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Analysis of Solid Medical Waste Management in Health Center

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Abstract: Waste is the residue that arises from various human activities. Kersik Tuo Community Health Center is one of the largest producers of solid medical waste out of the twenty-one Community Health Centers in Kerinci Regency in 2024, amounting to 272 kg. The purpose of this study was to determine input components such as planning, labor and facilities and infrastructure, to see process components such as sorting, transportation, temporary storage and destruction, and to obtain output components related to solid medical waste management at Kersik Tuo Community Health Center, Kerinci Regency. This research method was carried out with a qualitative approach that aims to examine more deeply regarding solid medical waste management. The data collection technique used primary data with the determination of nine informants and secondary data. The technical data analysis in this study used the SWOT analysis method. The results of the study indicate that the input components have not been fully implemented properly, such as planning, workforce and facilities and infrastructure, then the process components have not been implemented properly, especially sorting, transportation, and temporary storage, and the output components related to the management of solid medical waste have not fully complied with PermenLHK P.56 of 2015.

Keywords: Analysis; Health center; Solid medical waste

Introduction

Analysis and all actions undertaken with the primary goal of maintaining or improving public health are collectively referred to as "health efforts" under Law No. 17 of 2023 concerning Health. The government and the community work together to implement these efforts, which include disease prevention, health promotion, treatment, and rehabilitation. Ensuring a healthy environment free from health hazards is a shared responsibility between the federal government, state governments, and the community (Greenberg et al., 2019; Harrison, 2019). The ultimate goal of an environmental health management program is to create an environment free from hazardous substances and conditions so that everyone can live the healthiest life possible (Fang et al., 2023; Nriagu, 2019).

The law that regulates environmental management and preservation is Law No. 32 of 2009. Environmental protection encompasses various activities, such as planning, use, control, maintenance, supervision, and law enforcement, all of which work together to maintain the beneficial functions of the environment, which in turn support human and non-human life.

The involvement of Community Health Centers (Puskesmas) as first-level health institutions and institutions is one aspect of human health governance, particularly in relation to the environment. Puskesmas are responsible for implementing health development efforts within a designated work area as a technical implementation unit under the district/city health office. Through a number of core program activities, Puskesmas, as functional health organizations, offer comprehensive and integrated health services to the community within their respective areas.

Government Regulation No. 22 of 2021, which addresses the implementation of environmental protection and management, regulates the handling of medical waste in Indonesia, which is categorized as hazardous and toxic waste (B3). Guiding principles for B3 waste management include constant attention and the use of safe and environmentally friendly practices.

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From the initial stage (from birth to death) to disposal (after processing), specialized infrastructure is required.

One of the many challenges that persist in medical waste management in healthcare institutions is the small number of licensed hazardous waste processing companies—specifically, there are only twelve companies in Java, Sumatra, and Kalimantan. Indonesia's healthcare facilities far outnumber the number of companies. There are 9,993 community health centers (Puskesmas) and 2,893 hospitals. Conversely, third-party processing capacity is only 151.6 tons per day, even though healthcare institutions, including hospitals and Puskesmas, produce 296.86 tons of waste per day (Ministry of Health Regulation, 2020).

The enormous amount of waste generated by healthcare facilities in Indonesia poses a risk to human health and the environment. Research on waste management systems in healthcare institutions in Indonesia shows that only a small percentage of hospitals have incinerators, with 73.2% of healthcare facilities lacking the necessary equipment. The Indonesian government's solid medical waste management methods still fall short of expectations, according to data provided by the Ministry of Environment and Forestry. Therefore, it is clear that healthcare facilities, due to improper waste management, can transmit disease and harm the environment (Das et al., 2021; Hossain et al., 2011; Kenny et al., 2021; Majid et al., 2024).

Community Health Center A is one of twenty-one health facilities supervised by the Regency Health Office A, according to data collected from their website. This health facility is located in the heart of Province A, in District A, Regency A. Furthermore, among Community Health Centers, this Community Health Center ranks highest in terms of the amount of medical waste it produces. Community Health Centers are required by Ministerial Regulation No. 43 of 2019 to implement UKM and UKP at the basic level as health service facilities, with a focus on promotive and preventive approaches. Furthermore, health facilities must also manage their waste properly in accordance with Ministerial Regulation No. 56 of 2015.

