

A STUDY ON WASTE DISPOSAL MANAGEMENT AND RECOMMENDATION FOR SAFE DISPOSAL

*¹Hajera Anam, ²Ranjit Ambad, ³Priyanka Deshmukh, ⁴Minal Kalambe

¹Post-Graduate Student Datta Meghe Medical College, Shalinitai Meghe Hospital and Research Centre, Nagpur

²Professor Dept. of Biochemistry Dr. Rajendra Gode Medical College, Amravati

³Associate Professor Dept. of Anaesthesiology Datta Meghe Medical College, Shalinitai Meghe Hospital and Research Centre, Nagpur

⁴Senior Resident Dept. of OBGY Jawaharlal Nehru Medical College, Datta Meghe Institute of Medical Sciences Sawangi (Meghe), Wardha

Abstract: By conducting awareness campaigns, putting safety measures in place, and collaborating with a specialist to remove medical wastes properly, you can do your bit to reduce the hazards associated with improperly managing these wastes. To protect your facilities and personnel, handling biohazardous waste disposal is crucial. Suppose a biohazardous waste container such as a sharps container or a hazardous waste container is not properly disposed of. In that case, it might seriously endanger the safety of both personnel and guests. Biohazardous waste management may also involve transporting biohazardous items to a designated area for safe disposal. Safe ecosystems and healthy populations depend on effective biomedical waste treatment. The opinions on BMWM, laws, customs, and treatment methods now in use across the world are reviewed in this article. The best-case scenario would be for B7 yMWM to be the focus of a national plan with specialised infrastructure, cradle-to-grave laws, an effective regulatory body, and trained employees.

Keywords: biomedical waste, environments, safe disposal and hazardous waste.

1. Introduction:

If you work in a hospital, it is your job to ensure that the proper waste disposal procedures are in place. You can do this by ensuring that a viable/legal way of disposing of medical waste is provided and ensuring that you follow all state, federal, and hospital rules. This can be regained by working with your facility's environmental health department infectious waste management program. The public's health suffers when biological waste is handled improperly. It is necessary to handle biological waste in a consistent and safe manner. This article discusses the 2016 biomedical waste standards, including its key elements,

*Corresponding Author : samrajgopal@outlook.com

classification of biological waste, sources, and color-coding scheme. For a safer and greener environment, it is necessary to manage biomedical waste in a way that is economical, environmentally friendly, and less polluting. The community and related personnel are very interested in raising awareness about trash management.[1]

Unregulated biomedical waste management (BMWM) is a problem for public health. This has led to a major threat to human health and safety as well as the environment for both current and future generations. Biomedical waste (BMW) must be treated in a trustworthy and safe manner. Effective BMWM is both morally required and legally mandated. The best way to handle biomedical waste is to start with waste reduction. Different types of BMW are disposed of in line with national standards, norms, and laws on BMWM for the protection of healthcare personnel, patients, the general public, and the environment. [2]

In order for different health organisations to readily implement the most recent biomedical waste (BMW) management criteria, which were adopted in 2016, they have been streamlined and made easier. The newest rules have decreased the number of BMW categories from 10 to four. These most recent rules have undergone several modifications, which are summarised in the article that follows. The categorization of hospital waste is crucial, thus the trash must be separated at the point of creation in accordance with the categories specified in the most recent recommendations. We must abandon outdated facilities like incineration since it produces hazardous vapours (dioxins and furans) that are bad for both human health and the environment. Instead, we must use newer facilities like plasma pyrolysis, encapsulation, and incineration. When processing the waste produced by hospitals, we may even consider employing these wastewater treatment facilities to eliminate the genes associated with antibiotic resistance. [3]

Aim:

A study on hospital waste management and safe waste management recommendations.

Objectives:

To collect information on the –

1. Disposal of medical wastes:

It has to list the quantity of waste, the transport date, and the name of the hauler who will take the trash away. With this method, everything is properly documented all across the disposal procedure.

2. Determining the types of hazardous medical wastes produced in hospital:

Whether the waste is hazardous, infectious, radioactive or general.

3. Collection:

Collection of waste from the healthcare centres with proper procedure

4. Handling:

Precautions must be taken before handling the biomedical wastes as it can be hazardous and infectious to health.

5. Treatment: There is a proper technique of disposing biomedical by incineration and other methods.

2.MATERIAL AND METHODS :

After taking Institutional Ethical clearance, the study was conducted at a tertiary level centre Hospital at Dakshina Kannada, Karnataka This is a full-fledged 800 bedded hospital with adequate medical, paramedical staff and equipped with modern facilities. The data was collected through observation and interview with the help of a validated questionnaire prepared for staff, doctors, nurses and employees of operation theatres, laboratories, laundry and central sterilization departments of the hospital. The primary data was collected by observation and structured validated questionnaire and secondary data was collected from literature.

