



Awareness of Medical Mask Waste Management for Young People on Central Java and Special Region of Yogyakarta Provinces During the Covid-19 Pandemic

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Abstract – The Covid 19 pandemic that hit Indonesia caused the problem of increasing medical mask waste. Medical masks are included in B3 waste because they are infectious. Therefore, special treatment is needed to mask waste, so it doesn't transmit disease. This study was conducted to determine the awareness of medical mask waste management in young people, especially those who live in the provinces of Central Java and the Special Region of Yogyakarta. The research was conducted by distributing questionnaires to respondents aged 17-24 years. This research used descriptive analysis with a quantitative approach. Based on the results of the study, it is known that most of them already know the meaning of B3 waste, where 65% of respondents can answer questions correctly about the type of waste and about 95% of respondents considered medical mask waste to be harmful to the surrounding environment. Based on the results of data analysis, it is known that the respondents have shown awareness of the dangers of mask waste, but from the results of the questionnaire, it is also known that the respondents do not have the awareness to process waste. From the 151 respondents, there were only 4 people who did the processing. So that it can be seen that the level of awareness of medical waste management in young people, especially those who live in the Province of Central Java and the Special Region of Yogyakarta is still very low. The results of the questionnaire also show that there are still few TPS specifically for hazardous waste around the settlements.

Keywords – Awareness, B3 waste, Infectious Waste, Medical Mask, Waste Management

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1. Introduction

The covid-19 pandemic is the spread of the covid-19 virus experienced around the world, as well as Indonesia. Pandemic covid-19 is undeniably has changed daily life and adapted to health protocols. The virus is spread through respiratory sparks during coughing. Therefore, facing the Covid-19 Pandemic which in its spread is very easy and fast, it is required for everyone to wear Personal Protective Equipment (APD). One of the personal protective equipment is a medical mask. Medical masks are usually used only once. Many people prefer to use this medical mask on the grounds that disposable masks have higher protection than reusable masks (Budiastuti et al., 2021). Along with the large number of medical mask users, this causes the heap of medical waste in the form of medical mask marks to jump significantly (Fentia and Ningsih, 2020). Waste used medical masks are widely used both from the general public to Covid-19 patients. In the Covid-19 pandemic, medical masks are one

of the most medical waste produced (Nabilla et al., 2021). The use of medical masks is one way to prevent the transmission of Covid-19 virus infection. However, the use of medical masks alone is not enough to protect against Covid-19 infection because it still has to be accompanied by other prevention. (WHO, 2020). Some of the recommended prevention efforts from the government to avoid the Covid-19 virus are always using masks outside, the use of hand sanitizer, and social distancing. In the Covid-19 pandemic, the use of medical masks is one of the preventive measures aimed at limiting the spread of the Covid-19 virus. (WHO, 2020).

In Indonesia, medical waste belongs to B3 waste which is regulated in the Government Regulation on The Management of Hazardous and Toxic Waste Materials (Purwanti, 2018). B3 Waste Management is carried out on the principle of vigilance and uses safe and environmentally friendly waste management methods. B3 is a substance,

energy, and/or other component that due to its nature, concentration and/or amount either directly or indirectly can pollute and/or damage the environment, endangering the environment, the health and survival of humans and other living things (Yolarita and Kusuma, 2020). While Waste B3 is the rest of the business and / or activities that contain B3. B3 waste is generated from activities / businesses both from the industrial sector, tourism, health services and from domestic households (Kurniawan, 2019). Medical waste is categorized with B3 waste based on Kemenkes 1204 Year 2004 among others infectious waste, pathology, sharp objects, pharmaceuticals, cytotoxic, chemical, radioactive, and waste with a high heavy metal content. The impact These wastes can pollute the environment and human health (Rachmawati et al., 2018).