It's clear that not all healthcare workers follow the solid medical waste management protocols outlined in applicable regulations. This is evident in several aspects: transportation from the collection area to the temporary storage area, sorting medical and non-medical waste, and finally, the location of the non-permanent medical waste disposal site. Because it's located in a residential area, Community Health Center A poses a threat to the surrounding community and the environment if waste disposal is not carried out according to regulations.

Based on the background description above, "the researcher is motivated to analyze the management of solid medical waste at Community Health Center A with the Regulation of the Minister of Environment and Forestry P.56/Menlhk-Setjen/2015 concerning procedures and technical requirements for the management of hazardous and toxic waste from health service facilities."

Method

Descriptive studies attempt to characterize events, both natural and man-made, in various forms of activity, change, interaction, and other elements; this study uses descriptive techniques with a qualitative approach. The basis of descriptive research is to interpret and explain interrelated situations and conditions, along with their resulting impacts (Ferraris et al., 2016).

Qualitative descriptive research presents factual data without manipulation or other intervention. Using this method, one can better understand ongoing events or gain a comprehensive perspective on an event. This method is implemented by describing various variables related to actual conditions in the field, such as attitudes and perspectives found at the research site (Rusandi et al., 2021).

The interview approach was primarily used to collect data from informants with expertise relevant to solid medical waste management at the Kersik Tuo Community Health Center. Nine out of 100 workers served as informants. Those who provided information for this study are listed below:

Core data on solid medical waste management at the Community Health Center (Puskesmas) were collected using interview guides, observations, and documentation methods. Researchers also used recording devices and writing materials to ensure the accuracy of the findings. Secondary data, on the other hand, was obtained from document review guides related to solid medical waste management at the Community Health Center (Airin et al., 2025).

The data analysis technique in this study is using the Miles and Hubermen model, where in qualitative research it is carried out before going into the field, observation, during the implementation of research in the field after completion of the research. This research data was obtained from the results of interviews, observations and documentation. Data analysis was carried out by organizing the data obtained into a category, describing the data in units, analyzing important data, presenting data in accordance with the research problem in the form of a report and making conclusions so that it is easy to understand. Activities in qualitative data analysis use content analysis which is carried out interactively and takes place continuously until complete, so that the data is saturated.

Result and Discussion

At Community Health Center A, solid medical waste is handled in the following ways: sorting, transportation, temporary storage, and disposal. Research topics related to planning, personnel, and facilities and infrastructure are discussed in this section. Overall, this study has achieved its objective of describing and identifying problems in solid medical waste management at Community Health Center A.

Interview results showed that the hazardous waste management team at Community Health Center A consisted of three sanitarians and a cleaning service. Most of the cleaning service staff had a high school education. The interview results showed that there was planning related to the management of solid medical waste at Community Health Center A, which planning referred to Permen LHK P56 of 2015 and had standard operating procedures.

The findings from interviews and observations of the solid medical waste disposal facilities at Community Health Center A are not yet final. Furthermore, the trash bins in the room have been labeled as infectious or non-infectious, and the sorting procedure can begin.

Based on data obtained from Community Health Center A during the solid medical waste sorting process, solid medical waste has been handled by medical staff or health workers on duty. Different bins and bags have been provided for different types of solid medical waste: yellow bags are used for infectious waste; black bags are used for non-infectious waste; and safety boxes are used for sharp objects.

From what we observed, the medical staff or healthcare workers on duty at Community Health Center A successfully separated infectious and non-infectious solid medical waste before transporting it. After work hours, the cleaning staff transported the solid medical waste to a landfill.

Findings from interviews and observations indicate that Community Health Center A does not fully comply with Ministerial Regulation of the Environment and Forestry Number P.56 of 2015, which discusses the procedures and technical requirements for managing B3 waste from health service facilities, in terms of temporary storage of solid medical waste.

