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Solid Waste Management System for Hazardous and Toxic Materials (B3) at Upt. Lambunu 1 Health Center, Bolano District, Parigi Moutong District Central Sulawesi

Andika Hadi Permana[1], Nur Rismawati[2], Miswan[3]
[123]Universitas Muhammadiyah Palu, Indonesia
Correspondent: nur.rismawati@gmail.com[1]

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ABSTRACT: Hazardous and toxic waste is the remainder of business and service facility activities that contain B3. Hazardous and toxic materials are substances, energy and/or other components which, due to their nature, concentration or amount, either directly or indirectly, can pollute and damage the environment, endangering the environment, health and survival of humans and other living creatures. This research is a qualitative study that uses a descriptive case study approach. This approach involves an in-depth investigation of one or several cases that are considered representative. Researchers will collect data through interviews, observations, observations. This research was conducted to describe the management of hazardous and toxic solid waste (B3) at the Lambunu I Community Health Center, Bolano District, Parigi Moutong Regency, Central Sulawesi. The results of research at the Lambunu I Community Health Center found that the collection, sorting and packaging of solid B3 waste that met the requirements for transporting solid B3 waste and temporary shelters (TPS) did not meet the requirements. The conclusion of this research is that the collection, sorting and packaging of solid B3 waste at Lambunu I Community Health Center meets the criteria, while the transportation of solid B3 waste and temporary shelters (TPS) does not comply with the criteria determined by Minister of Health Regulation number 07 of 2019 which does not meet the requirements. This can be realized so that it does not have an impact on health and does not pollute the environment of the health center.

Keywords: System, Management, Waste, B3

INTRODUCTION

Hazardous and toxic waste is the remainder of business and service facility activities that contain B3. Hazardous and toxic materials are substances, energy and/or other components which, due to their nature, concentration or amount, either directly or indirectly, can pollute and damage the

environment, endangering the environment, health and survival of humans and other living creatures (Pratama et al., 2023).

Community Health Centers or Community Health Centers as one of the agencies that produce waste, have an obligation to maintain the environment and public health, and have special responsibilities relating to the waste produced. The obligations referred to include obligations that are very important to achieve a good environment.

Waste generated in a series of health service activities has a higher potential to cause infection and injury compared to other types of waste. Safe method and *reliable* in its management becomes very important. Improper and inadequate management of healthcare waste can have serious consequences for health and significant impacts on the environment. Proper management of health care waste is a very important component in protecting environmental health (Mirawati & Tasya, 2019).

The handling of solid medical waste and hazardous and toxic materials often experiences problems, sometimes there is a buildup of waste, the role of officers has not been carried out in accordance with their respective main duties and functions so that there is still waste that has not been handled seriously and the handling of medical waste cannot still be called perfect due to incomplete existing facilities and infrastructure (Budiman, 2022).

In the practice of managing medical waste at health service facilities, there are still several obstacles, including the limited number of B3 waste processing companies that already have permits, namely there are only 12 companies located on the islands of Java, Sumatra and Kalimantan. The number of these companies very less compared to the number of Health Service Facilities in Indonesia, such as the number of hospitals of 2,893 hospitals and 9,993 (R. I. Health, 2020).

Community Health Centers and other health service facilities. Meanwhile, waste generation generated from Health Service Facilities, especially hospitals and Community Health Centers, is 296.86 tons/day, but on the other hand, the processing capacity owned by third parties is only 151.6 tons/day. According to data from the Ministry of Environment and Forestry in September

In 2018, there were 95 hospitals that had licensed incinerators with a total capacity of 45 tonnes/day. Meanwhile, data from Medical Waste e-monev in December 2019 by the Directorate (Permenkes, 2020).

Based on the initial data collection and research information, the Lambunu I Community Health Center does not yet have facilities *incinerator* In processing solid waste, hazardous and toxic materials (B3), Lambunun I Community Health Center has collaborated with third parties, but transportation from the Lambunu I Community Health Center (TPS) is carried out once a year. Meanwhile, the Lambunu I Health Center produced 156 kg of B3 waste in the last year(Mottola et al., 2025; Sun et al., 2025). Apart from that, the Lambunu I Health Center is in the middle of a densely populated residential area, and several other public facilities such as markets and Islamic boarding schools, this poses a threat to the surrounding community, if this B3 waste is not managed properly.

