



The process of managing medical solid waste at the Siti Hajar Islamic Hospital Sidoarjo

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Abstract. Management of medical solid waste is very important, especially for health providers and the general public who are beginning to be aware of the effects of bad waste management and become a major threat to public health. This study aims to analyze the process of managing medical solid waste at RSI SH Sidoarjo based on the Minister of Health Decree No. 1204 of 2004 concerning hospital environmental health requirements. The type of research used is descriptive qualitative. The study was conducted from February to March 2019 with a total of 7 informants. Data collection by observation, interview and document study. Data analysis used the method of source triangulation and theory triangulation. The results showed that, of the 6 aspects of medical solid waste management there were 3 aspects which were entirely (100.0%) optimally implemented, namely the aspect of sorting, storage and destruction, in the aspect of collection and transportation mostly (75.0% and 66.8%) optimally implemented, the half of the TPS aspect (50.0%) was carried out optimally. It is recommended to collect aspects to adjust the use of safety boxes in each room. In the aspect of transportation, make a policy related to the use of PPE for cleaning service officers who handle medical solid waste and rearrange the transportation routes. In the aspect of TPS, reuse incinerators to treat medical solid waste.

Keywords: Hospital, Management, Medical Solid Waste.

INTRODUCTION

One of the results of hospital activities has never been separated from infectious waste disposal which can endanger public health. The amount of waste produced by the hospital is around 85%, which is non-infectious or harmless, while the remaining 15% is considered as a dangerous (infectious) substance. Developed countries produce an average of 0.5 kg of infectious waste per bed per day while developing countries have an average of 0.2 kg. Infectious waste in developing countries is often not separated so that the actual number of infectious waste is slightly more numerous, this can threaten public health^[1]. Hospitals produce hazardous waste which is relatively less compared to industry, but 20% of total hospital waste has the potential to be contagious^[2].

media Onlinecoverage on April 24, 2015, said that the Regional Police (Polda) of East Java (East Java) found 6 private hospitals that carry out hazardous and toxic waste management (B3) without permission. The results of observations made by the East Java Regional Police found improper waste management in one of the Sidoarjo district hospitals. The truck used by the hospital is known not to have a permit to transport waste. The waste in question is used infusion, chemical jerry cans, surgical equipment, and injection packs in the form of plastic^[3].

Siti Hajar Islamic Hospital is one of the private hospitals in the Sidoarjo Regency. The results of a preliminary survey conducted at the RSI Environmental Health Unit in Siti Hajar revealed that Siti Hajar Hospital had an incinerator but was not functioning because it had collaborated with a third party for the elimination of infectious waste. The use of personal protective equipment (PPE) in 2017 from the results of the recapitulation found that the use of completeness PPE has not reached the target. This is reinforced based on the results of observations found that one room does not use a safety box to dispose of sharps waste but uses packaging cardboard.

Management of medical waste is very important, especially for health providers and the general public who are beginning to be aware of the effects of bad waste management and become a major threat to public health. The risk of transmission occurs at the time of disposal from the source, followed by the process of collection, transportation, storage, and handling. The main danger is the

direct contact between the body and sharp objects (such as needles, knives, broken glass, glass, etc.). These sharp objects cause cuts, scratches and even the risk of being cut off. When the body is unprotected and in a weak condition it is easily infected by disease agents, so it needs procedures in handling it. The procedure in question includes sorting, proper storage, preventing physical contact with waste, using safety equipment, limiting the number of officers handling waste, and avoiding spills and possible handling accidents^[4].

The activities carried out at the Siti Hajar Hospital in Sidoarjo are very complex so that the medical solid waste produced is also very large. Therefore, this research is focused on seeing the process of medical solid waste management which includes sorting, storing, collecting, transporting, temporary shelters and extermination at Siti Hajar Sidoarjo Hospital in 2018.

METHODS

The type of research used is descriptive qualitative. The form of implementation uses an evaluative method, namely studying the process of managing medical solid waste at Siti Hajar Sidoarjo Hospital, then comparing it with the guidelines of the Ministry of Health of Republic of Indonesia number 1204 of 2004 concerning hospital environmental health requirements. The number of informants was 7 people taken by techniques Purposive Sampling. Data collection by observation, interview and document study. Data analysis used source triangulation techniques and theory triangulation.

