

BIOMEDICAL WASTE MANAGEMENT: LEGISLATION AND CURRENT SCENARIO

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ABSTRACT

The 'Health For All' by World Health Organisation means that health is to be brought within the reach of everyone in the country. The increased utilization of the healthcare services results in corresponding increase in the production of the biomedical waste. The poor management of the biomedical waste has far-reaching effects on human health and the environment. The present article highlights all the aspects of biomedical waste management right from the generation till the final disposal after treatment at waste treatment facility.

INTRODUCTION

Any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological [1]. Approximately 1.45 kg waste is generated per patient per day in Indian hospitals and it is as high as 4.5 kg in developed countries [2]. Approximately 15-20% of this total waste is hazardous as per western literature whereas, it would be much higher in India because proper waste segregation and waste disposal methods either do not exist or are not practiced at all. The disposable syringes, needles, catheters, bags, drug vials, bottles, and intravenous drip sets are picked up by rag pickers and purchased by duplicators, recycled, replaced without proper treatment in India [3].

LEGISLATION

I. The Environment Protection Act (EPA) 1986

The EPA is an umbrella legislation designed to provide a framework for environment protection of all activities.

II. The Bio-medical Waste Management & Handling Rules, 1998

It was implemented in India in 1998, through notification by Ministry of Environment & Forest for safe handling, segregation, storage, transportation, treatment and disposal of bio-medical waste generated from health care establishments. These rules were amended in the years 2000 and 2003. The State Pollution Control Boards have been notified as the prescribed authority for implementing the provisions of these rules in their respective states/UTs. The Central Pollution Control Board advises the government and lays down procedures and standards for prevention of environmental pollution across the country.

SCHEDULE 1: Classification and Management (amended)

SCHEDULE-II: Segregation of BMW (amended)

SCHEDULE III: Label for Biomedical waste containers/ Bags



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SCHEDULE IV: Label for transportation of Biomedical waste containers/ bags

Waste Category No.

Waste Class

Waste Description

Sender's Name & Address

Phone No. _____

Telex No. _____

Fax No. _____

Contact Person _____

Day ___ Month _____

Year _____

Date of generation _____

Receiver's Name & Address

Phone No. _____

Telex No. _____

Fax No. _____

Contact Person _____

SCHEDULE V: *It lays down the guidelines for standards for treatment of waste at waste treatment facility.*

III. National Guidelines on Hospital Waste Management, 2002

It was issued by the Ministry of Health & Family Welfare, Govt. of India. These guidelines include safety measures, waste management, training and related administrative functions in hospitals and its environment.

IV. Bio Medical Waste (Management and Handling) Draft rules, 2011

The Ministry of Environment & Forests has already gazetted and initiated the public notification process of its draft Bio-Medical Waste (Management and Handling) Rules, 2011. These rules have described the duties and responsibilities of occupier and operator in detail, besides the procedures for certification, authorization, monitoring etc. The changes made in the 2011 Rules which are relevant to this report are as follows

- ✓ It has been stipulated that every occupier of the healthcare facility shall set up the required biomedical waste treatment equipment's prior to commencement of its operation or make necessary arrangements through an authorized common bio medical waste treatment facility.
- ✓ In the earlier rules, occupiers of an institution, which provided service to less than 1000 patients per month, need not take authorization from the prescribed authority.

- ✓ Under the new rules, every occupier, irrespective of the number of patients served or the quantum of bio medical waste generated is required to obtain authorization.
- ✓ Under existing rules, there was an overlap with regard to color coding and segregation of waste. Now, the color codes have been clearly specified to avoid confusion and overlapping.
- ✓ The number of categories of waste has been reduced from ten to eight. Color coding for non-infectious waste has also been prescribed.
- ✓ Duties and responsibilities of the occupier including occupational safety and training requirements have been delineated in detail.
- ✓ Similarly, duties and responsibilities of the operator of the waste treatment facility are also provided in detail.
- ✓ Use of chlorinated plastic bags for segregation of waste by the occupier and incineration of the same by the operator is prohibited under the revised rules.

Knowledge, Attitude and Practice: current scenario

Chudasama RK et al (2013) conducted a KAP study on Biomedical waste management (BMW) involving 282 healthcare personnel in a tertiary care centre and concluded that 59% of the healthcare personnel didn't know about the BWM categories, 56% of the health care personnel didn't receive any training for BMW, 48% of the subjects hadn't even heard about

