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A Qualitative Study of Medical Hazardous Waste Management at a Health Center in Solok District Indonesia

Luthfil Hadi Anshari[1], Eri Barlian[2*], Indang Dewata[3], Nurhasan Syah[4], Linda Handayuni[5], Ch. Tuty Ernawati[6]

Abstract

From 2015 to 2017, it is estimated that six hundred tons of medical waste have been transported to the Java Region because waste destroyers only exist in Java. The average health service waste generation in health centers is 7.5 grams/patient/day; 64.6% of health centers separate medical and non-medical waste, and 26.8% carry medical waste handling with incinerators. This study is an analytical study with quantitative methods. The research was conducted in November 2020 at the health center in the Solok Regency working area. Primary data was obtained by direct observation of the location. Secondary data is received by tracing various sources, such as research results and databases from related agencies. The results of this research are in implementing the medical hazardous waste management system of the Public health center in Solok regency. All public health centers, both easy to reach and somewhat challenging to get, cooperate with third parties. The sorting of medical hazardous waste at a public health center in Solok Regency has been carried out. Still, the sorting is only in the form of medical and non-medical waste. Besides that, it is also equipped with a safety box for sharp debris in the condition of needles. Most of the Medical Hazardous Waste at the public health center in Solok Regency only provides a collection point after it is complete in the service room. Still, the Cleaning Service takes the waste that has been tied up directly to the storage room. Medical waste originating from medical service units temporarily stored outside the service room is transported to the medical hazardous waste storage area before being transported for destruction by a third party. The transportation of Medical Hazardous Waste at the Public health center in Solok Regency uses on-site and off-site transportation procedures. All public health centers in Solok district have sorted in each room, but some public health centers utilize containers that do not meet the requirements because some use plastic coatings that need to be standardized.

Keywords: *Hazardous, Medical Waste, Public Health Center.*

[1] Postgraduate Environmental Science Doctoral Program, Padang State University, Indonesia, luthfilhadi2023@gmail.com
[2] Postgraduate Environmental Science Doctoral Program, Padang State University, Indonesia, e.barlian@fik.unp.ac.id
[3] Postgraduate Environmental Science Doctoral Program, Padang State University, Indonesia, indangdewata@fmipa.unp.ac.id
[4] Faculty of Public Health, Andalas University, Indonesia, nurhasan@ft.unp.ac.id
[5] Postgraduate Environmental Science Doctoral Program, Padang State University, Indonesia, lindahandayuni@gmail.com
[6] Postgraduate Environmental Science Doctoral Program, Padang State University, Indonesia, ernawati.tuti@yahoo.co.id

INTRODUCTION

Community Health Centers, from now on referred to as Public health centers, include the First Level of Health Facilities. This health service facility organizes public and first-level individual health efforts by prioritizing promotive and preventive measures to achieve the highest public health in their working area. A public health center is one of the workplaces with risks to occupational safety and health in the human resources of the health center, patients, visitors, and the community around the Health Service Facility environment.

A public health center is a public place that provides medical services or increases the community's health level. Besides that,th service activities in health centers can produce medical and non-medical waste in solid and liquid forms.

If this waste is not managed correctly, exposure to health service waste can result in illness or injury to health workers, patients, visitors, and the community around the health facility environment. Although the proportion of medical waste in the hazardous waste category is only 15-25%, the risk is quite significant. The amount of medical waste sourced from health facilities is expected to increase over time. Waste generated from medical efforts such as health centers, polycliniCleaning Services, and other health facilities is a type of waste that is included in the biohazard category, which is a type of waste that is very dangerous to the environment, where there are many viruses, bacteria and harmful substances.

Since the first pandemic case of COVID-19 was found in Indonesia, the number of cases has continued to increase. The increasing number of points will also increase the amount of medical, hazardous waste generated by health centers, and this waste is categorized as medical, hazardous waste such as used masks, protective clothing, gloves, leftover medicines, labor instruments, and other personal protective equipment (Prasetiawan, 2020). They referred to the Circular Letter of the Minister of Environment and Forestry No. SE.2/MENLHK/ PSLHAZARDOUS.3/3/2020, it is stated that laboratory equipment and samples used include medical, hazardous waste in the form of infectious waste. Hence, they need to be managed as medical B medical hazardous 3 waste, which aims to control and prevent and break the transmission of COVID-19 and avoid the accumulation of waste generated from health services.

The number of health centers in West Sumatra is 268, and the volume of medical hazardous waste generated from health centers is 42.9 Kg/day. In 2015, the Environmental Agency brought a transport company from Sulawesi / Makassar to transport medical waste from hospitals and health care facilities in West Sumatra because there was no medical hazardous waste transportation company in Sumatra. From 2015 to 2017, it is estimated that 600 tons of medical waste have been transported to the Java Region because waste destroyers only exist in Java. The average health service waste generation in health centers is 7.5 grams/patient/day,64.6% of health centers carry out the separation of medical and non-medical waste, and 26.8% of health centers carry out medical waste handling with incinerators.

