# A Study of Disposal System of Biological Degradation And Hospital Waste in Private Hospital of Amravati City

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**Introduction:**

With rapid urbanization and ever increasing population growth there has been a substantial increase in the generation of hospital solid waste &contamination of air, water and land resources. The hospital solid wastes from different hospital is not managed properly, have been creating problems for human health and environment. Some of the hospital wastes have been proved to be extremely toxic and infectious. The uncontrolled dumping of such wastes have not only brought about increasing number of incidents of health hazard but also causing the surface and ground water contamination and thus posing serious environmental threat to the human being. The advent of waste of “disposable” in the hospitals has brought in its wake attendant ills, that is, inappropriate recycling, unauthorized and illegal reuse and increase in the quantum of waste.

***Waste can be defined as any unwanted residual matter arising from the hospital or activities related to the hospital. Bio-medical waste is defined as ‘any solid of liquid waste including its containers and any intermediate product, which is gathered during the diagnosis treatment or immunization of human beings or animals in research pertaining there to, or in the production or testing’’.***

This hospital solid waste can be classified into 8 main categories; general wastes, pathological wastes, radioactive wastes, chemical wastes, infectious and potentially infectious wastes, sharps, pharmaceutical waste and pressurized containers. The quantity of hospital waste and proportions of infection waste is definitely higher than one would expect in India due to extensive use of medical and non-medical disposals. Most of the waste generated in hospitals, including food waste is no more hazardous than general municipals waste. Therefore, hospital waste should be segregated into risk wastes and non-risk wastes and disposed off accordingly. The last century witnessed the rapid mushrooming of hospitals in the public and private sector, dictated by the need of the expanding population, and the advent and acceptance of “disposable” has made the generation of hospital waste a significant factor in present hospitals. In India, the rate of generation of hospital waste is estimated to be 1.59 to 2.2 kg/day/bed and out of which 10-15% is found to be bio-medical waste.

Asurvey done in various city revealed that the quantity of solid waste generated in hospitals and nursing homes generally varies from ½ - 4 kg per bed per day. In government hospitals ½ - 2 kg bed per day, in private hospitals ½ -1 kg per day. The total quantity of hospital waste generated in various city is about 40 tones per day. The problem of bio-medical waste disposal in the hospitals and other healthcare establishments has become an issue of increasing concern, prompting hospital administration to seek new ways of scientific, safe and cost effective management of the waste, and keeping their personnel informed about the advances in this area. The need of proper hospital waste management system is of prime importance and is an essential component of quality assurance.

Though the major hospitals and health care establishments have started implementing poor waste management systems. There are a number of health care establishments, which dump their wastes in the municipal garbage dumps. Rack pickers, who can sort these wastes manually, to pick up plastics, disposable syringes and needles, other disposables like catheters, IV sets and tubing, regularly, visit these dumping sites. In the case of open dumping sites with open borders, wastes and their emissions are directly discharged in to the natural medium. This increases the contamination spread by air circulation and superficial and ground water flows and the health risks are increased due to men and animals having access to the site. These wastes pose numerous hazards and must be appropriately managed to avoid damage to the environment and human health. Inadequate waste management thus will cause environment and human health. Inadequate waste management thus will cause environmental pollution, unpleasant smell, growth and multiplication of vectors like insects, rodents and worms and may lead to the transmission of diseases like typhoid, cholera, hepatitis and AIDS through injuries from syringes and needles contaminated with human. Although there are no exhaustive documented studies on health hazards associated with poor hospital waste management, some indicators like progressive increase in hospital infection rate, increasing resistance to wide variety of antibiotics are the pointers to the way in which poor hospital waste management can contribute to the ill health plaguing the health care institutions.

