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Medical Waste Management of Health Centers in Tapin Regency, South Kalimantan Province. Indonesia

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ABSTRACT

Medical waste management in Community Health Centers plays an important role in maintaining environmental safety and the quality of health services. The research aims to identify the medical waste management system in four Community Health Centers in Tapin Regency based on Minister of Health Regulation No. 18 of 2020 and to analyze the differences in implementation based on accreditation status. A mixed methods approach was used, with data collection through questionnaires, observations, and interviews with 16 sanitarians from the Lokpaikat, Binuang, Salam Babaris, and Hatungun Health Centers. The results of the study showed that Community Health Centers with Full accreditation had a higher level of compliance in sorting, containing, transporting, and storing medical waste compared to Community Health Centers with Main status. Supporting factors such as the availability of SOPs, IPAL facilities, and documentation play an important role in the effectiveness of management. These findings indicate that accreditation influences the quality of waste management, but strengthening technical capacity and field supervision is also needed. Comprehensive interventions are needed through training, infrastructure improvements and periodic audits to improve compliance with national regulations.

Keywords: *medical waste, health center, waste management, accreditation, Minister of Health Regulation No. 18 of 2020, Tapin Regency*

INTRODUCTION

Medical waste is a by-product of health service activities that has the potential to cause negative impacts on human health and the environment if not managed properly. The World Health Organization (WHO), around 15% of all health facility waste is categorized as hazardous waste, including infectious, sharp, pharmaceutical, and chemical waste. If not managed properly, medical waste can cause environmental pollution, spread infections, and endanger health workers and the general public. Good medical waste management must be standardized as an important indicator in ensuring the quality of service and safety in health care facilities. In Indonesia, medical waste management has been regulated through the Regulation of the Minister of Health of the Republic of Indonesia Number 18 of 2020. This regulation emphasizes the importance of medical waste management from the source, through the process of sorting, containerization, temporary storage, internal transportation, to final destruction.

In the context of primary health care facilities such as Community Health Centers, the implementation of this standard often encounters technical and structural challenges, such as limited waste storage facilities, and irregular transportation by third parties. which requires every health service facility, including Community Health Centers, to implement integrated waste management from upstream to downstream, starting from sorting, containerization, temporary storage, transportation, to destruction. As the spearhead of first-level health services, Community Health Centers have an important role in maintaining the safety of patients, officers, and the surrounding environment. Community Health Centers in Indonesia still face various obstacles in managing medical waste, such as limited facilities and infrastructure, lack of sanitarian training, and weak internal supervision. One indicator that describes the readiness and commitment of a health facility to service quality is accreditation status (Hidayatullah et al., 2023). The health facility accreditation system, including Community Health Centers, includes aspects of medical waste management as part of the risk management and infection control assessment elements (Sarri & Mi, 2021). Health centers with full accreditation status are expected to be able to implement medical waste management more optimally compared to health centers with primary accreditation. However, there have not been many studies that specifically compare medical waste management based on accreditation levels.

Tapin Regency, South Kalimantan, has 13 Community Health Centers spread across various geographical areas. The geographical conditions and uneven distribution of resources in this region lead to potential differences in medical waste management practices between Community Health Centers. In Tapin Regency, there has not been much research that comprehensively evaluates medical waste management at the Community Health Center level, both in terms of compliance with national regulations and from a comparison of processes based on accreditation status. This creates an important information gap that needs to be filled in order to form the basis for more targeted environmental health policy interventions. This research aims to identify the medical waste management system at Community Health Centers in Tapin Regency based on the regulation of Permenkes No. 18 of 2020; and analyze the medical waste management process based on the Community Health Center accreditation status. The research results provide a factual picture and serve as input for policy makers in improving the quality of medical waste management at the basic service level.

MATERIALS & METHODS

The research used a mixed methods approach, which is a combination of quantitative and qualitative approaches. Quantitative data were obtained through the distribution of closed questionnaires filled out by sanitarians at each Health Center. The subjects of this study were 16 main informants, namely sanitarians from four Health Centers in Tapin Regency: Lokpaikat, Binuang, Salam Babaris, and Hatungun. The four Health Centers were selected purposively based on considerations of geographic area representation (north, south, east, and west) and differences in accreditation status (Paripurna and Utama).

