



The Management of Infectious Waste in Households Amid the COVID-19 Pandemic in Indonesia



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Abstract

This study aimed to examine the quality of infectious waste management in households amid the COVID-19 pandemic in Indonesia. This study was a qualitative descriptive study and described the level of quality of infectious waste management in the household which was reviewed based on the relevant laws and regulations. The article used secondary legal materials, namely books, journals, articles, and other written works from print and internet media, and the phenomena that occurred in the field. The result indicated that the management of infectious waste during a pandemic was not optimal. Government policies were considered ineffective in managing infectious waste in households. Currently, SE Minister of Environment and Forestry Number SE. 2/MENLHK/PSLB3/PLB. 3/3/2021 asserts that the SE merely contains recommendations and guidelines and is not strictly binding, the consequence is that the public is not fully aware of it and its enforcement cannot be carried out optimally because of the limitations of its binding strength, even though infectious waste is B3 waste. It can be emphasized that the management of infectious waste in households amid the COVID-19 pandemic in Indonesia was not optimal. Thus, it is necessary to examine further strategic efforts in managing infectious waste in households based on local wisdom.

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1 Introduction

The COVID-19 pandemic has an impact on increasing the volume of handling waste both at referral facilities or at places and households (Hall, 2020). The pandemic condition has triggered the use of personal protective equipment from exposure to the COVID-19 virus infection, such as used masks, used gloves, used bandages, used tissues, used food and beverage wrappers, and personal protective equipment to increase the cause of new problems, namely COVID-19 infectious medical waste. -19 that is produced not from the hospital, but can be sourced from the community or households (Organization, 2020). Infectious waste is medical waste that is classified as hazardous and toxic waste (B3 waste) (Sukadaryati & Andini, 2021). The infectious waste is contaminated with pathogens in sufficient quantities and virulence to transmit disease, if not treated properly, infectious waste can become a source of disease transmission for patients, staff, and the surrounding community (Ardiyanto et al., 2020).

The COVID-19 pandemic has led to the increase in the emergence of infectious waste generated by households. According to data compiled from the Asian Development Bank, it shows a significant increase in infectious waste generation by up to 600% from the original 40 tons per day to 240 tons per day during the pandemic related to the community's need to use personal safety equipment in their daily activities (Arianta et al., 2020). Dealing with these data, more special handling is needed in the management of infectious waste to maintain cleanliness and environmental health as well as to prevent the spread of infectious diseases (Anggreni et al., 2020). As explained in Law Number 32 of 2009 concerning Environmental Protection and Management (hereinafter referred to as the PPLH Law), B3 waste is prohibited from being disposed of carelessly because it can have an impact on environmental components (Malik et al., 2021). The disposal of the B3 waste must be separated by the method of disposal based on the regulations for the disposal of B3 waste (GEDE SUDIKA MANGKU et al., 2020). Safe and efficient management of infectious waste is an important component of comprehensive emergency response (Mosolov, 2020).

Infectious waste, especially masks, becomes a particular concern due to the COVID-19 virus infecting the respiratory system. Infectious waste needs to be separated between ordinary household waste and infectious waste so as not to mix (Itasari, 2020). The infectious waste can be categorized as specific waste as stipulated in Article 2 paragraph (4) of Law Number 18 of 2008 concerning Waste Management (hereinafter referred to as the Waste Management Law) (Awaliyah et al., 2020; Mangku et al., 2022). This specific waste must be handled more specifically as specifically regulated in Article 8 of Government Regulation (PP) No. 27 of 2020 concerning Specific Waste Management (Yuliartini & Mangku, 2020). In the PP it is explained that the provision of specific waste handling facilities is carried out by the minister and in Article 8 paragraph (2) it is explained if the facilities are not yet available in this case the minister, governor, regent/mayor are authorized to use other facilities in the management of the specific waste, and it is emphasized in Article 6 Law on Waste Management which states that local governments have the authority to take action to increase public awareness and provide facilities for waste management (Utama et al., 2021).