One of the B3 wastes is disposable medical mask waste. In March 2020, medical mask waste in Indonesia increased by 30%. The Ministry of Environment and Forestry (KLHK) noted that since the beginning of the Covid-19 pandemic entered Indonesia in March 2020 until early February 2021 there were 5,417.95 tons of waste deposits of Covid-19 medical masks. From the data it is known that the use of medical masks has increased during the Covid-19 pandemic. During the Covid-19 pandemic, KLHK issued a policy on B3 waste management in efforts to deal with Covid-19, namely managing B3 waste. This is because proper and correct management of medical B3 waste is key in controlling the spread of Covid-19. According to researchers, medical B3 waste management research during the Covid-19 period in Indonesia has not been found knowledge to date. Considering the importance of medical B3 waste management issues, especially during the Covid-19 pandemic.

In this medical mask waste management research is based on the potential dangers from medical waste management can already occur from collection to extermination. Some of the influences that can be caused by the presence of this waste is the build up to cause pollution that has an impact on the decline of environmental quality and on health. Therefore, it is important to do B3 waste management including medical mask waste before removing it. Some special treatments on waste used medical masks are spraying disinfectant before removing it, discarded in a special place that is different from other garbage, changing the shape of medical masks can be by cutting or tearing it. From this research is expected to be able to increase the knowledge of young people in Central Java and Yogyakarta Special Region related to the prevention of Covid-19, the importance of the use of masks, to the main point of this study is awareness of waste disposal management of used medical masks.

2. Materials and Methods

This research on Medical Mask Waste Management Awareness among Young People in Central Java and Special Region of Yogyakarta During the Covid-19 Pandemic used descriptive analysis with a quantitative approach. The data

used are primary and secondary data obtained through filling out questionnaires and journal literacy. Primary data were obtained from 151 respondents spread across the Provinces of Central Java and the Special Region of Yogyakarta. Primary data in the form of a questionnaire was taken for three days on November 06, 2021 - November 09, 2021. The control variables used are young people aged 17-24 years who live in Central Java and Yogyakarta. The data taken relates to respondents' understanding of B3 waste, how respondents treat medical mask waste that has been used, understanding of how dangerous mask waste is to the environment, and the availability of B3 Waste TPS in their environment.

Table 1. List of Question

No	Question
1	Do you know what is B3 waste?
2	Which of the following options is included in B3 waste?
3	From numbers 1 to 5, in your opinion, how much of a negative impact does medical mask waste have on the surrounding environment? If the number 1 indicates a small impact and the number 5 indicates a large impact.
4	What type of mask do you usually use?
5	What is the average number of medical masks you use every day?
6	After using it, what do you do with the medical mask?
7	If thrown away, are the medical masks thrown in one place with other garbage?
8	Do you know the steps for disposing of mask waste correctly?
9	If you know, tell me what to do before the mask is thrown away!
10	Are there any special hazardous waste disposal sites (TPS) around where you live?
11	If there is a hazardous waste TPS around your house, where is it located?

The research was conducted on the island of Java, especially Central Java and Special Region of Yogyakarta provinces. Geographically, Central Java province lies between 5° 4' and 8° 3' south latitude and between 108° 30' and 111° 30' east longitude. In the north, the province of Central Java is bordered by the Java Sea, in the south by the Indian Ocean and the Province of the Special Region of Yogyakarta, in the west by the Province of West Java and in the east by the Province of East Java. Central Java was once included in the 5 provinces that contributed the highest Covid-19 patients in Indonesia. The number of Covid-19 patients in the Central Java province has an impact on the increasing number of masks, especially medical masks in Central Java Province. This research was also conducted in Special Region of Yogyakarta province. Although this region has a smaller than Central Java province, which is around 3,186 km², the number of COVID-19 cases in this region is quite high. The Province of the Special Region of Yogyakarta

has also been included in the 5 provinces that contributed the most Covid patients in Indonesia. Therefore, a lot of mask waste is also found in this area.