Data collection procedures using direct interviews at the Health Center location, accompanied by observations of medical waste management facilities such as separate trash bins, temporary storage areas, and Wastewater Treatment Plants (IPAL). Documentation in the form of photos and field notes were used to strengthen the validity of the data.

Data analysis using quantitative data was analyzed descriptively using percentage distribution to assess the level of compliance

and quality of waste management. Qualitative data was analyzed using a thematic approach to identify management patterns, technical constraints, and the impact of accreditation status on practices in the field.

RESULT

The research was conducted at four Community Health Centers in Tapin Regency, namely Lokpaikat, Binuang, Salam Babaris, and Hatungun Community Health Centers. Data were obtained from 16 sanitarians as the main informants representing each Community Health Center. Number of Community Health Centers based on Geographical Area in Tapin Regency.

Table 1. Community Health Centers in Tapin Regency

No.	Name of Health Center	Accreditation	Geographical Location
1.	Bakarangan	Plenary	South
2.	Banua Padang	Plenary	West
3.	Baringin	Plenary	West
4.	Binuang	Plenary	West
5.	Hatungun	Main	South
6.	Lokpaikat	Plenary	North
7.	Margasari	Plenary	East
8.	Pandahan	Main	West
9.	Piani	Main	East
10.	Salam Babaris	Plenary	East
11.	Tambarangan	Main	South
12.	Tambaruntung	Plenary	East
13.	North Tapin	Main	North

Table 1. explains that Tapin Regency has 13 Health Centers spread across 12 sub-districts. The study took 4 Health Centers that were selected purposively to represent each of the Paripurna and Utama geographical areas in Tapin Regency, namely Lokpaikat Health Center, Binuang Health Center, Salam Babaris Health Center, and Hatungun Health Center. Informant Characteristics

Table 2. Informant Characteristics

No.	**Informant Name**	**Gender**	**Health Center**
1.	HP	Male	Lokpaikat
2.	YR	Female	Lokpaikat
3.	N	Female	Lokpaikat
4.	TW	Female	Lokpaikat
5.	L	Female	Lokpaikat
6.	AW	Male	Binuang
7.	VAK	Female	Binuang
8.	S	Female	Binuang
9.	MH	Female	Binuang
10.	SEH	Male	Salam Babaris
11.	SA	Male	Salam Babaris
12.	WHERE	Female	Salam Babaris
13.	MH	Female	Salam Babaris
14.	IW	Male	Hatungun
15.	LA	Female	Hatungun
16.	FLUENT	Female	Hatungun

Table 2 explains that the characteristics of the informants amounted to 16 sanitarian workers, including, (1) Lokpaikat Health Center totaling 5 people, (2) Binuang Health

Center totaling 4 people, (3) Salam Babaris Health Center totaling 4 people, (4) Hatungun Health Center totaling 3 people.

Amount of Medical Waste from Health Centers

Table 3. Amount of Medical Waste in March 2025

No.	Health Center	Accreditation Status	Amount of Medical Waste (kg)
1.	Lokpaikat	Plenary	17
2.	Binuang	Plenary	96,6
3.	Salam Babaris	Main	14
4.	Hatungun	Main	7

Table 3. it is explained the amount of medical waste per three months in health centers including, (1) Lokpaikat Health Center with Plenary status totaling 17 kg, (2) Binuang Health Center with Plenary status totaling 96.6 kg, (3) Salam Babaris Health Center with Main status totaling 14 kg, (4) Hatungun Health Center with Main status totaling 7 kg.