Several regulations related to the management of infectious waste (B3 waste) already have a clear legal pattern, however, in practice, infectious waste is still found from the COVID-19 pandemic (Slack et al., 2005; Van Doorslaer et al., 2006). According to data from the Ministry of Environment and Forestry, it shows that the amount of medical waste from the COVID-19 pandemic has increased by 30%, while the capacity for processing medical B3 waste in several areas, especially outside Java, is still limited (Fauzi et al., 2021). Although in its development the government through the Minister of Environment and Forestry issued a Circular Letter (SE) of the Minister of Environment and Forestry Number SE.2/MENLHK/PSLB3/PLB.3/3/2021 concerning Management of Infectious Waste (B3 Waste and Household Waste from Handling Corona Virus Disease (COVID-19)) (Hesti, 2020). However, it does not emphasize the management of infectious waste. The validity of this circular is internal, so it cannot be binding out. Therefore, more specific regulations are needed, including a Regional Regulation (Perda) to regulate the management of

infectious waste for COVID-19 suspects and positive individuals who are self-isolating at home (Antin et al., 2020). This is because the SE is addressed to the heads of ministries/agencies, governors, and regents/mayors throughout Indonesia. Even though the region is authorized to take action if it is based on the Waste Management Law, then it is explained in the PP on Specific Waste Management (Isngadi et al., 2021). Therefore, the existence of SE Minister of Environment and Forestry Number SE. 2/MENLHK/PSLB3/PLB. 3/3/2021 can temporarily fill the void in the regulation (Widyastuti et al., 2021). However, because it is not a decision or statutory regulation, the public also does not fully know if they do not access it directly because its enforcement cannot be carried out optimally because of the limitations of its binding power (Alfarel et al., 2021).

Seeing the problem regarding the management of infectious waste and hazardous content in infectious waste during the COVID-19 pandemic, it is necessary to have strategic efforts in medical waste management to support the optimization of medical waste management related to infectious nature (Sukadaryati & Andini, 2021). Thus, it takes cooperation between and awareness of both the government and the community in managing household infectious waste safely as an effort to strengthen the 5 pillars of Community-Based Total Sanitation (hereinafter referred to as STBM). STBM is a hygienic and sanitary behavior that is used as a reference in the implementation of STBM (Purwaningtyas, 2021). STBM has 5 pillars, namely stopping open defecation (stop defecation), washing hands with soap (CTPS), food and beverage management, household waste protection, and household liquid waste management (Hardanto et al., 2021). Infectious waste management strategies with collaboration in dividing roles between the government and the community based on the 5 STBM pillars, especially in securing household waste, are necessary so as not to add to health problems through virus transmission that can occur if infectious waste is not managed properly (Ardiyanto et al., 2020).

2 Materials and Methods

According to Article 1 point 1 and number 4 of the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.12/MENLHK/SETJEN/PLB.3/5/2020 concerning Storage of Hazardous and Toxic Waste (Mangku & Firdaus, 2022), states that Hazardous and Toxic Materials (hereinafter abbreviated as B3) are substances, energy, and/or other components which due to their nature, concentration, and/or quantity, either directly or indirectly, can pollute and/or damage the environment, and/or endanger the environment, health, and human survival and other living things (Daniati et al., 2021). Meanwhile, B3 Waste Management is an activity that includes reduction, storage, collection, transportation, utilization, processing, and/or landfilling. Infectious waste is medical waste which is included in the category of hazardous and toxic waste (B3 waste) (Haris & Tantimin, 2022). The infectious waste is contaminated with pathogenic organisms in sufficient quantities and virulence to transmit disease, if not treated properly, infectious waste can become a source of disease transmission for patients, staff, and the surrounding community (Ramimpi & Setiyono, 2022).

In solving the problem formulation raised. The research method used was classified as normative or doctrinal legal research with a juridical-normative approach (Sumardjono, 1989). The normative legal research method used existing library materials research methods (Sulaiman, 2018). In collecting research data, using secondary legal materials in the form of books, journals, articles, and other written works, both from print and internet media related to this research (Soekanto, 2007). Due to this research was also considered normative research, the data collection technique used was documents or library materials, and the legal material analysis techniques used were deduction techniques (from general to specific) and interpretation (interpretation) in analyzing existing legal materials (Abdurrahman, 2009). Data analysis in this study used qualitative analysis techniques, namely to answer the issue of how to manage infectious waste in the household to strengthen pillar 4 Community-Based Total Sanitation (STBM), the factors that affect the quality of infectious waste management in households, and the absence of regulations which was strictly binding on the management of infectious waste in the household.

