

EDUCATION WEBINAR INCREASES THE KNOWLEDGE OF THE MASK WASTE MANAGEMENT DURING COVID-19 PANDEMIC

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ABSTRACT

Covid-19 caused many countries to implement new policies to combat its transmission. Among these new policies is the mandatory use of face masks in public spaces, which increased their production, consumption, and mask waste in the environment. Insufficient knowledge and awareness about the proper disposal of used masks, especially medical masks, might lead to environmental pollution due to microplastic particles and widespread contamination of Covid-19, which will affect sanitation and clean water supplies. Thus, providing education regarding proper and responsible masks use and disposal is essential to maintain good health for all and reduce potential environmental hazards amidst the Covid-19 pandemic. To understand the effect of providing education on knowledge regarding the use and management of medical masks, "EMISSION: Reducing Mask Waste in the Midst of Covid-19 Pandemic" webinar was conducted. This study used the One Group Pretest-post-test Design research method. The sample was selected by purposive sampling technique. The variable studied was the increase in knowledge as measured by pretest and post-test questionnaires. The obtained data were tested by using Paired Samples T-Test. There was a significant effect between knowledge scores related to medical masks before (pretest) and after the (post-test) webinar with a difference in the average value of 0.59 and p-value = 0.000. Education through "EMISSION: Reducing Mask Waste in the Midst of Covid-19 Pandemic" webinar increased public knowledge regarding medical masks to help ensure good health and well-being.

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INTRODUCTION

Coronavirus Disease 2019 or Covid-19 is a disease caused by the new variant of coronavirus, SARS-CoV-2, which was found for the first time in Wuhan, China on 31 December 2019 (WHO, 2020). Covid-19 was then transmitted to people from across the globe; thus, the World Health Organization (WHO) declared Covid-19 as a global

pandemic on 11 March 2020 (WHO, 2020). Up until 26 July 2021, more than 194 million Covid-19 cases were found worldwide (WHO, 2021) with 2.983.380 of those cases found in Indonesia (WHO, 2021). This condition pushed world leaders to implement new policies to stop the transmission of Covid-19. Through the Decree of the Ministry of Health of the Republic of Indonesia

Number HK.01.07/MENKES/382/ 2020, the Indonesian government issued a regulation about health protocols. One of those regulations was the use of face masks as personal protective equipment (PPE).

This new regulation caused an increase in face mask production and consumption which affects many sectors, including the environmental sector. The Indonesian Ministry of Environment and Forestry (*Kementerian Lingkungan Hidup dan Kehutanan*, KLHK) reported an increase in medical waste by 30% during the Covid-19 pandemic (KLHK, 2020). Similar data were also reported by the Indonesian Institute of Science (*Lembaga Ilmu Pengetahuan Indonesia*, LIPI) which found an increase in the number and variety of PPE waste in Jakarta Bay in April 2020 (Cordova et al., 2020). PPE contributes about 16% of all wastes found in Muara Cilincing and Muara Marunda, most of which are face masks which contribute 9.83% of all PPE wastes (Cordova et al., 2020).

These findings reflect how people still throw away medical wastes without proper precaution. This habit could potentially cause environmental pollution as most PPEs are made of plastic (Agaraw, 2020). It is believed that masks, as one of the microplastic pollution sources, have a huge impact on marine lives as they can be easily consumed by animals of the higher food chain, such as fishes (Agaraw, 2020). Face masks can also potentially affect human health. Previous research by Prata et al. (2020) reported that inadequate PPE waste management might cause wide environmental contamination due to the ability of SARS-CoV-2 to stay alive in plastic for up to 3 days. In Indonesia, the management of toxic and hazardous materials is regulated by the Decree of the Ministry of Health of the Republic of Indonesia Number

SE.2/MENLHK/PSLB3/PLB.3/3/2020 and the Decree of the Ministry of Environment and Forestry of the Republic of Indonesia Number S.167/MENLHK/PSLB3/PLB.3/3/2020.