Compliance of Each Health Center

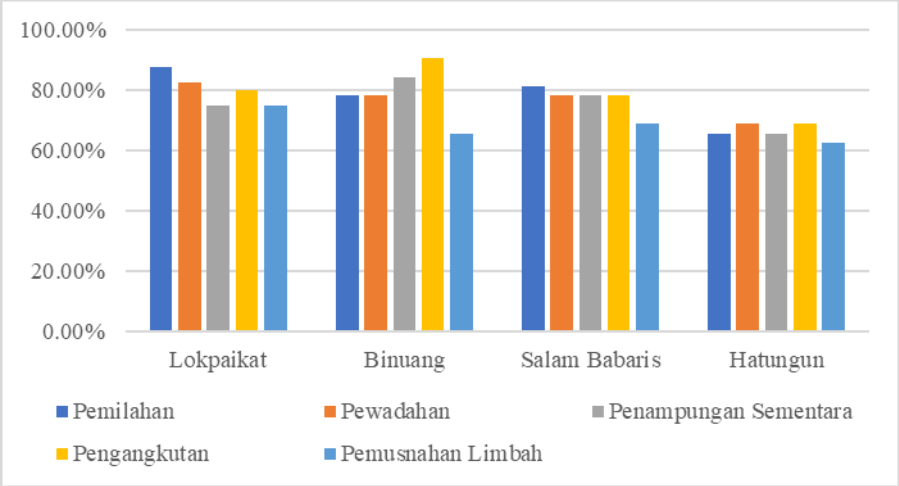

Figure 1. Medical Waste Management System of Health Centers in Tapin Regency

Figure 1. It can be explained that the medical waste management system in Tapin Regency has not fully complied with national regulations. The implementation of Permenkes No. 18 of 2020 still depends on the accreditation status, availability of facilities, and discipline in implementing SOPs.

Percentage of Compliance Based on Accreditation Status

Table 4. Average Percentage of Compliance Based on Accreditation Status

Indicators	Plenary (%)	Main (%)
Sorting	82,81	73,44
Container	80,31	73,44
Transportation	85,31	73,44
Temporary Shelter	76,69	71,88
Destruction	70,31	65,63
Infectious Waste	71,56	71,88
Non-Infectious Waste	82,19	73,44
Sharp Waste/Extortion	87,50	71,88
Pharmaceutical Waste	60,00	51,56
Average	77,40	69,60

Table 4. explains the average percentage of compliance based on the accreditation status of health centers, including: (1) Full Status with an average of 77.40%, (2) Main Status with an average of 69.62%. From the table, the results of the health center medical waste management system in Tapin Regency can be presented in the form of a graph which can be seen in the following image:

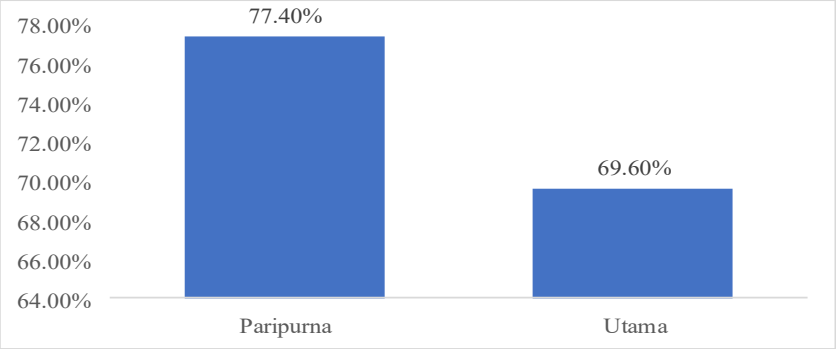

Figure 2. Accreditation Status based on compliance

IPAL Facilities

Table 5. Facilities, IPAL, and Constraints of Medical Waste Management in Tapin Regency

No.	Health Center	Trash Can & Safety Box Facilities	IPAL Condition	Constraints/Special Notes
1.	Lokpaikat	Complete and separate	Damaged, cannot be used	No liquid waste processing due to damaged IPAL
2.	Binuang	Available	Functioning but water and waste are limited	Difficult to sort waste because liquid waste (such as amniotic fluid) is mixed with other waste
3.	Salam Babaris	Available	Functioning but not optimal	Risk of needle stick injury because sharp waste is disposed of incorrectly by the village midwife
4.	Hatungun	Complete and according to standards	Functioning Well	No constraints, management is running according to procedure

Table 5 explains the IPAL facilities and constraints on medical waste management at health centers, including: (1) Lokpaikat Health Center is complete and separate but the IPAL cannot be used, (2) Binuang Health Center is available and can function but the amount of waste is limited, (3) Salam Babaris Health Center is available but is also less than optimal, (4) Hatungun Health Center is complete and functions well.

