

The Description of Personal Protective Equipment use during the COVID-19 Pandemic Period among Workers in Surabaya

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ABSTRACT

COVID-19 is an infectious disease caused by SARS-CoV-2. Policies to control exposure to SARS-CoV-2 are needed when operating a workplace during the COVID-19 pandemic, one of which is by implementing a hierarchy of control. Personal protective equipment (PPE) is the last control in the hierarchy of control which is also needed to be applied in addition to other controls to protect workers from the risk of being infected with SARS-CoV-2. This aimed to describe the use of personal protective equipment during the COVID-19 pandemic among workers in Surabaya. This study was a descriptive observational. The population in this study was workers who live in the Surabaya area who are internet and Whatsapp users. The sampling technique used was purposive sampling. The number of samples in this study was 542 respondents. Data were collected by distributing questionnaires online. The data obtained were analyzed descriptively. The category of using personal protective equipment is based on the frequency with which respondents use face masks. Most of the respondents (98.0%) are in the good category in using personal protective equipment. However, there were still some workers (0.9%) who are in the low category in using personal protective equipment. In conclusion, the use of personal protective equipment during the COVID-19 pandemic period among workers in Surabaya is quite good. However, the application of other controls besides the use of personal protective equipment needs to be established to increase the effectiveness of preventing the transmission of COVID-19.

Keywords: COVID-19, Workers in Surabaya, Personal Protective Equipment (PPE)

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INTRODUCTION

COVID-19 is an infectious disease caused by SARS-CoV-2¹. Covid-19 transmission can occur as a result of direct or indirect contact with a person infected with COVID-19². As a result of the COVID-19 pandemic, workplaces that are operating again need to make policies to protect their workers³. One way is to apply a hierarchy of control to COVID-19 in the workplace. Hierarchy of control is an approach to realizing occupational safety and health which is composed of protective measures from the most effective to the least effective, which are sequentially from the most effective consisting of elimination, substitution, technical control, administrative control, and finally personal protective equipment⁴. The first control in the hierarchy of control is the elimination, but at this time it is still not possible to eliminate SARS-CoV-2, thus it is necessary to apply other controls. The second control is a substitution, namely replacing the hazard with something that is not more dangerous, this also cannot be done, however, the level of transmission can be reduced by changing work processes, one of which is by implementing remote working and virtual meetings. The third control is technical control, namely, control to reduce exposure without depending on worker behavior. Technical control includes increasing ventilation, installing physical barriers, and others. The fourth control is administrative control, including changing policies or work procedures to reduce exposure to hazards, keeping the workplace and workers' hygiene, and others⁴. Personal protective equipment (PPE) is the last control in the hierarchy of control. Although technical and administrative controls are considered more effective in minimizing exposure to harm to SARS-CoV-2, the use of personal protective equipment may also be necessary to prevent certain exposures⁵. Personal protective equipment generally functions to protect all or part of the worker's body against the possibility of potential hazards or work accidents, as well as to reduce the risk of accidents. In general, personal

protective equipment consists of protective equipment for the head, eyes, face, ears, nose and mouth, body, and feet⁶. Personal protective equipment that is recommended to be used when making contact with people who may be infected with COVID-19 are face masks, gloves, gowns, and eye protection (goggles or face shields)⁷. However, the types of personal protective equipment that each person needs when working during the COVID-19 pandemic are readjusted to the risk of being infected with SARS-CoV-2 at work and certain work activities that may be exposed to SARS-CoV-2⁵. This study aimed to describe the use of personal protective equipment during the COVID-19 pandemic among workers in Surabaya.

