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RESEARCH ARTICLE

BIO-MEDICAL WASTE MANAGEMENT IN THE LOCAL PLANNING AREA OF MYSORE CITY

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Abstract

Medical wastes are among hazardous wastes and their disposal requires special methods prior to landfilling. Careless handling and disposal of these infectious wastes may lead to serious threat to the life of humans as well as animals. The present study deals with the practices of managing the bio-medical wastes at the health care units in the local planning areas of Mysore city. The staffs of various major hospitals who handle these waste lacked the proper training. It was observed that Colombia Asia Hospital was the largest generator of autoclavable and shreddable waste whereas K.R.Hospital was the largest generator of incinerable waste in the year 2013. M/s. Shree Consultant has been given the responsibility for the collection, transportation, treatment and disposal of Bio-Medical Waste in Mysore City. Frequent training to the staffs handling these waste and stringent instructions and follow-ups by the management would help manage these wastes at source.

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Introduction:

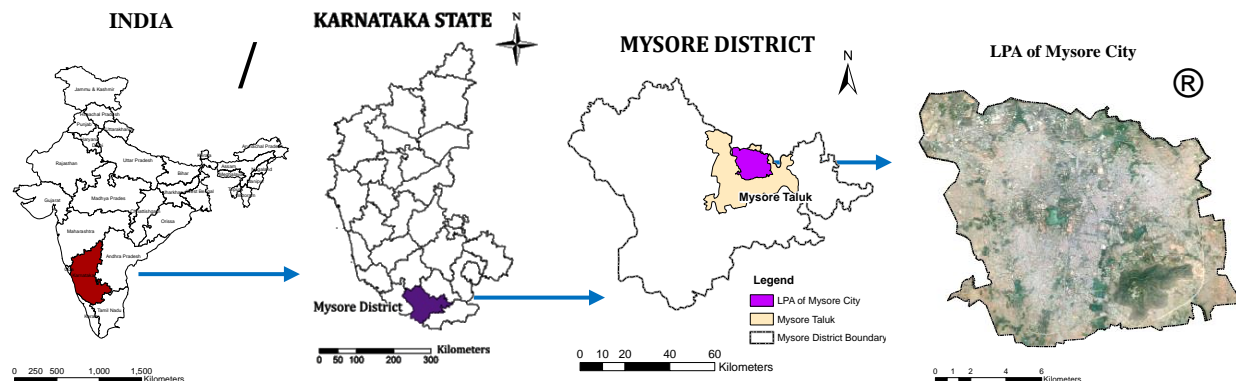
Rapid urbanization and industrial diversification has led to generation of considerable quantities of municipal, plastic, hazardous and biomedical waste. Improper disposal of waste often results in spread of diseases and contamination of water bodies and soils. Biomedical wastes are defined as waste that is generated during the diagnosis and treatment of human beings or animals and in research activities. About 75% to 90% of these wastes are non risk and only 10-25% of them are regarded as hazardous.

Usually medical waste is mixed with the municipal waste in the waste bins at the roadside and is disposed off in a similar fashion. However, most of the countries have the equipment to dispose medical waste as per the WHO norms, but the attitude of the municipal staff and training of these personnel is the concern area. Solution lies in the proper training of the hospital staff to segregate the waste and by training the municipal staff regarding the disposal of such waste (Rudraswamy S, et. al. 2013). Safe and effective management of waste is not only a legal necessity but also a social responsibility. Lack of concern, motivation, awareness and cost factor are some of the problems faced in the proper hospital waste management. (Hegde V, et. al., 2007)

Study Area:

Mysore as a historic capital had been the main administrative town of Wodeyars. Mysore is main tourist attraction in the region and caters to major tourist inflow in the state. Mysore is located about 140 km from Bangalore and well connected by rail and road to parts of the state and the country. The region lies on the Deccan plateau, east of the hilly Malenadu region, which includes the eastern foothills of the Western Ghats range. The LPA consists of gently rolling plains, punctuated by several of the large rivers that rise in the Western Ghats and flow eastward to empty

into the Bay of Bengal. Mysore region, also known as the Southern Karnataka Plateau, is made up of the low rolling granite hills from 600 to 900 meters elevation. It is bounded on the west by the Western Ghats and on the south and east by ranges of hills, and on the north it drops to the lower-elevation northern Maidan. The minimum temperature in winter is around 15°C and in summer, the maximum temperature is around 35°C. Mysore gets most of its rains during the monsoon between June to September.



