

CHAPTER XVI

HOSPITAL WASTE MANAGEMENT

16.1 Every hospital should make all efforts to implement the Bio-Medical Waste (Management & Handling) Rules 1998 notified under the Environment Protection Act. (Appendix IV).

16.2 Each hospital should take appropriate authorization from the competent authority for the different activities connected with the Waste Management. It may be noted that it is punishable under the act to run the hospital without such authorization and Chief of hospital is responsible for it.

16.3 A Hospital Waste Management Committee, chaired by the head of the institute should be constituted and this committee should make detailed hospital specific action plan for Waste Management detailing each activity like segregation, collection, transportation, treatment, disposal, safety precautions and training of staff within the ambit of the Waste Management Handling Rules. A detailed model guideline in this regard may be followed.

16.4 The hospital will make all arrangement to prevent recycling of disposable items like syringes, needles, catheters etc.

16.5 The reports/returns needed to be filed as per rules should be complied with.

16.6 In case, the waste needs to be transported outside the hospital for treatment, adequate precautions as mentioned in the rules should be taken.

GUIDELINES FOR HOSPITAL WASTE MANAGEMENT

16.7 OBJECTIVES

- (i) To enable each hospital to smoothly implement the Bio-Medical Waste (Management & Handling) Rules 1998, notified under the Environment Protection Act by the Ministry of Environment & Forest (Government of India).
- (ii) To help hospitals to develop their own comprehensive plan for Hospital Waste Management in terms of segregation, collection, transportation and disposal of hospital waste.

16.8 SEGREGATION OF WASTE

- (i) It should be done at the source of generation of Bio-medical Waste e.g. all patient care activity areas; diagnostic services areas, operation theatres, labour rooms, treatment rooms etc.
- (ii) The responsibility of segregation should be with the generator of Biomedical Waste i.e. Doctors, Nurses, Technician etc. (Medical & Paramedical personnel).
- (iii) The Biomedical waste should be segregated as per categories applicable mentioned in the rules.
- (iv) Categories of waste for segregation

Hazardous, toxic and Biomedical waste should be segregated into following categories for the purpose of its safe transportation to a specific site for specific treatment. Certain specific categories of toxic and hazardous waste require specific treatment (disinfection/decontamination) before transportation for treatment, which can also be done if we follow the categorization as mentioned below :

Category No.1

Human Anatomical Waste :

This contains human tissues, organs, body parts etc.

Category No.2

Animal Waste :

Animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals used in research.

Category No.3

Microbiology and Bio-technology Waste :

Waste from laboratory cultures, stocks or specimens of micro-organism, live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research laboratories, waste from production of biologicals, toxins, dishes and devices used for transfer of cultures.

Category No.4

Sharps Waste :

Needles, syringes, scalpels, blades, glass etc. that may cause puncture and cuts.

Category No.5

Discarded Medicines and Cytotoxic Waste

Waste comprising of outdated medicines, contaminated and discarded medicines.

Category No.6

Solid Waste :

Items contaminated with blood, body fluids, including cotton, dressing, soiled plaster casts, lints, bedding, and other material contaminated with blood.

Category No.7

Solid Waste (Disposable and Plastic):

Waste generated from disposable items, other than the waste sharp such as tubing, catheters, I/V sets etc.

Category No.8

Liquid Waste

Waste generated from laboratory and washing, cleaning, housekeeping and disinfecting agents.

Category No.9

Incineration Waste

Ash from incineration of any biomedical waste.

Category No.10

Chemical Waste

Chemicals used in production of biological, chemical used in disinfection as insecticides etc.

16.9 COLLECTION OF BIOMEDICAL WASTE

Collection of Biomedical Waste should be done as per Biomedical Waste (Management and handling) Rules 1998. (Schedule ii)

CATEGORY	TYPE OF CONTAINER	COLOUR
1 2	3	4
1. Human Anatomical Waste	Plastic	Yellow
2. Animal Waste	-do-	-do-
3. Microbiology & Biotechnology Waste	-do-	Yellow/Red

1 2	3	4
4. Waste Sharp	Plastic bag Puncture proof container	Blue/White translucent
5. Discarded Medicines & Cytotoxic Waste	Plastic bag	Black
6. Solid (Biomedical Waste)	-do-	Yellow
7. Solid (Plastic)	Plastic bag Puncture proof Container	Blue/White Translucent
8. Incineration Waste	Plastic bag	Black
9. Chemical Waste (Solid)	-do-	-do-

- (ii) All the items sent to incinerator/burial (Cat 1, 2, 3,6) should be placed in Yellow coloured bags.
- (iii) All the Biomedical waste to be sent for Microwave/Autoclave/Chemical Treatment should be placed in Red coloured bags.
- (iv) Any waste, which is sent to shredder after Autoclaving/Microwaving/Chemical treatment, is to be packed in Blue/White translucent bag.
- (v) Location of containers
All containers having different coloured polythene bags should be located at the point of generation of waste i.e. near OT tables, injection rooms, diagnostic service areas. The colour of containers/plastic bags used for collection of segregated Biomedical waste should be identifiable.
- (vi) Labelling
All the bags/containers must labelled according to the rules (Schedule III of Biomedical Waste Rules 1998).
- (vii) Bags/Containers
It should be ensured that waste bags/containers are effectively secured and filled up to only ¾ capacity and removed from site of generation regularly and timely.