This habit shows that more extensive education regarding medical wastes including face masks is needed. Education about the management of medical masks waste is aligned with the Sustainable Development Goals (SDGs) especially number 12 to reduce the effect of toxic and hazardous waste on human and environmental health as well as to promote prevention activities, such as reducing its sources, reusing reusable products, and recycling the wastes. Moreover, giving such education amidst the pandemic can also help create a healthy environment, as well as minimize disease transmission by reducing the risk of contamination. That purpose is aligned with the 3rd SDGs, especially SDGs number 3.3 and 3.9. This study was conducted to find out the effect of education on the knowledge and awareness of the participants of the "EMISSION: Reducing Mask Waste in the Midst of Covid-19 Pandemic" webinar held in 2021 regarding the effect of the Covid-19 pandemic on health and environmental sectors.

MATERIALS AND METHODS

This research used primary data collected by the writers. The study design used in this research was the One Group Pretest-Post test Design. This research was conducted by giving a pretest before giving an intervention on the samples and a post-test after the intervention.

The samples of this research were 829 participants of the "EMISSION: Reducing Medical Mask Waste in the Midst of Covid-19" webinar conducted in 2021 who fulfilled

the inclusion and exclusion criteria. The inclusion criteria were participants filling in both pretest and post-test, participants filling all the questions without exception. Whereas the exclusion criteria were that participants only fill out pretests or post-tests and did not answer all the questions completely. The sampling technique of this research was purposive sampling (Sugiyono, 2016). The data of this research were collected by giving a pretest questionnaire which had to be filled out by each of the participants before the webinar. Then, the participants were given two lectures about the use and the management of medical masks and how to process medical mask waste into something

else. Time allocation for each topic was 30 minutes of presentation and an interactive session for 10 minutes after each topic. At the end of the webinar, the participants were given a post-test questionnaire.

The data were then analyzed using Paired Samples T-Test method to determine the difference in the participants' knowledge regarding medical mask waste before and after the webinar.

RESULTS

The following are the questions asked on both pre and post-test questionnaires (Table 1).

Table 1. Pre and Post-Test Questionnaire

No	Questions	Answers
SECTION 1: IDENTITY SECTION		
Instruction: Please make sure you fill in your identity correctly, as it will be used on your certificate of participation.		
1.	Email address	
2.	Full name	
3.	Home institution (non-student participants can answer this question by filling in with "-")	
4.	Phone number	
SECTION 2: SURVEY SECTION		
Instruction: Answer the following questions by choosing one of the answer choices you think is the most correct.		
1.	Coronavirus can be seen by using...	<ul style="list-style-type: none"> a. Glasses b. Microscope c. Bare eyes d. Magnifying glass
2.	The following are the correct ways to use medical masks, except by...	<ul style="list-style-type: none"> a. Making sure it covers the nose and the mouth b. When taking off the mask, make sure not to touch the outer surface c. Hanging it around the neck d. Spraying used medical masks with disinfectant
3.	The following are the correct ways to dispose of used medical masks, except...	<ul style="list-style-type: none"> a. Disposing of used medical masks with household/non-medical wastes b. Washing the hands after disposing of used medical masks c. Disposing of used medical masks in a closed trash bin d. Disposing of used medical masks separately from household/non-medical wastes

4. The estimate of daily mask waste in Indonesia is...
 - a. 122 million masks/day
 - b. 12 million masks/day
 - c. 221 million masks/day
 - d. 22 million masks/day

5. The criterion of disposable masks that can be recycled is...
 - a. Washable masks
 - b. Not from health facilities, isolation places, or people who are doing self-isolation
 - c. Bought at a higher price
 - d. Made from special materials

6. Disposable masks can be recycled because...
 - a. Disposable masks are made of cloth that can easily be shaped
 - b. Disposable masks are made of plastic that can be decomposed
 - c. Disposable masks are made of plastic that has a certain melting point
 - d. Disposable masks are made of fiber

Table 2. Distribution of the Research Subjects' Gender

Gender	Frequency	%
Female	707	85.28
Male	122	14.72
Total	829	100

Table 2 showed that there are a total of 829 respondents. Among those respondents, 707 (85.28%) were female, while 122 (14.72%) were male.