Map: Location Map of Mysore City

Bio-Medical Waste Management:

Improper hospital waste management results in air, water and soil pollution, especially due to imperfect treatment and faulty disposal methods. Decomposing waste may generate foul odour inside the hospital premises and the surrounding areas. Waste dump may attract stray animals and birds that might spread waste materials leading to unhygienic environment. Uncontrolled and open burning of wastes will pollute the air. Hospital waste till recently was not managed but simply disposed off which would mix up with municipal waste and cause environment hazards. These rules are applicable to the Hospitals, Nursing Homes, Veterinary Institutions, Pathological Laboratories and Clinics, Blood Banks, etc. generating bio-medical wastes. The Municipal body of the area cannot pick up and transport untreated bio-medical wastes generated in the hospital and nursing homes.

Categories of Bio-Medical Waste:

According to Bio Medical Waste (Management and Handling) Rules, 1998, the bio-medical waste was categorized into ten categories. The amendment in 2011 reduced the categories into eight as shown in Table 1.

Table: 1: Categories of Biomedical waste

Cat. No.	Category	Types of Waste
Category 1	Human Anatomical Waste	Human Tissues, Organs, Body parts
Category 2	Animal Waste	Animal tissues, organs, body parts, bleeding parts, fluids.
Category 3	Microbiology and Biotechnology	Laboratory cultures, specimens, vaccines, culture, dishes and devices used for transfer of culture.
Category 4	Waste sharps	Needles, Syringes, Scalpels, Blades, Glasses etc. This will include both used and unused sharps.
Category 5	Discarded Medicines	Cytotoxic drugs.
Category 6	Soiled wastes	Items contaminated with blood, and body fluids including cotton, dressings, soiled plasters, lines beddings.
Category 7	Solid Waste	Generated from disposable items other than sharps like catheters, intravenous sets.
Category 8	Chemical waste	Chemical used in production, chemicals used as disinfection, as insecticides.

The bio-medical wastes are to be carefully handled and disposed in the color-coded containers maintained by each health care unit. The color-coding for the segregation of all categories of waste at source is shown in Table 2.

Table: 2: Color Coding for the containers of Bio-medical Waste in Health Care Units

Color coding	Type of container	Waste category
YELLOW	Plastic bin with Biohazard logo. Yellow plastic non chlorinated liner	Anatomic waste, Animal wastes, Soiled wastes, Discarded medicines
RED	Plastic bin with biohazard logo and red liner non chlorinated liner	Microbiology, Sharps, Solid wastes, (contaminated plastic)
BLUE	Plastic bin with blue plastic liner	Chemical waste
BLACK		Municipal wastes

Source: Central Pollution Control Board

M/s. Shree Consultants Pvt. Ltd. is authorized to run a Common Bio-medical Waste Treatment Facility (CBWTF) for the collection, transportation, treatment and disposal of bio-medical waste from all the Health Care facilities in Mysore City since the year 2002. The civic authority has made it compulsory for all the health care units to tie up with M/s. Shree Consultants for the management of Bio-medical waste. Their treatment and disposal facility is situated in Varuna Village near the city. Each health care unit are given four colour-coded containers for the waste to be segregated at source and for the safe transportation.

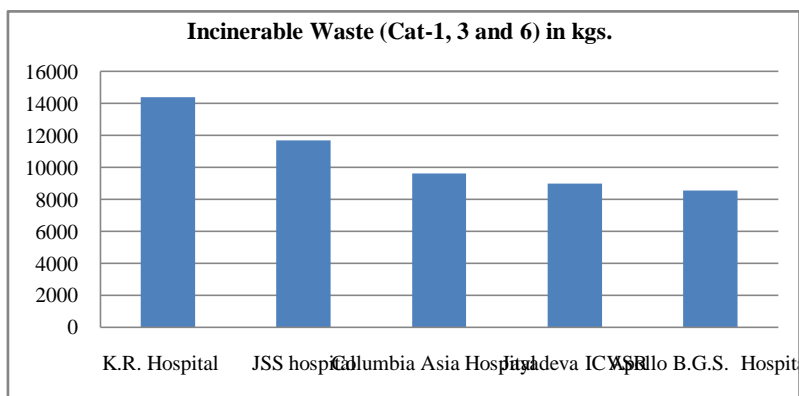
As the categories of bio-medical waste has been altered in the amendments in Bio Medical Waste (Management and Handling) Rules, 1998 and the categories have been reduced to eight, the staffs handling these waste are found confused. The City Corporation handles the black colour container carrying the municipal waste and the Shree consultants transport the other three coloured containers. The process of incineration, autoclaving and shredding are carried out for different categories of bio-medical waste at the CBWTF.