MATERIALS AND METHODS

This study is an analytical study with quantitative methods. A qualitative approach was used to develop research instruments. Qualitative research will obtain more in-depth information from implementing medical hazardous waste management in health centers. The study was conducted in November 2020 at the health center in the Solok Regency working area. Primary data was obtained by observing the location or object of research and conducting discussions and interviews directly with the leadership and staff of the public health center, the Head of infectious disease prevention, the Solok District Health Office, and the Solok District Environmental Service. Secondary data is obtained by

tracing various sources, such as research results and databases from related agencies. The source of informants in the study amounted to 19 people, including the Head of the Solok District Environmental Service and the Head of the Solok District Health Office, representatives of public health center leaders, sanitation workers, and the head of the sanitation section.

RESULTS AND DISCUSSION

1. Types of Medical Hazardous Waste generated by Public health center

Table.1. Types of Medical Hazardous Waste generated from health services at Public health center

No	Type of Waste	Number of Health Centers		Description
		Exist	None	
1.	Medicine leftovers	19	0	
2.	Disposible gloves	19	0	
3.	Disposi ble Maskeer	19	0	
4.	Syringe	19	0	
5.	Infusion hose	19	0	
6.	Infusion botox	19	0	
7.	Wipes exposed to blood fluids	19	0	
8.	Cotton swabs exposed to body fluids and blood	19	0	
9.	Bandage exposed to body fluids and blood	18	1	
10	Nebulizer syringe	18	1	
11.	Specimen container	17	2	
12.	Pipette petri disk	14	5	
13.	Specimen slides	16	0	
14.	Pasteur pipette	13	0	
15.	Chemicals	13	0	
16.	Medical contrast syringe	16	3	
17.	Used dressings	16	3	
18.	Dressing	14	5	
19.	Sponge	13	6	
20.	Catheter	13	6	
21.	Surgical gloves	15	4	
22.	Broken glass	12	7	
23.	Broken scalpel	11	8	
24.	Intravenous Supplies	11	8	
25.	Pampers/diapers	11	8	

No	Type of Waste	Number of Health Centers		Description
26.	Urine collection containers	10	9	
27.	Used bedding	15	4	

2. Medical hazardous waste management

In the implementation of medical hazardous waste management system of Public health center in Solok regency, all public health center, both easy to reach and rather difficult to reach, cooperate with third parties. In this case, the third party does not pick up the Medical Hazardous Waste to the public health center but waits with a container that will take this medical waste to Jakarta for further destruction. So Medical Hazardous Waste is delivered by each public health center to Kota Baru, Solok Regency using the public health center ambulance. On average, the transportation of waste is carried out more than once a month, some even up to 3-6 months. Medical Hazardous Waste that is transported is put in plastic and delivered by sanitation officers or puskel drivers. Some are equipped with PPE and some do not use PPE.

3. Stages of Medical Hazardous Waste Management

a. Medical hazardous waste sorting

The sorting of medical and hazardous waste at a public health center in Solok Regency has been done. Still, the sorting is only in the form of medical and non-medical waste. Besides that, it is also equipped with a safety box for sharp debris in the condition of needles. Plastic bags as container liners used for medical waste are yellow, and non-medical waste is black. Plastic bag liners have not permanently been installed and replaced every day when the trash can is emptied due to limited funds, even as a substitute for plastic had to be bought at the store in the form of ordinary plastic, and more easily leaked compared to yellow containers, so as a substitute using black plastic then given a sticker that the Solok Regency Health Office has assisted. Damaged and expired drug waste is handled directly by dispensary staff, and once every five years, it is destroyed within minutes, which third parties also manage. While other medical waste other than drugs is put in an infectious tub. So, it does not follow the PermenLH no. p.15 guidelines. 2015.

Still found in 4 (four) Public health centers, medical waste mixed with non-medical manure. Sorting containers are generally made of closed plastic; some are still open. The plastic covering the container is not all leak-proof. The black plastic used is not so thick that it leaks easily. Medical waste in the room is brought to the collection after reaching 2/3 full, then tied using plastic straps because the plastic lining of the container does not have straps.

Health center staff carry out efforts to sort and collect medical waste in each room, and some are carried out by CLEANING SERVICE using a plastic container consisting of 2 (two) containers for medical and non-medical waste. A particular container for needles or sharp objects is also placed in the service room. Cleaning Service officers then transport medical waste from each room.