Cate- gory	Waste Type	Treatment and Disposal- 1998	Treatment and disposal 2011
1	Human Anatomical Waste (human tissues, organs, body parts)	Incineration/Deep burial	Incineration
2	Animal Waste (animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal houses)	Incineration/deep burial	Incineration
3	Microbiology & Biotechnology Waste and <i>other Laboratory waste</i> (wastes from laboratory cultures, stocks or specimens of microorganisms, live or attenuated vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from production of biologicals, toxins, dishes and devices used for transfer of cultures)(<i>wastes from clinical samples, pathology, biochemistry, hematology, blood bank,</i>)	Local autoclaving/ microwaving/incineration	Disinfection at source by chemical treatment or by autoclaving /microwaving followed by mutilation/shredding and after treatment final disposal in secured landfill or disposal of recyclable wastes (plastics or glass) through registered or authorized recyclers.
4	Waste sharps (needles, syringes, scalpels, blades, glass, etc, that may cause puncture and cuts. This includes both used and unused sharps.)	Disinfection (chemical treatment/autoclaving/microwaving and mutilation/shredding)	Disinfection by chemical treatment or destruction by needle and tip cutters, autoclaving or microwaving followed by mutilation or microwaving followed by mutilation or shredding, whichever is applicable and final disposal through authorized CBWTF or disposal in secured landfill or designated concrete waste sharp pit.
5	Discarded medicines and Cytotoxic drugs (wastes comprising of outdated, contaminated and discarded medicines)	Incineration, destruction and drug disposal in secured landfills	Disposal in secured landfill or incineration
6	Solid waste (Items contaminated with blood, and body fluids, including cotton, dressings, soiled plaster casts, lines, beddings, other material contaminated with blood)	Incineration/autoclaving/microwaving	Incineration
7	<i>(Infectious)</i> Solid waste (Waste generated from disposable items other than the waste sharps such as tubings, catheters, intravenous sets etc)	Disinfection by chemical treatment /autoclaving/microwaving and Shredding	Disinfection by chemical treatment or autoclaving or Microwaving followed by mutilation or shredding and after treatment final disposal through registered or authorized recyclers

8	Chemical Waste (chemicals used in production of biologicals, chemicals used in disinfection, as insecticides, etc)	Chemical treatment and discharge into drains for liquids and secure landfill for solids	Chemical treatment and discharge into drains meeting the norms notified under these rules and solids disposal in secured landfill
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Following two categories that were present in Rules 1998 have been removed in Draft Rules 2011

Waste category (1998)	Waste Type	Treatment and Disposal
8	Liquid waste(waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities)	Disinfection by chemical treatment and discharge into drains
9	Incineration Ash (ash from incineration of any biomedical waste)	Disposal in municipal landfill

Revised Color coding and types of containers for disposal of bio-medical wastes as per Biomedical Waste (Management and Handling) Draft Rules 2011

Color coding	Type of container to be used	Waste category Number	Treatment options as per schedule I
Yellow	Non-chlorinated plastic bags	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 were for Red color)	Autoclaving/ Microwaving/ Chemical treatment/shredding
Blue	Non-chlorinated plastic bags container	Category 8(chemical wastes)	Autoclaving/Microwaving/ Chemical treatment/shredding
Black	Non-chlorinated plastic bags	Municipal waste	Disposal in Municipal dump sites [4]

the BMW Act/ Schedule, 25% of the health care personnel denied maintaining any BMW records, 15% of the health care personnel were not using personal protective equipments while handling the BMW, 13% of the subjects hadn't even heard about the BMW, 12% of the subjects didn't know about the biohazard symbols, 3.6% subjects said that their hospital didn't generate BMW, 15% of the subjects couldn't identify the color coded bags, 33% subjects were not practicing correct method for collecting soiled dressings/plaster casts/linen, 36% were not practicing correct method for collecting sharps and needles whereas 29% were not practicing correct method for collecting human anatomical waste [5].

Selvaraj K et al (2013) conducted a KAP study among the medical practitioners using pre-tested structured questionnaire and reported that that 70% of the practitioners have not undergone any orientation /

training in BMW management. Though most (98%) felt that BMW should be segregated, 36.2% of them were still dumping it with general waste. 61% of the practitioners didn't know what ultimately happens to the BMW. Their study underscored the need for programs that not only impart knowledge to the doctors but also motivate them to actively practice proper BWM [6].

Thirumala S (2013) surveyed the practice of biomedical waste management in various hospitals in Davangere city of Karnataka and observed that standard operating procedures for segregation and collection were not being followed and most of the authorities, administrators and other hospital staff were not aware about the damage to society and the environment around them due to in appropriate handling and disposal of biomedical waste [7].

Ujwala U et al (2012) in their study on awareness of medical undergraduates (MBBS and nursing) about biomedical waste, its hazards and management found that 36% of the students couldn't recall disposal methods for different BMW categories. The authors underscored that the importance of BWM should be stressed during the study curriculum of medical as well as nursing students [8].

CONCLUSION

A large proportion of healthcare personnel lack awareness regarding the different aspects of biomedical waste management, thereby, putting at risk their own health, the health of the people and the environmental health.

RECOMMENDATIONS

- The segregation of bio-medical waste according to the waste category in the designated color coded containers and bags, transport in the labeled containers/ bags, in designated vehicles driven by personnel with license to a recognized waste treatment facility.
- The implementation and surveillance of standard operating procedures by the hospital administrators in handling the biomedical waste.
- Political will to ensure the supply of personal protective equipments to the healthcare personnel.
- Imparting continuous medical education to the hospital staff as well as the support service staff regarding BWM with provisions for feedback.

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