Incineration:

Incineration is a controlled combustion process where waste is completely oxidized and harmful microorganisms present in it are destroyed/denatured under high temperature. Incineration is one of the oldest methods for treatment of medical wastes, but their usage have faced wide objections due to emission of hazardous gases such as CO₂ and CO as well as Carcinogenic gases such as Dioxins and Furans which are generated as a result of incomplete combustion of compositions like PVCs (Ferdowsi A et.al., 2013).

Table: 3: List of largest generators of incinerable waste in the year 2013

Name of the Hospital	No. of beds
K.R. Hospital	1050
JSS hospital	1200
Columbia Asia Hospital	100
Jayadeva Institute of Cardio Vascular Science and Research	600
Apollo B.G.S. Hospital	200



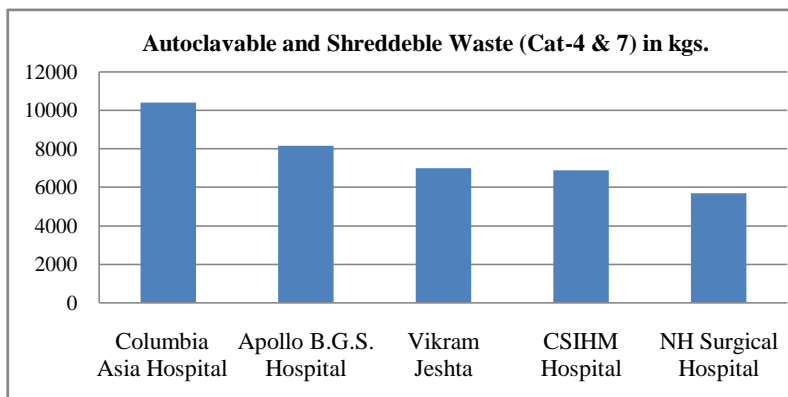
Health care facilities from Mysore Taluk contributed to 1,96,178.41 kgs of incinerable waste (Cat-1, 3 and 6) in the year 2013. K.R.Hospital with 1050 beds generated the largest quantity of incinerable waste among all the health care units within the LPA of Mysore City in the year 2013.

Autoclaving and Shredding:

Autoclaving is a low-heat thermal process where steam is brought into direct contact with waste in a controlled manner and for sufficient duration to disinfect the wastes. Shredding is a process by which waste are de-shaped or cut into smaller pieces to make the wastes unrecognizable. It helps in prevention of reuse of bio-medical waste and acts as identifier that the wastes have been disinfected and are safe to dispose off.

Table: 4: List of largest generators of autoclavable waste in the year 2013

Name of the Hospital	No. of beds
Columbia Asia Hospital	100
Apollo B.G.S. Hospital	200
Vikram Jeshta	104
CSI Holdsworth Memorial Hospital	280
Narayana Hrudayalaya Surgical Hospital Pvt Ltd	100



Health Care Facilities in Mysore Taluk generated 1,34,370.53 kgs of autoclavable and shreddable waste (Category 4 and 7) in the year 2013. In the Local Planning Area of Mysore City, Columbia Asia Hospital having 100 beds has generated the largest quantity of autoclavable and shreddable waste (10,402 kgs.) in the year 2013. Among all the health care units, the five largest generators of these wastes in the year 2013 are listed in table 4. After the process of incineration or autoclaving and shredding, these are disposed in the landfill sites and the plastics are sold to the recyclers permitted by the Pollution Control Board.

Conclusion:

It is the responsibility of the health care units to provide segregated waste to the CBWTF. The observations at the hospitals revealed that the staffs lack awareness of the proper handling and segregation of Bio-medical waste. The hospital management must create an infection control committee to monitor the Bio-medical waste handling within their hospitals. They must provide adequate training for all the staffs involved in handling waste and keep them updated on the amendments in the rules. The managements must conduct pre-tests to the staffs to assess the need and emphasis of the training and post-tests after the training. The vehicles transporting the Bio-medical waste were in unhygienic conditions. The authorities must ensure proper care in handling and transporting these wastes. These wastes have to be collected regularly based on their categories. The bio-medical waste must be managed with utmost care so that the waste of the sick shall not contaminate the lives of the healthy.

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