

Assesment of bio-medical waste generated in Government hospitals, Agara city (India)

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Abstract

Bio-medical wastes include anatomical, pathological and clinical infectious/ hazardous organic and inorganic wastes. These wastes are disposed off in unscientifically manner. The study has been conducted in the government healthcare establishment only to reveal the per day waste generation on each patient, present mode of waste management within the units and our suggestions which has helped the units to improve their waste management practices, in the city of Agra.

Keywords:- *Waste management, Healthcare waste, Management, Government hospital, Bio-medical waste*

Introduction

Bio-medical waste can be defined as the total waste stream that is generated from healthcare establishments, health related research facilities, laboratories and emergency relief donations. Hospitals, clinics, laboratories, medical research centers, pharmaceutical manufacturing plants, pharmacies, blood banks, veterinary healthcare centers and home healthcare activities are some of the generators of healthcare waste.

Bio-medical waste generated from diagnosis activities can be broadly categorized as general waste and hazardous waste. This, however, remains true only when proper segregation and separation of waste is practiced according to type at the source. There are different estimates regarding the share of hazardous and non-hazardous constituents of healthcare waste. Tietjen *et al.* (2003) also held that 85% of the waste produced in hospitals and clinics is non-contaminated and poses no risk of infection. On the other hand, WHO (2000) reported that from the total waste generated by healthcare activities, 80% is general waste and the balance is considered as hazardous, as it tends to be infectious, toxic or radioactive.

The total 10,000 approximately beds of healthcare units are located in Agra. Out of which 35% is from government sector and rest 65% is from private sector. Approximately 25,000 kgs of hospital waste is produced every day out of which 70-75% is non-infectious wastes, 20-25% infectious wastes and 05-10% is hazardous wastes. Out of which most of the hospitals, nursing homes and pathological laboratories are disposing off the waste in their neighborhoods due to lack of awareness, inadequate services, limited utilization of existing facilities, lack of adequate institutional arrangements, operation inefficiencies & nodal authorities inefficiency in performing their task effectively etc. but few take proper care of their wastes. The present study aim to the total waste generated in government hospital and their effective management of proper disposal of these waste.

Materials and Method

The study was carried out in three government hospitals i.e. District Hospital, Sarojini Naidu Medical

College, & Hospital and Lady Loyal Hospital, Agra. The Total waste was calculated by taking sample of everyday during study period (i.e. April, 2006). Sample was collected 24 hrs from each sampling unit in different colour coded polythene bags i.e. Yellow, Red and Blue. Yellow bag contain Human tissue, Organs, Body parts, Animal tissues, Carcasses, Bleeding parts, Fluid, Blood and Experimental animals used in research, veterinary hospital waste, animal houses, waste from laboratory, cultures and stocks etc. Red bag contain human and animal cell culture, waste from production of biological toxins, items contaminated with blood and blood fluid including cotton, dressing, soiled plaster casts, linen, bedding and wastes generated from disposal item other than sharps etc. Blue bag contain needles, syringes, scalpels, blades, glass, tubing, catheters, intra-venous sets etc. Total waste per day and per bed per day at each study site was calculated by division of total waste per month per day and waste per day division of total no. of bed of each site.

Results and Discussion

Results showing the hospital waste generation in three government hospitals in Agra city. In these hospitals, the total medical waste composite such as radioactive waste 2%, bottle broken glass 16%, needles sharpeners 6%, body parts 5%, miscellaneous 1%, plastic 10%, cardboard 2%, bandage swabs, cotton, cloths 9%, paper 3% and other wastes 46% (Fig. 1). The waste generation per month was observed to 14489.3 kg, 758.4 kg and 15016.37 kg at S.N. Medical College & Hospital (S.N.M.C.&H.), M.G. Road, Lady Loyal Hospital (L.L.H.), Raja ki Madi and District Hospital (D.H.), Sayee Ki Takia of Agra city (Table 1 & Fig. 2) and the average waste generation per day at source was found to be 25.28 kg, 482.9 kg and 500.54 kg at L.L.H., S.N.M.C.&H. and D.H. as shown in Fig. 3. An average waste generated per bed per day was found 4.49 kg/bed/day at S.N.M.C.&H., 0.12 kg/bed/day at L.L.H. and 4.20 kg/bed/day at D.H. respectively (Table 1 & Fig. 4). The healthcare waste produced in different healthcare unit are found within limit (0.5-2 kg/bed/day) describe in CPCB guideline Kishore and Ingle (2004), Acharya and Singh (2000) and Patil and Shekdar (2001). Rampal *et al.* (2002) also observed the generation of solid waste per capita per day and average solid waste generation per day along with qualitative composition of solid waste; moreover Sharma (2002) also reported that between 75% and 90% of the waste produced by healthcare facilities is general waste, comparable to domestic waste.