3 Results and Discussions

It should be emphasized that the increasing need for masks in the community in the era of the COVID-19 pandemic and the policies set by the government have increased the use of masks, including medical masks at the household level produced households during a pandemic (Mangku et al., 2020). Therefore, there is a need for strict and binding arrangements regarding the management of mask waste which is included in infectious waste and there is a need for a collaborative role between the government and the community in the management of infectious waste during the COVID-19 pandemic (Karno & Sulaiman, 2021). Management of Infectious Waste in Households to Strengthen Pillar 4 of Community-Based Total Sanitation (STBM) Based on Circular Letter of the Minister of Environment and Forestry Number SE.2/MENLHK/PSLB3/PLB.3/3/2021 concerning Management of B3 Waste and Waste from Handling Corona Virus Disease (COVID-19) (Roder-DeWan, 2020).

Various countries around the world, including Indonesia, are being tested for their resilience in the face of the COVID-19 pandemic (Mangku, 2018). The practice of preventing and controlling COVID-19 cannot be separated from environmental conditions (Valizadeh et al., 2021; Mühlich et al., 2003). The environment is a major factor in the spread of the COVID-19 virus, the increasing number of COVID-19 patients is directly proportional to the increase in medical waste produced, so if this is left unchecked it will have a negative impact on both the environment and health (Joob & Wiwanitkit, 2020). The COVID-19 pandemic has an impact on increasing the volume of waste from patient handling activities, both in referral facilities or in quarantine and household areas. This pandemic condition has triggered the use of personal protective equipment from exposure to the COVID-19 virus infection, such as used masks, used gloves, used bandages, used tissues, used food and beverage packaging, and used personal protective equipment to increase and cause new problems, namely infectious medical waste (Song & Zhou, 2020). COVID-19 that is produced is not only from hospitals but can come from the community or households.

Following data compiled from the Asian Development Bank, it shows a significant increase in infectious waste generation by up to 600% from the original 40 tons per day to 240 tons per day during the pandemic related to the community's need to use personal safety equipment in their daily activities (Gupta et al., 2020). Furthermore, conditions in Indonesia regarding the generation of infectious waste are also quite high, according to data from the Ministry of Environment and Forestry showing that the amount of medical waste from the COVID-19 pandemic has increased by 30% while the capacity for processing medical B3 waste in several areas, especially outside Java, is still limited (Hardanto et al., 2021). Based on these data, more special handling is needed in the management of infectious waste to maintain cleanliness and environmental health as well as to prevent the spread of infectious diseases.

Dealing with the urgency of infectious waste management, the legality must be undertaken for officers in carrying out the handling of infectious waste properly and correctly following procedures (Ilczak et al., 2021). Therefore, the government through the Minister of Environment and Forestry in overcoming these problems then issued a discretionary policy through the Minister of Environment and Forestry Decree Number SE. 2/MENLHK/PSLB3/PLB. 3/3/2021 to assist health service facilities in managing their medical B3 waste even though the management does not yet have a permit (Xing et al., 2020). The issuance of the SE is also used to control, prevent and break the transmission of COVID-19 and reduce the accumulation of waste caused by handling COVID-19 (Mangku, 2021).

Dealing with the SE of Minister of Environment and Forestry Number SE. 2/MENLHK/PSLB3/PLB. 3/3/2021, the implementation of infectious waste management and household waste management was undertaken based on handling steps, including (Akhmad, 2022):

1. Infectious waste was obtained from health service facilities, it was carried out through the following activities (Fikri, 2021):
 - a) conduct the separation/segregation of COVID-19 B3 waste from other B3 waste at health service facilities;
 - b) carry out packaging with yellow packaging that is closed, does not leak, and is soundproof; and
 - c) do storage at room temperature for a maximum of 2 (two) days from the date of production.
2. Infectious waste obtained from residential homes was managed by (Aeni, 2021):
 - a) carry out packaging using plastic packaging that is closed, does not leak, and is airtight;

- b) carry out storage for a maximum of 2 (two) days from the time it is produced using closed containers or packaging; and
 - c) brought by officers from the agency responsible for handling the environment and/or cleanliness to a collection (collection) facility or depot provided by the Regional Government which is then submitted to the B3 Waste Manager.
3. Management of other waste was obtained from households, then it was carried out by (Satrianegara, 2014):
- a) reduce waste by using reusable masks, to reduce waste generation;
 - b) people who are healthy and use disposable masks are required to tear, cut or cut the masks and pack them neatly before throwing them in the trash to avoid misuse; and
 - c) local governments prepare trash bins or special drop boxes for masks in public spaces.

