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## TITLE: BIOMEDICAL WASTE MANAGEMENT

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### Abstract

The aim of our presentation is to spread awareness about biomedical waste management. Biomedical waste management is a big issue in India. Biomedical waste is of two types i.e. hazardous and non-hazardous waste materials. Biomedical waste is various types of hazardous materials which can affect the human health. This topic is also correlated with public health engineering. In Maharashtra there will be 57% of this waste generated. The generation happens at the hospital, nursing homes clinics, dispensaries, pathological laboratories etc.

The rules are already framed by Ministry of Environment and Forests, Government of India, known as biomedical waste rules, 1998, notified on 20<sup>th</sup> July 1998, provides uniform guidelines and code of practice for the whole nation. Effective management of biomedical waste is not only our priority but it's our social responsibility. Waste separation and its collection was not found in the field regularly i.e. in the hospital surveyed and knowledge regarding biomedical waste management .Some topics that becomes fairly important due to this are handling, segregation, disinfection storage, transportation final disposal and public education and are the some of the steps for safe and scientific management .

The present article which deal with the basic concepts such as its definition, classification, methods for its disposal, objectives and its prevention is presented with all details. For the importance of same topic the WORLD HEALTH ORGANISATION (WHO) also contributes and gives guidelines to the Government to apply the schemes in the urban and also in rural areas. Now a days the Government has tried to take control over the medical waste disposal by organising some meeting and visiting the place of medical waste disposal for relevant person and training them and also by building the effective administrative monitoring system of medical waste, The goal of our topic is to spread awareness to the society of this waste and take certain measures about it.

**KEY WORDS:** Management, Awareness, victim etc.

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## 1. INTRODUCTION

Biomedical waste management is of great importance because of its affects the human health. Medical care is must be important in our life, health and wellbeing so that the doctors are the victims of our society .The two parts of the waste hazardous and non-hazardous waste. Used needles, syringes, and other sharps present risks of injury and infection such as hepatitis B and C, and HIV for health care employees. Chemical and pharmaceutical and any other biomedical wastes may cause intoxication or injuries such as burns. Genotoxic wastes are hazardous and may have mutagenic, 1 teratogenic, 2 carcinogenic properties. Radioactive sources may have cause severe injuries to humans such as destruction of tissue Untreated liquid wastes from health care facilities and sewerage present risk of surface water contamination, and leachate from untreated or improperly treated HCWs may contaminate groundwater at disposal sites. According to the Ministry of Environment and forest, in, is to study about the collection methods and its processes and its procedure. etc. From total quantity of waste generated by health Infectious wastes containing potentially harmful employees, and patients' visitors

### 1.1 DEFINATION OF BIO MEDICAL WASTE:

“The waste generated by hospitals, nursing or maternity homes, Veterinary institution, blood banks, pathological laboratory, Which is infectious or injurious to human health and which is infectious or injurious to human health and Environment is called biomedical waste.

**Hospital waste** refers to various waste, biological or non-biological that is discarded and not intended for further use.

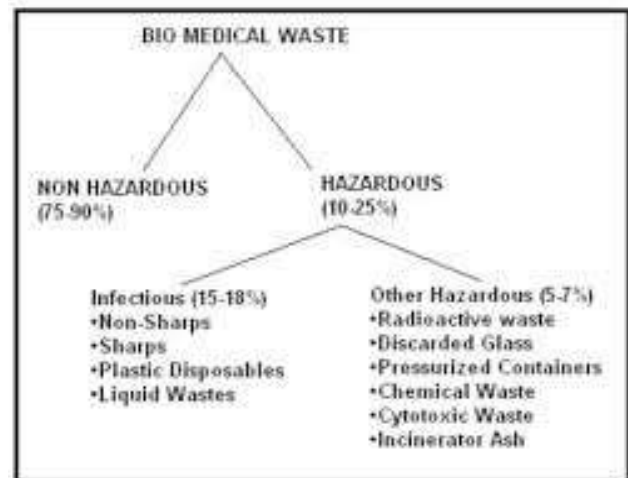
### 1.2 SOURCES OF BIOMEDICAL WASTE:

- Hospitals
- Nursing homes
- Medical laboratories
- Blood banks
- Mortuaries
- Medical research & training centers
- Biotechnology institution/production units
- Clinics

