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A review

Bio-Medical Waste Management: Strengthening the Needs and Significance in Healthcare Facilities in Katsina State

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ABSTRACT: This paper studies the strengthening needs and significance of the management of biomedical waste in secondary healthcare centres in Katsina State. This paper highlighted categories of waste (Hazardous, infectious, radioactive etc.) and best ways of handling them as specified by experts which include Segregation, Collecting, Categorizing the waste, Storing, Transporting and Treating the waste. Recommendations were made to relevant stakeholders on effective use of biomedical waste management strategies in the state and beyond such as State Ministry of Health should impose biomedical waste management strategies in all Health Facilities. People looking for livelihood in Waste disposal places should be banned from biomedical waste disposal places.

Keywords: Biomedical waste, managements, health centres

INTRODUCTION

It becomes an order of the day to habitually meet people adult and young parading in west disposal places looking for waste materials to be sold to earn living. Such recent behavior need to be looked into as those normally involve do not know the implications to their health, of other people and the entire populace. Though, there are many types of waste, medical and nonmedical waste, the one concern in this write up is the medical waste.

Medical or Biomedical waste (BMW) is mostly found in healthcare facilities especially in the surgical and medical wards, blood banks, medical laboratories, etc. BMW causes infection to any person coming into contact with it without proper kitting. The BMW may consist wholly or partly of human or animal blood or body fluids, tissue, excretions, contaminated drugs or pharmaceutical products, swabs or dressings by-products, used contaminated syringes and needles or other contaminated sharp instruments. This waste may become hazardous to any person coming into contact with it (WHO, 2018).

It is estimated that around 85% of the total amount of waste generated during healthcare activities is non-hazardous waste while only 15% is considered hazardous waste that includes various form of waste such as human anatomical parts, blood and tissues, radiation waste, chemo-toxic drugs, and broken medical equipment (Besufekad et al., 2021). WHO (2018) estimated that around 16 billion injections are given every year for treatment or immunization. Unfortunately, not all used needles and syringes are disposed off as per the legislation and safety norms specified under injection safety and aseptic techniques, in which risk of needle prick injury and acquiring the relative infection is evident. Health care workers (HCWs) are found to be mostly at

risk as they are involved in day-to-day care to the patients and other health care activities (Wafula et al., 2019). The health workers involved are general and specialist medical practitioners, nurses and midwifery professionals, complimentary medicine practitioners, pharmacists, physiotherapists, laboratory technicians/ scientist etc. (Besufekad at el., 2021).

Types of biomedical waste

Endris et al. (2022) classifies biomedical waste in to 4 major types as hazardous, infectious, and radioactive and Sharps. Hazardous medical waste is more dangerous compared to other types of waste. Being in contact with hazardous materials can cause difficulty in breathing, skin rashes and eye irritation, and other dangerous ailments. Example of hazardous medical waste include any material that can destroy other substance with which it come in contact with, like poisons and some medications. Infectious medical waste on the other hand can lead to producing or spreading infections. This type of waste should be handled by only those trained to do so and using approved and recommended personal protection equipment. Infectious waste includes the following among others:

i) Contaminated instrument and Personal protective equipment (PPE): - these include gown, face shield/goggle, face mask, and gloves, and boots that have been in contact with bodily fluid.
ii) Blood and blood product
tubing: - is a tube used to administer medication in to the patient body.
iii) Microbiological waste: - these are cultures, stocks, or any laboratory agent that may be contaminated with an infectious disease.

Radioactive medical waste is another types of waste that if improperly handled may cause severe long-term ailments. Most of the radioactive medical waste produced in the health care centres comes from radiation therapy. Radioactive medical waste may varies from Sharps used for radiation and any material that comes into contact with radioactive rays. Sharps are seen as any medical instrument that can puncture human or animal skin. Sharps used health care settings, especially for vaccination, drawing blood, and inserting an IV may become infected if used on infected persons. Though, there are containers specially made for disposal of used sharps, if care is not taken they may become dangerous. Examples of the instrument that are sharp include needles, syringe scalpels and Injector pen.

Steps in managing biomedical waste (BMW)

Management of BMW needs to be organized, as even a single mistake can cause harm to the people in charge. Endris et al (2022) identified the following activities in management of BMW. Surveying the waste product to ascertain its types. Segregation or separation of different types of waste generated, which helps reduce the risks resulting from improper management of BMW.

Collection of the waste

This involve the utilization of different color of waste disposal bins. The color is an important indicator for the segregation and identification of different categories of waste into suitable-colored containers.

