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MANAGEMENT OF HAZARDOUS AND TOXIC WASTE (B3) AT PUSKESMAS IN JEMBER DISTRICT

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ABSTRACT

Management of Hazardous and Toxic Waste (B3) at Puskesmas in Jember District. Puskesmas X serves various programs such as health check-ups, outpatient care, inpatient care, emergency room services, and so on. The purpose of this research is to determine the type of B3 waste, the amount of B3 waste heap, the B3 waste treatment system, and also the impact that will be caused by poor B3 waste management. The type of study in this research is descriptive observational. This activity was carried out on February 14 to March 31, 2022. The data sources in this study were obtained from 4 (four) ways, namely by observation, interviews, weighing and documentation. The results of this study indicate that the types of waste (B3) in Puskesmas X are used syringes, expired syringes, expired drugs, soft infectious waste (used gloves, cotton, bandages, tissue, masks, used drug packaging, and used injection packaging), and infusion bottles. Sources of B3 waste come from service units such as the emergency room, immunization room, general treatment room, inpatient room, MCH room, laboratory room, delivery room, and dental and oral service room. The largest solid medical waste producer at Puskesmas X was from the delivery room unit with an average daily weight of 0.458 Kg and the laboratory room with an average daily weight of 0.299 Kg. B3 waste management in Puskesmas X is by collaborating with PT Sagraha Satya Sawahita and PT. International Wastec. Poor management of medical waste can lead to health hazards such as infection, hepatitis, HIV and Aids, respiratory or skin diseases, cancer, damage to offspring, and death.

INTRODUCTION

A health service facility is a place that provides services to the community through health, promotion, preventive, curative, and rehabilitative service efforts carried out by the government, regional government, and/or the community. A community health centre, or what is called a puskesmas, is a health service facility that carries out public health efforts and first-level individual health efforts by prioritising promotional and preventive efforts in its work area [(2)]. Community health centres have the task of implementing health policies to achieve health development goals in their working areas. One way to improve services at community health centers is to switch from outpatient health centers to inpatient services, which will indirectly affect the composition and rate of B3 waste generation. The increase in

B3 waste generation rate must be balanced with a good B3 waste management system, so that it does not become a source of disease spread [1].

According to Law No. 32 of 2009 concerning PPLH, hazardous and toxic materials (B3) refer to substances, energy, and/or other components that, due to their nature, concentration, and/or amount, can either directly or indirectly pollute and/or damage the environment, thereby endangering the environment, health, and survival of humans and other living creatures. Solid and liquid B3 waste is generated from community health center activities. Waste from the Health Centre B3 can cause problems in both the service and aesthetic aspects. B3 waste that is not managed according to regulations has the potential to pollute the environment and harm public health.

There are still several obstacles to implementing medical waste management in health service facilities, including the limited number of B3 waste processing companies that already have permits. In Indonesia, only 12 companies on the islands of Java, Sumatra, and Kalimantan currently hold permits, a relatively small number compared to the total number of health service facilities, which includes 2,893 hospitals and 9,993 health centers and facilities. other health services In the Republic of Indonesia Minister of Health Regulation Number 18 of 2020, it is stated that the generation of waste generated from health service facilities, especially hospitals and community health centres, is 296.86 tonnes/day, while the processing capacity owned by third parties is only 151.6 tonnes/day [3].

The B3 waste produced must be managed properly and correctly to avoid having a negative impact on the environment. B3 waste management is one of the most serious problems in health facilities because medical waste, especially infectious waste, has the potential to transmit infectious diseases either through direct contact or indirectly through environmental media. Medical waste must not be disposed of directly in environmental media without first processing it. The accumulation of infectious medical waste can undoubtedly contribute to environmental pollution in health service facilities, particularly affecting staff, patients, and the public outside these facilities [4].

