

# APPLICATION OF BIO MEDICAL WASTE IN HOSPITALS AND ITS MANAGEMENT

## (A STUDY OF SELECTED HOSPITALS IN MADHYA PRADESH)

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### **ABSTRACT:**

Management of waste from hospitals, other health care facilities and health-related research laboratories, is not a new issue now, it has gained increased attention in recent years. There are certain issues which are not given weightage in due course of development. The world is now facing the problem of environment pollution, which is now a major issue. They have created the problems which may lead to the very human existence. One of these issues is bio medical waste which should not be ignored now. Unfortunately, the management procedures and practices in many Asian countries the facilities, mentioned those in other, do not have an appropriate methodology. Having recognized the need for improvement already in the late 1970s, particularly with respect to the hazardous component of the waste, the World Health Organization Regional Office for Europe has convened a special working group of experts to prepare a short manual of good practice, conducted training courses at the request of national health authorities, supported and co-sponsored conferences and, in co-operation with other organizations concerned, is planning to prepare and publish a handbook for worldwide use. These laid down the very first impression of the handling the waste generated by the hospitals.

Keywords: Hazardous materials, Health care, Hospitals, Toxic waste, Waste disposal.

### **INTRODUCTION:**

At the time of the creation of the World Health Organization (WHO), in 1948, Health was defined as being "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity". If a Machine is treated with care of given proper maintenance, it is more likely to fraction efficiently. Similarly, the human body is most likely to function to the best of its ability if it is kept fit and healthy. Therefore, the need of hospitals was needed.

The nature of medical treatment changed with the

development and growth of civilization in India. From the early times we use and followed Ayurvedic pattern of medicine while in eastern part of the world it was popularly used the methods of acupuncture and acupressure. These methods produce no or minute amount of waste which could be handed and disposed in simple way. Land filling was the most common and oldest way of waste disposal that is still in practice with slight modification.

The bio medical waste is a broader term applied to waste generated in the diagnosis, treatment or immunization of human beings or animals, in research or in production or testing of biological products. It also includes waste coming out of medical treatment given at home. The medical waste includes all micro organisms which have the potential to transmit viral, bacterial or parasitic diseases.

The government of India, Ministry of Environment and Forests, New Delhi wide notification dated 28th July 1998 had published the rules of bio medical waste management aiming at proper handling and disposing of bio medical waste generated by medical institutes like hospitals, nursing homes, clinics, pathological labs, animal houses etc.

Today rapid growth in health care facilities is being observed. The advanced health care facilities are always associated with increased in bio medical hazards. Therefore management of BMW is always an important part in the hospitals.

### **OBJECTIVES OF HOSPITAL**

#### **MANAGEMENT:**

In most hospitals, the overall goals or objectives include the following:

- 1) Reducing risks and liabilities;
- 2) Controlling costs;
- 3) Planning for the future;
- 4) Coordinating with the respective government department or institution for better waste management practices.
- 5) To study the social responsibility in public hospitals and ensure the involvement of private

hospitals in social responsibility part.

- 6) To suggest the measures and improvements in these areas: BMW, Disaster, HRD management.
- 7) To strengthen the basic health services through the establishments of primary health care centers and sub centers through public private partnership.

After having a view on the objectives of hospital management we come for the waste management areas. The main objective is to properly manage the BMW in MP. These goals according to waste reduction are further described as:

- a) Reducing the waste in the hospitals by using more of recycled products.
- b) Listing the harmful effect of waste to the community and people.
- c) An environment friendly approach for solving the problem of waste imitations.
- d) Present scenario of waste management in MP.
- e) Suggestion for future plans of waste disposal/ treatment options.

#### **METHODOLOGY**

The data have been collected from both the primary and secondary sources. The primary sources is field survey method and secondary methods includes the annual reports submitted by Regional Officers of MP Pollution Control Board and records obtained from Health Department of Govt. Of Madhya Pradesh. The existing data have been reviewed and a list have been prepared. The methodology included the number of beds in each hospital and category wise quantum of waste produced in selected hospitals. Literature survey was also included.