RESULTS

1. Sorting

Following are the results of observations on the sorting aspect at Siti Hajar Hospital in Sidoarjo.

Table 1. Results of observation of sorting aspects at Siti Hajar Sidoarjo Hospital

No	Kepmenkes Criteria 1204 / Menkes / SK / X / 2004	Realization at Siti Hajar Sidoarjo Hospital					
		Implemented Optimal		Implemented Not Optimal		Not Implemented	
		n	%	N	%	n	%
1.	Sorting starts from producing sources garbage.	1	33,3	0	0	0	0
2.	Each source of the medical waste producers must have a separate container with non-medical solid waste.	1	33,3	0	0	0	0
3.	Sorting between infectious waste and sharp objects.	1	33,4	0	0	0	0
Total		3	100,0	0	0	0	0

Source: Primary data 2019

Based on Table 1. It can be informed that, the results of observations of the three criteria in the sorting aspect, namely that all (100%) are optimal.

2. Arrangement

An overview of aspects of preservation of medical solid waste at Siti Hajar Sidoarjo Hospital can be seen in Table 2.

Table 2. Observation aspects of storage at RSI Siti Hajar Sidoarjo

No	Kepmenkes Criteria 1204 / Menkes / SK / X / 2004	Realization at Siti Hajar Sidoarjo Hospital					
		Implemented Optimal		Implemented Not Optimal		Not Implemented	
		n	%	N	%	n	%
1.	Waste disposal is distinguished for sharp and infectious waste.	1	16,7	0	0	0	0
2.	The containers are labeled and cleaned regularly.	1	16,7	0	0	0	0
3.	The container is made of strong material, quite light, rust-resistant, waterproof, and has a smooth surface on the inside, such as fiberglass.	1	16,7	0	0	0	0

No	Kepmenkes Criteria 1204 / Menkes / SK / X / 2004	Realization at Siti Hajar Sidoarjo Hospital					
		Implemented Optimal		Implemented Not Optimal		Not Implemented	
		n	%	N	%	n	%
4.	The container is coated with a plastic bag.	1	16,7	0	0	0	0
5.	An infectious and cytotoxic solid medical waste storage place that does not directly contact with waste immediately cleaned with a disinfectant solution if it is to be reused.	1	16,6	0	0	0	0
6.	Plastic bags that have been used and direct contact with waste should not be used again.	1	16,6	0	0	0	0
Total		6	100,0	0	0	0	0

Source: Primary data 2019

Based on Table 2. it can be informed that the results of observations from the six criteria in the aspect of storage are that all (100%) are optimal.

3. Collection

description of aspects of medical solid waste collection at Siti Hajar Sidoarjo Hospital can be seen in Table 3.

Table 3. Observation results of collecting aspects at Siti Hajar Sidoarjo Hospital

No	Kepmenkes Criteria 1204 / Menkes / SK / X / 2004	Realization at Siti Hajar Sidoarjo Hospital					
		Implemented Optimal		Implemented Not Optimal		Not Implemented	
		n	%	N	%	n	%
1.	Waste is collected in containers covered with plastic bags.	1	25,0	0	0	0	0
2.	Garbage collection is distinguished for sharp and infectious objects.	1	25,0	0	0	0	0
3.	Sharp objects are accommodated in a special place (safety box) such as a safe bottle or carton.	0	0	1	25,0	0	0
4.	If 2/3 parts have been filled with waste, the plastic bag will be transported	1	25,0	0	0	0	0
Total		3	75,0	1	25,0	0	0

Source: Primary data 2019

Based on Table 3. it can be informed that the results of observations from the four criteria in the collection aspect, namely most (75.0%) were carried out optimally and a small part (25.0%) had not been optimally implemented.

4. Transportation

Description of the aspect of transporting medical solid waste at Siti Hajar Sidoarjo Hospital can be seen in Table 4.

