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**PRODUCTION OF MEDICAL WASTE AND ITS IMPACT ON ENVIRONMENT**

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*Shambhavi Bhushan<sup>1</sup>***ABSTRACT**

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This article addresses the impact of medical waste on the environment and human health. Hospitals and nursing homes generate bio medical waste in an unscientific manner at a continuous rate. As a result these poor management's practices cause vulnerability to health hazards and environmental problems. The article also reviews the recent 2016 BMW rules for its effective implementation. The issue of biomedical waste management, identification, and disposal needs an enhancing review so that better management protocols can be established. Biomedical waste is dangerous to the exposed population if it's not managed properly. Medical waste is considered as a source of contamination of water and land sources if not rendered harmless before it is buried in land or disposed in water. The numbers of hospitals are increasing in view of the population increase and subsequently the waste as well. Moreover, the location of the hospital is likely to determine the type as well as the quantity of the waste. The paper examines medical waste management, including the common sources, governing legislation, and handling and disposal methods. Medical waste is a special type of waste that carries a high potential of infection and injury. This lack of clarity has made sorting medical waste inefficient, thereby, increasing the volume of waste treated for pathogens, which is commonly done by incineration. The paper also highlights that the unnecessary classification of waste as infectious results in higher disposal costs and an increase in undesirable environmental impacts.

**KEYWORDS:** *Environment, Human Health, Waste, Medical, Infection, Pollution*

**INTRODUCTION**

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Bio medical waste is defined as any type of waste created during a diagnostic process, the treatment of a disease, or immunizations of animals and humans. The article addresses the impacts of biomedical waste which includes various types of wastes collected from hospitals, nursing homes, research centers, clinics, medical shops etc. Predominantly, it is a type of waste that contains any type of the material that may be contaminated with infectious properties.

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It mentions the effects of medicines in the environment, including mostly human, animal, and fish health, and shockingly there are not so many studies as it should be expected due to the increasing importance of medical waste management. The solid waste emergence during diagnosis and treatment, clinical and pharmaceutical research, besides that the emergence in medicine production, hospital waste, or in other words, they are referred to as clinical waste.

The importance of healthcare waste management in preserving the environment and protecting the public cannot be denied. The main purpose to write this paper is to identify the trends in healthcare waste management literature; methodologies used in healthcare waste management and determine the scope of future research in healthcare waste management.

The medical waste is hazardous and they must be taken under control and must be collected safely without giving any danger to the environment and human beings. The impact of biomedical waste on water, soil, air quality, the environment, and human health. Hospitals and nursing homes generate an increasing amount of biomedical wastes in an unscientific manner. Poor waste management practices by these institutions cause exposure to health hazards and actual environmental problems.

The waste must be sorted temporarily and must be disposed of permanently. The negative impact of the wastes can be eliminated by creating a waste minimization program about hospital waste that will affect people's health and environmental health or that will be able to reduce has been taught.

### **WASTE GENERATION, PRACTICES AND MANAGEMENT**

Indian cities are facing biomedical waste management problems. On account of urban development with increase in population, the number of healthcare facilities is attempting to keep up, resulting in a large-scale generation of biomedical waste. Hospitals in metropolitan cities produce more than 30 tons of waste each day.

It is a matter of grave concern that most of the hospitals, especially government run hospitals, are not maintained in a proper manner as the employees of such hospitals often do not follow the guidelines developed in 1998 hospital handling and management rules. Kottaveeran and Mohankumar in 2011 argued that, India with 6 lakh hospital beds in 15,000 private hospitals and 23,000 in primary health centers is facing the grim situation due to poor management and pathological waste. It is believed that 20- 30% revenue can be

generated from hospital waste<sup>2</sup>, if treated and managed properly, which is substantially a great spring from the current 8% mark<sup>3</sup>.

The current management is not only defacing the economy but also is responsible for exposures to workers, patients, visitors and also those who are living. The presence of vast quality of metals such as cadmium, lead, and zinc may ultimately end up and leach down the soil and may cause damage to it. The non-biodegradable nature of these elements is a cause of concern as it accumulates in the environment.

According to the national health expenditures (NHE) over 10 years, the economic input output model revealed negative public health comes. They say, that this sector is responsible for acid rain (12%), greenhouse gas emissions (10%), smog formation (10%), air pollutants (9%), stratospheric ozone depletion (1%), and carcinogenic and non carcinogenic air toxics (1-2%) all over the world<sup>4</sup>. Over 44,000-98,000 people die in hospitals every year in the United States alone due to preventable medical errors.