DISCUSSION

The study aims to describe the medical waste management system implemented by four Community Health Centers in Tapin Regency and to evaluate its level of compliance with the provisions stated in the Regulation of the Minister of Health of the Republic of Indonesia Number 18 of 2020. This regulation stipulates that the stages of medical waste management must include activities ranging from the sorting process, use of appropriate containers, internal transportation, temporary storage, to final disposal that is safe and environmentally friendly.

The Minister of Health Regulation states that every health service facility is required to have and implement written and consistent standard operating procedures (SOPs). The results of field observations show that only two Community Health Centers, namely Lokpaikat and Binuang, have written SOPs, while the other two, Salam Babaris and Hatungun, do not have them. This has an impact on the irregularity

in the implementation of the medical waste management system. For example, only Lokpaikat and Binuang have temporary waste storage facilities that are closed and relatively up to standard, although still simple. Other Community Health Centers use unsuitable rooms that are not equipped with ventilation, waterproof floors, or weather protection.

Pasai et al. (2021) which states that compliance with medical waste management is greatly influenced by the availability of facilities, understanding of officers, and applicable SOPs. Sutrisno (2020) also stated that the existence of a functioning wastewater treatment plant (IPAL) is an important part of a good medical waste management system. Among the four health centers, only Hatungun has an optimally functioning IPAL. Quantitative data from the questionnaire showed that the sorting indicator had the highest level of compliance (87.5% in Lokpaikat), followed by storage (82.5%), while the destruction indicator showed the lowest score (75%). This indicates that although most health centers have implemented most of the management stages, obstacles still exist in the final stage. Ideal sorting, as stated in Permenkes No. 18 of 2020 and WHO (2014), requires the use of yellow bags for infectious waste, black for non-infectious, and safety boxes for sharp waste. Health centers with Paripurna accreditation such as Binuang have implemented it routinely, but violations are still found in Puskesmas with Utama accreditation, such as sharp waste not being put into safety boxes.

In terms of storage, most Puskesmas have used appropriate containers, but still lack standard biohazard bags. Temporary storage facilities that meet standards are only found in Binuang; other Puskesmas are still using converted rooms that do not meet the TPS B3 criteria. Internal transportation also varies: Lokpaikat and Binuang work with third parties, Salam Babaris sends waste to the Tapin Utara Puskesmas using motorbikes, while Hatungun uses a special ambulance. Ideal transportation should use closed and special vehicles to prevent cross-contamination.

All Puskesmas hand over medical waste to third parties for destruction, but this process is only carried out every two to three months, exceeding the storage limit of 2x24 hours without a cooling system. This is against regulations and increases the risk of infection and environmental pollution (Sutrisno & Meilasari, 2021).

The strength of this study lies in its approach that links the waste management system with regulations and accreditation status, something that is rarely studied simultaneously. Data were obtained from four Tapin areas that represent variations in health facility conditions. The Ministry of Health (2020) emphasized that accreditation reflects the readiness of facilities in providing health services, including in medical waste management.

Recommendations that can be given include regular technical training for sanitarians, improving temporary waste storage infrastructure, and implementing a digital-based waste reporting system to improve the effectiveness of supervision. The Health Office is advised to develop a risk classification system to determine intervention priorities, both in terms of facilities and human resource training.

The results of the analysis, it can be concluded that the medical waste management system in Tapin Regency is not fully in accordance with national provisions. The level of implementation of Permenkes No. 18 of 2020 is greatly influenced by accreditation, availability of facilities, and consistency of SOP implementation.