3. Result and Discussion

Table 2. Number Mask Used in a Day

Number of masks used in day	Number of respondents	average one day
0	2	1 - 2
1	83	
2	49	
3	12	
4	4	
5	1	

Table 3. Respondent's Age

Respondent's Age	Number Of Respondent	Average
17	2	18 - 20
18	24	
19	74	
20	26	
21	12	
22	7	
23	4	
24	2	

Table 4. Mask Waste Hazard Scale

Mask Waste Hazard Scale	Number Of Respondent	Average Mask Waste Hazard Scale
1	0	4
2	2	
3	20	
4	52	
5	77	

1: Not Dangerous, 2: Little Dangerous, 3: Quite Dangerous, 4: Dangerous, 5: Very Dangerous

3.1. Awareness of Young People Based on The Results of The Questionnaire

Respondents are dominated by the age group of 18-20 years, most of whom already know what B3 waste is. In line with his statement, when presented with types of B3 waste such as batteries, used masks, and detergent, 65 percent answered all correctly and 30 percent answered only mask waste, and the rest answered batteries and detergent. Around 95 percent of respondents also gave points 4-5 when asked about how dangerous medical waste is for the environment. This shows that young people are aware of the dangers of medical mask waste for the environment and their health. Unfortunately, this awareness is not matched by their awareness to process the waste of medical masks that have been used.

Public awareness of B3 waste only knows about the dangers it will cause. People are still not aware of the waste or waste that is included in hazardous waste. Respondents

know that waste is hazardous such as batteries and detergents. Respondents also mostly know that medical mask waste is included in infectious waste. Medical masks are included in infectious waste because medical masks are used to protect harmful particles or substances in the air, so that medical masks have been contaminated by hazardous substances.

3.2. The Reason Why Choose Medical Mask and Easy Management for Disposable Masks

This was shown in 146 respondents who claimed to immediately dispose of their waste without any special treatment on the masks used. Based on the statement, when disposing of their mask waste, they still mix it with other types of waste and only 10 percent of them have separated the waste. The average number of medical masks used by young people in this age group ranges from 1-2 pieces per day. They also stated that they often alternated with more reusable cloth masks. Although most of the respondents mixed their medical mask waste with other waste, most of them also understood what to do before throwing it away, such as tearing/damaging it first, cutting the rope, and spraying disinfectant. When asked about the availability of B3 TPS in their environment, 98% of respondents answered no, only 2 out of 151 respondents found B3 waste TPS in the vicinity, namely at the Kampung Jawa TPS and in one of the hotels in the Semarang area.

Covid-19 is a disease caused by a virus that attacks the respiratory tract (Nasution et al., 2021). The beginning of the corona virus case came from the Huanan animal market in Wuhan which sold various types of exotic animal meat such as bats, snakes, and various kinds of rats. Viruses originating from these animals are believed to carry the corona virus that eventually infects humans. Corona virus itself can spread in several ways. The first way is contact with surfaces that have been contaminated by the virus, then physical contact with sufferers or carriers of the corona virus. And the most important thing is transmission through droplets or water that comes from the respiratory tract. So that masks are one of the main protections in preventing the spread of the corona virus.

In the era of the Covid-19 pandemic, wearing a mask is one of the health protocols that must be obeyed to prevent the spread of the Covid-19 virus. Based on the results of the study, medical masks are the superior choice of masks. Most of the respondents used medical masks instead of cloth masks. The main function of the mask is to block liquid (droplets) or airborne particles from leaving the wearer. Masks also help prevent other people's droplets from sticking to the face and finding their way into the body. Medical masks are guaranteed with a maintained air system, besides that they have a waterproof outer material and an inner material that can absorb liquids. Therefore, it will be more effective in warding off harmful particles or germs. Medical masks are able to withstand droplets of about 80-90 percent and can only be used once within 4 hours of use. Medical masks that have been used will become waste and

enter the type of B3 waste. Based on research data, from 151 respondents with an age range of 17-24 years, there are 51 respondents who do not know that medical masks are included in B3 waste. Hazardous and toxic material waste or B3 waste is a substance, energy, or other component which due to its nature, concentration and quantity either directly or indirectly can pollute and damage the environment, endangering the environment, health, and survival. B3 waste includes medical masks, used batteries, laundry detergent, insecticide, hairspray, etc. Mask waste is infectious waste just like handkerchiefs, gloves, cloth, tissue, and other APD (Alat Pelindung Diri).