The transportation route for medical, hazardous waste has yet to have a particular way, and it is still combined with the patient and officer route.

b. Dumping and Collection of medical waste

Most of the Medical Hazardous Waste of public health center in Solok regency does not provide a collection point after it is full in the service room, but the waste that has been tied up is taken directly to the storage room by the CLEANING SERVICE, because the distance is not far from the service room to the storage room.

Some that have cold storage have their medical medical hazardous waste stored in cold storage, but because the size is only for 10 L, only a small portion can be put in, while the waste is stapled for more than one month, and the waste always increases every day so that the medical waste exceeds the cold storage, and this excess is also placed in the storage room and combined with other items.

Tabel 2 Distribution of Health Centers Based on Medical Hazardous Waste Collection Containers

No.	Health Centers	Sorting	Accumulation
1	SR	Appropriate	None. Directly taken to Cold Storage and storage room
2	AP	Available, not yet compliant	None, plastic containers
3	SN	Available	None, directly to the temporary storage room
4	TB	Available	None, plastic containers
5	STN	Available	Yes, plastic container
6	TL	Available, not yet compliant	No, plastic containers
7	JG	Available	Yes, plastic container
8	KJ	Available, not yet compliant	Yes, taken to cold storage
9	SY	Available	None, directly to cold storage
10	TB	Available	None, directly to cold storage
11	SK	Available	None, directly to the storage area
12	PN	Available, not yet compliant	There is, lansgsung to cold storage
13	SA	Available	None, directly to cold storage
14	PJ	Available	None, directly to cold storage
15	SL	Available	None, directly to the storage room
16	SRK	Available	None, directly to the storage room
17	BJJ	Available, not yet compliant	None, open plastic, to cold storage
18	MP	Available	None, directly to cold storage
19	BS	Available	None, directly to cold storage

From table 2 above, it can be seen that public health center that have carried out sorting in accordance with the guidelines have only reached 73.7% and most public health center do not have outdoor collection but are directly transported from the room to the storage room or to the cold storage that is already available for temporary storage. However, there are 4 health centers (21%) that provide collection bins located outside the service room before being taken to temporary storage.

c. Storage room

Medical waste originating from medical service units that are temporarily stored outside the service room is transported to the medical, hazardous waste storage area before being transported for destruction by a third party. The medical waste is contained or packaged in tied plastic liner bags. Temporary storage location of medical waste. There are two types of storage locations at the public health center. Some have cold storage and are

directly stored in the provided space, but some still use the space as a warehouse for used goods and place medical Hazardous Waste. The location of this storage room is just a short distance from the service room. Even for those using cold storage, it is located in the workspace.

Seeing that the volume of cold storage is only to accommodate 10 L of waste, there is still a lot of trash that cannot be stored in cold storage, so it still uses storage space. The transportation length exacerbates this problem to the third-party collection site located in Kota Baru, Solok Regency, an average of more than 1 month, some even more than three months, and some even longer, namely above six months.

Supplies for cleaning equipment (brooms, bins, garbage, etc.), protective clothing, and plastic liner bags for packaging Medical Hazardous Waste in the sanitation room where the location is quite close to the temporary storage location of medical waste. The place or area of the quick medical, hazardous waste storage has yet to be locked to prevent unauthorized entry. Medical waste in the temporary storage area is packed using plastic liner bags and large buckets with a volume of 50 L. before being transported by transport vehicles. The distribution of health centers based on storage facilities is presented in Table 3.

Table 3. Distribution of Health Centers Based on Storage Facilities

No.	Health Centers	Storage Facilities	Amount of medical waste (Kg)	Duration of Delivery
1	SR	Cold Storage	35	1 month
2	AP	Self-storage room	241	1 month
3	SN	Combined storage space with others	200	1 month
4	TB	Own storage room	110	1 month
5	STN	Own storage room	129	6 month
6	TL	Combined storage room with others	100	1 month
7	JG	Own storage room	95	1 month
8	KJ	Cold Storage	85	1 month
9	SY	Cold storage	171	1 month
10	TB	Cold storage	42	1 month
11	SK	Combined storage space with others	200	3 month
12	PN	Cold storage	85	6 month
13	SA	Cold storage	110	1 month
14	PJ	Cold storage	70	1 month
15	SL	Storage room	150	1 month
16	SRK	Storage room	60	1 month
17	BJJ	Cold storage	260	1 month
18	MP	Cold storage	90	1 month
19	BS	Cold storage	90	1 month

Based on the table above, it can be explained that of the 19 health centers in Solok district, there are only 10 health centers that already have cold storage, but the contents are very limited, still unable to accommodate waste generated for one month let alone

longer. The other nine public health center still use space for storage but do not meet the requirements, because they are still placed directly on the floor, then there are also still liquid splashes from waste due to leaks in the plastic packaging of medical medical hazardous waste.

