



Bio-Medical Waste Management – A Short Review

Azra N Yasin

Dental Assistant Surgeon, District Government Hospital, Peddapalli, Telangana State, India

Abstract

According to the Bio-Medical Waste (Management and Handling) Rules, 1998 and amendments, bio-medical waste is any waste that is produced during the diagnosis, treatment, or immunization of humans or animals, or in research activities related to those activities, or in the production of biological testing, including categories listed in schedule 1 of the Rule. In India, the private sector is responsible for more than 80% of all healthcare spending. It will be difficult to considerably increase public health expenditure until the combined central and state government deficit, which is now at about 9%, decreases. The expansion of this industry has improved patient care while simultaneously generating vast quantities of bio-medical waste, which has had a negative impact on the environment. According to estimates, hospitals in our nation produce between 0.5-2 kg of garbage per bed per day, and India produces 0.33 million tons of waste yearly. The majority of the waste produced at hospitals and other institutions is made up of solids and liquids, which can be harmful, infectious, or not. An estimated 85% of hospital wastes are truly non-hazardous, 10% are contagious, and 5% are non-infectious yet hazardous, according to a WHO assessment.

Keywords: Bio-Medical Waste Management, Disposal of biomedical waste, Environmental Impact

Address for correspondence: Dr. Azra N Yasin, Dental Assistant Surgeon, District Government Hospital, Peddapalli, Telangana State, India. Email: drurooj22@gmail.com

Date of Acceptance: 15/02/2023

Introduction

Definition of Biomedical waste: Bio-medical waste is defined by the Bio-Medical Waste (Management and Handling) Rules, 1998 and amendments, as any waste produced during the diagnosis, treatment, or immunization of humans or animals, or in research activities related to those activities, or in the production of biological testing, including categories listed in schedule 1 of the Rule [1]. According to WHO standards, the term "healthcare waste" refers to all trash produced by healthcare institutions, research institutes, and labs. It also covers garbage that comes from unimportant or dispersed sources, such as the waste generated during at-home medical procedures like dialysis and insulin injections. Hence, the waste coming from various types of such institutions has been divided into 10 separate categories in Schedule I

of the Bio-medical Waste (Management and Handling) Regulations, 1998 (Annexure II), and their treatment and disposal alternatives have been identified.

Current Indian scenario

In terms of employment and income, the healthcare industry is one of India's largest and is growing quickly. Indian healthcare expanded at a compound annual rate of 16% in the 1990s. The sector is currently worth more than \$34 billion overall. This is \$34 per person or about 6% of GDP. The healthcare market in India is expected to reach around \$50 billion by 2025.

Schedule I: Categories of Bio-Medical Waste

Waste Category	Waste Category Type	Treatment and Disposal Option
Category No. 1	Human Anatomical Waste (body parts, organs, human tissues, etc.)	Incineration / deep burial
Category No. 2	Animal Waste (animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood, and experimental animals used in research, waste generated by veterinary hospitals, discharge from hospitals, animal houses).	Incineration @/ deep burial
Category No. 3	Microbiology & Biotechnology Waste (Wastes from laboratory cultures, stocks or micro-organisms live or vaccines, human and animal cell culture used in research and infectious agents from research and industrial laboratories, wastes from the production of biologicals, toxins, dishes, and devices used for transfer of cultures).	Local autoclaving/microwaving/incineration
Category No. 4	Waste Sharps (needles, syringes, scalpels, blades, glass, etc. that may cause punctures and cuts. This includes both used and unused sharps).	Disinfection (chemical treatment/autoclaving/microwaving and mutilation /shredding
Category No. 5	Discarded Medicines and Cytotoxic drugs (Waste comprising of outdated, contaminated, and discarded medicines).	Incineration /destruction and drugs disposal in secured landfills
Category No. 6	Soiled Waste (items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, lines, bedding, and other material contaminated with blood).	Local autoclaving/microwaving/incineration
Category No. 7	Solid Waste (Waste generated from disposal items other than the sharps such as tubings, catheters, intravenous sets, etc.).	Disinfection by chemical treatment autoclaving/microwaving and mutilation/shredding
Category No. 8	Liquid Waste (Waste generated from laboratory and washing, cleaning, housekeeping, and disinfecting activities).	Disinfection by chemical treatment and discharge into drains
Category No. 9	Incineration Ash (Ash from the incineration of any Bio-medical waste).	Disposal in municipal landfill
CategoryNo.10	Chemical Waste (Chemicals used in the production of biologicals, chemicals used in disinfection, Insecticides, etc.).	Disinfection by chemical treatment and discharge into drains for liquids and secured landfill for solids

