BMW is labelled	YES

The biomedical waste generated is transported in trolleys, the waste is collected and transported twice daily. However there is no separate route for

transportation of waste and neither the trolleys are covered ones.

**Table 4.Observation at level of storage facilities of waste**

1	Separate room for storing waste after collection	Yes
2	Storage area impermeable with supply of water	NO
3	Storage room locked to prevent entry of unauthorized person	NO
4	Weighing machine present in storage room	Yes
5	Waste not stored for more than 48 hrs	Yes

Biomedical waste collected each day is stored at a single dumping site near incinerator in open space, wherefrom it is taken to pyrolytic incinerator. The yellow bag as

well as red bag is incinerated and the incineration ash left behind is dumped in black bags, in the remote pit in the medical college itself.

**Table 5 Type of personal clothing worn by waste handlers/sweepers during collection, transportation, storage and treatment of BMW**

S. no.	Personal protective clothing	NO.(N=100)	%
1	Gloves	50	50
2	Apron	0	0
3	Long boots	0	0
4	Eye shield	0	0
5	Mask	15	15
6	Hepatitis B vaccination	2	2

The safety practices adopted by the sanitation staff for collection of biomedical waste in rudimentary. Only 50% sweepers were using gloves while managing waste whereas apron, long boots, eye shield and mask was worn by none. This was not because of unavailability of

personal protective equipments but because of unawareness of health hazards to which they are exposed to while handling such waste. Only two worker were immunized for hepatitis B.

**Table 6. Training of waste handlers and particulars regarding risk involved in waste handling**

S no.	Training and other particulars	No.100	%
1	Received special training in bio-medial waste handling	30	30
2	Aware of risk involved in BMW handling	30	30
3	Any injury/infection in past 6 months	6	6
4	Accident reported to higher authority	0	0

Regarding sensitisation of biomedical waste management practices only 30% sweeper were trained for waste management practices and were aware of risks involved in waste handling. Six workers reported of prick injury during segregation of waste.

### Waste treatment practices

Regarding treatment of waste the needles and sharps were buried in pits of dimension 4ft x4 ft after disinfection. The institute has incinerator plant for management of yellow bags and red bags. The black bag is dumped in the pit.

### Discussion

MMCH generates 1.5 kgs waste per bed per day and maximum waste is generated in wards, similar observations were found in a study at Sher-I-Kashmir Institute of Medical Sciences, Srinagar for a period of three months. Study showed that quantity of solid waste generated per bed per day was found to be 2.02 kgs. In patient area generated maximum solid waste (71.6%) followed by supportive services. Other areas like operation theatre, emergency and OPD together produced lesser amounts (12. (%).

A study at S.N Medical College Agra by S.V.S Chauhan and S. Sharma found many garbage dumps in and around the health care facilities, which have been frequently visited by rag pickers. These rag pickers collect used needles, disposed drugs, syringes and PVC items from the garbage dumps.

This practice not only encourages disposables being repacked and sold without proper disinfection but they also expose themselves to injuries with sharps and other infections.

These finding are in agreement with those of Neema and Ganesh Prasad (2002). They have observed that except for a few hospitals, waste is mostly dumped in the open space enabling rag pickers to collect syringes, cotton, plastics etc.

In many hospitals medical waste is burnt at dumpsites in an open environment.

### Conclusion

Though the waste management practices in the hospitals is far better than other hospitals in state, the institute has taken authorisation for waste treatment Still the waste management activities like collection, segregation, transportation, needs to be done on more scientific basis.

In the waste management process, segregation practice needs to be practiced more strictly and by the waste generators itself. Day to day collection of waste was done but there is no separate route for transportation of waste. Regarding treatment of waste the institute has got its own incinerator plant.

The safety practices adopted by the sanitation staff for collection of bio-medical waste are rudimentary. Only 50% sweepers were using glove while managing waste whereas apron, long boots, eye shield and mask was worn by none. This was not because of unavailability of personal protective equipments but because of unawareness of health to which they are exposed to while handling such waste. Only two workers were immunized for Hepatitis B. Regarding sensitization of Bio-Medical Waste management practices only 30% sweeper were trained for waste management practices and were aware of risks involved in waste handling.

### Recommendations

Following recommendations were made for improving the waste management practices of the hospital:

Segregation should start at the source of generation and by the generator itself.

Transportation of black and yellow bags should preferably be done separately to avoid mixing of waste.

Transportation should be done in closed trolleys and by separate routes.

Sensitization of waste generators and health care providers should be done more frequently and separate sensitization programmes should be organized for sweepers and fourth class health care workers in local

language emphasizing the importance of using personal protective measure and immunization for Hepatitis B.

Last but not least is effective implementation of rules by surprise visits and inspection by appropriate authorities and fixing accountability of each and every person involved in management of biomedical waste.

**Conflict of Interest:** Nil

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