3.REVIEW OF LITERATURE:

According to Pandey A et.al. a change in policy is required. Future versions of the new policy will be designed with the BMW 2016 in mind. After receiving approval from the hospital management committee, the policy change will be implemented after informing the HCPs about it.[4]

In accordance with Datta P et.al., effective management of biomedical waste (BMWM) necessitates a collaborative approach supported by robust legislation, dedicated government endorsement, and the adoption of exemplary BMW practices by healthcare professionals and healthcare facilities (HCFs). It is our fundamental entitlement to reside in a hygienic and secure environment. The pillars of BMWM lie in waste segregation at the source and waste reduction (WR). The updated BMWM guidelines of 2016 surpass previous regulations in terms of enhanced segregation, transportation, and disposal methods, aiming to mitigate environmental pollution and ensure the safety of personnel, patients, and the general public. Furthermore, it is imperative to foster the development of innovative, eco-friendly solutions for BMW disposal and encourage greater utilization of non-PVC medical equipment. All participants in BMWM must strive to guarantee a cleaner and more sustainable environment. [5]

According to Manar MK et. al.'s study, it is critical to put into practise efficient techniques to enhance the management and treatment of biomedical waste (BMW) in Lucknow's hospitals. This may be accomplished by giving staff members thorough training, enforcing rules strictly, and regularly inspecting healthcare facilities. According to observations, each bed in Lucknow's eight non-teaching hospitals produces 0.56 kg of hospital trash on a daily average. However, it is alarming that almost 50.5 percent of these facilities lack coloured garbage cans and a separate BMW department. BMW records and source segregation are also not used in 37.5 percent of the institutions. It is important to note that only hospital A uses an incinerator to handle BMW, whereas hospitals G and H lack any equipment for treating BMW. [6]

According to research by Adu RO et al., the present trash sorting and management practises in five hospitals in Ghana have been shown to be insufficient for efficiently managing hospital waste, especially in high-risk regions. A significant problem affecting the effectiveness of trash collection and management as well as the overall integrity of the final waste treatment procedures has been found as the absence of uniform colour coding and labelling for various kinds of hospital waste. Additionally, when comparing health professionals depending on their employment or work environment, substantial disparities in trash sorting behaviour were discovered.[7]

According to Singh et al.'s research, participants showed a considerable increase in their comprehension of BMW (M and H) regulations following a well-structured training workshop. Such a training regimen must be repeated frequently in order to be successful. Furthermore, it is advised that any revisions or instructions provided by the government regarding the BMW (M and H) rules be incorporated into any future training programmes. The Department of Environment & Climate Change, Government of Haryana, provided funding for this research through the Centre for Disaster Management, HIPA, Gurugram (Haryana), India. [8]

According to Sarvathikari R et.al. The two most prevalent problems were the lack of regular BMW pickup and the requirement for larger BMW disposal containers. This can be the case since the disposal agent's services offer less wasteful manpower pickup and a wider geographic coverage. Some practitioners still lacked this even though the majority of survey participants were informed about and actively involved in management. A knowledge gap may be seen in more than half of the answers to the questions on managing and storing BMW management.[9]

Based on the research conducted by Hasan MM et.al., the study concludes that the incineration system is the most suitable waste treatment option for Khulna city, considering technical suitability as well as environmental, economic, and social factors. However, it is essential to ensure the continuous maintenance of the system by employing appropriate air pollution control equipment. Among the alternative treatment methods evaluated, microwave treatment ranked second, followed by autoclaving, when considering all parameters. It is important to note that the assessment of treatment alternatives in this study heavily relies on the subjective evaluations of experts and is subject to potential bias in the selection and weighting of criteria. Moreover, the study did not account for seasonal variation when determining the waste generation rate. Therefore, to comprehensively evaluate the sustainability of these management options, a more extensive study is required, involving a larger number of highly qualified experts, an extended period of data collection, and considering seasonal variance. Additionally, a wide range of Multiple Criteria Decision-Making (MCDM) approaches should be developed to effectively evaluate different choices for healthcare waste (HCW) treatment. The findings of this study will contribute to the development of recommendations for healthcare waste management (HCWM) planning and design not only in Khulna city but also in other municipalities in developing countries. [10]

MATERIAL AND METHODS :

After taking Institutional Ethical clearance, the study was conducted at a tertiary level centre Hospital at Dakshina Kannada, Karnataka. This is a full-fledged 800 bedded hospital with adequate medical, paramedical staff and equipped with modern facilities. The data was collected through observation and interview with the help of a validated questionnaire prepared for staff, doctors, nurses and employees of operation theatres, laboratories, laundry and central sterilization departments of the hospital. The primary data was collected by observation and structured validated questionnaire and secondary data was collected from literature.

