



# Medical Waste Management During Pandemic Covid-19 in Indonesia

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**Abstract.** Coronavirus disease (COVID-19) is an infectious disease caused by SARS-CoV-2. This virus can infect millions of people around the world in a short time. The rules for using masks impact the increasing mask waste, whose management is still not under the rules. Mask waste that is not managed properly will pollute the environment and potentially spread viruses and diseases. The research method used is qualitative research. This research is included in analytical descriptive and used methods in the literature study. For this reason, mask waste management is essential to prevent the spread of viruses and diseases.

**Keywords:** Medical Waste Management · Pandemic Covid-19

## 1 Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by SARS-CoV-2. This virus can infect millions of people around the world in a short time. Covid-19 can spare small liquid particles from an infected person's mouth or nose when they cough, sneeze, speak, sing or breathe. The Covid-19 disease was first discovered in Wuhan, Hubei Province, China. The first case in Indonesia was in march 2020. To prevent the spread of the virus, the Indonesian Government announced to stay at home and work from home for all humans.

The action we can take to prevent the spread of the covid-19 virus is not to make direct contact with positive coronavirus patients or asymptomatic patients. We must wear a mask when leaving the house, keep washing our hands, or use hand sanitizer. Stay at least 1 m from others. The World Health Organization also reinforces this statement that preventive activities to slow coronavirus transmission are done. One of them is getting vaccinated, social distancing, wearing a mask when physically distancing, and staying home.

Recommendations for using masks and other personal protective equipment also impact the increase in medical waste. Medical waste such as masks and Personal Protective Equipment (PPE) can be categorized as Hazardous and Toxic (B3) waste or waste that is harmful to the environment and living things and requires special treatment to deal with. Muhjad [1] reinforces this statement the Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning Environmental Protection and Management, this B3 waste is dangerous and needs to be managed by the Government. Unfortunately,

in reality, on the ground, there are still many people who do not know how to manage B3 waste. Even though the accumulation of B3 waste is also dangerous for the environment, the germs and viruses trapped in the waste can potentially transmit disease. Matin et al. [2] also reinforce this statement that Most people still do not know the meaning and types of B3 waste, especially the Covid-19 B3 residue. People still eliminate all types of waste without classifying the type of waste. Minimum information to the public regarding waste management is also one of the obstacles.

## 2 Discussion

The COVID-19 pandemic has had a major impact on life, including the impact on the living environment. Medical waste, which is one of the impacts of the coronavirus, must be managed properly because medical waste that accumulates can spread viruses and diseases. The PPE material used is made of polypropylene which is safe for the skin, but masks and other PPE can only be used once for a limited period of 4 h. More than that, the mask must be replaced. PPE that has been used to treat patients should also be replaced immediately. This situation causes the accumulation of medical waste both in hospitals and residential areas, and other public facilities. In the current condition, only a few hospitals have hazardous and toxic medical waste management tools. Only a few hospitals have incinerators, but the gas produced from incinerators can pollute the environment. Meanwhile, fewer hospitals have autoclaves for B3 waste management.

Based on law number 32 of 2009 concerning environmental protection and management, general provision No. 23 PPE waste is included in the category of B3 waste. This PPE waste must be managed properly so as not to transmit disease to the community, following the B3 waste management guidelines in the circular issued by the Ministry of Environment and Forestry [3]. The Government also issued a circular regarding the processing of PPE infectious waste through the Circular Letter of the Minister of Environment and Forestry Number SE.2/MENLHK/PSLB3/PLB.3/2020 dated March 24, 2020, concerning Management of Infectious Waste (B3) and Household Waste from Handling Corona Virus Disease (Covid-19).

The circular describes the steps for handling infectious waste in households as follows (Minister of Environment and Forestry, 2020) [4]:

- a. Collecting PPE infectious waste in the form of masks, gloves, and protective clothing
- b. Medical masks must be cut before disposal to avoid misuse.
- c. Packaged separately from other waste in closed containers marked
- d. Officers collect infectious waste from the service responsible for collecting from each source, then transport it to a predetermined collection location before being handed over to the B3 waste processor.
- e. Cleaning officers and waste managers must use PPE such as masks, gloves, and safety shoes, which are disinfected daily.
- f. The circular also states that local governments should prepare trash bins/drop boxes specifically for masks in public spaces.

Furthermore, the Government updated the previous circular with Circular Letter Number SE.3/MENLHK/PSLB.3/3/2021 dated March 12, 2021, regarding the Management of B3 Waste and Waste from Handling Corona Virus Disease-19 (Covid-19).

Laelasari [5] stated that Socialization and monitoring from the Government need to be carried out to continue to monitor the implementation of the rules in the community because even though the Government has issued regulations regarding medical waste, there are still people who mix medical waste with other household waste. The case that arises from the impact of this medical waste is the discovery of PPE waste that is not processed first and mixed with other household waste. Research conducted in Padang, West Sumatra proved that 75.9% of high-income household respondents threw away medical masks and mixed them with other waste; 6.02% of respondents disposed of medical masks in separate places, and 18.07% of respondents cut the mask before throwing it away [6]. As many as 100% of low-income household respondents threw away masks and other waste. Another result states that public knowledge about the dangers of mask waste is still lacking.

Medical waste, on average, is made of plastic which is difficult to decompose, so the accumulation of medical waste impacts the environmental ecosystem. In addition to preventing the spread of viruses, medical waste must be disinfected first. One way that can be used to treat medical waste is to use combustion in an incinerator, namely, burning at a temperature of 850 degrees Celsius for 60 min. Still, this method produces gases that are harmful to the environment. In addition to using incinerators, medical waste treatment can be carried out by Pyrolysis. Laelasari explained that Pyrolysis is a decomposition process of organic chemicals at high temperatures without or with little oxygen and a catalyst where the long hydrocarbon chains that make up the polymer will be broken down into short chains which are in the gas phase which is then cooled to melt. The liquid resulting from this processing is often referred to as pyrolysis oil (pyrolyzed). This technology can decompose plastic waste, including PPE made from plastic polymers, into oil that can be used as an energy source of up to 30–41%.

The Ministry of Industry (Kemenperin) has also begun to develop pyrolysis technology to reduce plastic waste through research from the Center for Chemistry and Packaging, which is one of the research and development work units of the Ministry of Industry. This technology is expected to help the Government's target to reduce plastic waste by up to 70% by 2025 (Ministry of Industry, 2017) [7]. The management of mask waste management carried out in Indonesia is no different from that applicable in other Asian countries, only that Indonesia is constrained by the lack of resources, such as the limited number of shelters which causes waste to be disposed of indiscriminately. The lack of management personnel is also a factor in the lack of management of mask waste.

### 3 Conclusion

Medical waste management in Indonesia has yet to be able to run according to the rules set by the Government. This can be seen from the used masks that we can find scattered about, medical and household waste that is not separated, and so forth. In simple terms, the management of mask waste can be started from the smallest scope independently by separating medical and household waste and disinfecting medical waste. Local governments can also carry out socialization related to medical waste management and provide special transportation for medical waste. Proper medical waste management will help prevent the spread of viruses and diseases.

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