The above problem i have decided to selected the topic ‘A study of disposal system of biological degradation and hospital waste in the private hospital of Amravati city’. The study was undertaken with few following objectives in mind –

**Objective of the Survey –**

1) Qualitative as well as quantitative assessment of biomedical wastes generated in different private hospitals in Amravati city.
2) Inventory of the existing system of storage, collection, transportation and disposal of private hospitals biomedical waste and identification of deficiencies in the respective management system.
3) To make comparative study of biological and biomedical waste management mechanisms adopted by private hospitals in Amravati city.
4) To find out the challenges and threats posed to the health and hygiene level of the patients, workers in the hospitals and the residents of the Amravati city.

**Methodology and data collection –**

The methodology followed and adopted for preparing the inventory and fulfilling the above objectives are as follow.

1. Collection of information through questionnaire.
2. Visits and interactions with concerned private hospitals in Amravati city.
3. Study of existing storage, collection, transportation, processing and disposal facilities of private hospitals in Amravati city of biological and biomedical waste. As well as future plan for betterment of the management system.
4. The data collected by questionnaire was tabulated and analysis tied by various statistical method as per requirement.

**Limitations:**

Lack of uniformities in the available information regarding solid waste management of different hospitals in Amravati city and also the time period for collection was the major constraint in survey report preparation.

**Study Area:**

Amravati city is located at $20.93^0$N $77.75^0$E. It has an average elevation of 343 meters. It lies 156 km west of Nagpur, and serves as the administrative center of Amravati District and of Amravati Division. The town is located near the passes through the hills that separate the cotton-growing regions of the Purna basin to the West and the Wardha basin to the East. There are two lakes in the eastern part of the city. Chhatri talao & Wadali Talao. Pohara & Chirodi hills are to the east of the city. The Maltekdi hill is inside the city, it is 60 meters high.

Amaravati has a tropical wet and dry climate with hot, dry summers and mild to cool winters. Summer lasts from March to June, Monsoon Season from July to October and winter from November to March.

The Amravati Municipal Corporation is headed by a Mayor who is assisted by the Deputy Mayor. Amravati Municipal Corporation was established on 15 August 1983. In August 1983 the area occupied by the Municipal Corporation was 121.65 $km^2$. The AMC comprises area of erstwhile Municipal Council, Amravati and area of erstwhile Municipal Council, Badnera along with eighteen revenue villages namely Navsari, Tarkheda, Shegaon, Rahatgaon, Mhasala, Wadali, Benoda, Jewad, Vadad, Mimbhora (K), Saturna, Akoli, Waruda, Kasbe, Badnera Mahajanpura, Gambhirpura and Amravati Peth. Now the total area of the city is 270 $km^2$ of which 181 $km^2$ falls under municipal limits and about 89 $km^2$ falls out off the municipal limits.

The city is having couple of government hospital and as many as 500 plus small to medium private hospital spread in the city out of which we selected few hospitals for data collections and analysis. Few are as follows – Arihant Hospital Dr. Bharat Shah, Belokar Hospital, Dr. Monali Dhole Gyancologist, Laparoscopic Surgeon Dr. Kela Hospital, Dr. Murkey Hospital, Dr. Arora Cancer hospital, Dr. Chandak's Hospital, Dr. Kulkarni's Accident hospital, Dr. Nagalkar Hospital, Hitech Critical Care & Bonde hospital, Parashree Speciality Hospital, Sushruit Hospital, Vyankatesh Hospital, Omkar hospital, Adwani hospital, Shobha patode hospital, Jahagirdar hospital, Manawar hospital, Vimal Thorat hospital, Dhahale hospital, Bhatiya hospital, Satish Tiwari hospital, Bankar hospital etc.

**Figure No. 01 Amravati City Map**


**Data analysis and Findings of the Study:**

The data collected through various (N25) questioners was visually analysied, tabulated and then statistically analised, graphically represented were ever necessary and the observation and conversation with the respondent few findings are put forth. -

A. From the observation the medical waste generated in the hospital is basically from four sources Operation theatre, Labour Room, Laboratory, Injection Room, Ward, OPD Store dressing room etc. and the information and the detail nature of the biomedical and other waste is given below in the table 1.