Table 3. Mean and Probability (p) of the Overall Pretest and post-test Score Based on Paired Samples T-Test

Variable	Frequency	Mean		p-Value
		Pretest	post-test	
Overall Score	829	3.46	4.05	0.000

In table 3, the average overall score of the pretest questionnaire of the 829 respondents is 3.46. At the same time, the average overall score of the post-test questionnaire was 4.05 with a p-value of 0.000 ($p < 0.05$).

Table 4. Mean and Probability (p) of Each Question of the Pretest and post-test Questionnaires Based On Paired Samples T-Test

Variable	Mean		p-Value
	Pretest	post-test	
Question No. 1	0.95	0.96	0.275
Question No. 2	0.84	0.89	0.007
Question No. 3	0.83	0.90	0.000
Question No. 4	0.34	0.55	0.000
Question No. 5	0.36	0.43	0.000
Question No. 6	0.13	0.32	0.000

In the analysis of each question in Table 4, it is found that on the first question, the average pretest score is 0.95, and the average post-test score is 0.96 with a p-value of 0.275 ($p > 0.275$). On the second question, the average pretest score was 0.84, and the average post-test score was 0.89 with a p-value of 0.007 ($p < 0.05$). The average pretest score for the third question was 0.83, while the average post-test score was 0.90, and the p-value was 0.000 ($p < 0.05$). As for the fourth question, the average pretest score was 0.34, and the average post-test score was 0.55 with a p-value of 0.000 ($p < 0.05$). On the fifth

question, the average pretest score was 0.36, and the average post-test score was 0.43 with a p-value of 0.000 ($p < 0.05$). While on the sixth question, the average pretest score was 0.13, and the average post-test score was 0.32 with a p-value of 0.000 ($p < 0.05$).

DISCUSSION

Of the total of participants, 707 (85.28%) were females, and 122 (14.27%) were males. The participants' occupations were high school students, college students, workers, and housewives.

The average score for the pretest was 3.46 and 4.05 for the post-test. Based on Table 3, it was known that the minimum score for both the pretest and post-test is 1, and the maximum score is 6. There was a 0.59 increase in the average score of the pretest compared to that of the post-test. This shows an increase in the participants' knowledge regarding face masks after participating in the webinar.

The level of knowledge of each respondent was analyzed specifically for each question on both the pretest and post-test questionnaires. Based on table 4, there was an increase in the average score of each question on both questionnaires. On question no. 1 about the device used to see the coronavirus, the average pretest score was 0.96, while the average post-test score was 0.96. Most of the respondents answered correctly, and there was no significant increase in the average post-test score compared to the pretest. This result means that most participants were already aware that the coronavirus could be seen through a microscope. Good knowledge of the society about Covid-19 was also reported in a study by Prihati *et al.* (2020) in Kelurahan Baru, Kotawaringin Barat, Indonesia. Prihati *et al.* (2020) found that

100% of the respondents had good Covid-19 knowledge. Another study conducted in Pekalongan also reported that 72% of the respondents had good knowledge regarding Covid-19 (Nidaa, 2020). A Malaysian study by Hamzah *et al.* (2020) also reported that 80.5% of the respondents had adequate knowledge regarding Covid-19.

The second question regarding the incorrect ways to dispose medical masks was answered correctly by most of the respondents. This statement was supported by the fact that there was an increase in the average score from 0.84 on the pretest to 0.89 on the post-test after the participants received lectures regarding the topic, which indicated the participants' knowledge regarding medical mask waste disposal had increased after the webinar. An analytical study about medical and household waste management during the Covid-19 pandemic in Surabaya by Juwono (2021) also showed similar findings. This study showed that the citizens of Surabaya had a high level of knowledge (57.73%) regarding this topic. However, the application of the said knowledge on waste management was still low.