In India, the private sector is responsible for more than 80% of all healthcare spending. It will be difficult to considerably increase public health expenditure until the combined central and state government deficit, which is now at about 9%, decreases. The expansion of this industry has improved patient care while simultaneously generating vast quantities of bio-medical waste, which has had a negative impact on the environment. According to estimates, hospitals in our nation produce between 0.5-2 kg of garbage per bed per day, and India produces 0.33 million tons of waste yearly [2]. The majority of the waste produced at hospitals and other institutions is made up of solids and liquids, which can be harmful, infectious, or not. Around 85% of hospital wastes are truly non-hazardous, 10% are contagious, and 5% are non-infectious yet harmful, according to a WHO assessment.

Health Risks Connected with Improper Bio-Medical Waste Management: Infections, harmful effects, and injuries can result from improper bio-medical waste management, which puts healthcare facility employees, waste handlers, and the community at large at risk. Scavengers and kids who come into contact with the garbage disposed of with regular municipal rubbish risk suffering serious harm. Hepatitis B and C, tuberculosis, G E infections, and other significant bloodborne diseases are at high risk

of transmission through infected sharps, scalpels, catheters, etc.

1. Injury from sharps to staff and waste handlers associated with the health care establishment.
2. Hospital Acquired Infection (HAI) (Nosocomial) of patients due to the spread of infection.
3. Risk of infection outside the hospital for waste handlers/scavengers and eventually general public Occupational risk associated with hazardous chemicals, drugs, etc.
4. Unauthorized repackaging and sale of disposable items and unused / date-expired drugs.

According to WHO estimates Injections using tainted syringes are thought to have contributed to 21 million HBV infections (32% of all new infections), 2 million HCV infections (40% of all new infections), and 260 000 HIV infections (5% of all new infections) in 2000. According to epidemiological research, the odds of contracting HBV, HCV, or HIV for someone who suffers one needle-stick injury from a needle used on an infected source patient are 30%, 1.8%, and 0.3%, respectively. According to the findings of a WHO, evaluation carried out in 22 developing nations in 2002, anywhere between 18% and 64% of healthcare institutions do not employ suitable waste disposal techniques. (Source: World Health Organization (WHO). [3]

Schedule II: Color Coding and Type of Container for Disposal of Bio-Medical Waste^[4]

<i>Colour Coding</i>	<i>Type of Containers</i>	<i>Waste Category</i>	<i>Treatment options as per schedule I</i>
Yellow	Plastic bag	1,2,3,6	Incineration/deep burial
Red	Disinfected Container/ Plastic bag	3,6,7	Autoclaving/Microwaving/ Chemical Treatment
Blue/ White Translucent	Plastic bag/puncture-proof container	4,7	Autoclaving/Microwaving/ chemical treatment and destruction/shredding
Black	Plastic bag	5,9,10 (Solid)	Disposal in a secured landfill

Disposal

In accordance with the regulations, no untreated biomedical waste should be held for more than 48 hours. To guarantee effective waste segregation and treatment, any healthcare institution that produces biomedical waste must

have the necessary bio-medical waste treatment facilities.

Conclusion

Improper disposal of infected and hazardous waste from hospitals, nursing homes, and pathological laboratories has led to a great risk

of the spread of diseases from highly contagious material. It has also led to significant degradation of the environment. Therefore, it is important to sensitize medical and paramedical staff about the hazards posed by Bio-medical waste, and its proper management to ensure that as far as possible the staff adheres to the governmental guidelines related to Bio-Medical waste management.

<p><i>Conflict of Interest: None</i> <i>Source of support: Nil</i> <i>Ethical Clearance: Obtained</i></p>
--

References

1. Datta P, Mohi GK, Chander J. Biomedical waste management in India: Critical appraisal. *J Lab Physicians*. 2018 Jan-Mar;10(1):6-14.
2. Patil AD, Shekder AV, Health care Management in India, *Journal of Environment Management*; Oct 2001: 63(2): 211-220.
3. World Health Organization (WHO) AIDE-MEMOIRE; courtesy: Department of Protection of the Human Environment Water, Sanitation and Health. Available at <https://www.who.int/teams/environment-climate-change-and-health/water-sanitation-and-health> [Accessed on 20/02/2023]
4. National AIDS Control Organization. *Manual of Hospital infection control*, New Delhi, 1998;50-66.