



THE ASSOCIATION BETWEEN FACE MASK USE AND HEADACHE: A CHALLENGE IN THE NEW NORMAL ERA

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ABSTRACT

Background: Indonesia has entered a new normal in the Covid-19 era and implemented strict health protocols. The air transportation has been allowed to continue their services by following the health protocols, such as the mandatory use of face masks. Unfortunately, face masks now deal with several negative health issues, e.g., headache. **Objective:** To observe the association between face mask use and headache among airport officers and the average degree of the headache experience. **Methods:** The study was conducted at the Sultan Mahmud Badaruddin II (SMB II) International Airport in Palembang. The data were collected by a questionnaire gathered from December 2020 to January 2021 and were processed using a quantitative approach with chi-square test to find correlations. **Results:** From 207 airport officers, the major characteristics were female (57.9%), indoor workplaces (78.3%), face masks use ≤ 4 (four) hours per day (58.9%), and no headaches while using face masks (70.1%). There was a significant relationship between headache and face masks used > 4 hours per day ($p < 0.001$; 95% CI = 6.201 {3.215-11.958}). The mean of headaches degree using the VAS score was 2.3 (scale 0 - 10). **Conclusion:** Headaches could result from wearing facemasks for more than 4 hours per day with a relatively mild degree of headaches. The present research suggests that face masks must not cause other health problems. Improvement in face masks is the key to facing the Covid-19 pandemic and as important as washing hands and physical distancing.

Keywords: Face mask; Headache; VAS Score

INTRODUCTION

In 2020, the world experienced a global health burden, known as the Coronavirus Disease 2019 (Covid-19) pandemic. The Covid-19 is a disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) in humans.¹ It is mainly transmitted through the respiratory system, specifically by droplets and aerosols.^{2,3} Like other countries, Indonesia is also affected by this pandemic. The death rate of Covid-19 in Indonesia reaches 2,1%.⁴ One prevention effort to protect the respiratory system and reduce the death rate is using a face mask. Many scholars report that the use of face masks can directly reduce the spread of Covid-19 infection.^{5,6,7}

Today, Indonesia has entered a new normal era, which means that people can return to their normal activities, yet with some adjustments to prevent the spread of SARS-CoV-2 infection. The critical part of this adaptation is to follow a strict health protocol when doing day-to-day activities. During this time, people must wear face masks, be physically distanced, wash their hands, and adopt a clean and healthy lifestyle.^{8,9} Transportation sectors are allowed to continue their services as long as they follow the health protocols.¹⁰ Air transportation, which is the most affected mode by this pandemic,

may reopen their services with some strict travel regulations, including the mandatory use of face masks for all travelers and airport officers.^{11,12}

Because of the high frequency of using face masks to prevent the spread of SARS-CoV-2 infection, face masks now deal with several negative issues.¹³ For example, people who use face masks encounter some discomfort. These discomforts create some health problems, such as itchy,¹⁴ breath difficulty, speech problems, and headaches.^{15,16} Among them, headache is deemed a major health problem.^{16,17} Headaches are uncomfortable or unpleasant feelings felt in the head or face that provoke pain.¹⁸ Headaches are also a symptom of Covid-19 infection.¹⁹ Headaches can be felt differently by each individual. However, the pain experienced by individuals can be measured by using a Visual Analog Scale (VAS) Score.¹⁸ The measurement is performed by the individual himself by pointing a dot in the scale value based on the pain intensity with simple writing tools.

The use of face masks by people who work in the transportation sector, especially airport officials, is mandatory to break the chain of SARS-CoV-2 transmission. Airports as entry points for people from inside and outside of the country are potential places of the infection spread.²⁰ Therefore,



airports should properly implement health protocols regulated by the government.^{11,12} Airport officers are also susceptible to this viral infection. Thus, wearing face masks while working in the airport area is an obligation to protect themselves and others.^{11,12} In hand with protecting themselves, airport officers must be aware to prevent any health problems that can arise from using face masks. Hence, we are interested in observing the association between face mask use and headache among airport officers. We specifically aim to assess the average degree of headache experienced by airport officers.