METHOD

This research is a qualitative study that uses a descriptive case study approach. This approach involves an in-depth investigation of one or several cases that are considered representative. Researchers will collect data through interviews, observations, observations. This research was conducted to describe the management of hazardous and toxic (B3) solid waste at UPT. Lambunu I Health Center, Bolano District, Parigi Moutong Regency, Central Sulawesi(Cai et al., 2025; Xiao et al., 2025). Using the Informant Determination Technique *Purposive sampling* namely by selecting informants who are considered capable of providing information to answer the questions that have been made by the researcher, this is the number 3 people, namely the head of Sanitation, sanitation officer and *cleaning servis* on Lambunu I Health Center, Bolano District, Parigi Moutong Regency, Sulawesi Middle.

RESULTS AND DISCUSSION

Research Conducted at the Lambunu I Community Health Center, Bolano District

Parigi Moutong Regency, Central Sulawesi is managed in accordance with the Regulation of the Minister of Health of the Republic of Indonesia number 07 of 2019 concerning Hospital Environmental Health with the results of the research presented as follows.

Based on the Minister of Health regulations, the collection of solid B3 waste at the Lambunu I Community Health Center is categorized as meeting the requirements, because the method for collecting solid B3 waste involves different storage efforts for organic and non-organic waste, starting in the source room and also providing trash cans with sufficient volume and transported in the morning and evening(Chen et al., 2025; He et al., 2025). After the trash can is used, it is cleaned using water and disinfectant.

Based on the Minister of Health regulations, solid B3 waste sorting at the Lambunu I Community Health Center is categorized as meeting the requirements, because the sorting method is carried out from the start by providing trash cans of the appropriate type, and the sorting is still carried out by sanitation officers(Li et al., 2025; Park et al., 2025).

Based on the Minister of Health regulations, the packaging of solid B3 waste at the Lambunu I Community Health Center is categorized as meeting the requirements, because the trash cans are differentiated based on the different colors of the trash cans, attached writing/codes/symbols or pictures made of strong material, watertight, easy to clean, equipped with covers and insect-proof(Dong et al., 2025; Shen et al., 2025).

Based on the Minister of Health regulations, the transportation of solid B3 waste at the Lambunu I Community Health Center is categorized as not meeting the requirements(Sreekantan et al., 2025). Transporting B3 waste from the source room to the B3 waste TPS does not use a special trolley/cart. Transporting this waste does not use a special route (road) which is far from the density of people in the room.

Based on the Minister of Health regulations, Temporary Storage Places (TPS) for B3 solid waste(Ashraf et al., 2025; Yao et al., 2025). The Lambunu I Community Health Center is categorized as not meeting the requirements, because the TPS location is close to residential areas around the health facility and there is no periodic cleaning, it still floods if there is heavy rainfall, the TPS is not equipped with a board bearing the B3 Waste TPS sign.

Based on the results of interviews and observations, the collection of B3 solid waste at the Lambunu I Community Health Center has been carried out according to the B3 waste collection criteria(Liu & Wu, 2025; Wang et al., 2025). Carrying out different containment efforts for organic and non-organic waste, starting in the source room, at each source there are trash cans with adequate numbers and volumes, the waste is always picked up by officers in the morning and evening after the waste is used. A cleaning program is carried out using clean water and disinfectant, the bins are in good condition and are not damaged or leaking.

This is in line with research M. Health, (2019), collecting medical waste at the Pangi Health Center. Medical waste collected from each service unit is collected in a closed and open place without changing the bags in the medical waste disposal container. This waste collection is carried out by Cleaning Services every day. Collection of medical waste should be strictly separated between medical and non-medical, including separating medical waste based on characteristics, the container used when collecting medical waste must also be closed.

Based on the results of interviews and observations regarding sorting

Lambunu I Community Health Center has been carried out according to the criteria for sorting from the start by providing different trash cans according to the type, group and/or characteristics of B3 waste.

