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HAZARDOUS AND TOXIC WASTE MANAGEMENT (B3) IN HOSPITALS

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Abstract
Management of hazardous and toxic materials (B3) waste in hospitals is crucial for protecting human health and preserving the environment. B3 waste, such as chemical residues, medicines, syringes, and infectious materials, can pose a risk of disease transmission, poisoning, and soil, water, and air pollution if not handled properly. Therefore, hospitals must sort, store, transport, and dispose of waste in accordance with safety procedures and standards. Proper B3 waste management helps prevent harm to healthcare workers, patients, and the surrounding community, while ensuring the hospital operates safely, hygienically, and responsibly towards the environment.
Keywords: *Hazardous and Toxic Waste, Management, Hospital*

Abstrak
Pengelolaan limbah bahan berbahaya dan beracun (B3) di rumah sakit sangat penting untuk melindungi kesehatan manusia dan melestarikan lingkungan. Limbah B3, seperti residu kimia, obat-obatan, jarum suntik, dan bahan infeksius, dapat menimbulkan risiko penularan penyakit, keracunan, dan pencemaran tanah, air, dan udara jika tidak ditangani dengan benar. Oleh karena itu, rumah sakit harus memilah, menyimpan, mengangkut, dan membuang limbah sesuai dengan prosedur dan standar keselamatan. Pengelolaan limbah B3 yang tepat membantu mencegah bahaya bagi petugas kesehatan, pasien, dan masyarakat sekitar, sekaligus memastikan rumah sakit beroperasi dengan aman, higienis, dan bertanggung jawab terhadap lingkungan.
Kata Kunci*: Limbah Bahan Berbahaya dan Beracun, Pengelolaan, Rumah Sakit*

INTRODUCTION

Hospitals are healthcare institutions that not only provide medical services but also generate waste from various medical and non-medical activities. One type of waste produced is Hazardous and Toxic Materials (B3), which can negatively impact human health and the environment if not managed properly. Therefore, safe, appropriate, and standardized B3 waste management is crucial for maintaining the safety of patients, healthcare workers, and the surrounding community.

Medical waste management, particularly hazardous waste (B3), has been regulated in various regulations, such as Minister of Health Regulation No. 7 of 2019 concerning the Management and Handling of Hospital Medical Waste, and Government Regulation No. 101 of 2014 concerning the Management of B3 Waste. Furthermore, Minister of Health Regulation No. 18 of 2020 technically regulates medical waste management based on health service areas. Although these regulations have been issued, their implementation still faces challenges, such as inconsistencies in waste transportation and sorting procedures. In fact, as of November 2023, more than 40 cases of B3 medical waste contamination were recorded due to non-compliance with applicable procedures.

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According to Attachment I of PP No. 101 of 2014, hospital medical waste can be classified as B3 waste because it is infectious. B3 waste is waste that is harmful to the environment and living things if disposed of directly without being processed. B3 waste does not have the characteristics of waste in general because it is

unstable, reactive, explosive, flammable and toxic. Hospital medical waste is very dangerous because of its infectious nature, especially if many pathogens are found that are resistant to several antibiotics such as *Staphylococcus aureus* and *Pseudomonas aeruginosa*.

According to the Regulation of the Minister of Public Works No. 4 of 2017, Domestic IPAL is a series of domestic wastewater treatment activities in one unit with processing infrastructure and facilities that are carried out centrally.

Wastewater treatment is one of the things that waste producers need to pay attention to. As a country develops, so does the amount of waste it produces. Wastewater treatment is mandatory before being discharged into water bodies, as the waste produced often contains substances that are hazardous to health. Wastewater treatment aims to purify wastewater if it has been contaminated with waste products from industrial processes or household activities (Askari, 2015).

A wastewater treatment plant is a system designed to treat liquid and solid waste generated by hospitals. Its purpose is to reduce the negative impact of waste on the environment and public health.

Hospital wastewater comes from various sources, such as inpatient wards, outpatient wards, laboratories, and patient bathrooms. This wastewater contains various hazardous substances, such as toxic chemicals, radioactive materials, and microorganisms.

Hospital wastewater treatment plants (WWTPs) must meet specific standards stipulated in government regulations. Wastewater treatment in hospital WWTPs typically involves several stages, including: initial filtration, hazardous chemical control, biological processing, and disinfection. After treatment, hospital wastewater can be discharged into municipal waterways or reused as recycled water.

B3 waste treatment is the process of reducing and/or eliminating hazardous and/or toxic properties. In practice, B3 waste treatment from healthcare facilities can be carried out thermally or non-thermally.

The best method is to store hazardous materials (B3) in a special, tightly closed container and store it in a special cabinet. Furthermore, B3 mechanics must be protected from impacts and high pressure, especially explosive B3. Some B3s are recommended for storage in brown bottles. The three components are fuel, high heat, and oxygen.

Considering the frequent occurrence of fires, explosions, or leaks of hazardous materials (B3), several factors need to be considered when storing B3. Another factor to consider in the storage process is the length of storage time. B3 that has been opened should be used up first, and also pay attention to the expiration date. The quality of B3 must meet the required standards, and the quantity purchased must be in accordance with needs, taking into account that large quantities have consequences for waste management costs if the B3 is contaminated or experiences quality degradation so that it cannot be used.

CONCLUSION

Management of hazardous and toxic materials (B3) waste in hospitals is crucial for protecting human health and preserving the environment. B3 waste, such as chemical residues, medicines, syringes, and infectious materials, can pose a risk of disease transmission, poisoning, and soil, water, and air pollution if not handled properly. Therefore, hospitals must sort, store, transport, and dispose of waste in accordance with safety procedures and standards. Proper B3 waste management helps prevent harm to healthcare workers, patients, and the surrounding community, while ensuring the hospital operates safely, hygienically, and responsibly towards the environment.

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