METHOD

We conducted an observational study at Sultan Mahmud Badaruddin II (SMB II) International Airport in Palembang. The population was all airport officers who worked at the SMB II International Airport. Using the unpaired categorical analytic method, we calculated that the minimum sample in this study was 198 people.²¹ The exclusion criteria of this study were officers who refused to be the sample and data that were not fully answered (incomplete data).

The data were collected through a questionnaire that was distributed via a google form. Before distributed, it should pass a validity test. The questionnaire was then shared, and the responses were collected from December 2020 to January 2021. In the questionnaire, participants filled out identity information and an informed consent sheet. The questionnaires consisted of several items: (1) Where do most of your work take place? (Indoors / Outdoors); (2) How long in 1 (one) day do you use a face mask? (≤ 4 (four) hours/ > 4 (four) hours); (3) Have you ever experienced headaches while using a face mask? (Yes/ No); (4) By using numbers, what is the scale of headache that you feel? (Scale 0 - 10).

Then, the data were processed using a quantitative approach with analytical methods. Two unpaired categorical variables were analyzed for significant correlations using chi-square test.²¹ The analysis tool was the SPSS Statistics 22.0 for Windows.

RESULTS

Of all populations in this context, 222 people filled out the questionnaire. However, 15 people were not willing to be selected as the sample. Thus, only 207 data can be processed, as shown in Table 1.

Table 1. Distribution of SMB II international airport officers

Variable	n	%
Gender	Female (120)	57.9
	Male (87)	42.1
Workplace	Outdoor (45)	21.7
	Indoor (162)	78.3
Length of face masks used per day	>4 hours (85)	41.1
	≤ 4 hours (122)	58.9
Headache experienced while using face masks	Yes (62)	29.9
	No (145)	70.1

As illustrated in Table 1, we could study the distribution of airport officers at SMB II Palembang. The major characteristics of airport officers were female (57.9%), indoor workplaces (78.3%), face masks use ≤ 4 (four) hours per day (58.9%), and no headache while using face masks (70.1%).

Table 2. Association analysis between headaches and the length of using masks per day

		Headache Experience				p-value	POR 95% CI
		Yes		No			
		n	%	n	%		
Length of face mask use per day	>4 hours	44	21.3	41	19.8	0.000	6.201 (3.215-11.958)
	≤ 4 hours	18	8.7	104	50.2		

The analysis was carried out to find the association between headaches and the length of using face masks per day, as shown in Table 2. When using face masks > 4 hours per day, there was a significant relationship with the incidence of headache ($p < 0.001$; 95% CI = 6,201 {3.215-11.958}). The mean VAS score was calculated in airport officers with headaches. Of 62 people, the mean VAS score was 2.3 (scale 0 - 10).

DISCUSSION

Face masks are mandatory during the Covid-19 pandemic. Wearing face masks is expected to prevent the spread of this virus to allow people to continue their daily lives. As one of the professions that are susceptible to the virus spread, airport officers have returned to their activity in this new normal era. However, they must use face masks properly while working. The present research observed that the length of face masks used by the



airport officers was mainly ≤ 4 hours per day. Most airport officers had no complaints of headaches while wearing face masks. However, if the data were analyzed statistically, it was found that there was a significant relationship between the use of face masks > 4 hours and headaches. Such a long duration indeed might have some disadvantages. Some studies reported the incidence of health problems among healthcare workers because of face masks used.^{13,15,17,22,23,24,25} In addition, there were minor health complaints, including itchy, skin breakdown, and acne.¹⁴ Some problems may even contribute to bigger issues, such as headache,^{15,16} hypercapnia,²⁶ and the alteration of cerebral hemodynamics.^{24,25} Among them, headaches become a problem that must be taken into account seriously. Headaches can lead to disruption in work because of discomfort feelings, impaired concentration, and decreased work performance.²⁷

Several mechanical factors contribute to the increase of headache pain levels. For instance, tight pressure from face masks can press superficial facial and cervical nerves.^{16,22} This pressure, along with tractional forces from face masks, may trigger the pain sensation around the head.^{16,22} Local tissue injury, such as skin breakdown around the straps, can also cause discomfort feelings.¹⁴ With prolonged use of face masks, the pain sensation around the head may intensify.