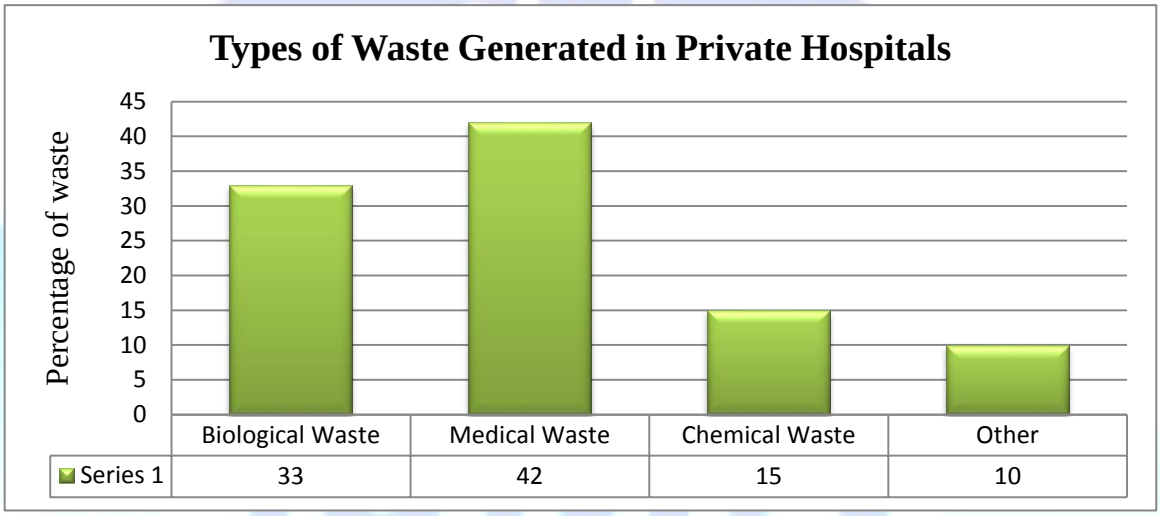
**Table: 1 Areas of waste generation and kinds of waste generated in the Hospitals**

| Sr. No. | Areas of Waste Generation | Activities Performed | Types of Waste Generated |
|---|---|---|---|
| 1 | Operation Theatre | Family planning procedures, cataract surgeries. Minor Surgical Procedures | Blood and body fluids, soiled waste, swabs, cotton, syringes and needles, blades, gloves and masks. |
| 2 | Labour Room | Child birth (Deliveries) | Placenta, blood and body fluids, soiled waste, cotton, swabs, syringes and needles, blades, tubings and IV sets masks and gloves |
| 3 | Loboratory | Malarial smears, TB testing and other essential laboratory services | Blood and body fluids, syringes and needles, gloves, slides, sputum and sputum cups, chemical waste and liquid waste |
| 4 | Injection Room | Immunization and curative injections | Syringes and needles, ampoules, vials, broken glasses, gloves and vaccine waste |
| 5 | Ward | In-patient services | Blood and body fluids, syringes and needle, slides, ampoules, vials, chemical waste, liquid waste, broken thermometer and soiled waste |
| 6 | OPD | Out-patient services, routine examination of patients | Blood and body fluids, syringes and needles, slides, ampoules, vials, broken thermometer, plaster cast chemical waste and liquid waste. |
| 7 | Store | Store | Discarded medicine |