The results of this research are in line with (Novi A,N, 2022), Singkil Health Center, sorting is an activity carried out at the source of medical waste. This process is carried out by medical officers on duty in each room and separates medical and non-medical waste. The Singkil Community Health Center is in accordance with the requirements stipulated in Number: P.56/MenLHK-Setjen/2015, namely separating B3 waste based on the type, group, and/or characteristics of B3 waste. Separation of B3 medical waste must also be containerized according to the B3 waste group.

Regarding waste packaging, it can be seen from the results of observations and interviews of the B3 waste packaging process carried out by the parties. The Lambunu I Community Health Center has carried out according to the packaging criteria according to the type of trash can using different colors and symbols, made of strong, impermeable material, easy to clean with water, equipped with insect-tight covers and lined with plastic trash bags. Waste ampoule bottles are put in used mineral bottles, based on the results of interviews with officers, so that when they break they are not scattered so that they are not dangerous when the officers are sorting them.

Based on the results of interviews and observations of waste transportation

B3 is carried out by the cleaning service. Transporting B3 waste from the room from the source to the TPS for B3 waste there is no special route/road which is far from the density of visitors or patients at the health center, and for transportation from the source of the waste to the TPS it is transported using a special waste trolley (meter), for transportation from the TPS to third parties it is only done once a year and even then when the box cars are full it will be done the next day, and from the puskesmas itself they wait for instructions from the district, or the health service when the third party is ready to pick up the medical waste from each of them. health center.

The results of this research are in line with Putra, (2021), transportation of medical waste through two stages: internal transportation and external transportation. The internal transportation process is carried out by the cleaning service every day to be taken to temporary shelter. This activity was carried out manually without using tools because the amount of waste transported was not large. Medical waste is stored in wheelbins with a capacity of 30 liters, where each health center and hospital has around two to three wheelbin containers. External transportation is carried out by private transporters using box cars once a month. Medical waste is taken directly from the temporary storage area of the health center and hospital. Before the waste is put into the box car, the medical waste is weighed and recorded by the health cooperative in two copies. Medical waste in the wheelbin will be put directly into the car and then the empty wheelbin will be exchanged from the transporter.

Based on the results of interviews and observations, the temporary storage place for B3 waste, the TPS is not equipped with a board that says B3 Waste TPS, a sign prohibiting entry for unauthorized persons, and no cleaning has been done at the TPS after transporting the waste by a third party. The TPS location in the environmental area is still flooded with water when rainfall is high, with the TPS location being close to service activities and residential areas around the FASYANKES, as well as housing for health workers(Ningsih Azria Novi, 2022).

The results of this research are in line with Nurhayati et al., (2021), Betungan Care Health Center, Bengkulu City. This is in accordance with Minister of Health Regulation Number 7 of 2019 concerning Hospital Environmental Health, this can be seen from the building being closed from sunlight, having a waste storage area that has partitions separating the storage area and the storage area is not directly in contact with the floor, and is equipped with safety facilities.

CONCLUSION

The results of the research can be concluded that the management of waste (B3) of toxic hazardous materials in the Lambunu I Community Health Center, Bolano subdistrict, Parigi Moutong district starts from:

1) Collection of solid B3 waste in the waste management process at the Lambunu I Community Health Center according to the criteria determined by Minister of Health Regulation number 07 of 2019.

2) Sorting solid B3 waste in the waste management process at the Lambunu I Community Health Center according to the criteria determined by Minister of Health Regulation number 07 of 2019.

3) Packaging of solid B3 waste in the waste management process at the Lambunu I Community Health Center according to the criteria determined by Minister of Health Regulation number 07 of 2019.

4) Transportation of solid B3 waste in the waste management process at the Lambunu I Community Health Center does not comply with the criteria determined by Minister of Health Regulation number 07 of 2019.

5) The temporary storage place (TPS) for solid B3 waste in the waste management process at the Lambunu I Community Health Center does not comply with the criteria determined by Minister of Health Regulation number 07 of 2019

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