### 1.3 OBJECTIVES OF BIOMEDICAL WASTE:

- 1) To avoid transmission of diseases from patient to patient, from patient to health worker.
- 2) To avoid injury to the health care worker and workers in support services, while handling waste.
- 3) To stop general exposure to the harmful effects of the cyto toxic.
- 4) Define medical waste, regulated and medical waste and infectious medical waste
- 5) Discuss the regulations applicable to medical waste.
- 6) Discuss the components of an infectious waste management plan.
- 7) Discuss the problem of mercury.
- 8) Recommend inspection terms.
- 9) Discuss use of contractors

### 2. CLASSIFICATION OF BIOMEDICAL WASTE MANAGEMENT:



As these are some of the biomedical waste are expresses in percentages. And then again divided into two forms i.e. infectious and other hazardous.

**2.1 COLLECTION OF WASTE:**

The quantity of such waste is around 10% to 15% of total waste generated from the Health Care Facility. This waste consists of the materials which have been in contact with the patient’s blood, secretions, infected parts, biological liquids such as chemicals, medical supplies, medicines, lab discharge, sharps metallic and glassware, plastics etc.

Bio Medical Waste Management Rules, 2016 categorizes the bio-medical waste generated from the health care facility into four categories based on the segregation pathway and colour code. Various types of bio medical waste are further assigned to each one of the categories, as detailed below:

- Yellow Category
- Red Category
- White Category
- Blue Category

Color coding	Type of container to be used	Waste Category Number	Treatment options as per schedule I
Yellow	Non-chlorinated plastic bags / puncture proof container	Category 1,2,5,6	Incineration
Red	Non-chlorinated plastic bags / puncture proof container for sharps	Category 3, 4, 7 (4- waste sharps) (In the earlier Rules, Soiled wastes )	As per Schedule I (rule 7)
Blue	Non-chlorinated plastic bags container	Category 8 (chemical waste)	As per Schedule I (rule 7)
Black	Non-chlorinated plastic bags	Municipal waste	Disposal in Municipal dump sites

FIG. CATEGORY WISE CLASSIFICATION

**3.0 PROVISIONS IN THE LAW OF BIOMEDICAL WASTE MANAGEMENT:**

Safe disposal of biomedical waste is now a legal requirement in India. The ministry of Environment and Forests Notified the biomedical waste (Management and handling)Rules,1998 in July 1998.

The rule also envisages that common facility or any other facility can be used for waste treatment.

There is some difference between the rules of biomedical waste

**BMW RULES 2011 v/s 1998**

2011	1998
Every occupier generating BMW, irrespective of the quantum of wastes comes under the BMW Rules and requires to obtain authorisation	Occupiers with more than 1000 beds required to obtain authorisation
Duties of the operator listed	Operator duties absent
Categories of Biomedical Waste reduced to Eight	Biomedical waste divided in ten categories
Treatment and disposal of BMW made mandatory for all the HCEs	Rules restricted to HCEs with more than 1000 beds
A format for annual report appended with the Rules	No format for Annual Report

FIG. BMW RULES 2011 V/S 1998

**Biomedical waste management rules as per schedule:**

Schedule 1: Classification of biological waste in various categories.

Schedule 2: Colour coding and types of containers to be used for each category of biological waste.

Schedule 3: Performa of the label to be used on container/bag.

Schedule 4: Performa of the label for transport of waste container/bag.

Schedule 5: Standards for treatment and disposal of wastes.

Schedule 6: Deadline for creation of waste treatment facilities.

**4.0 STEPS INVOLVE IN BIO-MEDICAL WASTE MANAGEMENT:**

First five steps (Segregation, Collection, pre-treatment, Intramural Transportation and Storage) is the exclusive responsibility of Health Care Facility. While Treatment and Disposal is primarily responsibility of CBWTF operator except for lab and highly infectious waste, which is required to be pre-treated by the HCF. Following are the responsibility of HCF for management and handling of bio-medical waste:

- Biomedical Waste should be segregated at the point of generation by the person who is generating the waste in designated colour coded bin/ container
- Biomedical Waste & General Waste shall not be mixed. Biomedical Waste & General Waste shall not be mixed. Storage time of waste should be as less as possible so that waste storage, transportation and disposal is done within 48 hours.