Table 4. Observation results of transportation aspects at Siti Hajar Sidoarjo Hospital

No	Kepmenkes Criteria 1204 / Menkes / SK / X / 2004	Realization at Siti Hajar Sidoarjo Hospital					
		Implemented Optimal		Implemented Not Optimal		Not Implemented	
		n	%	N	%	n	%
1.	The plastic bag is lifted every day or less a day if 2/3 parts have been filled with waste.	1	16,7	0	0	0	0
2.	Solid medical waste bags before they are put into transport vehicles must be placed in strong and closed containers.	1	16,7	0	0	0	0
3.	Solid medical waste bags must be safe from the reach of humans and animals.	1	16,7	0	0	0	0
4.	Equipment is labeled and cleaned regularly.	1	16,7	0	0	0	0
5.	Officers who handle waste must use personal protective equipment consisting of hats/helmets,	0	0	1	16,6	0	0

No	Kepmenkes Criteria 1204 / Menkes / SK / X / 2004	Realization at Siti Hajar Sidoarjo Hospital					
		Implemented Optimal		Implemented Not Optimal		Not Implemented	
		n	%	N	%	n	%
	masks, eye protection, long clothing (coverall), apron for industry, gaiters/boots, and, gloves special hand (disposable gloves or heavy-duty gloves)						
6.	Waste transportation routes are safe for the health environment and far from the center of activity (not through patient, nursing, and kitchen lines). The transportation process is carried out when there is no activity.	0	0	1	16,6	0	0
Total		4	66,8	2	33,2	0	0

Source: Primary data 2019

Based on Table 4. it can be informed that the results of observations from the six criteria in the transportation aspect, namely most (66.8%) were carried out optimally and almost half (33.2%) were not optimally implemented.

5. Temporary Shelter

The table below describes a temporary shelter at Siti Hajar Hospital in Sidoarjo.

Table 5. Observation results of temporary shelters at Siti Hajar Sidoarjo Hospital

No	Kepmenkes Criteria 1204 / Menkes / SK / X / 2004	Realisasi di RSI Siti Hajar Sidoarjo					
		Implemented Optimal		Implemented Not Optimal		Not Implemented	
		N	%	N	%	n	%
1.	If RS has an incinerator in the environment, it must burn waste no later than 24 hours.	0	0	1	50,0	0	0
2.	For hospitals that do not have an incinerator, solid medical waste must be destroyed through collaboration with hospitals that have an incinerator to be destroyed at the latest 24 hours if stored at room temperature.	1	50,0	0	0	0	0
Total		1	50,0	1	50,0	0	0

Source: Primary data 2019

Based on Table 5. it can be informed that the results of observations of the two criteria in temporary shelters namely a half (50.0%) were carried out optimally and half (50.0%) were not optimally implemented.

6. Destruction

The table below illustrates the aspect of extermination at the Siti Hajar Islamic Hospital Sidoarjo.

Table 6. Observation results of extermination aspects at RSI Siti Hajar Sidoarjo

No	Kepmenkes Criteria 1204 / Menkes / SK / X / 2004	Realisasi di RSI Siti Hajar Sidoarjo					
		Implemented Optimal		Implemented Not Optimal		Not Implemented	
		n	%	N	%	n	%
1.	Medical waste burned at Incinerator .	1	33,3	0	0	0	0
2.	The gas and ash emission test is carried out to determine the content of gas and ash emissions produced.	1	33,3	0	0	0	0
3.	The officer is equipped with protective equipment and special clothing.	1	33,4	0	0	0	0
Total		0	100,0	0	0	0	0

Source: 2019 primary data

Based on Table 6. it can be informed that the results of observations from the three criteria on the annihilation aspect, which are entirely (100%) performed optimally.

DISCUSSION

1. Sorting

The results of the study found that overall (100%) the sorting process was carried out optimally. The sorting of medical solid waste is carried out starting from the source, which is carried out by officers (nurses) of hospitals located in each waste-producing unit. This is following by Indonesian Minister of Health Decree number 1204 of 2004 where the sorting of waste must be carried out starting from sources that produce waste, namely by nurses^[4].

Sorting medical solid waste with non-medical solid waste, and medical solid waste with sharp objects has been carried out well by the hospital. Research conducted by Awodele et al (2016) in seven hospitals in Lagos, Nigeria stated that 6 of the 7 hospitals surveyed had disposed of general and medical waste separately^[5]. According to WHO (2009), 65% of hospitals in the cities of Medan, Bandung, and Makassar have separated between medical waste and domestic waste. This shows that RSI Siti Hajar Sidoarjo is one of the hospitals that has segregated medical solid waste with non-medical solid waste well in Sidoarjo Regency.