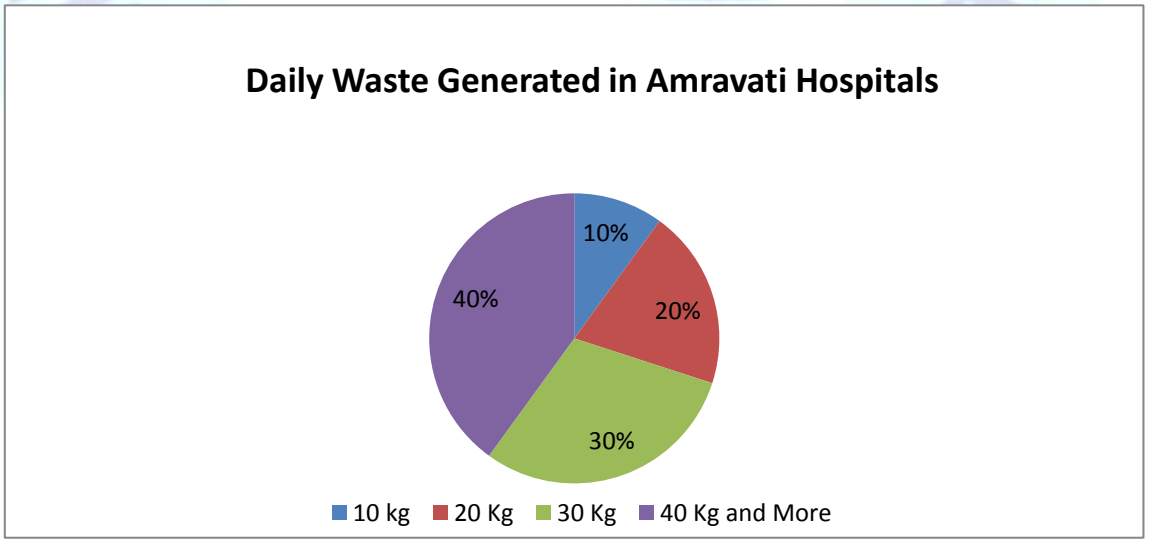
**B.** The biomedical waste generated in the hospital is managed in three levels for disposal as it is firstly segregated, secondly the waste is properly collected and stored in covered bins, later it is transported in closed containers and lastly before final disposal the waste is treated, disinfected and mutilated at proper isolated place.

**C.** From the study conducted by us the waste generated in the hospitals included 33% of Biological waste. 42% Medical Waste, 15% Chemical waste and nearly 10% other wastes. (detail in below graph).

**D.**




the private hospitals of Amravati on and average 85% hospital generate 10kg or less medical waste daily, while 8% hospitals generate 20Kg and 2% hospitals generate 40Kg or more medical waste is coming for disposal in environment and creating a serious problem for environmental health of Amravati city.



**E.** All the medical waste which is generated in these private hospitals are segregated properly by the hospital authorities. But these waste is properly collected in appropriate bags by only 75% hospitals, while 20% hospital collect them in certain boxes and 5% hospitals dispose the waste in common disposal system showing there lack of information and knowledge. So only 75% hospitals have appropriate colour bags to collect the medical waste.

**F.** Similarly in the private hospitals, only 67% hospitals have trained and separate person appointed for the collection of medical waste. While the remaining 33% hospital does not have trained and separate persons for the same.

**G.** From our findings and observations 33% of the hospitals have there own separate room or compartment for the management of medical waste. And at the same time all the hospitals have own incineration and autoclave for processing of medical waste.

**H.** In Amravati nearly 73% hospitals ensure the precautionary mechanism for the persons who collect the medical waste in the hospital. While only 46% of the hospitals have given special training to the appointed person who handle the medical waste of the hospital.

**I.** Amravati city has a uniform medical waste treatment and disposal system but the collection and transportation of these wastes is done by various agonies. As 66% of the medical waste is collected and transported by Global eco system, while 20% the medical waste is collected and transported by Municipal corporation and rest of the 14% waste is collected and transported by private contractors in the city.

**Recommendations & Conclusions:**

An old saying says “Cleanliness is next to Godliness”. The essence of this was aptly captured by Dravidians, who in 5000 BC gave due emphasis to immaculate town planning and safe and effective sewerage systems who got rid of all solid and liquid wastes generated by the pollution.