Table-1: Healthcare waste generated by government healthcare units in Agra City

Name of Healthcare unit	Total no. of beds	Total waste generated per month (kg)	Average waste generation per day (kg)	Average waste generation per bed per day (kg)
S.N.M.C. Hospital	976.00	14489.30	482.90	4.49
Lady Loyal Hospital	200.00	758.40	25.28	0.12
District Hospital	119.00	15016.30	500.54	4.20

The average generation of waste/month by the government three healthcare units in Agra was observed in yellow bag, red bag and blue bag. The yellow colour bag waste generated/month was observed 514.12 kg at L.L.H., 5811.77 kg at DH and 7751.3 kg at SNMC&H and the total waste generated/day in between 17.13 kg at L.L.H., 193.7 kg at DH and 258.3 kg at SNMC&H respectively (Table-2 & Fig. 5 & 6).

Table-2: Healthcare waste generated per month and per day by government healthcare units in Agra City

Colour code	Waste	S. N. M. C. Hospital	Lady Loyal Hospital	District Hospital
Yellow	Total waste generated/month (kg)	7751.3	514.12	5811.77
	Total waste generated/day (kg)	258.3	17.13	193.7
Red	Total waste generated/month (kg)	4352	156.5	5011.35
	Total waste generated/day (kg)	145.06	5.21	167.04
Blue	Total waste generated/month (kg)	2386	87.8	4160.6
	Total waste generated/day (kg)	79.53	2.92	138.68

The red colour bag also containing total waste generated/month was observed 156.5 kg at L.L.H., 4352 kg at SNMC&H and 5011.33 kg at DH and the total waste generated/day 5.21 kg at L.L.H., 145.06 kg at SNMC&H and 167.04 kg at DH respectively. The blue bag observed total waste generated/month was observed 87.8 kg at L.L.H., 2386 kg at SNMC&H and 4160.6 kg at DH and the total waste generated/day 2.92 kg at L.L.H., 79.53 kg at SNMC&H and 138.68 kg at DH respectively (Table-2 & Fig.5 & 6). This waste dumped without proper disposal or incinerated. Fikru (2004) also observed that the open burning of waste in holes or similar enclosures (45%) and incineration (43%) were the most common types of waste disposal methods for sharps waste and in 33% of the health facilities, the dumping of waste in unsupervised areas and/or open burning as well as the inappropriate use of incinerators are the commonest malpractices that often meet the eyes. Yemane & Millogo (2000) also reported that 38% of the waste management consisted of burning, 32% done using holes or similar enclosures; sharps and other wastes were dumped using open ground or otherwise unsupervised containers in 30% of the healthcare facilities. Furthermore, the report revealed that among the health centers using incinerator, 50% of them dumped sharps openly and rather nonchalantly, resulting in the conspicuous presence of sharps laying here and there around the health centers in 49% of the places visited. Disposing used syringes in open places and the belief that used syringes are not harmful are widespread among the communities studied and awareness on where to dispose of used needles and syringes are found to be very low was described by Solomon (2005). Consequently, sharps are observed relegated in open containers, exposing personnel and the rest of the public to needle stick injuries in 61% of the facilities.

Recommendations

- 1) What method use for waste segregation. To appoint a well knowledge staff for separate collection, transport, treatment and proper disposal of infectious healthcare waste.
- 2) To store waste at site, including the specification of the bins (colour, size, type etc. according The Biomedical Waste (Management & Handling) Rules 1998/2000).
- 3) To develop a time table for proper waste collection and transportation at dumping site.
- 4) Proper procedures to consider for waste storage and treatment

- 5) Given protective clothing to worn and safety measures to be practiced by waste collectors.
- 6) Recycle non-hazardous waste by separating the waste into organic and inorganic factors, selling the inorganic waste and making compost from organic waste.
- 7) Regular monitor the waste management practices in the hospital and evaluate the performance of the system time to time.
- 8) Contact the municipality for separate collection of hazardous and non-hazardous waste. If municipal service is not available, make arrangement for treatment and disposal of hazardous waste.

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