Provision of a place in the process of sorting at Siti Hajar Sidoarjo Hospital was adjusted to the Minister of Health Republic of Indonesia number 1204 in 2004, but there were still obstacles in the sorting process. Errors that occur in the sorting process are there are still nurses who mistakenly enter wet medical solid waste into dry medical solid waste or vice versa. This happens because all medical solid waste bins have the same color which is yellow with a yellow plastic bag with a label above the lid as a differentiator. There is no impact due to the error of disposal of wet medical solid waste and dry medical solid waste. Another case is if the nurse misses medical waste into a non-medical waste bin. This can lead to additional waste generation and increase the cost of handling the waste.

2. Construction

On the aspect of storage, it is known that all (100%) are optimal. RSI Siti Hajar Sidoarjo has distinguished between medical and non-medical solid waste bins. Yellow solid medical bins made of plastic rust-resistant, waterproof and have a smooth surface. The medical solid waste bin is covered in a yellow plastic bag and has a lid with a footrest as its opening. The results of this study are in line with the research conducted by Putri (2016) in the DR. Sudirman Kebumen who said that the solid waste of Dr. Sudirman Kebumen has used a trash bin that following the requirements stipulated by Kepmenkes No. 1204 of 2004^[6].

There are 3 types of solid medical bins at RSI Siti Hajar Sidoarjo. Medical solid waste bins have also been labeled according to the category of waste distribution and given signs biohazard and the words "Infection Rubbish". This is following Pruss (2005) which states that each unit provides at least three separate containers at the source which are properly labeled and placed in a place that is easily visible and affordable so that waste can be easily separated^[7]. Medical solid waste bins that have been transported, cleaned immediately using soap and replaced with new plastic bags. This is in accordance with the Indonesian Minister of Health Decree number 1204 of 2004^[4].

Medical solid waste in the form of sharp objects has been separated and collected using a safety box. But under certain conditions, some rooms use cardboard instead of a safety box due to the size or volume that is too small and the limited supply of safety boxes so that the use of cardboard instead of the safety box. The use of cardboard as a substitute for safety boxes has not been matched in the criteria of Kepmenkes number 1204 in 2004 so that sharp objects are not optimally implemented^[4].

The use of special containers for sharp objects is very important to prevent workers from handling injuries caused by sharp objects, so there is a need for supervision from the hospital to use cardboard instead of safety boxes. Also, RSI Siti Hajar Sidoarjo needs to spend more budget funds to meet hospital standards to improve the quality of hospitals so that good budget planning and adjusting hospital needs are needed, especially the safety box.

3. Collection

Aspects are known that almost all (75%) is optimal and there are still a small percentage (25%) of criteria that have not been optimally implemented, namely the criteria for collecting sharp objects accommodated in the safety box. If one container looks full or has been filled with 2/3, it will be

transported and a plastic bag replaced with a new one. This is following by Indonesian Minister of Health Decree number 1204 of 2004^[4]. The use of plastic bags in containers makes it easy for the transportation process (emptying) and cleaning.

The collection of sharp objects in a special place (safety box) at Siti Hajar Sidoarjo Hospital has not been optimally implemented. This is because the researchers found the use of cardboard packaging instead of the safety box. The use of a special place that is wrong to replace the safety box can result in an increase in workplace accidents to personnel cleaning service who handle medical solid waste such as needle puncture or injury due to sharp objects. The research conducted by Putri et al (2018) said that there was an increase in work accidents, namely the incidence of needle puncture from 2015 to 2016 due to officers not throwing sharp objects into safety boxes or sharp objects[8]. Therefore there is a need for good budget planning by RSI Siti Hajar Sidoarjo and adjusting the use of safety boxes in each room.

4. Transportation

Almost all (66.8%) of the implementation of the transportation aspect at the Siti Hajar Sidoarjo Hospital was carried out optimally. Transportation of medical solid waste is carried out by a cleaning service if the medical solid waste bag has reached 2/3 of the plastic bag, the waste is transported to the Temporary Shelter (TPS) of Hazardous and Toxic Waste (LB3). The results of the study found that, transporting medical solid waste using a trolley with a yellow cover. The trolley can hold 3 to 4 bags of medical solid waste. Carts transporting medical solid waste are labeled biohazard and cleaned regularly. This is following by Minister of Health Decree No. 1204 / Menkes / SK / X / 2004^[4].