Medical mask waste must be managed properly because it has the potential to be infectious which can transmit disease to other people so that it will cause new problems. Medical mask waste management can be carried out in several stages which include:

1. First, used masks are collected into one container. People still dispose of all types of waste without prior sorting (Putra et al., 2019).
2. Second, do disinfection by soaking the mask in a disinfectant solution, it can also use chlorine or bleach in order to kill germs, bacteria, or viruses attached to the mask.
3. Third, change the shape of the mask or damage the mask. Masks can be cut in half or damaged on the rope so that they cannot be used and reused by irresponsible people.
4. Next, the fourth stage, namely a collection of masks that are tightly wrapped in plastic and disposed of in the domestic trash or can also be disposed of in a special box for masks in public places. The plastic is labeled to facilitate further handling. Packaging must be done correctly. Make sure that the bag is tightly closed, it can also be tied with a goose neck model (Axmalia and Sinanto, 2021).

The disposal site must also be separated from other types of waste. However, based on research data, most respondents (88.74%) did not separate mask waste from other types of waste. This is dangerous because it is not known what viruses and bacteria are attached to it and can endanger human health. In addition, in this pandemic season, more land should be used for the purpose of disposing of masks to make it easier for the community to manage mask waste independently. The last step is to wash your hands with soap and running water to prevent transmission of the virus from the mask. The stages in the management of mask waste are still unknown to the general public, especially teenagers.

Research data shows that 55.62% of respondents do not know the correct stages of mask waste management, while 44.38% of respondents know the management of mask waste, such as disinfecting, cutting the middle of the mask, damaging the rope, and separating mask waste from other waste. However, B3 waste disposal sites, including mask waste, are still very minimal in the vicinity of the settlement, as evidenced by only 8 of 151 respondents

(5.29%) whose surroundings are B3 waste disposal sites. This has become a new problem related to the lack of availability of medical waste destruction facilities which are not proportional to the increasing significance of medical waste during a pandemic (Kojima et al., 2020). Therefore, It can be expected that there will be counseling or socialization of knowledge about B3 waste management, especially mask waste in the general public, especially teenagers and the government can provide a B3 waste disposal site. With proper waste management of disposable masks, it is hoped that an environment that is always safe, clean, and protected from various viruses will be created.

3.3. The Dangers of Medical Masks

The use of masks during the Covid-19 pandemic era is mandatory for people who will carry out outdoor activities. Before the Covid-19 pandemic era, masks had become one of the equipment in driving. When driving, the masks used are mostly cloth masks. This is because when driving, cloth masks can reduce harmful particles that can be inhaled. Cloth masks have a longer lifespan than medical masks. The masks used are an effort made to prevent the spread of some viruses or pathogens through close contact, the environment or objects contaminated with viruses, respiratory droplets, and airborne particles.

Users of medical masks are increasing during the Covid-19 pandemic era. At the beginning of the pandemic era, medical masks became scarce to buy and the price skyrocketed. The increase in the use of medical masks causes the waste of medical masks to increase. Medical mask waste is infectious waste, where mask waste should be treated before being disposed of (Maimunawaro, 2021). Guidelines for the disposal of mask waste have been issued by the Ministry of Health of the Republic of Indonesia but this is not carried out by the community on a household scale. When infectious waste is not managed properly it will cause various problems that will arise. Problems that will arise when infectious waste or hazardous waste is not managed properly will first cause disease transmission to the nearest community (Saghita et al., 2017).

Medical masks that are used to reduce the potential for exposure to viruses will become virus spreaders if they are not managed before being disposed of. Infectious waste that is disposed of at random will increase the transmission of Covid-19 without realizing it (Listiningrum et al., 2021). In addition to increasing the transmission of covid-19, infectious waste will cause environmental pollution and damage the environment (Ameridya et al., 2021). That is because the basic material used in the manufacture is a type of polypropylene plastic which makes mask waste unable to decompose in the short term.