According to data released by the Ministry of Health of the Republic of Indonesia, there are 971 community health centres in East Java, namely 588 inpatient community health centres and 383 non-inpatient community health centres. In Jember Regency, there are 50 health centres, namely 17 inpatient health centres and 33 non-inpatient health centres. Puskesmas X is one of Jember Regency's inpatient health centres. Based on observations, it was determined that hazardous and toxic waste (B3) at the Community Health Centre was piling up and had not been processed properly. Hazardous and toxic waste (B3) is collected in the warehouse behind the inpatient building. Researchers intend to find out the type of B3 waste, the amount of B3 waste stockpiled, and the B3 waste processing system in Puskesmas

MATERIALS AND RESEARCH METHODS

This research uses a descriptive-observational type of study. This activity will be carried out from February 14 to March 31, 2022, with times adjusted to Puskesmas' working hours. The Hazardous and Toxic Material (B3) Waste Management System at Community Health Center

RESEARCH RESULTS AND DISCUSSION

The Community Health Centre offers a variety of hazardous and toxic waste types (B3).

The observations revealed that the Community Health Centre produced various types of B3 waste from its service activities. These waste types included medicine packaging, injection packaging, ampoules, infusion tubes, and infusion bottles. Additionally, liquid waste, such as used syringes, gloves, cotton, and injection packaging, was directly channeled to the IPAL of Puskesmas. 85% of the waste generated from health services is non-hazardous, and 15% is infectious, toxic, or radioactive [5]

Picture1. Sharps Waste from Community Health Center

Picture2. Non-Sharp Infectious Waste at Community Health Center

The Community Health Centre is a source of hazardous and toxic waste (B3).

Based on the observations made by researchers in the field, it is known that the units producing medical waste at Community Health Centre X, among others, can be seen in Table1.

Table 1. B3 Waste Generating Units and Their Characteristics

Solid B3 Waste Generating Unit	Waste Characteristics
Immunization Room (Vaccination)	- Sharps waste: Used syringes - Soft medical waste: Used gloves, used tissues, and used cotton - Others: Used vaccine bottles
Emergency room	- Sharps waste: Used syringes and used IV needles - Soft medical waste: Used gloves, used tissues, used bandages, used masks and used cotton. - Others: Used medicine bottles, used IV tubes, and used IV bottles - Liquid medical waste
Delivery room	- Sharps waste: Used syringes and used IV needles - Soft medical waste: Used gloves, used tissues, used masks, used cotton, and bedclothes. - Others: Used medicine bottles, used IV tubes, and used IV bottles - Liquid medical waste
Maternal and Child Health Room	- Soft medical waste: Used gloves, used tissues, used masks, and used cotton.
Inpatient	- Soft medical waste: Used gloves, used tissues, used masks, and used cotton. - Others: Used medicine bottles, used IV tubes, and used IV bottles - Liquid medical waste
Dental Room	- Soft medical waste: Used gloves, used tissues, used masks, and used cotton. - Liquid medical waste
Laboratory Room	- Soft medical waste: Used gloves, used tissues and used masks - Others: Phlegm and blood - Liquid medical waste
General Medicine Room	- Soft medical waste: Used gloves, used tissues, used masks, and used cotton.

The observation results showed that the service unit at Puskesmas Waste generated at the Community Health Centre includes infusions, infusion bottles, syringes, gauze, and others [6]. To reduce the amount of waste generated from health services, one way is to reduce waste from the source. Waste reduction, for example, is an effort that must be implemented to prevent or reduce the generation of waste that comes out of the production process. Reducing waste at the source is an effort that aims to reduce the volume, concentration, toxicity, and level of danger of waste that will be released into the environment in a preventive manner directly at the source of the pollution [7].

The Community Health Centre is responsible for the generation of hazardous and toxic waste (B3).

The Community Health Center is conducting measurements of B3 waste generation. The measurement process can be seen in the following picture:

Picture3. Weighing of Solid B3 Waste at Community Health Center

Table 2 presents the daily measurement results of hazardous waste generation.

Room Units	Hazardous Waste Generation / Day (Kg)							**Total**
	1	2	3	4	5	6	7	
R. Immunization (Vaccination)	0.25	0.5	0.26	0.081	-	0.021	0.675	1,787
ER	0.31	-	0.01	0.2	0.1	0.1	0.03	0.75
R. Maternity	0.285	-	0.8	-	0.03	0.89	1,2	3,205
R. KIA	0.02	0.01	0.05	0.04	-	0.05	0.04	0.21
R. Stay	-	-	-	0.4	0.2	-	-	0.6
R. Gigi	0.375	0.02	0.02	0.07	0.02	0.03	0.04	0.575
Laboratory	0.125	-	-	-	0.02	0.970	0.980	2,095
R. General	0.02	0.02	0.02	0.06	0.05	0.064	0.175	0.409
Total	1,385	0.55	1.16	0.851	0.42	2,125	3.14	**9,631**

According to Table 2, Puskesmas is the largest source of solid medical waste. Meanwhile, the unit with the smallest source of solid medical waste is the Maternal and Child Health unit, with an average daily weight of 0.03 kg. After weighing, it was discovered that the highest amount of B3 waste was produced on April 26, 2022, with a total of 3.14 kg, while the results of weighing carried out by researchers within a week resulted in the amount of B3 solid waste at Community Health Centre X reaching 9.631 kg.