- Phase out use of chlorinated plastic bags (excluding blood bags) and gloves by 27/3/2019.
- No secondary handling or pilferage of waste shall be done at healthcare facility. If CBWTF facility is available at a distance of 75 km from the HCF, bio-medical waste should be treated and disposed only through such CBWTF operator.
- Only Laboratory and Highly infectious waste shall be pre-treated onsite before sending for final treatment or disposal through a CBWTF Operator.



FIG. STEPS IN BMW MANAGEMENT

- Disposal of biomedical waste pre-treatment:

The infected waste that cannot be incinerated has to be incinerated first, before it is sent for final disposal.

#### 5.0 FINAL DISPOSAL:

Most of the waste i.e. 80-90% generated in the hospital is general waste. This waste is non infectious and comprises of paper, leftover food articles, peels of fruits, disposable and paper container for tea / coffee, cardboard, outer cover or wrappings.

- ❖ These general wastes should be put into black coloured polyethylene bags and deposited at the municipal dumps- Always remember to disinfect and mutilate the waste before its final disposal.
- ❖ Remember the following while treating the bio medical waste.

- ❖ Anatomical waste to be deep buried
- ❖ Syringes to be cut (with hub cutters) and chemically disinfected with 1% bleaching powder solution at source of generation before final disposal into sharps pit
- ❖ Infected plastics to be chemically disinfected or autoclaved, shredded and recycled and sent for final disposal into municipal dumps.

**5.1. Incineration:** The specific requirements regarding norms of combustion efficiency and emission level have been described in BMW rules 1998.

- ❖ Suitably designed pollution control devices should be installed.
- ❖ Incinerator should be certified from pollution control board.
- ❖ In case of small hospitals, joint facilities for incineration can be developed.
- ❖ The chlorinated plastic bags should not be incinerated.
- ❖ Waste to be incinerated shall not be chemically treated with

any chlorinated disinfectants. The functioning of the incinerator and the number of cycles operated per day should be documented in a log book.

As per CPCB norms regular monitoring of the process should be done

- ❖ The ash produced by incinerator should be sent for secure land filling and should also be periodically checked for toxic metals.

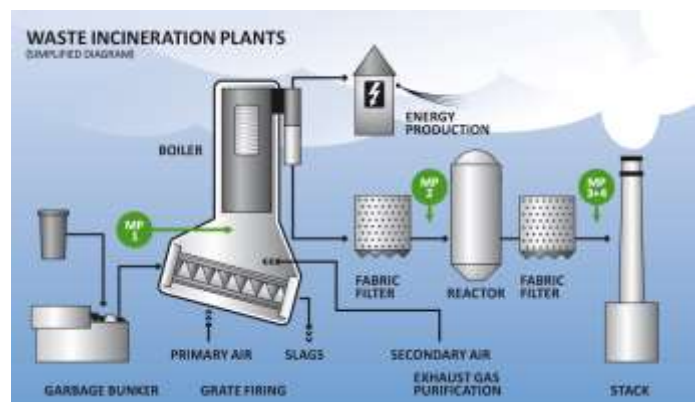


FIG. INCINEARATION OF BIOMEDICAL WASTE

## 5.2 SHARP PIT:

Sharp waste can be disposed into a circular or rectangular pit, after disinfection. Pit can be dug and lined with brick masonry or concrete rings and the pit should be covered with heavy concrete slab which is penetrated by galvanized steel pipe projecting about 1.5m above the slab with an internal diameter of upto 20mm.