- (viii) Certain categories of waste, which may need pre-treatment (decontamination/disinfection) at the site of generation such as plastic and sharp materials etc. should be removed from the site of generation only after treatment.

16.10 TRANSPORTATION WITHIN THE HOSPITAL

- (i) Within hospital, waste routes must be designated to avoid the passages of waste through patient care areas.
- (ii) Separate time should be earmarked for transportation of Biomedical waste to reduce chances of its mixing with general waste.
- (iii) Dedicated covered wheeled containers, trolleys or carts should be used to transport the waste bins/plastic bags to the site of storage/treatment.
- (iv) Trolleys or carts should be thoroughly cleaned and disinfected in the event of any spillage.
- (v) The wheeled containers should be so designed that the waste can be easily loaded, remains secured during transportation, does not have any sharp edges and easy to clean and disinfect.

16.11 TRANSPORT OF CLINICAL WASTE TO TREATMENT/ DISPOSAL UNIT OUTSIDE THE HOSPITAL

- (i) If the hospital waste is to be transported outside the hospital for final treatment and disposal in a shared facility, guidelines as per the rules should be followed.
- (ii) Large hospitals having their own treatment facility in their campus may not need to transport their waste over long distances. Smaller establishment may need to transport waste over some distance, hence road transport must be provided.
- (iii) Hazardous Biomedical Waste needing transport to a long distance should be kept in container and should have labels prescribed in schedule (iii) of Biomedical Waste (Management and Handling) Rules 1998 and also carry information as prescribed in schedule (iv).

- (iv) The transport is to be done through dedicated vehicle specially constructed for the purpose having fully enclosed body, lined internally with Stainless Steel or aluminum to provide smooth and impervious surface, which can be cleaned. The driver's compartment should be separated from the load compartment with a bulkhead. The load compartment should be provided with roof vents for ventilation.

- (v) The containers for transportation must be labeled as given in schedule III and IV of BMW, 1998.

16.12 TREATMENT OF HOSPITAL WASTE

- (i) General Waste (Non hazardous, non toxic, non infectious):
90% of the waste generated in the hospital belongs to this category. The safe disposal of this waste is the responsibility of the local authority.

16.13 BIO-MEDICAL WASTE

- (i) Incineration:

The incinerator should be installed and made operational as per specifications under the BMW rules 1998 and a certificate may be taken from CPCB/State Pollution Control Board. Specific requirement regarding the incinerator and norms of combustion efficiency and emission levels etc. have been defined in the Biomedical Waste (Management and handling) Rules 1998. In case of small hospitals, facilities can be shared. The waste under category 1, 2, 3, 5, 6 can be incinerated depending upon the local policies of the hospital and feasibility. The polythene bags made of chlorinated plastics should not be incinerated.

- (ii) Deep burial

Standards for deep burial are also mentioned in the Biomedical Waste (Management and handling) Rules 1998. The waste under category 1 and 2 only can be accorded deep burial and only in cities having less than 5 lakh populations.

(iii) Autoclave and Microwave treatment :

Standards for the autoclaving and micro waving are also mentioned in the Biomedical Waste (Management & handling) Rules 1998. All equipment installed/shared should meet these specifications. The waste under category 3,4,6 & 7 can be treated by these techniques.

(iv) Shredding

The plastics (IV bottles, IV sets, syringes, catheters etc.), sharps (needles, blades, glass etc.) should be shredded but only after either chemical treatment/Micro waving/Autoclaving. Needle destroyers can be used for disposal of needles directly without chemical treatment.

(v) Secured landfill:

The incinerator ash, discarded medicines, cytotoxic substances and solid chemical waste should be treated by this option.

(vi) It may be noted that there are multiple options available for disposal of certain categories of waste. The individual hospital can choose the best option depending upon the facilities available and financial resources. However, it may be noted that depending upon the option chosen, correct colour of the bag needs to be used for that treatment technology.

