

STUDY OF BIO-MEDICAL WASTE GENERATION AND MANAGEMENT IN VARIOUS HOSPITALS IN DAVANGERE CITY OF KARNATAKA, INDIA

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Abstract:

This research article is to survey the practice of biomedical waste such as collection, storage, transportation and disposal along with the amount of generated biomedical waste in various hospitals in Davangere city, and create awareness among the staff and patient about biomedical wastes. The survey result on biomedical waste generation, disposal and methods adopted in various hospitals of Davangere city are discussed.

Keywords : Biomedical waste, Hospital waste, Davanagere city.

Introduction :

The biomedical waste is the waste that is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining there to, or in the production or testing of biological components. Hospital is one of the complex institutions which are frequented by people from every walk of life in the society without any distinction between age, sex, race and religion. This is over and above the normal inhabitants of hospital i.e. patients and staff. Biomedical waste is mainly classified as biological and non biological waste, some waste may be infectious or non infectious. Operation theatre, Intensive care units, dialysis room, Laboratory, corridor etc are main location of source of waste in health care. Improper medical waste management is alarming and it poses a serious threat to public health. Medical waste contains

highly toxic metals, toxic chemicals, pathogenic viruses and bacteria (Chintis et al, 2004). This can lead to pathological disinfection of the human body (Ray 2005). Medical waste poses high risk to

doctors, Nurses, technicians, sweepers, hospital visitors and patients due to arbitrary Management (Becher et al, 2002).

The Biomedical waste treatment and disposal are to be done very carefully, as it is infectious in nature. Considering the then level of information and knowledge, the Government of India has specifically laid down the treatment and disposal options. All health care institutions are required to follow this without fail. As per the Rule, the biomedical waste has to be treated and disposed of in accordance with options suggested under Schedule I, and in compliance with the standards prescribed in Schedule V of the Rule.

Any biomedical waste treatment system should comprise of segregation at source, storage in colour coded containers, systematic collection, transportation to treatment site, treatment considering the type of waste and disposal considering the type of waste. Segregation of biomedical waste is based on the category of waste. Storage and collection of waste in colour-coded containers is based on the treatment adopted. The treatment options for biomedical waste as per the schedule I of the Rules are incineration, deep burial, autoclave, microwave, chemical

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treatment, destruction and shredding, and disposal in secured landfills. Disinfection refers to procedures, which reduce the number of microorganisms on an object or surface but not the complete destruction of all microorganisms or spores. Sterilization on the other hand, refers to procedures, which would remove all microorganisms, including spores, from an object. Sterilization is undertaken either by dry heat (for 2 hours at 170oC in an electric oven - method of choice for glass ware and sharps) or by various forms of moist heat (i.e. boiling in water for an effective contact time of 20 minutes or steam sterilization in an autoclave at 15 lb/sq inch at 121oC for 20 minute

Methodology :

Following Hospitals are selected for surveying the biomedical waste in Davangere city

- 1 Government Hospital -CJ Hospital (CJ) 540 beds
- 2 Private Hospital -Bapuji Hospital (BH) 350 beds
- 3 Private Hospital City central Hospital (CCH) 200 beds
- 4 Private Hospital –Sparsha hospital (SH) 120 beds

Methods of storage and segregation at ward, department, internal transportation, external transportation and final disposal were studied for all 4 hospitals by direct observation and infrastructure for the same were studied. Informal discussion with various hospital functionaries were carried out. Common regional facility for final disposal of infectious waste was also studied. Wastes generated in four hospitals (Table 1) were weighed during a week for each hospital in three shifts for a period of one month. Interviews with the committee member of hospitals, workers, and training them all segregated wastes according to types of bio medical waste.

Result and Discussion :

Table 1: Rate of Waste Generation and Hospital Waste in Davanagere city.