The improvement in environmental performance in the healthcare sector could decrease the expenditures through waste reduction as well as energy savings. The healthcare sector not only represents an image of nuisance, if waste cannot be handled directly, but can be troublesome when it emits different CHG and is overburden with different types of pathogens that may cause damage to human health and environmental services.

Although the service of hospitals is to protect and save human life, the by products which are generated are causing great damage which includes sharps, non-sharps, blood, body parts chemicals, pharmaceuticals, medical tools and many more. The improper handling of such waste may increase the airborne pathogenic bacteria which could also adversely affect the hospital environment and the community at large. The waste is fully loaded with harmful microorganisms which if not managed properly, lead to infections, infertility, genital deformities, hormonally triggered cancers, mutagen city, asthma and many other diseases out of which some may last for lifetime.

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<sup>2</sup> Cebe, A., S. Dursun, and H. Mankolli. *Hospital solid wastes and its effect on environment*, 8(5), Journal of International Environmental Application & Science, 733–7, (2013)

<sup>3</sup> Akter, N, *Medical waste management: A review. Environmental engineering program: School of environment, resources and development*, Thailand: Asian Institute of Technology, Khlongluang, Pathumthani (2000)

<sup>4</sup> Ahmed, R, *Hospital waste management in Pakistan: Case study report special waste fractions. Hospital Waste*, (1997)

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The BMW 1998 rules were modified in 2000, 2003 and 2011. The draft of BMW 2011 remained as a draft and did not get notified by the government due to lack of consensus on categorization and standards. Now ministry of environment, forest and climate change in 2016<sup>5</sup> have amended the BMW rules. The new rules have simplified the categorization and authorization while improving the segregation, transportation and disposal methods to decrease environmental pollution. It consists of four schedule, five forms and eighteen rules.

Some of the salient features of the rules made in 2016 are-

1. The scope of the rules has been expanded and included various health camps such as vaccination camps, blood donation camps, and surgical camps.
2. The segregation packaging, transportation and storage of BMW have been improvised. The waste has been classified into four categories based on color code-type of waste and treatment options. Furthermore, untreated human anatomical waste, solid waste, and biotechnology waste should not be stored beyond a period of 48 hours.
3. No HCF shall establish on-site BMW treatment and disposal facility if the provision of CBMWTF is available at a distance of seventy- five kilometers. If there is no facility, the occupier shall set up requisite BMW treatment facility such as incinerator, autoclave or microwave, shredder after taking prior authorization from the authority concerned.
4. Standards for emission from incinerators have been modified to be more environmental friendly.
5. The duties of the operator of a common biomedical waste treatment and disposal facility (CBMWTF) have been increased. They should assist in the training of HCW from where the waste is being collected. In addition, there should be barcoding and global positioning system established for handling of BMW within 1 year.
6. Ministry of environment forest and climate change will monitor the implementation of rules yearly. There will be a responsibility of each state to check for compliance by setting up district-level committee. Further, every 6 months, this committee shall submit its report to the state pollution control board.

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<sup>5</sup> <http://www.ppcb.gov.in/Attachments/Bio%20Medical%20Waste/CBMWTF.pdf>

The management of medical waste is of great importance due to its potential environmental hazards and public health risks. In the past years, medical waste was often mixed with the municipal waste and disposed of in residential waste landfills or improper treatment facilities.

In recent years, many efforts have been made by the environmental regulatory agencies and waste generator managements to better manage the waste from healthcare facilities and practices like generation, composition, segregation, transportation, and disposal of medical waste do not follow proper regulations. The method of incineration is identified as the most preferred disposal method and was the only one to be available till 2005. Various methods now in use are incineration, steam disinfection, microwave disinfection, autoclave disinfection and mechanical/chemical disinfection.

### CONCLUSION

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This article highlighted that unscientific and inadequate management of biomedical waste is linked with risks to people who are directly or indirectly associated with this medical profession. It has been a challenge to maintain the quality of water, soil and air by the medical waste. The quantities and proportions of different constituents of wastes, their handling, treatment, and disposal methods in different healthcare settings varies and treatment and disposal methods have been found to be inadequate in most of the studies and it is recommended that the management should follow the policies, plans and protocols.

Moreover, establishing training programs on proper waste management for all healthcare workers is essentially needed. The management of medical waste is of great importance due to its potential environmental hazards and public health risks. In the past years, medical waste was often mixed with the municipal waste and disposed of in residential waste landfills or improper treatment facilities.

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