Sample size: Four districts (Bhopal, Jabalpur, Indore, Sagar)

#### **MAJOR FINDINGS:**

The following report is based on the Status Report of BMW of MP Pollution Board on 31st December 2007.

- a) Health care facilities(HCFs)  
Table I
- b) MP 14 common biomedical waste treatment facilities were working as on 31 december 2007.
- c) It was observed that except Bhopal, Jabalpur and Indore other districts like Sagar does not have appropriate management of BMW.
- d) The waste is not properly treated specially the solid waste it is been sold to scrape collectors/ kabadi.

Quantity of solid waste generated from health care

units:

- Table II
- Table III
- Table IV

#### **COMPUTATION OF DATA:**

The data of waste generated provided by various hospitals seems to be very less. According to the above available data it shows that the average waste generated by the hospitals is around 1 to 1.5kg/bed/day out of which 20 to 25 % is infectious in nature.

#### **TYPES OF HOSPITAL WASTE:**

There is high increase in use of technology for treatment as well as the disposal of the various kinds of waste. WHO have identified and classified the hospital waste into the following types:

1. General waste: These kinds of waste are largely generated from offices, administration, stores, kitchen, laundry etc.
2. Sharp: These includes the sharp ended
  - Hypodermic needles
  - Needles attached to tubing's
  - Scalpel- blades, razors, nails, etc
  - Broken glass pieces.
3. Infected Waste: These include the equipments and instruments used in various diagnostic and therapeutic procedures. Some of them are-
  - Laboratory waste like cultures, stocks and samples
  - Waste from surgeries like human tissues and organs removed during surgery
4. Chemical Waste: These are being generated in various labs and departments.
  - Fixer and developer used in radiology department
  - Various solvents used in labs which includes xylene, ethanol, methanol etc
5. Radioactive Waste: These are mainly generated from
  - Research activities
  - Clinical labs
  - Nuclear medicines labs
6. Cytotoxic Waste: Various anti cancerous drugs are being used for treating malignant conditions which are very harmful for human tissues and organs.

#### **Table V**

##### **NOTES: Yellow- Infectious waste**

Blue- Waste for auto carving

Red- Human anatomical waste for burial

Orange- Animal waste for disinfection and burial

Black- Non-infectious wastes for municipal

dumps

### **METHODS INVOLVED FOR SOLVING THE PROBLEM OF HOSPITAL WASTE:**

1. Coordination between hospitals and outside Agencies: The agencies which play a major role are as follows:
  - Municipal authority : As quite a large percentage of waste (nearly 85%), are generated in Indian hospitals, belong to general category (non-toxic and non-hazardous), hospitals either public or private should have constant interaction with municipal authorities so that this category of waste is regularly taken out of the hospital premises and are used for land fill or other treatment.
  - Co-ordination with Pollution Control Boards: The hospitals should search for better methods and technology, provision of facilities for testing, approval of certain models for hospital use in conformity with standards laid down in the acts.
  - To search for cost saving and environmental friendly technology for treatment of bio-medical and hazardous waste. Also, to search for suitable materials to be used as containers for bio-medical waste requiring incineration/ autoclaving/ microwaving.
  - Development of non-PVC plastics as a substitute for plastic which is used in the manufacture of disposable items.
2. Maximum use of recycle products: As far as possible, purchase of reusable items and recycled products like glass and metal should be encouraged. Select non PVC plastic items, they are not environment friendly. Adopt procedures and policies for proper management of waste generated, the mainstay of which is segregation to reduce the quantity of waste to be treated. Establishment of effective and sound recycling policy for plastic recycling and supplying it to authorised manufactures.
3. Renewal of the Committee: It is the responsibility of the administration or the head of the hospital to check the committee on time and to get it renewed as per time schedule laid down in the rules. Each hospital should constitute a hospital waste management committee, chaired by the head of the Institute and having wide representation from all major departments of the institution. This committee should be responsible for making Hospital

specific action plan for hospital waste management and its supervision, monitoring and implementation.

