



3R Approach towards Bio-Medical Waste Management System

Anupam Khajuria*

Researcher, United Nations Centre for Regional Development, Nagoya, Japan

*Corresponding Author: Email - khajuria@uncred.or.jp

ABSTRACT Bio-medical waste means any waste, which is generated during the diagnosis, treatment or immunisation of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps or any healthcare establishment (Bio-Medical Waste Management Rules, 2016). Bio-medical waste is considered as hazardous waste because it contains toxic substances. Bio-medical waste constitutes a small portion of total municipal waste generated, needs special segregation, handling and treatment as it is highly infectious and can pose a serious threat to human health. Improper bio-medical waste management causes a direct health impact on the community, the health care workers and on the environment. The illegal disposal and illegal burying of bio-medical waste causes land, water and air pollution. The waste segregation at source is very vital as municipalities in most developing countries have neither technical nor scientific capacity to properly manage bio-medical waste. In developing countries the scientific awareness of safe and proper bio-medical waste disposal has not been solidly established, which calls for immediate attention on its management. The bio-medical waste management is far less intensive in rural areas where polluting sources includes dead sick animals and expired drugs, generated in veterinary hospitals or incineration centres together with regulation on illegal burying and fly tipping of biomedical waste. This presentation aims to provide a clear overview of bio-medical waste management system in developing countries (in urban and rural areas) including classification of bio-medical waste, treatment technologies of bio-medical waste. This presentation would particularly emphasize on the mechanism of how 3R (reduce, reuse and recycle) technology contributes to bio-medical waste management, basically by REDUCING waste quantities, reselling plastic, paper, glass metal materials to scrap dealers for REUSE, and by improving the potential of RECYCLABLE waste that is rendered unusable through contamination.

Keywords: Bio-medical waste, Management, Pollution, Reducing, Reuse, Recyclable;

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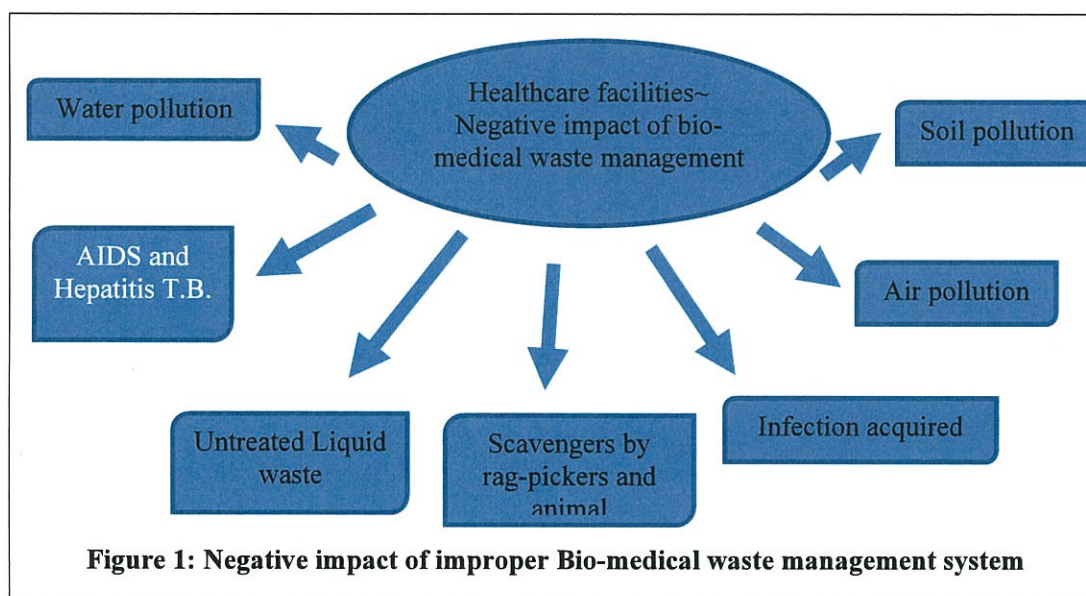
1.0 Introduction

Bio-medical waste means any waste, which is generated during the diagnosis, treatment or immunisation of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps, including the categories mentioned in (Bio-Medical Waste Management Rule, 2016, Schedule I appended to these rules). Bio-medical waste is considered as hazardous because they contain toxic substances. Although, bio-medical waste

comprises a small segment of total municipal solid waste, besides being infectious. Now a days, due to rapid urbanization and alarming growth of bio-medical waste management has become a major issue of concern. The World Health Organization has classified medical waste into eight categories such as General waste, Pathological, Radioactive, Chemical, Infectious to potentially infectious waste, Sharps, Pharmaceuticals, Pressurized containers (WHO, 1999). According to new amended rules of bio-medical waste management rules, 2016, bio-medical waste has classified into various categories with prescribed colour coding containers - Human anatomical waste, Animal anatomical waste, Soiled waste, Expired or Discarded medicines, Chemical waste, Chemical liquid waste, Discarded linen, mattresses, beddings contaminated with blood or body fluid, Microbiology, Biotechnology and other clinical laboratory waste, Contaminated waste (Recyclable), Waste sharps including metals (Glassware and Metallic body implants). The quantity of bio-medical waste generated per bed per day will vary depending upon the type of health problems, the type of care provided and the bio-medical waste management practices. In India, the total amount of municipal waste a city generates, only 1-1.5 percent is bio-medical waste, of which 10-15 percent is considered as an infectious waste, whereas in developed countries, due to increased use of disposables the waste produced has been up to 5.24 kg per bed per day (Tiwari and Kadu, 2014).

2.0 Problems associated with bio-medical waste

Inadequate implementation of rules and regulation plays a major drawback in bio-medical waste management system. Improper and inadequate treatment and disposal of bio-medical waste causing serious implications on public health and environment. Infectious waste gets mixed with solid waste and get added into ground waste during rainy season and causes water pollution. It is essential to properly collect, segregate, treat and dispose bio-medical waste in a safe manner.



3.0 3R (Reduce, Reuse and Recycle) approach

The hospitals and other healthcare facilities can better manage their waste via prevention, reduction, reusing and recycling. The non-hazardous waste can be reduced by using hand dryers rather than paper towels in bathrooms, and using washable items in patient rooms (gowns, linens). Reusing as a 'win-win' practices to lower the amount of waste, and also save the 'cost-effectiveness' of healthcare facilities. The certain types of bio-medical waste, although labelled as

single-use, can be disinfected and reused. Recycling of non-hazardous waste by separating the waste into organic and inorganic factors, selling the inorganic waste and making compost from organic waste (Khajuria and Kumar, 2007). Some products can be recycled such as cardboard, office paper, aluminum cans, glass bottles, newspapers, plastics, and steel cans.

4.0 Conclusion

The various list of prescribed authorities and the corresponding duties are involved in the effective implementation of bio-medical waste management according to new rules in 2016. Government and non-government agencies have recognized the importance of bio-medical waste management. The segregation of bio-medical waste at source is important to reduce, reuse and recycle which is considered as an innovative and effective measures. The educating staff and monitoring outcomes from healthcare facilities, resulted effective and best biomedical waste management system. The effective method of treatment and proper disposal of bio-medical waste needs to be develop for benefits of human health and clean and safe environment. 3R is a buzzword for an environmentally friendly way to manage bio-medical waste.

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