The Hazardous and Toxic Waste Management System (B3) is located at the Community Health Centre.

There are nine stages of medical waste management at community health centres, according to the Directorate General of Waste, Waste, and B3 Management of the Ministry of Environment and Forestry in 2017. After observations, it was discovered that Community Health Centre X had carried out recycling. By placing used syringes in large, closed trash cans, safety boxes can be reused. Apart from that, Puskesmas X has collaborated with PTSagrahaSatya Sawahita for transporting hazardous and toxic materials (B3) waste since

two years ago. PT Sagraha Satya Sawahita is a company engaged in collecting and transporting B3 waste. This company transports B3 waste to Puskesmas X twice a year. 37% of health centers transport B3 waste every day to the final shelter; 46% transport it every month; 23% transport it twice a month; and 1% transport it every week [11].

Apart from collaborating with PT. Sagraha Satya Sawahita, Puskesmas X also collaborates with PT. Wastec International for the destruction of hazardous and toxic waste (B3). Before PT Sagraha Satya Sawahita transports the B3 waste, the cleaning staff at Community Health Centre Cleanliness collects it first. In addition to this, the cleaning staff at Puskesmas also separates waste into medical and non-medical categories. Once the cleaning staff completed the transportation process, they collected the B3 waste in the warehouse located behind Puskesmas. There are 88.2% of health centers that do not have B3 waste processing facilities, and 78.5% of B3 waste is burned [9]. Only 25% of health centres have policies or guidelines for B3 waste management [10]. B3 waste management can start with waste minimization. Minimising medical waste can be done through segregation, housekeeping, preventive maintenance, clean technology, material substitution, pharmaceutical, and chemical management [12].

We conducted interviews with officers from the Community Health Center. This waste was collected from August to December 2021 and stored in the back of Community Health Centre Wastec International warehouse.

The improper management of B3 waste will lead to various impacts.

The B3 waste produced must be managed properly and correctly to avoid having a negative impact on the environment. B3 waste management is one of the most serious problems in health facilities because medical waste, especially infectious waste, has the potential to transmit infectious diseases either through direct contact or indirectly through environmental media. Medical waste that is not properly managed can spread disease germs and develop in the health facility environment through air, water, floors, food, and medical and non-medical equipment. Germs in the environment can reach both workers and new sufferers. In addition, improper management of medical waste can lead to careless work practices such as syringe punctures, exposure to chemical liquids, and the presence of various pathogenic microorganisms in the waste, which can spread disease to those exposed [8].

Medical waste must not be disposed of directly in environmental media without first processing it. The accumulation of infectious medical waste can certainly have an impact on pollution in the health service facility environment, especially for health service facility staff, patients, and the community outside the health service facility [4]. Medical waste has the potential to contain dangerous microorganisms, which can infect patients, employees, and the public [5]. Having appropriate and correct management of medical waste in accordance with established regulations, as well as strict supervision of the processing of medical waste generated from health service facilities, can prevent the spread of disease or environmental pollution, ensuring public health and the environment [4].

CONCLUSIONS AND RECOMMENDATIONS

Based on the information that has been presented, it can be concluded that common types of B3 waste at Community Health Centre X include used syringes, expired medicines, soft infectious waste, and infusion bottles. This waste comes from various service units, such as the emergency room, immunization room, and inpatient room, with the delivery room having the highest level of generation. B3 waste management is carried out in collaboration with PT Sagraha Satya Sawahita for transportation and PT Wastec Internasional for destruction. However, there are several suggestions to improve waste management at Puskesmas, including the selection of containers according to waste characteristics.

It is hoped that by implementing this suggestion, Puskesmas X can improve efficiency and safety in managing B3 waste as a whole.

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