4. Proper and Timely Training: Each and every hospital must have well planned awareness and training programme for all category of personnel including administrators (medical, paramedical and administrative) working in the hospital. All the medical professionals must be made aware of Bio-medical Waste (Management and Handling) Rules 1998.
5. All Safety Measures are to made compulsory: All the generators of bio-medical waste should adopt universal precautions which are given down in manuals and appropriate safety measures while doing therapeutic and diagnostic activities and also while handling the bio-medical waste. They should be made aware about the major emergency services.
6. Awareness: Drivers of vehicles, collectors and other handlers are aware of the nature and risk of the waste. There should be written instructions, regarding the procedures to be adopted in the event of spillage/ accidents. Protective gears provided and instructions regarding their use are given.
7. Free flow of Informal and formal Communication: There should be a free flow of information from top level management to lower level management.
8. Training: in most of the hospitals the medical staff do not have enough knowledge of BMW rules. So the staff which is indulge in waste management are sweepers not ward boys so the proper training should be given to them.
9. Protective clothing: In small hospitals workers do not use the proper clothing facility except facemasks and latex gloves occasionally. Now it comes to the responsibility of hospital sto provide them with proper clothing.
10. Commitment: there are no plans and written rules in waste disposal so the person responsible for the management is going to provide the compliance of rules of their own work load , and completing the work of lack of awareness and lack of funds.

### **HOSPITAL WASTE AND ITS EFFECT ON:**

1. EMPLOYEES WORKING IN HOSPITALS- The employees who are coming directly and indirectly in contact within the premises of hospital includes the staff engaged in generating, collecting, storing and treating the

waste in the hospital wards. They are mainly coming in contact with the patients. As a result they got a high risk of exposed and catching an infection, which could be transmitted through air, blood, faeces, etc. Secondly they have to work with equipments which have sharp ends and many a times they are injured due to these sharps. This is the most common route of getting an infection in the body. Since these are day today activities and it cannot be avoided so this is the responsibility of hospital administration to provide the safety measures like gloves, footwear, protective eye care glasses, masks and gowns.

2. **HOSPITAL ACQUIRED INFECTIONS-** The major modes of transmission of diseases are as follows:

- Aerial route- these form the major portion of infections.
- Oral route- It includes the direct contact with the patient.
- Contact route- This includes the persons coming directly and indirectly into contact with the patients like visitors and attendants.
- Through equipments and materials- sharps and other equipments like masks, oxygen cylinder carries a wide variety of diseases.

3. **THE PUBLIC-** As we know that hospitals are the institution which are social in nature as well as there are many stakeholders coming in contact with the hospital and the patients daily. These are visitors coming to the hospitals, attendants, suppliers, vendors, regular workers, and people staying near by hospitals. There is high rise of burning fumes or waste dumping on a particular site or area has a direct and long lasting effect on the citizens living nearby that area. A strong sense of insecurity arises in the mind of citizens, in order to reduce it and for the benefit of them proper handling of waste should be done. Infectious waste can cause diseases like Hepatitis A & B, AIDS, Typhoid, Boils, etc. People pick up used syringes from the hospital waste and sell them.

4. **ENVIRONMENT-** The environment inside the hospital includes the major portion of air borne disease which has maximum number of micro organisms like bacteria and virus being spread by TB patient, Rabies. Radioactive waste give rise to long lasting disease like cancer so proper treatment is to be given in order to reduce the effect. If the waste is being dumped on the

ground for along period of time it gives rise to polluted land, water composition and more of all breeding ground for many worms. The chemical waste runs in the form of liquid goes directly into the rivers, ponds, lakes or other water bodies and pollutes them. When waste containing plastics are burnt, Dioxin is produced, which can cause Cancer, birth defects, decreased psychomotor ability, hearing defects, cognitive defects and behavioural alternations in infants. Flies also sit on the uncovered piles of rotting garbage. This promotes mechanical transmissions of fatal diseases like Diarrhoea, Dysentery, Typhoid, Hepatitis and Cholera. Under moist conditions, mosquitoes transmit many types of infections, like Malaria and Yellow fever. Similarly, dogs, cats and rats also transmit a variety of diseases, including Plague and Flea born fever, as they mostly live in and around the refuse.