Storing

This is the process of keeping BMW. This should be done for not be less than 8-10 hours in hospitals with around 250 beds. In nursing homes it must not be less than 24 hours (Sahiledengle, 2019).

Treatment and disposal of biomedical waste

Incineration technology is a highly used in treatment and disposal of BMW where high temperature thermal process is used to convert them into inert material and gasses. Non-incineration technology treatment includes some process such as thermal, chemical, irradiative and biological. The non-incineration technologies mostly employ the chemical and thermal processes. The processes destroy pathogens to decontaminate the waste. Furthermore, Autoclaving is a process that involves using steam at high temperatures, such as gravity, pre-vacuum and autoclave treatment to destroy the harmful pathogens that are present in the waste. All these methods were recommended for treatment and disposal of for BMW such as sharps, soiled and solid wastes, whereas the treated residue can be land filled (Kenny and Priyadarshini, 2021). Microwave irradiation makes the particles within the waste material to vibrate and generate heat that kills all pathogens. Other methods of treatment includes: Chemical methods where 1% hypochlorite solution can be used for chemical disinfection. Plasma pyrolysis is another state-of-the-art technology for safe disposal of biomedical waste. The intense heat generated by the plasma enables it to dispose all type of waste including municipal solid waste, biomedical waste and hazardous waste in a safe and reliable manner (Kenny and Priyadarshini, 2021).

BMW and health promotion model

Significance of BMW can be measured using Health promotion model as it explain the factors underlying motivation to engage in health promoting behaviors, interaction with physical and interpersonal environments to improve health. The model emphasizes the significant role that healthcare workers can play in initiating and

maintaining health-promotion behavior, and to shape the environment to support health- promotion behavior. This model highlights three major factors that influence health promoting (Alice, 2023).

1 Individual characteristic and experience.
2 Behavior-specific cognitions and effect.
3 Behavior outcome.

This model also highlighted on the basic beliefs which are believed to determine the health-promotion behavior and change interventions which include benefit, barrier, self efficacy and activity related to action. Others include interpersonal and situational influence, commitment to plan of action and immediate competing to demands. In pursuance to the provision of the health promotion model healthcare facilities need to design plan of action toward BMW management. Many a times, due to some other factors especially in the Accident and Emergency centres waste disposals are not carried out properly. One realizes that containers became over full before discards despite (Akkajit et al., 2020). The quantity of infectious/medical waste in the container or bag should fill the 1/3 to 2/3 of the bag and medical waste containers must be accurately closed and covered containers.

Necessity of biomedical waste management

WHO (2018) indicated that 85% of BMW is non-hazardous. The methods employed in disposing the waste can make it hazardous waste that can pollute and damage the environment leading to serious global health consequences. Pollution may cause disease and premature death in the populace (Besufekad et al., 2021). Similarly, Athar Institute of Health and Management Studies (AIHMS) (2020) indicated that inadequate management of waste produced in health care facilities may cause health hazards on the healthcare workers and general public. Therefore it is an obligation to ensure that biomedical waste are manage properly to reduce the risk of contamination of waste to handlers and those living in the locality of hospitals. Biomedical waste has highest risk to healthcare workers and the general public. The biomedical waste mismanagement leads to having infectious and rapid spread deadly communicable haemorrhagic fevers and other deadly disease conditions. Therefore biomedical waste management is necessary to defend the environment health and spread of infectious disease in the population.(AIHMS; 2020). On this note, there is need for proper and correct management of biomedical waste to avoid endangering lives and environment.

Conclusion

Healthcare is a complex and constantly evolving industry, and overseeing it may be challenging to all of the moving components. As the healthcare sector expands, the economics of healthcare becomes more complicated as such it affects Its of paramount importance to note that accurate waste management lead to decrease in the incidence of diseases spread by infectious medical equipment. Biomedical waste is seem to be hazardous which can lead to serious infectious diseases that may be lethal; it is a problem of global nature that need cooperate effort from waste generation sites. The management is of much importance in reducing the menace and serious health consequences attached to the healthcare waste. Proper management tactics can equally reduce misused of medical tools.

Recommendations

i State Ministry of Health should impose biomedical waste management strategies in all Health Facilities.
ii State Ministry of Health should periodically pay unscheduled visit to Health facilities to ensure compliance with the biomedical waste management strategies plans.
iii Populace should be educated on the hazardous nature of biomedical waste management to the individual and communal health.
iv Biomedical waste disposal sites should be strictly out of bound to non-trained personnel.
v People looking for livelihood in Waste disposal places should be banned from biomedical waste disposal places.

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