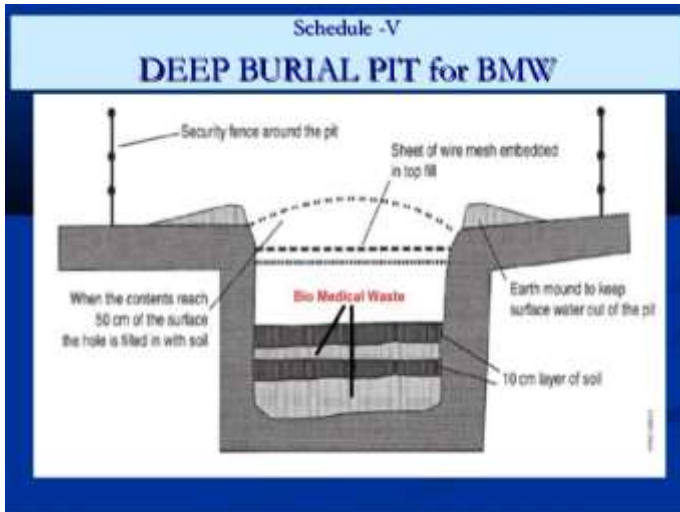


FIG. SHARP DEEP BURIAL PIT FOR BIOMEDICAL WASTE MANAGEMENT

## 5.3 LANDFILL DISPOSAL:

It is another method of final disposal of biomedical waste. If a municipality or medical authority genuinely lacks the means to treat the waste before disposal, sanitary landfill observing certain standards can be as an acceptable choice especially in developing countries.



FIG. LANDFILL DISPOSAL OF HOSPITAL WASTE

## 6.0 PROBLEM FACED ON BIOMEDICAL WASTE MANAGEMENT:

### 1) INCORRECT TRANSPORTATION AND IMPROPER SEGREGATION:

India is a developing country. Poor waste management is a serious concern being identified by both governmental and non-governmental organization. Transporting manually for longer distances, uncovered or unpacked containers instead of puncture proof bags, etc. all of which effect hospital workers in different ways.



FIG. SYMBOL OF BIO HAZARD

### 2) IMPROPER DISPOSAL AND IMPROPER HANDLING

Improper disposal refers to open dumping, unrestrained burning, and improper handling of waste during generation, collection, storage, transport and treatment. Improper handling involves unsafe procedures followed during handling of wastes i.e. without wearing protective equipment, poor storage (high temp, high residence),

### 3) DUMPING HAZARDOUS WASTE INTO THE REGULAR SEWER INSTEAD OF SPECIFICALLY DESIGNATED SEWER:

For the proportion of the population using 'piped sewers' this variable represents the proportion of the population whose excreta are 'contained', which is conveyed in closed sewer pipes that is delivered to a treatment plant. It can not include the fraction whose excreta leak from sewers or discharge directly to the environment before reaching the treatment plant.

Similarly, for the basic onsite sanitation system types, it represents the proportion of the population whose excreta (i.e. faecal sludge) are 'contained', 'emptied for transport', which are transported using a method that safely separates the transporter from the excreta and are delivered to a treatment plant.

#### 4) PROBLEM FACED ON INCINERATION:

It is a good solution to overcome the biomedical waste disposal with the help of incineration. But due to incineration, there may be a cause of air pollution problem which may be leads to the Human health.

#### 5) LABOURS ARE NOT SKILLED:

Apart from professional trainers, HCFs may also invite the concerned officials of the SPCB/PCCs and operators of CBWTF to attend in-house training programmers organized by them so as to impart training to staff involved handling of BMW in health care facilities.

- HCFs shall also depute the person designated and other identified staff for attending training programmed as and when conducted by SPCBs/PCCs.

- Nodal Officer for biomedical waste management in HCF may take the responsibility to provide induction training to the newly recruited healthcare staff

- Trained employee of the healthcare worker can also take up the role of trainer.

#### 7.0 SAFETY MEASURE:

Health Care Workers (HCW) require following Personal Protection Equipments

(PPE):

- Gloves
- Masks
- Protective glasses
- Plastic aprons
- Gum boots for waste handlers
- Tetanus immunization and Hepatitis B

All accidents while doing therapeutic, diagnostic and handling waste should be recorded. All waste handlers should be made aware of risks involved in handling.

#### 8.0 CONCLUSION:

Hospital Management must under the gravity of the issue and they must be able to differentiate between hospital waste and general waste. They must ensure proper identification, segregation at the source of generation, collection prescribe colour container, safe transportation, appropriate treatment and environmentally sound management and handling of biomedical waste.

In this seminar or paper presentation we have conclude that the implementation of management of biomedical waste on the field. There may be some problems occur in the management of biomedical waste and studied on it. We cannot destroy this problems but we can take certain remedial measures about it . Our aim is to make society aware for biomedical waste management. So that society should live healthy and free from various health issues.

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