MATERIALS AND METHODS

This study was a descriptive observational, which was only making observations with the aim of making an objective picture of a situation. The population in this study was infinite, with the criteria of workers who live in the Surabaya area and are users of the internet network and Whatsapp services. The sampling technique used was purposive sampling. The number of samples in this study was calculated based on the minimum sample size required in the online survey using the Lemeshow proportion technique. The proportion of internet users in Indonesia is 62.6% (Internet World Stats, 2011), using a significance level of 5%, a minimum sample size of 360 people is obtained as calculated below.

$$n = \frac{Z^2(p)(1-p)}{d^2} = \frac{1.96^2(0.626)(1-0.626)}{0.05^2} = 359,76$$

Note:

n = minimum number of samples taken

Z = Z table value corresponding to alpha

p = proportion of population to be measured

d = sampling errors

This study was conducted in May-December 2020 in Surabaya, East Java, Indonesia. Data was collected by

distributing questionnaires online to prospective respondents, which were published through the Surabaya Manpower Office network and social media during October-November 2020. The total number of respondents in this study was 542 workers living in the Surabaya area. Previously, 5% of respondents who had filled out the questionnaire were validated randomly to reduce the respondents' error bias. The variable examined in this study was the use of personal protective equipment.

Personal protective equipment in this study includes the use of face mask, face shield, gloves, safety goggles, and long-sleeved work uniform. The collected data were then analyzed descriptively or univariately.

RESULT

The frequency distribution of individual characteristics among the study respondents is shown in Table 1.

Table 1: The Frequency Distribution Table of Individual Characteristics

Individual Characteristics	Frequency	Percentage (%)
Gender		
Male	203	37.5
Female	339	62.5
Age		
<20	3	0.6
21-30	304	56.1
31-40	161	29.7
41-50	48	8.9
51-60	26	4.8
Last education		
Junior High School	5	0.9
Senior High School	80	14.8
Bachelor	383	70.7
Masters	40	7.4
Doctor	2	0.4
Others	32	5.9
Length working period		
<1 year	121	22.3
1-5 years	256	47.2
> 5 years	165	18.3
Employment Sector		
Education	96	17.7
Government Agencies	97	17.9
Health services	106	19.6
Oil and gas	33	6.1
Services	117	21.6
Manufacturing and Construction	29	5.3
Entrepreneur	20	3.7
Others	44	8.1

Based on Table 1, it can be seen that the majority of workers in Surabaya who are the study respondents are female (62.5%), are in the age range of 21-30 years (56.1%), have the latest education of bachelor's degree (70.7%), and have been working for 1 - 5 years (47.2%). Most of the workers in Surabaya who are the study

respondents are in the sectors of services (21.6%), health services (19.6%), government agencies (17.6%), and education (17.7%).

The frequency distribution of the types of personal protective equipment and the frequency of its use among the study respondents is shown in Table 2.

Table 2: The Frequency Distribution Table of Personal Protective Equipment Use

Types of Personal Protective Equipment	Frequency of Use					
	Never		Rarely		Often	
	Frequency	%	Frequency	%	Frequency	%
Face Mask	5	0.9	6	1.1	531	98.0
Face shield	177	32.7	270	49.8	95	17.5
Gloves	277	51.1	182	33.6	83	15.3
Safety goggles	341	62.9	142	26.2	59	10.9
Long-sleeved work uniform	96	17.7	80	14.8	366	67.5

Based on the table above, it can be seen that the personal protective equipment most often used by study respondents is face masks, while the personal protective equipment that is mostly not used by study respondents is safety goggles. A total of 531 respondents (98.0%) stated that they often use face masks at work. Besides, the majority of respondents (49.8%) stated they rarely use face shields. The frequency of using gloves in the majority of respondents is never (51.1%). Likewise, the use of safety goggles where the majority of respondents (62.9%) stated they never use them. However, the long-sleeved

work uniform is often used by the majority of respondents (67.5%).

The assessment of COVID-19 control using personal protective equipment is based only on the frequency of using a face mask which is the main personal protective equipment in preventing COVID-19 in the workplace. The category for the use of personal protective equipment is based on the frequency of its use, namely the less category for never use, the moderate category for use with infrequent frequency, and the good category for frequent use. The frequency distribution of the personal protective equipment categories is shown in Table 3.

