THE GROWING NEED FOR BIOMEDICAL WASTE MANAGEMENT IN HOSPITALS

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Abstract

Biomedical waste (BMW) remains as a threat to the medical personnels and community. Adequate knowledge and good practice towards BMW are mandatory for different cadres in health care sector dealing with medical wastes. Every healthcare facility (HCF) should have a designated flow of BMW management. Segregation is the crucial step and if done properly ensures that all the remaining steps are done effectively. More focus is needed in record maintenance and reporting of BMW. Regular inspection and periodic audits of BMW are to be implemented in waste generating facilities. Hospitals should ensure proper implementation of guidelines by forming a Committee for BMW management.

Key words

Biomedical waste, Biohazard, Health care facility

Introduction

BMW is "'any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining thereto, or in the production or testing of biologicals"[1]. BMW are infectious wastes which can be either liquid or solid in nature. The demand for rapid and quality health care attracts more wastes due to improved diagnostic procedures. The common sources of production are clinics, diagnostic laboratories, nursing houses, hospitals and health camps.

Adequate knowledge and good practice towards BMW are mandatory for different cadres in health care sector. Various health hazards are associated with mishandling of these wastes. About 40 pathogens are documented to be transmitted and the predominant ones are HIV, Hepatitis B and C viruses[2].

Pollution of air, water and soil can occur due to poor BMW activities. So utmost care is needed at all levels, while handling and disposing them.

Biomedical waste rules

The Ministry of Environment, Forest and Climate change has formulated BMW management rules in 2016. These rules are done amendments in 2018 and 2019. The apex body which monitors the BMW activities is Central Pollution Control Board (CPCB) in India. The State Pollution control boards of respective state regulate, monitor and report the BMW activities to CPCB. Every HCF should have a designated flow of BMW management and their own sewage treatment plant (STP).

The Indian scenario

The average BMW produced per bed is about 1.5-2 kg daily in India. Our country generates 484 tonnes per day from 168869 HCFs. There are 198 Common BMW treatment facilities (CBMWTF) in use and 28 are under construction. The number of HCFs using CBMWTFs are 131837 and approximately 21870 HCFs have their own treatment facilities on-site[3].

Classes of biomedical waste

Among the total waste generated in hospitals, 85% is general (non-hazardous) waste, and the remaining 15% is hazardous. BMW includes masks, gloves, body parts, sharps, broken ampoules, soiled cotton, discarded linen, expired drugs, vaccines, laboratory wastes, urinary bags, chemicals, cytotoxic and radioactive materials. The BMW produced in hospitals is classified into four major classes. They are the non-plastic infectious wastes (yellow), the plastic recyclable items (red), sharps and metals (white) and broken glasses and metallic body implants (blue) (Figure 1). All the BMW bags and containers should have the logos of biohazard and cytotoxic hazard on them (Figure 2).

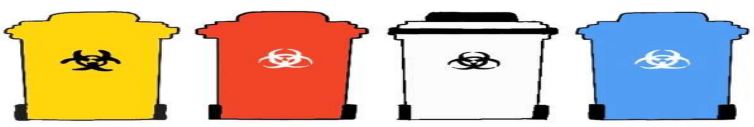

Figure 1-Colour coded bins for biomedical waste[4]

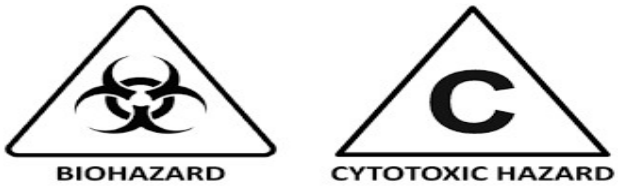

Figure 2. Logos of biohazard and cytotoxic hazard

Steps

The four main steps in BMW management are

1.Segregation

2.Storage

3.Transport

4.Disposal

Segregation

BMW is a potential source of infection. Segregation is the crucial step and if done properly ensures that all the remaining steps are done effectively. Health care workers have to be mindful while doing this step. A single wrong mistake nullifies the entire effort of appropriate disposal[5]. For example, disposing a plastic syringe in yellow bag instead of red one leads to liberation of toxic fumes during incineration. Only three fourths of the capacity of the bags are to be filled. Adequate number of bins should be placed at appropriate waste generating units[5]. All the laboratory liquid waste is to be pretreated either by autoclaving or 1-2% hypochlorite.

Storage

The properly labelled and segregated waste from various areas of hospital is transported by trained workers to common storage area. These workers during transport should wear gowns, masks, heavy duty gloves and gumboots. The common storage area should be safe, well-ventilated, easy to clean with good

drainage system and remote from general public. It should display biohazard sign and have compartments to store different categories of wastes temporarily. This area should be sheltered from water, wind, rodents, insects and animals.

Transport

The BMW from central storage area after proper weighing are transported in designated closed vehicle which has a tracker system. The waste reaches the CBMWTF where all wastes are treated and safely disposed within 48 hours of generation time. The treatment methods are Incineration, Autoclaving, Microwaving, Plasma Pyrolysis and Shredding. Any waste which couldn't be reused or recycled are disposed by Deep burial, Sharp pits and Encapsulation.

The principle of BMW management is based on 3Rs- Reduce (decreasing the production of waste), Reuse (if feasible), and Recycle (Plastics). The energy obtained during disposal is used for generating electricity and also as compost for soil.

Challenges

Non-adherence of BMW rules is a major failure. There is always demand for human resources and infrastructure for handling and storing the wastes respectively. Poor segregation practices by few health care workers adds to the menace. The safety measures for BMW workers are often inadequate. There is always risk of hospital associated infections and environmental hazards due to mishandling. Inaccurate data maintenance and poor documentation of BMW also fuels the problem. There is a deficiency in knowledge, attitude and practice on medical wastes among health professionals. Among doctors, the knowledge about BMW is desirable (82%) while its of lower percentages in other cadres. Nurses score more in practice (83%) compared to other cadres.[6]

Solutions

Hospitals should ensure proper implementation of guidelines by forming a Committee for BMW management. Following right approach towards onsite segregation of wastes should be insisted consistently. Logos of biohazard should be displayed on the plastic bags and containers. The BMW should not be stored

more than 24 hours after generation. More focus is needed in record maintenance and reporting, at all levels starting from site of generation to common storage area. Dedicated trolley or vehicle is needed for safe transport of wastes from wards to the common storage area of hospital. Strict monitoring of BMW is to be done as per Standard Operating Procedures (SOP). Raising the awareness among health care workers by Information, Education and Communication (IEC) strategies. Regular inspection and periodic audits of BMW are to be implemented in waste generating facilities.

Conclusion

BMW remains as a threat to the medical personnel and community. Adequate infrastructure with dedicated health care workers with right approach helps in effective BMW management. Commitment and support from Government helps in creating a sustained impact. An eco-friendly environment could be derived by collaborating easy approaches and strict monitoring measures.

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