These mechanical factors can lead to further downsides. For example, the tight use of face masks gradually causes hypercapnia, a condition with an increased level of carbon dioxide because of poor ventilation.^{16,22,25,26} Some of the symptoms involve tachypnea, shortness of breath, and chest discomfort.²⁶ Changes in the balance of oxygen and carbon dioxide can trigger alterations in cerebral hemodynamics.^{22,25,26} Thus, headaches may occur as a response to this phenomenon.

Other mechanisms that cannot be taken for granted are the involvement of psychological problems.²² High levels of carbon dioxide cause confusion, impaired consciousness, and disorientation.²⁸ Along with anxiety while working in the Covid-19 era, these problems aggravate headaches.^{29,30} Airport officers will potentially have direct contact with a lot of people without knowing whether these people can spread the viral infection or not. An extended period of working in this situation and the length of face masks use can possibly cause headaches.

As mentioned in the previous section, this study observed the mean VAS score of headaches caused by face masks use. The score was 2.3. On a scale of 0 to 10, this pain degree is relatively mild. Mild pain does not require specific treatment to reduce pain.²⁷ Even though the pain is relatively mild, preventing pain is the most appropriate step to take. By taking precautions, headaches that arise can be avoided immediately. Hence, a plan to avoid these problems should be appropriately arranged.

This research found that headaches could result from wearing face masks for more than 4 hours per day. This finding should become a concern to stakeholders and policymakers. The use of face masks as protective equipment is an obligation in the new era of this pandemic to prevent the transmission of Covid-19. However, using face masks as protection must not cause another health problem. Appropriate prevention methods must be carried out to minimize health problems caused by face masks used. The variable of face masks use duration can be considered the key to changing the way face masks are used. It is necessary to adjust the working time for airport officers when wearing face masks. When face masks have been worn for 4 hours in one day, it is highly recommended that they can have a rest to put off the face mask for a moment. This procedure may be done before a headache occurs. In supporting this method, a simple place has to be prepared to be used by airport officers. This place has to implement health protocols for preventing the risk of Covid-19 transmissions, such as an open space, well-ventilated and circulated rooms, some marks to physical distance, and providing of new and clean face masks. This method has to be delivered to all airports' stakeholders, so some policies can be arranged to protect the airport officer's health status.

Furthermore, changes in the period of face masks use can also be made in the public area. Limiting the time of face masks use and providing the space for resting can be applied to the daily community and society. Government can examine this finding as a consideration before making future regulations in this Covid-19 pandemic. The final result of this policy is the protection of Covid-19 transmission with face masks used without raising another health problem, especially headache. Limitation of time using face masks may also increase public compliance. This research believes that improvement in face masks is as important as



washing hands and physical distancing in dealing with the Covid-19 pandemic.

There were some limitations in this study. The data were collected through a questionnaire that was distributed via a google form, so the answers of the pain degree cannot be objectively ensured. However, in this pandemic situation, this method was the best way to conduct the study. There were also several variables that did not include in this study but can affect the outcome such as age, prior health conditions, and the use of analgesics. These variables can be added to improve future studies about face masks.

CONCLUSION

There was a significant relationship with the incidence of headache when using face masks > 4 hours per day. The mean degree of headaches due to facemasks used was relatively mild. The use of face masks as protective equipment in the Covid-19 pandemic era must not cause another health problem. When face masks have been worn for 4 hours in one day, it is highly recommended that they can have a rest to put off the face mask for a moment to prevent headaches. Improvement in face masks is as important as washing hands and physical distancing in dealing with the Covid-19 pandemic.

ETHICAL APPROVAL

All procedures have been approved with ethical clearance No. KP.501/57/16-Poltekbang.Plg-2020 from the Ethics Commission of Palembang Aviation Polytechnic.

CONFLICTS OF INTEREST

The author states that there are no competing interests to disclose.

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AUTHOR CONTRIBUTIONS

WDU designed the study, collected data, wrote the first draft, and submitted the manuscript. EP made a statistical analysis plan and edited the manuscript for intellectual content.

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