16.14 SAFETY MEASURES

- (i) All the sanitation workers engaged in the handling and transporting should be made aware of the risks involved in handling the biomedical waste.
- (ii) All the generators of biomedical waste should adapt universal precautions and appropriate safety measures while doing therapeutic and diagnostic activities and also while handling the Biomedical Waste.
- (iii) It should be ensured that :
 - (a) Drivers, collectors and other handlers are aware of the nature and risk of the waste.

- (b) Written instructions are provided regarding the procedures to be adopted in the event of spillage/accidents.
- (c) Protective gears are provided and instruction regarding their use given.
- (d) Workers are protected by vaccination against tetanus and hepatitis-B.

16.15 TEACHING

- (i) Each and every hospital must have well planned awareness and training programme for all categories of personnel including administrators (medical, paramedical and administrative).
- (ii) All the medical professionals must be made aware of Biomedical Waste (Management and handling) Rules 1998.
- (iii) To make aware all other categories of staff, the provisions of Biomedical Waste (management and handling) Rules 1998, and the responsibilities of different categories of personnel therein.
- (iv) To make aware about safe hospital waste management practices.
- (v) Training should be conducted category wise and more emphasis should be given in training modules as per category of personnel.
- (vi) Training should be conducted in appropriate language/medium and in an acceptable manner.
- (vii) Where possible audio-visual material and experienced trainers should be used.

16.16 MANAGEMENT AND ADMINISTRATION

- (i) Heads of each hospital will have to take authorization for generation of waste from appropriate authorities as notified by the concerned state/U.T. Government well in time and get it renewed as per time schedule laid in the rules. The application is to be made as per format given in form I of BMW Rules.

- (ii) Each hospital should constitute a hospital waste management committee, chaired by the head of the institute and having wide representation from all major departments. This committee should be responsible for making hospital specific action plan for hospital waste management and its supervision, monitoring and implementation.
- (iii) The annual reports, accident reporting, as required under BMW rules should be submitted to the concerned authorities as per BMW rules format (Form II and Form III respectively).

16.17 MEASURES FOR WASTE MINIMIZATION

- (i) As far as possible, purchase of reusable items made of glass and metal should be encouraged.
- (ii) Select non-PVC plastic items.
- (iii) Effective sterilization procedures, quality assurance, proper monitoring and validation of cleaning, disinfection and sterilization of reusable items for patient care, will go a long way in increasing confidence in reusable items and reduce reliance on presterilised single use items.
- (iv) 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.
- (v) Establish effective and sound recycling policy. For plastic recycling, get in touch with authorized manufacturers.
- (vi) Special efforts should be made to minimize chemical hazardous waste as given in the Annexure- IV of the Biomedical Waste (Management and handling) Rules 1998.

16.18 COORDINATION BETWEEN HOSPITAL AND OUTSIDE AGENCIES

(i) Municipal authorities

As quite a large percentage of waste (in India up to 90%) generated in Indian hospitals belong to general category (non-toxic and non-hazardous), hospital should have constant interaction with municipal authorities so that this category of

waste is regularly taken out of the hospital premises for land fill or other treatment.

- (ii) Coordinated efforts should be made by health authorities and municipal authorities to develop norms and practices for transport of biomedical waste outside the hospital for treatment.
- (iii) Coordinated efforts should be made by health authorities and municipal authorities to involve private sector/NGO's for creation of common facilities for treatment.
- (iv) Efforts will also be required for training of waste generator of small units.
- (v) Health authorities in coordination with municipal authorities should play leading role in utilizing excess capacity or providing alternative for short-fall in capacity.
- (vi) Co-ordination with Pollution Control Board

Search for better methods technology, provision of facilities for testing, approval of certain models for hospital use in conformity with standards laid down.

- (vii) Co-ordination with NGO's and Essential Group: For public awareness, education and training of hospital employees.

(viii) Sharing of facility :

Hospitals, which are not in possession of their own facility for treatment, may get their waste, treated in a shared facility. The hospitals having excess capacity for treatment should extend the capacity to nearby smaller hospital or health care units.

16.19 RESEARCH AND DEVELOPMENT

Regarding cost effective and comprehensive waste management practices, adequate research activities should be conducted by institutions/ departments of Environment/Environmental Engineering/Health and Hygiene. The main purpose of the research should be :

- (i) To search for cost effective and environmental friendly technology for treatment of Bio-medical and hazardous waste.

- (ii) To search for suitable materials to be used as containers for Bio-medical waste requiring incineration/autoclaving/micro waving.
 - (iii) Development of shredders for POP cast and technology for disposal of rubber mattresses.
 - (iv) Development of non-PVC plastics to substitute the plastic, which is used for manufacture of disposable items.
 - (v) Incentive should be given to Indian industries for development of indigenous technology & material etc. for cost effective and eco-friendly management of hospital waste.
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