THE INFLUENCE OF AGE ON BEHAVIOR AND KNOWLEDGE OF MEDICAL MASKS WASTE MANAGEMENT DURING THE COVID-19 PANDEMIC

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ABSTRACT

The use of masks as self-protection from Covid-19 can cause new problems by increasing the amount of waste. Medical masks are infectious waste containing microplastics that are difficult to decompose. People's behavior and level of knowledge may have a role in the management of medical mask waste. Therefore, this research aimed to find out the comparison of the age group <17 years and 18-25 years regarding the knowledge about the impact of medical masks on the environment as an indication of public concern for environmental preservation. The research was an analytic observational study. The sample was selected using total sampling according to age group. The variables studied were the management of medical masks and respondents' knowledge of the impact of medical masks on the environment as measured from questionnaire data. The data obtained were tested using the independent sample t-test and the Chi-Square test. The results obtained a p-value=0.259 related to the management of medical masks and p-value=0.172 related to knowledge of the impact of medical mask waste. There was no relationship between the age group <17 years and 18-25 years related to the management of medical masks and knowledge of the impact of mask waste on the environment.

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INTRODUCTION

Coronavirus disease-2019 (Covid-19) is an infectious disease caused by a new variant of the coronavirus[1]. On December 31st, 2019, the Health Service of Wuhan Province, China reported a cluster of pneumonia cases suspected to be the beginning of Covid-19[2]. In Indonesia, the first case of Covid-19 was discovered on March 2nd, 2020.[2] According to the situation report by WHO, as of June 6th, 2021, there has been a decrease in the number of cases by 15% and a decrease in the number of deaths by 8% worldwide. On June 6th, 2021, there were 1,049,694 new cases in Southeast Asia with cumulative death of 425,123 people[1]. Meanwhile, according to the *Satuan Tugas Penanganan Covid-19*[3], as of June 11th, 2021, in Indonesia there were a total of 1,894,025 positive Covid-19 cases with 1,735,144 patients recovered and 52,566 people died. This was certainly one of the results of the implementation of health protocols and the implementation of Covid-19 vaccination as an effort to break the transmission chain of Covid-19.

Through the Decree of the Minister of Health of the Republic of Indonesia Number 382 of 2020, the Government of the Republic of Indonesia establishes rules related to health protocols, one of which is related to the use of personal protective equipment in the form of masks[4]. The increased use of masks due to the Covid-19 pandemic has led to an increase in the amount of mask waste in the environment. According to LIPI on 2021 data, in March-April 2020 in Muara Cilincing, there was an increase in the amount of medical waste by 1.51% and 1.36% in Muara Marunda[5]. The increase in the amount of waste can cause environmental problems that could have a possible impact on sanitary workers, health workers, and stray animals. The waste can endanger the environment and society around if it is not handled properly[6]. In animals, findings were found in the form of ingestion, entanglement, and animal stucked by mask waste in the environment[7]. Mask wastes are containing microplastic when decomposed and can affect marine life, ranging from plankton, fish, sea birds, and whales[8]. If marine fish that ingest microplastics are consumed by humans, then microplastics can affect human health[9].

The behavior and level of society knowledge on the management and impact of medical masks may have an effect on the increase in the amount of medical waste. It was found on a study in Indonesia that age is associated with Covid-19 knowledge and significantly affects a person's behaviour toward pandemic. People with younger age tends to have possibility to ignore the practical knowledge[10]. This study was structured to determine the comparison of behavior and society in the age group <17 years & 18-25 years regarding on the impact of medical masks. This research was similar to the Sustainable Development Goals (SDGs) point 12, which is to reduce the impact of hazardous waste on human health and the environment. In addition, the use and good management of mask waste can also create a healthy life by reducing the spread of infectious diseases that results from environmental contamination. This is in accordance with SDGs point 3, health and environment[11].

MATERIALS AND METHODS

The source of data in this study was primary data from research conducted directly by the authors. This type of research was analytic observational. The sample used was the general public of non-health faculties that have met the criteria as a sample of 158 people. The sampling technique used was random and total sampling. Meanwhile, the data collection technique in this study was to provide a questionnaire survey of the use of medical masks among non-medical faculties. The questionnaire contains questions regarding the use, management, and knowledge of medical masks.

In this study, the Independent sample t-test and Chi-Square test were used. The t-test Independent sample method to find out or compare two unpaired samples. In this study, the Independent sample t-test was used to determine the effect of age and management on medical mask waste. The Chi-Square test is a statistical test used to show the relationship or influence of two variables. In this study, the aim was to compare the level of knowledge with age.

RESULTS

Based on Table 1, we obtained 158 data with an equal distribution in age <17

years and 79 data in the age 18-25 years. At the age of <17 years, there were 5 (3.2%) male respondents and 74 (46.8%) female respondents. Meanwhile, in the 18-25 years old age group, 15 (9.5%) respondents were male, and 64 (40.5%) were female.

Table 1. Characteristic of Subject Research Based on Age and Gender

Age group	Gender	Frequency	%
<17 years old	Male	5	3.2
	Female	74	46.8
18-25 years old	Male	15	9.5
	Female	64	40.5
		158	100

Table 2. Characteristics of Research Subjects Based on Age and Management of Medical Masks Waste

No.	Treatment on Medical Mask	Age group				*P*-value
		<17 years old		18-25 years old		
		(n)	%	(n)	%	
1	Disinfected	1	1.3	0	0	0.259
2	Tear the mask	52	65.8	60	75.9	
3	Cut the mask's rope	10	12.7	6	7.6	
4	Directly throw it away	14	17.7	13	16.5	
5	Others	2	2.5	0	0	

To determine the effect of age on behavior, the independent sample t-test was conducted. Based on the analysis using the Independent sample t-test, the results obtained p-value = 0.259 (p>0.05), so could be concluded that there was no relationship between the age group and the behavior or management of medical masks.

