e-ISSN:2582 - 7219

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY

Volume 5, Issue 2, February 2022

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 5.928

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928| Monthly Peer Reviewed & Referred Journal |

| Volume 5, Issue 2, February 2022 |

|DOI:10.15680/IJMRSET.2022.0502027 |

"Comprehensive Management and Community Engagement in Biomedical Waste Disposal"

Vaibhav Hoonka[1], Manish Tiwari[1], Dr. Parth Verma[1], Gurusharan Mishra[1], Dr. A K Khare[1], Bhupendra Sirbaiya[1]

Department of Civil Engineering, Baderia Global Institute of Engineering and Management, Jabalpur, Madhya Pradesh, India[1]

ABSTRACT: Solid and liquid waste produced by hospitals, clinics, nursing homes, and research laboratories are potential health hazards requiring proper treatment and disposal. Indian hospitals generate about 1.45 kg of waste per patient per day. A comprehensive management system has been developed to segregate hazardous and non-hazardous waste in hospitals. The major health risks from biomedical waste are associated with sharp objects like needles and syringes, which pose risks of needle prick injuries and transmission of diseases such as AIDS/HIV and Hepatitis B & C to healthcare staff. Surveys indicate frequent needle prick injuries among nursing staff, underscoring the need for proper waste handling. This paper discusses the current biomedical waste disposal system and emphasizes the importance of public awareness and community involvement

.

I. INTRODUCTION

Recognizing the hazardous effects of medical waste, the Indian Union Ministry of Environment and Forests has enacted the "Biomedical Waste Rules 1998." These rules mandate that every healthcare institution ensures their waste is managed without harming humans or the environment. Non-compliance can result in penalties under the Environment Act of 1986. Effective disposal requires waste segregation to classify it into hazardous and non-hazardous categories for appropriate treatment and disposal.

II. COLLECTION & SEGREGATION OF MEDICAL WASTE

Medical waste is classified into hazardous and non-hazardous categories and collected in different coloured containers; a process known as Waste Segregation. This system, called colour coding, aids in the efficient and safe disposal of non-hazardous waste like plastic, paper, and food waste, primarily through landfilling. Benefits of waste segregation include:

- Reduction of toxic waste requiring specialized treatment
- Easier labelling of waste
- Lower health risks for hospital staff
- Stability and uniformity in waste management

According to the 1988 Indian rules, biomedical waste is segregated as follows:

1. **Yellow Bin**: Waste for incineration or deep burial
2. **Red Bin**: Waste for autoclaving, chemical disinfection, and microwaving
3. **Blue/White Bin**: Waste for autoclaving, chemical disinfection, microwaving, and shredding
4. **Black Bin**: Waste for landfill disposal

2.1 Collection of Sharp Waste

Sharp waste, such as needles and blades, poses significant health risks. It should be collected in puncture-resistant containers to prevent injuries and spills during transportation. Sharp waste is generated by nearly all health facilities and must be handled with utmost care.

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928| Monthly Peer Reviewed & Referred Journal |

| Volume 5, Issue 2, February 2022 |

|DOI:10.15680/IJMRSET.2022.0502027 |

2.2 Storage, Treatment & Disposal of Biomedical Waste

Infectious waste cannot be stored for more than 48 hours and may need refrigeration if immediate disposal is not possible. Storage facilities should be located away from populated areas. Waste collection from hospital wards should be done using well-marked collection points and disinfected trolleys. Vehicles used for waste transport should be designated for this purpose and clearly labelled.

Table 1 - The Classification, Colour Coding, Treatment, And Disposal of Biomedical Waste (Bio-Medical Waste Rules, 1998)

CATEGORY	WASTE TYPE	COLOR CODING	TREATMENT & DISPOSAL METHOD
1	Human Anatomical Waste	Yellow	Incineration/Deep Burial
2	Animal Waste	Yellow	Incineration/Deep Burial
3	Microbiological & Biotechnology Waste	Yellow/Red	Local Autoclaving/Microwaving/Incineration
4	Waste Sharp	Blue/White	Disinfection, Autoclaving/Microwaving & Mutilation/Shredding
5	Discarded Medicines and Drugs	Cytotoxic	Black
6	Solid Waste	Yellow	Incineration/Autoclaving/Microwaving
7	Disposable Solid Wastes	Red/Blue	Disinfection & Mutilation/Shredding
8	Incinerated Ash	Black	Landfills
9	Chemical Solid Wastes	Black	Disinfection, Discharge into Sewers for Liquids, and Secured Landfills for Solids
10	Liquid Waste	Red/Blue	Disinfection and Discharge into Sewers

III. DISPOSAL METHODS

Various methods are used for disposing of hospital waste, including:

- **Chemical Process**: Chemical disinfection
- **Thermal Processes**: Autoclaving, hydro-claving, microwaving, and incineration

While landfilling is sometimes used, it has several drawbacks:

- Difficulties in safe transport
- Limited availability of landfill sites
- Potential contamination of air, soil, and water
- Risk of disease outbreaks and epidemics

Therefore, thermal processes and chemical disinfection followed by shredding are preferred for biomedical waste disposal.

IV. HUMAN RESOURCE MANAGEMENT ISSUES

Hospitals must develop a comprehensive waste management plan, minimizing health and environmental risks without overburdening healthcare staff. Proper training in waste segregation and minimization is crucial for all hospital staff.

| ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 5.928| Monthly Peer Reviewed & Referred Journal |

| Volume 5, Issue 2, February 2022 |

|DOI:10.15680/IJMRSET.2022.0502027 |

V. COMMUNITY AWARENESS

Public education about the risks associated with biomedical waste is essential. Efforts should be made through media to raise awareness and encourage community involvement in safe waste disposal practices.

VI. CONCLUSION

Environmental pollution from healthcare facilities is a significant concern. Healthcare institutions are legally obligated to ensure safe waste disposal. Government authorities and pollution control boards must enhance public awareness and community involvement in managing biomedical waste safely.

REFERENCES

1. Santra, S. C. (2004). Environmental Science, New Central Book Agency (P) Ltd.
2. Chatterjee, A. K., 2001, Water Supply and Waste Disposal and Environmental Engineering, Khanna Publishers.
3. Bhatia, S. C., 2001, Environmental pollution control in chemical process industries, Khanna Publishers.
4. Bio-Medical Waste Rules (1998) http://dpcc.delhigovt.nic.in/bio-medical-waste.html
5. Hazardous Waste Management By Charles A. Wentz (McGraw-Hill International Edition, 1989)
6. Hazardous Waste Incineration By Calvin R. Brunner (McGraw-Hill International Edition, 1989)
7. Environmental Pollution Control Engineering By C.S. Rao

INNO SPACE
SJIF Scientific Journal Impact Factor
Impact Factor: 5.928

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY

9710 583 466 9710 583 466 ijmrset@gmail.com

www.ijmrset.com