Table 3: The Frequency Distribution Table of Categories of Personal Protective Equipment Use

Category of Use of Personal Protective Equipment	Frequency	Percentage (%)
Less	5	0.9
Moderate	6	1.1
Good	531	98.0
Total	542	100.0

Based on table 3, it can be concluded that the majority of respondents (98.0%) are in the good category in using personal protective equipment to control COVID-19 in the workplace.

DISCUSSION

Transmission of COVID-19 can occur when a person infected with COVID-19 releases infected droplets while coughing or breathing which make these droplets can be inhaled by people who are within 1 meter⁸. This incident may occur in the workplace, where there are interactions between fellow workers as well as workers and customers⁸. Every risk in the workplace, including the risk of COVID-19 transmission, must be handled according to the hierarchy of control. Various controls at the elimination, substitution, technical, administrative, and PPE levels need to be implemented in the workplace to prevent transmission of COVID-19. Although the controls from the elimination to administrative levels are considered more effective, the use of PPE does not rule out the possibility that it is still necessary to prevent COVID-19 infection, especially in high-risk occupation⁴.

The personal protective equipment covered in this study is face masks, face shields, gloves, safety goggles, and long-sleeved work uniforms. However, the category for the use of personal protective equipment is only based on the use of face masks on workers in Surabaya. This is based on a study that found that using only safety goggles cannot prevent the transmission of COVID-19⁹. Likewise, using only a face shield without a face mask is still less effective in preventing COVID-19, because there are still gaps for droplets to enter the respiratory tract¹⁰. The use of other personal protective equipment without a face mask is still considered ineffective in preventing the transmission of COVID-19. Therefore, the use of face masks is used as the main assessment of the use of personal protective equipment used by workers in Surabaya.

There is already a lot of evidence showing that the use of a face mask can reduce transmission of COVID-19. This is because by wearing a mask, the possibility of droplets from a person infected with COVID-19 entering another person's respiratory tract can decrease¹¹. A study conducted in Hong Kong shows that the use of mass face masks by the public can contribute to controlling COVID-19 because the use of face masks can reduce the number of emissions of infected saliva and respiratory droplets released by infected individuals¹². Other studies using a systematic review method have also shown that the use of

face masks can reduce the risk of infection both in health care settings and in other public places¹³. Also, although the protective effect is limited, the use of face masks can reduce total infections and deaths, and can slow down the peak time of a pandemic¹⁴. A study states that the level of protection in using a face mask increases when a face mask is used by a person infected with COVID-19¹⁵.

Several studies have shown the effectiveness of using face masks in preventing transmission of COVID-19 when accompanied by other infections prevention and control. Previously, the World Health Organization states that only using a face mask, even in the correct way of using it, is still not enough to protect someone from COVID-19 infection. Thus, this protective control must be accompanied by maintaining hand hygiene, applying physical distancing (at least 1 meter), avoiding touching the face, practicing coughing and sneezing ethics, and providing adequate ventilation in the room¹⁶. A study evaluating the potential impact of using medical face masks on society to prevent COVID-19 shows that the use of face masks is effective when combined with the application of social distancing¹⁷. Other studies have also shown that the benefits of using face masks are even greater when applied alongside other non-pharmaceutical practices (such as social distancing) and when face masks are applied universally¹⁸. Thus, even though most workers in Surabaya are already in the good category in using personal protective equipment, the application of other controls is still needed so that the prevention of COVID-19 transmission can run effectively.

CONCLUSION

The use of personal protective equipment during the COVID-19 pandemic for workers in Surabaya is determined based on the frequency of using face masks, which are the main personal protective equipment needed to prevent transmission of COVID-19. The results show that most of the respondents in this study (98.0%) are in the good category in using personal protective equipment during the COVID-19 pandemic. However, there are still workers who are in the moderate (1.1%) and less (0.9%) categories in the use of personal protective equipment. Therefore, efforts are still needed to increase the use of personal protective equipment during the COVID-19

pandemic for workers in Surabaya so that all workers are protected from the risk of contracting COVID-19. Besides, other infections prevention and control need to be enforced so that the use of a face mask to prevent the transmission of COVID-19 can be more effective.

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