The transportation criteria which is almost half (33.2%) have not been optimally implemented, namely the use of personal protective equipment (PPE) for waste officers and waste transportation routes. Transportation of medical solid waste is an activity that is quite risky to the health and safety of workers, therefore the RSI Environmental Health Unit of Siti Hajar Sidoarjo has provided PPE facilities for officers cleaning service. The use of PPE for officers handling medical solid waste has not been optimally implemented. PPE is used by Cleaning service that served to transport the waste, namely masks, boots and gloves, so as not fully meet the criteria. According to Kepmenkes RI number 1204 of 2004 in the process of transportation, officers handling waste must use personal protective equipment consisting of hats / helmets, masks, eye protection, long clothing (coverall), industrial apron, footwear / boots, and gloves special hand (disposable gloves or heavy duty gloves)^[4].

The transportation route at Siti Hajar Hospital in Sidoarjo already has a special route, but it is used interchangeably. This is because part of the route is used as a route to deliver food from the nutrition kitchen unit and transport linen to the unit laundry so that RSI Siti Hajar Sidoarjo applies transportation time for the nutrition unit and unit laundry. This needs to be considered by the hospital so that the route usage schedule does not collide. According to the Minister of Health of Republic of Indonesia number 1204 in 2004, hospitals should have a special transportation route for the process of transporting hospital waste, so that when the process of transporting waste does not damage the aesthetics and cause nosocomial infections in hospitals^[4].

5. Shelter

Aspects of shelter while half (50%) are carried out optimally. The LB3 temporary shelter of the Islamic Hospital of Siti Hajar Sidoarjo is located inside a hospital located in the backyard, side by side with a domestic polling station, adjacent to an incinerator and facing a Waste Water Treatment Plant (WWTP). This study is in line with Putri's research (2016) conducted at Dr. Hospital. Soedirman Kebumen, where storage of medical and non-medical solid waste is located in a backyard hospital adjacent to an incinerator^[6].

LB3 temporary shelter has been equipped with lighting and light fire extinguishers (APAR). The condition of LB3 TPS is in good condition, does not leak, has tightly closed doors and is locked so that only interested people can enter LB3 TPS. This is in accordance with the Indonesian Minister of Health Decree number 1204 of 2004 which states that temporary shelter must be provided in an

adequate size and in good condition (not leaky, tightly closed, and locked). The incinerator at RSI Siti Hajar Sidoarjo is no longer used because it has collaborated with third parties to carry out the destruction. So that the storage of medical solid waste at LB3 TPS RSI Siti Hajar Sidoarjo is done no more than 24 hours or no more than one day. This is in accordance with the Indonesian Minister of Health Decree number 1204 of 2004^[4].

6. Destruction

The results of the study on the annihilation aspect showed that overall (100%) was optimal. RSI Siti Hajar Sidoarjo has collaborated with a third party, PT. PRIA for processing medical solid waste. This is in accordance with the Indonesian Minister of Health Decree number 1204 of 2004, that is, if the hospital does not have an incinerator, then the solid medical waste treatment process is carried out in collaboration with other hospitals or submitted to third parties^[4]. The transport of medical solid waste carried out by third-party transporters uses special vehicles, namely cars with closed boxes with yellow license plates and biohazard signs or infectious signs. This is in accordance with the Indonesian Minister of Health Decree number 1204 of 2004 which states that if transportation of waste outside the hospital must use a special vehicle. Research conducted by Ahmed et al (2014) said that transporting solid waste outside the hospital location uses vehicles^[9]. Medical solid waste transporters transported out of the hospital must have a permit issued by the health department. The car used must be closed and locked so that no one can open except the transporter.

CONCLUSION

The results of the analysis of the process of managing medical solid waste at the Islamic Hospital of Siti Hajar Sidoarjo show that it has not been optimally implemented. There are still aspects that are not in accordance with the criteria of the Republic of Indonesia Ministry of Health number 1204 of 2004, namely the aspects of collection, transportation and temporary shelters.

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