4.MATERIAL AND METHODS:

This present study will be carried out at Datta Meghe Medical College, Shalinitai Meghe Hospital and Research Centre, Nagpur in collaboration with Jawaharlal Nehru Medical College with proper medical, paramedical, nursing staff and equipped with modern facilities. The data for this research will be collected through observations and interview. We will take interviews of doctors, nurses, laboratories, operation theatres, laundry and central sterilization department employees of the hospital. The primary data will be collected by observation and secondary data will be collected from literature.

Research Questions:

1. What is the procedure of biomedical disposal according to norms?
2. What are the objectives of the biomedical waste management study?
3. What is the instrument of research in a biomedical waste management study?
4. Is biomedical waste management in hospitals a moderate process?
5. What has past research taught us about biomedical waste management?

5.Expected Outcome:

It is impossible to overstate the value of healthcare waste management in protecting the environment and the general population. Various difficulties in healthcare waste management

and disposal have been the subject of prior study, which has been published in a number of publications, major research areas, and research groups. In this article we will see what are the proper waste of disposing biomedical wastes and safety recommendations of disposal for the safety of employees, workers and the environment.

6.Reference:

1. Patil PM, Bohara RA. Nanoparticles impact in biomedical waste management. *Waste Manag Res.* 2020 Nov;38(11):1189-1203. doi: 10.1177/0734242X20936761. Epub 2020 Jul 15. PMID: 32667845.
2. Capoor MR, Bhowmik KT. Current perspectives on biomedical waste management: Rules, conventions and treatment technologies. *Indian J Med Microbiol.* 2017 Apr-Jun;35(2):157-164. doi: 10.4103/ijmm.IJMM_17_138. PMID: 28681801.
3. Singhal L, Tuli AK, Gautam V. Biomedical waste management guidelines 2016: What's done and what needs to be done. *Indian J Med Microbiol.* 2017 Apr-Jun;35(2):194-198. doi: 10.4103/ijmm.IJMM_17_105. PMID: 28681805.
4. Pandey A, Ahuja S, Madan M, Asthana AK. Bio-Medical Waste Management in a Tertiary Care Hospital: An Overview. *J Clin Diagn Res.* 2016 Nov;10(11):DC01DC03. doi: 10.7860/JCDR/2016/22595.8822. Epub 2016 Nov 1. PMID: 28050362; PMCID: PMC5198315.
5. Datta P, Mohi GK, Chander J. Biomedical waste management in India: Critical appraisal. *J Lab Physicians.* 2018 Jan-Mar;10(1):6-14. doi: 10.4103/JLP.JLP_89_17. PMID: 29403196; PMCID: PMC5784295.
6. Manar MK, Sahu KK, Singh SK. Hospital waste management in nonteaching hospitals of lucknow city, India. *J Family Med Prim Care.* 2014 Oct-Dec;3(4):393-5. doi: 10.4103/2249-4863.148122. PMID: 25657950; PMCID: PMC4311349.
7. Adu RO, Gyasi SF, Essumang DK, Otabil KB. Medical Waste-Sorting and Management Practices in Five Hospitals in Ghana. *J Environ Public Health.* 2020 Mar 4;2020:2934296. doi: 10.1155/2020/2934296. PMID: 32190061; PMCID: PMC7073495.
8. Singh S, Dhillon BS, Nityanand, Shrivastava AK, Kumar B, Bhattacharya S. Effectiveness of a training program about bio-medical waste management on the knowledge and practices of health-care professionals at a tertiary care teaching institute of North India. *J Educ Health Promot.* 2020 May 28;9:127. doi: 10.4103/jehp.jehp_704_19. PMID: 32642483; PMCID: PMC7325787.
9. Sarvathikari R, Pavithran VK, Ravichandiran R. Challenges in implementation of biomedical waste management among the dental practitioners in a tier 2 town in India - A cross-sectional study. *Indian J Dent Res.* 2021 Oct-Dec;32(4):443-447. doi: 10.4103/ijdr.ijdr_867_21. PMID: 35645069.
10. Hasan MM, Rahman MH. Assessment of Healthcare Waste Management Paradigms and Its Suitable Treatment Alternative: A Case Study. *J Environ Public Health.* 2018 Jul 29;2018:6879751. doi: 10.1155/2018/6879751. PMID: 30151013; PMCID: PMC6087569.