3.4. Steps to be Taken to Raise Awareness

Table 5. Type and Treatment of Masks

Type Of Mask	Respondents
Medical Mask	130
Cloth Mask	21
Treatment	Respondents
Thrown Away	147
Processed	4

Based on the data that has been obtained from 151 respondents, there are 130 medical mask users and 21 cloth mask users (Table 5). Of the 151 respondents who know that medical masks must be processed, 67 respondents and those who do not know there are 84 respondents. There were only 4 respondents who managed the mask waste and the other 147 were just thrown away (Table 5). From this, it can be seen that many respondents are aware of the management of mask waste before disposal but do not understand what mask waste management can do. Infectious waste management begins with selecting medical mask waste and disposing of it in a special place for infectious waste. If no infectious waste disposal is found, it must go through a processing process before being disposed of in the domestic waste bin.

Table 6. Waste Disposal Sites

Availability Of Hazardous Waste Disposal Sites	Number Of Respondent
Yes	143
No	8

To increase public awareness about infectious waste disposal, it is necessary to increase public understanding regarding the use of masks and mask waste management. As found in the data, most respondents use medical masks and use at least one mask in one day. The masks that have been used by many respondents are only immediately disposed of without going through the management stage so that mask waste will continue to increase. Medical mask waste that continues to increase is not matched by special disposal sites for infectious waste. When infectious waste bins are not available in large quantities, people will dispose of infectious waste mixed with ordinary waste.

The role of government is also needed to increase public awareness of the management of medical mask waste. The government can also provide education on the management of medical mask waste through advertisements on television, social media, or other media. Now, the use of social media has a very high intensity. Different ages have their own social media accounts. Therefore, the use of social media to disseminate information about waste management is the most appropriate and effective way. The amount of information obtained in it will raise public awareness to start processing their medical mask waste.

There have been many things that display information on the management of medical mask waste. However, the implementation by the community to treat medical mask

waste is still lacking. Maybe the government can facilitate it by providing facilities and infrastructure that support the management of mask waste, such as providing disinfectant liquid to help manage mask waste and providing special containers for collecting mask waste. The provision of these facilities can increase the enthusiasm of the community to treat medical mask waste. The government can also hold a medical mask waste management program. The community will be invited to directly participate in managing medical mask waste so that the knowledge they gain will be more easily absorbed in this activity program. Giving prizes to the best participants will increase the enthusiasm of the community to make this event a success.

4. Conclusion

Young people in Central Java and the Special Region of Yogyakarta prefer to use medical masks instead of fabric masks. Medical masks are guaranteed with a maintained air system. In addition, it has a waterproof material on the outside and on the inside that can absorb liquids. They think that medical masks are more effective at warding off harmful particles or germs. In the discussion, it was stated that most of the youth in Central Java and the Special Region of Yogyakarta already understood the dangers of mask waste. Mask waste is included in the type of B3 waste because it can transmit, so that mask waste requires special measures before being disposed of.

From the results of the questionnaire, 100 respondents already knew that medical masks were included in B3 waste. Although the respondents already know the dangers of mask waste, there are still very few respondents who separate masks from other waste. Of the 151 respondents, 88.74% did not separate mask waste from other waste. As many as 44.38% of respondents already understand how to process masks such as disinfecting, cutting the middle of the mask, damaging the rope, and separating masks from other waste. Although many respondents already know how to process mask waste, out of 151 people only 4 respondents have used mask waste. From this, it shows that awareness in the management of masks in the provinces of Central Java and Yogyakarta is still very low.

To raise awareness, it is necessary to increase the understanding of mask waste management. In addition, it can be done with community service programs and socialization of mask waste management. The first stage in good mask management is to collect mask waste in 1 container. The second stage is soaking the mask in a disinfectant solution, you can also use chlorine or bleach in order to kill germs, bacteria, or viruses attached to the mask. Third, change the shape of the mask or damage the mask by cutting it out. The fourth stage is to collect masks that are tightly wrapped in plastic and disposed of in the domestic trash or can also be disposed of in a special box for masks in public places. Based on the results of the study, it was also concluded that the existence of B3 waste disposal sites around residential areas was still very small.

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