Medical waste management can spread viruses and microplastic fibers on masks that may be released into the environment[12]. Disinfecting medical masks with chemicals (including ethanol, hydrogen peroxide, and peracetic acid), radiation, or temperature may reduce >3logs of SARS-CoV-2 virus[13]. The management of infectious medical waste, including medical masks, is segregation, disinfection, devastation, collection, then manual solid waste (MSW), which is then transported and disposed. However, only 56.46 Indonesian people did medical mask waste sorting and 71.29% of the people have not managed infectious waste because they do not know on any guidelines for it[14].

The results of this study were in line with research conducted by Sari et al. (2020). that there was no relationship between age and a person's behavior in preventing Covid-19, which was also included in the management of medical masks. This means that the age group of <17 years & 18-25 years should also obtain and process information to learn and adjust mentally in a new situation, the Covid-19 pandemic, so that they are able to carry out the preventive behaviors, one of which is the proper management of medical masks waste. Medical mask waste was included in the category of domestic waste which needs to be handled after using, in the form of collecting medical mask waste, disinfecting it, changing its shape, and throwing it into domestic waste[15].

Table 3. Knowledge of the Impact of Medical Mask Waste by Age

N.	Knowledge of the Impact of Medical Mask Waste	Answers		P Value
		Yes	No	
1	<17 years	59 (37.3%)	29 (12.7)	0.171
2	18-25 years	66 (41.8%)	23 (8.2%)	

In Table 3, the distribution of knowledge of the impact of medical masks waste is obtained by age. To find out the effect or differences related to the level of knowledge, the Chi-Square test was carried out. Based on the analysis using the Chi-

Square test, the results obtained p-value = 0.171 (p>0.05). It can be concluded that there was no relationship between the age group and knowledge of the impact of medical masks waste on the environment.

DISCUSSION

This result was in line with a research that was conducted in the Tourism Village in Malang, Indonesia. It stated that age is not related to a person's concern for the environment[16]. However, there are also several theories and studies that contradict this research's results. Based on a book by Budiman and Riyanto[17]. which states that as ones get older, ones' mindset and capture power will also develop so that the knowledge gained will also increase. This research was also not in accordance with the research conducted by Wang, Hao, and Liu[18], which explains that older individuals are more likely to do activities that can protect the environment.

Table 3. Characteristics of Research Subjects Based on Age and Knowledge of the Impact of Medical Mask Waste

N	Impact of medical mask answers	Age group			
		<17 years old		18-25 years old	
		(n)	%	(n)	%
1	Environmental pollution	39	38	31	37
2	Increased waste volume	42	40	40	48
3	Contaminating/damaging ecosystem	23	22	12	14

This difference may occur because of the significant difference in the number of samples. Knowledge related to the environment, especially in students aged <17 years can be influenced by the level of education of parents as advisers about environmental care. In addition, sources of information from teachers, the internet, TV, and advice are very important in providing additions and understanding of students about the environment[19]. In addition, there are other supporting factors such as familiarity with the use of technology that allows all age groups to easily get or access information about the impact of medical mask waste on the environment through social media.

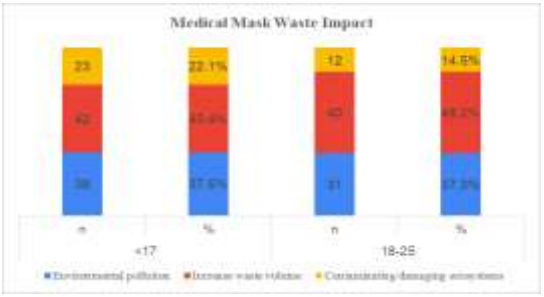

Figure 1. Impact Diagram of Medical Mask Waste by Age According to Respondents

Based on Table 4, the result of respondent's knowledge of the impact of medical mask waste in both age groups are about the same. In both <17 years old and 18-25 years old age groups, the most significant impact for respondents was an increase in the amount of waste, namely 42 responses (40.4%) and 40 responses (48.2%), respectively. Meanwhile, the impact of contamination or ecosystem damage was answered with the least 23 responses (22.1%) in the <17 years old age group and 12 responses (14.5%) in the 18-25 years old age group. The data are presented in a diagram (Figure 1). Based on this result, was found that the respondents did not have extensive knowledge about the impact of medical mask waste on the environment, especially the contamination/ ecosystem damage caused by medical mask waste. About 70% college students in Italy were positively towards pro-environmental behavior and health literacy is one of the some factors that positively related to this behavior[19]. Thus, in order to increase the impacts of medical mask waste knowledge,

people are needed to do the health literacy and health risk perception of health-related impacts first. Previous research conducted by Sangkham[20], states that medical mask is an infectious waste because it may contain various pathogens by previous users without going through a management process. Medical mask waste also has an impact on the environment in various forms including increasing waste which contains plastic that is difficult to decompose, pollution or environmental pollution after use or even during the production and transportation of masks itself which can lead to climate change, mask waste contaminates or destroying ecosystems through piles that endanger ecosystems, especially fauna which can indirectly cause starvation and death of fauna[21]. Although it is still too early to measure the impact of Covid-19 on the environment, it requires a special attention to raise awareness and public concerns in future environmental preservations[22].

CONCLUSION

Different age groups, <17 years and 18-25 years, do not affect and is not related to the management and knowledge of the community towards medical masks waste and their impact on the environment.

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CONFLICT OF INTEREST

All Authors have no conflict of interest

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AUTHOR CONTRIBUTION

All authors have contributed to all process in this research, including preparation, data gathering and analysis, drafting and approval for publication of this manuscript.

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