The modern hospitals and health care institutions including research centers use a wide variety of drugs including antibiotics, cytotoxics, corrosive chemicals, radio active substances, which ultimately become part of hospital waste. All round technological progress has lead to increased availability of health related consumer goods, which have the propensity for production of increased wastes. The issue of improper Hospital Waste Management in India was first highlighted in a writ petition in the Hon’ble Supreme Court; and subsequently, pursuant to the directives of the court, the Ministry of Environment and Forests, Govt. of India notified the Bio-Medical waste (Management and Handlings) Rules on 27$^{th}$ July 98; under the provisions of Environment Act 1986. These rules have been framed to regulate the

disposal of various categories of Bio-Medical Waste as envisaged therein; so as to ensure the safety of the staff, patients, public and the environment. But in Amravati city the Bio-Medical Waste Management policy is very rarely observed in few hospitals, so from my study isuggest some of the improvement in medical waste disposal system :-

- One should change the age old “Mind Set” and attitude through knowledge and raining of people concerned with disposal system.
- One has to defining the various categories of waste being generated in the hospitals as per their patients and available facilities.
- Segregation and collection of various categories of hospital waste in separate containers/bags, so the each category is treated in a suitable manner to render it harmless.
- Identifying and utilizing proper “treatment technology” depending upon the category of waste.
- City should create a system where all categories of persons from doctors, patient, common people, persons handling waste etc. are not only responsible, but also accountable for proper hospital waste management.
- One has to change the using patterns from single usage to multiple usage where ever possible for various materials generated in hospital.

**Points to be remembered by doctors and persons handling the Hospital waste.**

- Do segregate waste at point of generation to :
- Infection (b) Non-Infectious/Garbage (c) Sharps/Needles
- Do collect waste in color coded containers/bags
- Yellow – infectious waste for incineration.
- Black – Garbage for dumping in municipal bin.
- Blue (inner perforated) – Sharps/needles.
- Do decontaminate all sharps and plastic waste by chemical/autoclave.
- Do shared plastic waste (cut all tubes into pieces by scissors).
- Do use syringe and needle destroyer.
- Do incinerate blood soaked dressings/body parts etc.
- Do cover waste collection containers.
- Do transport through covered trolleys / vans.

- Doctors to Provide protective wear (mask, gloves, plastic aprons, gum boots to transporters and handlers.
- Doctors to should immunize all waste handling persons.

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**QUESTIONNAIRE**

**A Study of disposal system of biological degradation and hospital waste in the private hospital of Amravati city**

Please use √ mark to response to your answers –

1. Mention the types of waste generated in your hospital?

   A) Biological Waste B) Medical Waste C) Chemical Waste D) Other

2. How much waste is generated daily?

   A) 10kg B) 20 Kg C) 30 kg D) 40 kg and more

3. Do you have a process of segregation of waste?

   A) Yes B) No

4. If yes, how is it segregated?

   A) In box B) In C) 30 kg D) 40 kg and more

5. Do you have separate bags for collection and disposal of waste?

   A) Yes B) No

6. Do you have an incineration disposal mechanism of your own?

   A) Yes B) No

7. Have you appointed a special person to collect waste in your

   A) Yes B) No

8. Do you have separate room or compartment for the management of waste?

   A) Yes B) No

9. How is the waste disposed?

   A) Outside B) Inside the Hospital C) By giving contract

10. How do you dispose the disinfected medical waste?

    A) By Selling B) By Autoclaving

11. Have you ensure the precaution mechanism for the persons who collect the waste?

    A) Yes B) No

12. Have you provided special training to the appointed person?

    A) Yes B) No

13. Do you have any uniform collection system of waste in your city?

    A) Yes B) No

14. If yes, please state in brief…….

Signature of respondent
Number of Beds –
Name of the Hospital and Address -