Based on the research results, it was discovered that Community Health Center A did not carry out destruction but instead collaborated with a third party that managed the waste, because destroying it on its own would be risky considering that the Community Health Center is located in a residential area. In this regard, the process of destroying solid medical waste at Community Health Center A has partially followed the Minister of Environment and Forestry Regulation P 56 of 2015.

Based on the results of the input and process components, it can be concluded that solid medical waste management at Community Health Center A has generally begun to comply with applicable regulations and standard operating procedures. However, several shortcomings remain, such as in facilities and infrastructure. Waste disposal has been handled through third-party services.

Santo et al. (2022) found that the Kampung Laut Community Health Center in Cilacap Regency had planned for solid medical waste management, which aligns with this study. Allocations for infrastructure and facilities for solid medical waste management are determined during the planning stage of the Regional Public Service Agency (BLUD) Work Budget Plan.

This is in accordance with research Pertiwi et al. (2017) that the lack of officers and supervision from sanitation officials causes the temporary storage area (TPS) to become dirty due to the accumulation of waste stored for more than 48 hours and allows human contact with microbes, disturbs the view, and causes odors.

According to research Ratnaningtyas et al. (2021), this is true. Improvements are still needed in the Inti Medika Insani Clinic's medical solid waste management system, particularly in terms of infrastructure and facilities. Inadequate temperatures in the temporary storage area (TPS) and a lack of specialized waste collection equipment are indicators of this.

The Pati Regency Community Health Center (Puskesmas) sorted waste into medical and non-medical categories, in accordance with previous research (Pratiwi, 2013). In this case, solid medical waste was divided into Puskesmas A and B, consisting of infusion bottles, vaccination bottles, and cardboard boxes, and was sorted by Puskesmas service staff and cleaning staff.

Consistent with previous research Permana et al. (2025), the Pangi Community Health Center does not provide waste transportation equipment such as containers or trolleys for solid medical waste. Once collected, various types of medical waste are sorted into large, open containers before being immediately disposed of behind the Community Health Center.

This contradicts previous research Ardianto et al. (2021), which found that safety boxes were used at the Onembute Community Health Center to store solid medical waste, specifically sharp objects. The emergency room serves as a temporary storage area for medical waste. Due to the lack of a dedicated storage area for solid medical waste, the resulting medical waste is disorganized, damaged, disordered, and potentially infectious (Andeobu, 2023; Cirstea et al., 2025; Cook et al., 2023; Luhar et al., 2022).

Contrary to previous research Pratiwi et al. (2013), no new work has been conducted in recent months using incinerators to dispose of infectious waste, namely solid

medical waste. Environmental officers monitor the Community Health Center (Puskesmas) due to the potential hazards it poses to the local ecosystem due to its proximity.

Conclusion

The medical waste classification process is collected using black plastic which is then transported internally every 3 days which is stored in a closed place before being transported back to the temporary landfill. Transportation of waste using this trolley is easy to clean and leak-proof. Officers use PPE that has been provided from the puskesmas. Planning has been carried out, sufficient manpower has been provided and training has been provided regarding medical waste management in health facilities. Facilities and infrastructure are in place, but temporary storage facilities are inadequate. transported after employees return from work to a temporary storage facility. However, transportation does not use a dedicated route for solid medical waste; storage is already in a dedicated location. However, this is not yet permanent; destruction is being carried out in collaboration with a third-party medical waste management company. After conducting research at Community Health Center A, it was found that the management of solid medical waste did not fully comply with Permenlhk P.56 of 2015 and standard operating procedures. Propose and/or provide a budget for facilities and infrastructure specifically for temporary B3 storage areas in accordance with applicable regulations and implement Ministerial Regulation of the Ministry of Environment and Forestry Number P.56/Menlhk - Setjen/2015 as a basis for B3 waste management. Pay attention to the facilities and infrastructure related to solid medical waste management at the District A Health Center and always supervise the solid medical waste management system. Increase research on solid medical waste management in community health centers and hospitals so that the management system becomes better.

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