EVALUATION OF BIOMEDICAL WASTE MANAGEMENT PRACTICES IN MULTI-SPECIALITY TERTIARY HOSPITAL

Shalini Srivastav*, Peeyush Kariwal*, Atul Kumar Singh*, V.P Shrotriya**

Assistant Professor*, Professor and Dean**

Department of Community Medicine SRMS-IMS, Bareilly

ABSTRACT :

Background : *Biomedical Waste (BMW) collection and proper disposal has become a significant concern for both the medical and the general community. 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.*

Objectives :

(i) To assess current practices of Bio-medical Waste management including generation, collection, transportation storage, treatment and disposal technologies in tertiary health care center.

(ii)To assess health and safety practices for the health care personnel involved in Bio-Medical waste Management.

Materials and Methods : *Waste management practices in tertiary care-centre was studied during May 2010 June 2010.The information / data regarding Bio-Medical 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.*

Results : *SRMS-IMS generates 1.25Kgs waste per bed per day and maximum waste is generated in wards. The institute has got separate color coded bins in each ward for collection of waste but segregation practices needs to be more refined. The safety measures taken by health care workers was not satisfactory, it was not due to unavailability of Personal protective measures but because of un-awareness of health hazards which may occur due to improper waste management practices. Thus it is concluded that there should be strict implementation of a waste management policy set up in the institute, training and motivation must be given paramount importance to meet the current needs and standard of bio-medical waste management.*

Keywords : *Biomedical waste management, Evaluation, Waste treatment facility.*

Introduction :

During 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"[1] According to "Biomedical Waste" (Management and Handling) Rules, 1998 of India means "any waste which is generated during the 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 I."[1]

Though 75-90% of the 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 nonhazardous, 10% infective and remaining 5% non infective but hazardous.[1]

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 650 bedded private medical college Sri Ram- Murti Institute of Medical Sciences Bareilly.

Study type : Observational study

Duration of Study : 1 May to 15 June 2010

Data Collection :

(i) The information / data regarding Bio-Medical Waste Management practices and safety was collected by way of semi structured interview, with the house-keeping in-charge of the 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 :

Bio-medical waste generation in SRMS-IMS Hospital depends on different sites, which includes:

Table 1

RECORD OF BIO-MEDICAL WASTE GENERATED / PER DAY IN KG.

S.NO.	Dept.	Black bag	Yellow bag	Red bag	Blue bag
1.	T.B chest	26	--	--	3
2.	Gynae ward	11	--	--	10
3.	Gynae OT/Labour room	6	8	20	4
4.	Ortho ward	28	--	9	18
5.	Pediatric ward	23	--	6	6
6.	NICU/PICU	5	--	5	3
7.	Cardiac / Cath. Lab	15	--	--	6
8.	Medical Ward	29	--	16	13
9.	ICU	34	--	13	13
10.	OT	32	16	10	17
11.	Central Lab	13	--	5	7
12.	OPDs	11	--	6	5
13.	Blood bank	9	--	9	5
14.	Others	124	22	99	100
15.	Total	820 Kg/day			

$$\text{Waste produced per bed per day} = \frac{\text{Mean waste generated per day}}{\text{No. of beds}}$$

$$= 1.5\ \text{kg}$$

This is in support of previous studies which suggests that most hospitals in India generate 1-2kgs per day, except the tertiary care hospital, which produce on higher side. In patient areas contribute to 71.6% of waste generated.

Table 2

OBSERVATION AT LEVEL OF SEGREGATION OF WASTE

S. No.	Dept.	Black Bag	Yellow Bag	Red Bag	Blue Bag
1.	Located at right place	Yes	Yes	Yes	Yes
2.	Placed on stand	No	Yes	No	Yes
3.	Contains waste as in schedule I	No			
4.	Respective bins fitted with closed fitting cover	No			
5.	Labeling of Bags as in Schedule III	Yes			
6.	Daily disinfection of bins with 1% hypochlorite solution	No			
7.	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 labeled accordingly as in Schedule III. However bins are disinfected once in 3-4 days. The waste generated in each ward is collected by in-service sanitation staff (sweepers) about 3-4 sweepers 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 BAGS

1.	Separate route for transportation of Waste	No
2.	Separate timings for transportation of BMW and general waste to avoid mixing of waste	Yes
3.	Covered wheeled trolleys used for transportation of bags	No
4.	Trolley used for transportation of BMW is labeled	Yes

The Bio-Medical 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

Bio-Medical waste collected each day is stored at a single dumping site near incinerator in a 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 PROTECTIVE 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 boot	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 Bio-Medical waste is rudimentary. Only 50% sweepers were using gloves while managing wastes, 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 workers 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-medical 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.	Accidents reported to higher authority	0	0

Regarding sensitization of Bio-Medical Waste management practices only 30% sweepers 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 x 4ft. after disinfection. The institute has incinerator plant for management of yellow bags and red bags. The black bag is dumped in the pit.

Discussion :

SRMS-IMS generates 1.5Kgs 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 2.02Kgs. Inpatient area generated maximum solid waste (71.6%) followed by supportive services. Other areas like Operation Theatre, Emergency and O.P.D together produced lesser amounts (12.9%).[2]

Chauhan and Malviya (2002) analyzed solid waste management practices in sixteen hospitals of Indore city and found that hospital authorities think that their basic responsibility is to take care of the health of the patients whereas the waste disposal in an environmentally compatible manner has been given a low priority.[3]

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.[4]

These findings are in agreement with those of Nema 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.[5]

Conclusion :

Though the waste management practices in the hospitals is far better than other hospitals in state. The institute has taken the authorization 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 is rudimentary. Only 50% sweepers were using gloves while managing wastes, 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 workers were immunized for Hepatitis B. Regarding sensitization of Bio-Medical Waste management practices only 30% sweepers 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 bag should preferably be done separately to avoid mixing of waste.
- Transportation should be done in closed trolleys and by separate route.
- Sensitization of waste generators and health care providers should be done more frequently , and separate sensitization programs should be organized for sweepers and fourth class health care workers , in local language emphasizing the importance of using personal protective measures 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 Bio-Medical waste.*

References :

1. Biomedical Waste (Management and Handling) Rules 1998, 2000, Ministry of Environment and Forests Notification, New Delhi
2. Pandit NA, Tabish SA, Qadri GJ, Ajaz Mustafa.Biomedical waste management in a Large teaching hospital. JK-Practitioner 2007;14(1):57-59
3. Chauhan, Maya Singh and Kishore Malviya: Existing solid waste management in hospitals of Indore city. Indian J. Environ. Sci., 6,43-49 (2002).
4. Sharma Shalini, Chauhan SVS. Assessment of bio-medical waste management in three apex Government hospitals of Agra. Journal of Environmental Biology March 2008;29: 159-62
5. Nema, S.K. and K.S. Ganeshprasad: Plasma pyrolysis of medical waste. Curr. Sci., 83, 271-278 (2002).
6. Kedar Rijall and Ashok Deshpande. Critical Evaluation of Biomedical Wastes Management Practices in Kathmandu Valley. Proceedings of the International Conference on Sustainable Solid Waste Management 5 - 7 September 2007, Chennai, India. pp.

❖ ❖ ❖

Laughter is medicine

for the heart.