The second objective of this study was to evaluate the medical waste management process based on the accreditation category of the Health Center. In Tapin Regency, two Health Centers, Lokpaikat and Binuang, have Plenary status, while Salam Babaris and Hatungun have Main status. Accreditation status is believed to reflect the readiness of the institution in meeting health

service standards, including in the aspect of waste management.

Based on observation and questionnaire data, it was found that Health Centers with Plenary status generally showed a higher level of compliance, especially in the indicators of waste transportation and storage. Lokpaikat and Binuang have a more organized waste transportation system, as well as the use of separate safety boxes and TPS. Salam Babaris and Hatungun still show weaknesses in implementing procedures, especially in containers. A significant case occurred in Salam Babaris, where an officer was almost stabbed by sharp waste due to the negligence of the village midwife, indicating a weak understanding of SOPs in facilities with lower accreditation.

The results show a correlation between accreditation status and the level of completeness of facilities and the success of the implementation of the medical waste management system. Paripurna Health Center is more orderly in implementing stages from sorting to reporting. In contrast, Utama Health Center still faces various obstacles both in terms of technical and management. Sarri & Minaniarti (2020) emphasized that the quality of health services is determined by structure, process, and results. In this context, a strong structure is indicated by Paripurna accreditation status contributing to a more optimal waste management process.

Juliastini (2024) also strengthens this finding, showing that accreditation is a dominant factor in the effectiveness of waste management strategies, with a score of 4.52 out of 5. This is evident in this study, where Paripurna Health Center has complete documentation and written SOPs that are implemented. In contrast, Utama Health Center relies more on implementation in the field which has not been well documented.

The large volume of waste also needs to be considered. For example, Binuang produces 96.6 kg of waste in one period, far exceeding Hatungun which only produces 7 kg. However, the process in Binuang is still well managed because of the existence of a well-organized storage system and transportation schedule. This shows that in addition to accreditation, internal management plays a major role in the effectiveness of medical waste management.

Accreditation contributes significantly to the effectiveness of the medical waste management system, but successful implementation also depends on the availability of physical facilities, internal policies, and ongoing supervision. Increasing the accreditation status must be accompanied by technical guidance and field monitoring so that it really has an impact on the quality of service and environmental protection.

The advantage of this approach is its ability to assess not only the regulatory side, but also the managerial capacity and work culture of each Health Center. Therefore, the recommended solution includes increasing accreditation gradually with a focus on environmental aspects, training non-medical personnel, and forming an internal waste management monitoring team. The Health Office is advised to conduct regular internal audits to ensure that the implementation of the SOP is in accordance with the provisions, not just administrative documentation.

CONCLUSION

The results of the analysis of the medical waste management system in four Community Health Centers in Tapin Regency, it can be concluded that the implementation of Permenkes Number 18 of 2020 is still not fully optimal. The management process which includes the stages of sorting, containerization, internal transportation, temporary storage, to destruction has not been carried out consistently in all facilities. A striking difference can be seen between Community Health Centers that have been fully accredited and those that are still at the Main accreditation level. The Full Health Centers show higher compliance with standard

operating procedures, have more complete documentation, and more adequate facilities and infrastructure, including in terms of IPAL and waste storage areas.

Community Health Centers with Main status still face various obstacles, both in terms of limited facilities, lack of understanding of procedures by officers, and weak implementation of SOPs in practice. This shows that accreditation status contributes greatly to the quality of medical waste management, but is not the only determining factor. Internal management, officer commitment, and infrastructure support also play a significant role in the effectiveness of waste management.

Strengthening the medical waste management system in Community Health Centers must be carried out comprehensively. Interventions include increasing the capacity of sanitarian personnel through technical training, improving physical facilities such as waste storage and wastewater treatment plants, and strengthening integrated reporting and monitoring systems. Internal audits conducted periodically by the Health Office will help ensure that medical waste management procedures are not just documents, but are actually implemented in the field to ensure environmental safety and quality of health services.

Declaration by Authors

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