The average pretest score for the third question regarding the incorrect usage of medical masks was 0.83, while the average post-test score was 0.90. Before the webinar, most of the respondents already knew the correct usage of medical masks and after the webinar, almost all respondents answered correctly on this question. A previous study done by Sikakulya (2021) in Western Uganda showed that 60.1% of the respondents had sufficient knowledge regarding the use of face masks to restrict Covid-19 transmission. Another study by Duong *et al.* (2021) conducted in Vietnam, showed that 89.7% of the respondents, who were college students,

had good knowledge regarding face masks. In Indonesia, a similar study has been conducted with students of Universitas Advent Indonesia as the respondents. This study reported that 71.8% of the respondents were among those with a high level of knowledge regarding this topic (Tarigan dan Elon, 2021).

The fourth question aimed to gauge the respondents' knowledge about the daily estimated number of masks waste in Indonesia. Most of the respondents answered incorrectly on the pretest on this question, as shown by the average pretest score of 0.34. However, after receiving the information from the webinar, the respondents had become aware that, in Indonesia, it was estimated that there were 122 million mask wastes daily. This increase in knowledge and awareness was shown by the significant increase in the average post-test score to 0.55. A study by Kusumaningtiar *et al.* (2021) reported that 97% of the respondents were aware that face masks were categorized as infectious medical waste, which indicated that most people had good awareness regarding masks wastes. However, not many were aware of how many masks wastes were produced each day.

The fifth question was aimed to know the respondents' knowledge about which type of disposable face masks can be recycled. On this question, the respondents' answers were variable. However, most respondents answered incorrectly, as shown by the average pretest score of 0.36. The average post-test score increased to 0.43 after the respondents received information on this topic on the webinar. It can be assumed that there was an increase in the respondents' knowledge on this topic, although insignificant, and that half of the respondents still answered incorrectly.

On the sixth question, which aimed to know the respondents' knowledge of why disposable masks could be recycled, the majority of respondents answered incorrectly, as indicated by the average pretest score of 0.13. After receiving the information that disposable masks could be recycled as they were made of plastic with a specific melting point, there was an increase in the average post-test score to 0.32, but it was insignificant. To increase the knowledge of the society on masks waste management, the citizens need to be actively involved and educated in collecting disposable masks wastes safely, disinfecting and destroying the disposable masks waste by tearing at it or ripping the loop, and disposing of the waste on the specific bin with a closed top and labeled as infectious waste (Kementerian Kesehatan Republik Indonesia, 2021) (IGES, 2020).

Paired Samples T-Test analysis was conducted to understand the effect of education in increasing the participants' knowledge regarding face masks before and after the webinar based on the average overall score. Based on this analysis, it was found that the *p*-value for the overall score was 0.000. Similar findings could be found on almost all questions, except question no. 1, which had a *p*-value >0.05. This result showed a significant increase in the respondents' knowledge of face masks after participating in the webinar.

A prior study by Diyanah and Damayanti (2021) also showed similar findings that there was an increase in the community members' knowledge after participating in a webinar, with a higher average post-test score of 87.50 compared to the average pretest score of 78.33. The increase in knowledge occurred due to the transfer of information through

webinars, enabling the participants to be more aware and had a better understanding of specific topics. Knowledge is a result of sensing processes done by individuals regarding particular objects, which can occur through sight, hearing, smell, taste, and touch (Nurmala *et al.*, 2018).

Based on the result of this study, it can also be assumed that education through webinars effectively increases the knowledge of society regarding specific topics. A previous study by Ernyasih *et al.* (2020) also suggested the same finding by reporting an increase of 85% on the average post-test score after the webinar compared to the pretest.

CONCLUSION

This study concludes that education through the "EMISSION: Reducing Mask Waste in the Midst of Covid-19 Pandemic" webinar increased the respondents' knowledge regarding medical masks as an effort to create a healthier life and environment during the Covid-19 pandemic.

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