Dealing with the overview of infectious waste management, health services (hospitals) must pay attention to the disposal and management of household waste produced especially from COVID-19 patients (Itasari, 2020). Infectious waste obtained from health services must be managed following the standards and procedures specified in the SE Minister of Environment and Forestry Number SE. 2/MENLHK/PSLB3/PLB. 3/3/2021, namely by storing in closed packaging, no later than 2 (two) days from the time it is produced, transporting and destroying infectious waste (B3 waste) (Arifin & Lestari, 2019).

Management of infectious waste originating from households was carried out by collecting, packing, transporting, and destroying, and the community must try to reduce the generation of masks (Das et al., 2021; Lowe & ÓLaighin, 2014). Masks have become mandatory equipment used by the public as a form of preventing COVID-19 (Yuliartini & Pramita, 2022). However, this emerges new problems related to the types of waste that are often found in the community, one of which is masks which are included in infectious waste (Fauzi et al., 2021).

Infectious waste is waste that is closely related to infectious disease patients who require self-isolation, such as COVID-19. Therefore, infectious waste can be a source of the spread of disease to health workers and the wider community (Awaliyah et al., 2020). Thus, the government needs serious attention to reducing the generation of such waste. As has been explained in the data on the increase in the generation of infectious waste both in the world and in Indonesia, infectious waste management becomes an urgency in creating arrangements that are binding and firm (Kartika, 2009).

Currently SE Minister of Environment and Forestry Number SE. 2/MENLHK/PSLB3/PLB. 3/3/2021 if it is noticed deeply, its contents reveal that the SE contains recommendations and guidelines and does not explicitly bind how to handle it and the institution authorized to manage it (Organization, 2020). Considering that the SE is not a decision or a statutory regulation, the consequence is that the public does not fully know if they do not access it directly because its enforcement cannot be carried out optimally because of the limitations of its binding power (Joob & Wiwanitkit, 2020). Whereas infectious waste is B3 waste. According to Article 1 point 1 of the Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.12/MENLHK/SETJEN/PLB.3/5/2020 concerning Storage of Hazardous and Toxic Waste, it states that B3 waste is substance, energy, and/or other components which due to its nature, concentration, and/or amount, either directly or indirectly, can pollute and/or damage the living environment, and/or endanger the environment, health, and survival of humans and other living creatures (Purwaningtyas, 2021). Thus, it requires special management, especially in the current pandemic situation.

Infectious waste that continues to increase is a problem and a very dangerous threat to public health. Infectious waste management that is not following data procedures has a negative impact related on the spread of COVID-19 (Magnavita et al., 2020). The increase in household infectious waste due to the COVID-19 pandemic has caused the workload of the Ministry of Environment and Forestry to also increase, as a result, the destruction of infectious waste is not optimal (Bryson, 2021). In addition, currently, the exact location or location of self-isolation that is not officially mapped and results in the handling of infectious waste is also unclear and has the potential to be mixed with other ordinary household waste (Kartikawangi, 2017; Usman et al., 2014).

Dealing with the urgency of the problem regarding infectious waste management, a regulation that can bind firmly (not just a recommendation) related to the problem of infectious waste in the household is needed (Dewi & Tobing, 2021). In addition to efforts with binding rules, community participation in infectious waste

management is also needed, such as reminding each other to maintain cleanliness and environmental safety, for example managing infectious waste safely in the household environment (Greenberg et al., 2020). Collaboration between regulation (positive law) and community cooperation in securing infectious waste in the household through waste treatment activities such as carrying out waste processing safely that prioritizes the principle of reducing or reusing (Ozili & Arun, 2020). Thus, the act of managing COVID-19 infectious waste is an effort to strengthen the implementation of 4 pillars of STBM, namely household waste security.

Infectious waste management strategy in the household by local wisdom

The COVID-19 pandemic has an impact on increasing the amount of infectious waste so that it burdens health care facilities (Inkster et al., 2020). Infectious waste is B3 waste whose management is carried out with the principle of vigilance and using safe and environmentally friendly waste management methods (Guerrero et al., 2013; Broadbent & Laughlin, 2009). Infectious waste if not managed properly will pose a potential hazard to health and the environment (Alfarel et al., 2021). Environmental pollution caused by infectious waste will again have an impact on public health. Potential hazards from infectious waste management occur from the collection, storage, transportation, and disposal to destruction (Magnavita et al., 2020).