The amount of waste generated by public health center that is weighed every time they are going to carry out transportation is more than 100 Kg as many as 10 Public health center and the most of more than 200 Kg are public health center Bt Bjj, AP, SN and SKR. On average, Medical Hazardous Waste is delivered by public health center to the pool/container located in Kota Baru for more than 1 month, but there are still 3 public health center that exceed 3 months, namely public health center SP.Tj.Nan IV, PN and SKR.

d. Transportation and Destruction of Medical Hazardous Waste

The transportation of Medical Hazardous Waste at Public health center in Solok Regency uses on-site and off-site transportation procedures. On site transportation is transportation carried out at the starting point to a temporary shelter. Medical waste from each room is transported by hand because they do not have garbage carts, Plastic that has been filled with waste is directly lifted to temporary storage by CLEANING SERVICE personnel through the general route (patient's path) because they do not have a special route. Based on observations, there are still 30% of officers who do not use complete PPE such as gloves, work shoes, masks, helmets and work clothes in carrying the medical waste plastic. PlastiCleaning Service that are full in the service room are tied with plastic straps then taken to the storage room, some still use plastic that is less strong, so there can be spills on the way to storage.

Table.4. Distribution of Health Centers Based on On Site Transport Facilities

No	Health Centers	Means of conveyance
1	STN	Cart
2.	JG	Lifted by hand
3.	KJ	Cart
4.	PN	Lifted by hand

Based on table 4 above, the observation results show that of the 19 Public health centers in Solok Regency, four Public health centers have temporary collections before being taken to the storage room and placed outside the service room. Of these four health centers, two use carts to transport hazardous medical waste to the storage room, and two use their hands to transport dangerous medical waste. The container used to accommodate this temporarily is a container in the form of a bucket, then collected from several rooms and put in a collection tub, after which it is immediately transported to the storage room or cold storage.

Off-site transportation is carried out at the temporary storage point outside the Public health center. Medical waste in the temporary storage of medical waste is transported outside the Public health center. Considering that a third party carries out the destruction and transportation of Medical Hazardous Waste from the public health center, and because the location of the public health center is quite far apart, an agreement was made between the Health Office and the third party that the third party waits with a particular transport truck from a third party located in Kota Baru, Solok Regency.

To deliver this medical, hazardous waste from the public health center to the waiting vehicle in Kota Baru Solok with Puskel vehicles must be by applicable regulations. Moreover, this puskel is also used for public health center operations and transporting patients who need to be referred to the hospital.

Transportation is carried out every day with a frequency of 1x/day. The Cleaning Service carries out transport. The Cleaning Service uses Personal Protective Equipment (PPE) but only work shoes and gloves to handle medical waste.

The destruction of Medical Hazardous Waste at the Public health center in Solok Regency is managed by the Public health center itself until the temporary storage process. Still, for destruction, it cooperates with third parties. From the information of the Head of the Solok district Health Office and confirmed by the sanitation worker of the Solok district Health Office, there is one health center with an Incinerator built by DLH several years ago at the Bukit Sileh health center. From 2020 to 2022, it will be used to burn medical waste in the form of PPE for health center staff with a capacity of 80 kg, temperature of 800-13000 C, kerosene fuel, working time setting: 1 hour, electricity: 500W/220W. Medical waste in the category of sharps, such as syringes, mess slides, and medicine bottles, is burned at a temperature of 800-13000, while medical waste in the form of cotton, gauze, plasters, hand scoops is burned at a temperature of 500-8000 C. burning of medical waste is carried out once a week depending on the amount of medical waste produced. This burning is by the circular of the Director of Environmental Health of the Indonesian Ministry of Health to control medical waste, which was relatively soaring at the time of the Covid 19 case. It is no longer used because there is no special permit for operations from DLH Solok Regency.

Suppose there is a delay in the transportation of this medical waste, and the storage room is also very complete and causes disturbance to the environment. In that case, this medical, hazardous waste is also burned in the public health center environment in small quantities, but it still blames the government regulations. Payment for the transportation and destruction of Medical Hazardous Waste is made when there is a letter from the receiving party at the destruction site in Jakarta.

CONCLUSION

All public health centers in Solok district have sorted in each room, but some public health centers utilize containers that do not meet the requirements because some use plastic coatings that need to be standardized. Most health centers do not use collection activities that Cleaning Service directly takes from the service room to the storage room or cold storage. Hazardous medical waste in public health centers is transported from the service room to the cold storage room using only direct hands without intermediaries. The storage of dangerous medical waste consists of 3 forms: cold storage, unique storage rooms for hazardous medical waste, and storage rooms combined with other equipment warehouses. A third party from another island carries out the destruction of medical waste.

ETHICAL CLEARANCE

All the ethical issues (plagiarism, informed concent, double publication or submission) have been observed by the authors.

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CONFLICT OF INTEREST

We declare that there is no conflict of interest

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