Hospital code	Number of bed	Generation rate (day/bed/kg)			
		-Non infectious	Infectious	Sharp	Total
CJ	540	2.11	4.21	0.6	6.92
BH	350	.034	0.70	0.20	1.24
CCH	200	0.12	0.67	0.06	0.85
SH	120	0.18	0.23	0.01	0.42

Non-infectious, infectious and sharps wastes from out-patient and in-patient services in hospitals were collected separately and weighing with accurate scales each types of waste were recorded on special data form. Following these procedures, the wastes were transported to a special site for storage and final disposal. The data collected through the questionnaires and the quantities of infectious, non- infectious and sharp wastes were tabulated and analyzed in terms of kg/bed/day . These data were used to determine the quantities of wastes generated by each ward of hospital. The data was tabulated, coded and analyzed. Segregation of waste at source including radioactive, infectious, non-infectious and sharp waste with proper color coding were done in all hospitals and stored in separate containers. Pharmaceutical waste and cans packed under pressure were disposed along with infectious waste in all hospitals. Liquid pharmaceutical waste was poured into the sewer. The study revealed that the total amount of waste generation rate (Table 2) in all hospitals Was 9.43 kg/day , which includes 2.75kg (29.0 percent) of Non-infectious waste 5.81kg (61.6 percent) infectious waste and 0.87 kg (9.2 percent) sharp waste. And the average of waste generation rate in the hospitals was estimated to be 2.35kg/bed/day which included 0.68 kg/bed/day non-infectious waste, 1.45Kg/bed/day infectious waste and 0.21kg/bed/day sharp waste.

The results revealed that in all hospitals, the wastes were collected at the morning of each day, and then collected wastes were transported to a temporary storage area by the hospital staff. The medical wastes were collected by trolley. The staff employed for handling the wastes in all hospitals used personal protective equipment with Apron, gloves mask and boots Containers (trolley) with coding and capacity 250 liters that have cover were used in all hospitals. At the morning waste are moving it outside of wards in hospitals and cleaning staff knot bags and collected all bags that existed in different coding containers (A for infectious, B for non-infectious and C for sharps) manually and transported to the containers located outside of ward and then moving these

containers to storage room. It is observed that in some hospitals cleaning workers collected all infectious and non-infectious waste and closed the corner of wards before transporting wastes to containers outside wards.

In this study, private hospital used incineration for almost sharps, placenta and waste of patients that have Hepatitis. Incinerator had problems with regard to temperature, height of the smoke stack and rate of smoke production, and some personnel and workers had complained about smoke and bad smell due to incineration of waste. Waste transportation from hospitals was done in Davanagere Municipality and the waste Containers had 250 liters capacity and person who carrying infectious waste have protective Clothes Including boots, musk, gloves, uniform with white colure that carrying waste of hospital every day. Sharps and infectious waste were buried in the final disposal site in specific burial sites outside of the city. Non-infectious waste was treated and as house garbage by Municipality. All hospitals disposed of their non-infectious wastes at the site of municipal garbage And the infectious and sharps wastes Were buried in pits and covered with clay and lime at specific landfills sites or burial site of the city.

Table 2 : Waste generation rate (kg/bed/day) in Davanagere hospital

Hospital (day/bed/kg)	Mean waste generation rate			
	Non-infectious	Infectious	Sharp	Total
Government	2.11	4.21	0.6	6.92
Private	0.64	1.6	0.27	2.51
Total	2.75	5.81	0.87	9.43

Conclusion :

According to survey of biomedical waste in Hospitals of Davanagere city it was found that conditions of biomedical waste management in the Bapuji hospital Davanagere were better as compared to other three hospitals. Hospital personnel were trying to meet the current needs and standards. It also observed in lack of awareness , and Improper waste management systems in all health-care establishments to protect general health and

environmental condition, so it requires to involving the handling, storage, transport, treatment and disposal of wastes management by proper methods to minimize the risk of health hazards. Segregation and collection practices of bio-medical waste still needed some improvement even at this hospital. In the present investigation it was observed that most of the authorities, administrators and other hospital staff were not concerned about the damage to society and the environment around them due to in appropriate handling and disposal of biomedical waste. Lesser amount of bio-medical waste means a lesser burden on waste disposal work. Cost saving and efficient waste disposal system is necessary. Hence, hospital should providers always try to reduce waste generation in day-to-day work in hospitals.

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