**CONCLUSION:**

The term hospital waste is basically used to denote unwanted material produced by various medical processes carried out in medical treatment and other laboratory procedures. Hospitals have been there since time immemorial in one or the other form but there has been no such concern about the waste generated in them and their disposal. The last few decades have seen a tremendous growth of hospitals either in public sector or the private players with respect to increased population and as a result there has been an increase in the waste generated by them. There are various kinds of waste being produced by the hospitals about 70% of the healthcare facilities used a needle cutter/destroyer for sharps management. Access to Common Waste Management facilities was low at about 35%. Dumping biomedical waste on the roads outside the hospital is still prevalent in mostly smaller areas along with many hospitals in big cities also and access to Common Waste facilities is still limited. Surveillance, monitoring and penal machinery was found to be deficient and these require strengthening to improve compliance with the Bio-medical Waste Management Rules and to safeguard the health of employees, patients and society. The human community as well as animals are to be safeguard from all these kinds of waste which may have cross infection in the hospitals. They further lay problem for the environmental pollution also.

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**Table I**  
**BEDS IN HOSPITALS NUMBER**

BEDS IN HOSPITALS	NUMBER
500 beds and above	7
200 beds and above but less than 500 beds	28
50 beds and above but less than 200 beds	121
Less than 50 beds	1191
Others: labs, blood banks etc	459
TOTAL	1806

**Table II**

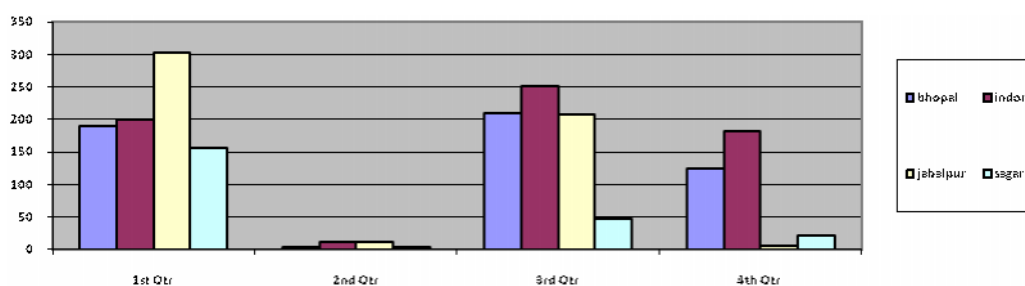
Serial No.	Category of health care unit	Quantity(kg/day/bed)
1	Paediatric unit	0.56
2	Eye unit	0.72
3	Orthopaedic unit	2.12
4	Gynaecology unit	1.56
5	Cardiology unit	0.73
6	Medicine unit	2.10
7	Surgery unit	1.52
8	OPD, Burns, X-ray and Canteen	2.63
9	General hospital	1.83
10	Multispecialty Hospital	2.53

Source: Global Journal of Health Science: A case study of biomedical waste management in hospitals Vol. 1 No. 1 - April 2009

**Table III**  
**Number of health care facilities (Region wise)**

S. No.	Region	Government of MP	Government of India	Private hospitals	Others: labs/blood bank	Total
1	Bhopal	189	04	209	125	527
2	Indore	199	12	252	182	645
3	Jabalpur	302	11	208	06	527
4	Sagar	157	03	48	22	230
TOTAL	4	847	30	717	335	1929

**Table IV**



**Table V**  
**Colour coding of hospital waste:**

Colour Coding	Types of Container	Waste types	Categories
Yellow	Plastic Bags	Human anatomical waste Animal waste Microbiological waste Soiled waste	Cat 1 Cat 2 Cat 3 Cat 6
Red	Disinfected container Plastic Bags	Microbiological waste Soiled waste Solid waste	Cat 3 Cat 6 Cat 7
Blue/White	Plastic Bags/Puncture Proof container	Waste sharps Solid waste	Cat 4 Cat 7
Black	Plastic Bags/ Puncture Proof container	Disclarded medicines Incineration ash Chemical waste	Cat 5 Cat 9 Cat10

Source: Global Journal of Health Science: A case study of biomedical waste management in hospitals Vol. 1 No. 1 - April 2009