Seeing the impact of infectious waste, it is necessary to have a strategy in infectious waste management in addition to the role of the government with regulations issued in managing waste. However, only rules and without involving broader things such as local wisdom will also not run optimally (Ilczak et al., 2021). Thus, an effort approach to the management of infectious waste in the household is very necessary. Considering that local wisdom is a view of life and knowledge as well as various life strategies in the form of activities carried out by the community (South, 2014).

According to Sartini as quoted by Basyari in his journal entitled "Local Wisdom Values (Local Wisdom) of Memitu Tradition in the Cirebon Community" (Study of the Setupatok Village Community, Mundu District), he explained the roles and functions of local wisdom, including (Roth, 2014):

- For the conservation and preservation of natural resources;
- Human resource development;
- Development of culture and science;
- As a source of advice/belief;
- As the basis of ethics and morals; and
- The function of politics.

Based on the role and function of local wisdom, in preventing environmental damage to infectious waste through local wisdom, things that must be considered are conservative values. Conservative values are attitudes to maintain existing conditions, traditions, and customs that apply today (Sugiartha et al., 2021). Humans and the natural environment are inseparable units (Knigavko et al., 2022). However, the relationship that exists between the two is not only manifested as a dependent relationship between humans and their environment (Sabyr et al., 2019). However, it manifests as a relationship that shows that humans can influence and see, interpret, and utilize the natural environment and the physical environment in which they live (Urkidi & Walter, 2011). For example, in Bali, the society knows the concept of Tri Hita Karana, which implies three causes of happiness that can be obtained from a harmonious relationship with God (Parahyangan), Human (Pawongan), and the Environment (Palemahan) (Genta & Sarjana, 2016). This concept is one of the foundations of local wisdom that can be used in infectious waste management strategies in households. Infectious waste management through local wisdom can be undertaken in various ways, including (Erviana, 2017):

- Uphold religious values to protect the environment and prohibit its destruction;
- Mandatory learning curriculum both formally and informally through local content in providing education about the importance of preserving the environment;
- The government must be firm and consistent in the enforcement of infectious waste management which has been regulated in various laws and regulations from the central and regional levels;

- Supervise the implementation of regulations, for example providing counseling or socialization evenly and continuously so that the public understands and is aware of waste and its environment;
- Involve community participation in decision-making. Thus, with community control, it is hoped that it will be able to foster commitment and care together in collaborating in waste management and protecting the environment;

In dealing with strategy, the government needs to conduct various efforts and it must have synchronization of goals between the government and its people through efforts, including increasing public awareness of the dangers of COVID-19 infectious waste and playing a role in waste management (Francillon, 1979). Thus, the concept of waste management with local wisdom does not only involve knowledge and understanding of humans and the relationship between humans but also involves understanding and customs about humans, nature, and the relationship between them (Kartika, 2003). Thus, it is expected that it will lead to better management of natural resources and the environment.

4 Conclusion

Responding to the results of the research and discussion that have been described previously, it can be concluded that the Management of Infectious Waste in the Household to Strengthen Pillar 4 of Total Sanitation Based on Community (STBM) is based on the Circular Letter of the Minister of Environment and Forestry Number SE.2/MENLHK/PSLB3/PLB. 3/3/2021 is considered ineffective in the management of infectious waste in the household. If you look closely, the contents show that the SE merely contains recommendations and guidelines and is not strictly binding. The consequence is that the public is not fully aware of it and its enforcement cannot be undertaken optimally because of the limitations of its binding strength, this is evidenced by the fact that an increase in infectious waste is still being found, as shown in the data from the Ministry of Environment and Forestry and it reveals that the amount of medical waste from the COVID-19 pandemic has increased by 30% while the capacity for processing medical B3 waste in several areas, especially outside Java, is still limited. Currently, the exact location or location of self-isolation that is not officially mapped and results in the handling of infectious waste is also unclear and has the potential to be mixed with other ordinary household waste. This indicates that the conditions of the setting and the infectious waste management facilities are the cause of the ineffective management of infectious waste in the household.

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