



Potential Self-contamination: Improper Hygiene Procedure of Using Masks

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Abstract

Using masks has become popular as an effort to prevent COVID-19. This increased the public consumption of masks. But in practice, this effort might cause other problems. The survey arranged to observe the potential contamination form from using masks. Specifically, it is a procedure when using and removing an inappropriate mask. This descriptive study is a cross-sectional study. Data collection was carried out using a questionnaire filled in by 152 respondents aged ≥ 15 -years-old who lived in the Jabodetabek area through a link shared online on various social media. Working at the healthcare facility was the exclusion criteria for the participants. Fabric masks were the most commonly used. The majority replaced mask with the new or clean one once a day. Touched outer side of masks was the habit of most participants with lack of hand-hygiene practice. Potential self-contamination from inhaling pathogens, direct or indirect, released by the infected person when coughing, sneezing, even when talking, sourced themselves or others. Environmental contamination could occur due to lack of hand hygiene practice before wear masks, and after-touch while in use and after-remove it. Hence, educate the community for proper procedure use of masks and hand hygiene practice is necessary to prevent contamination and spread of diseases.

Introduction

The COVID-19 pandemic first emerged in December 2019 in Wuhan City, Hubei Province, China. Furthermore, this disease began to spread almost throughout the world until on January 30, 2020 the World Health Organization (WHO) designated this case as a Public Health Emergency of International Concern. The first case in Indonesia was found in early March 2020 in Depok City. Until August 2020, all provinces in Indonesia have reported the discovery of positive cases with a total of more than 170,000 cases and tens of thousands of others who have symptoms are designated as People Under Monitoring (ODP) and Patients Under Monitoring (PDP). The Center for Disease Control and Prevention (CDC) explained that the transmission medium for COVID-19 is in the form of droplets containing viruses that are released

by patients when coughing, sneezing, or even talking, so that transmission of this disease is easy. The rapid and widespread mobility of the world's population makes it difficult to prevent its spread throughout the world. This condition is exacerbated by the fact that not all infected people have symptoms, so it is not easy to detect sufferers to prevent transmission (CDC, 2020a). This new type of coronavirus can even survive on solid surfaces for a certain time, allowing transmission through touch (Chin et al., 2020).

One of the efforts that will have a major impact on reducing the number of COVID-19 cases is to prevent transmission. Efforts that can be made are to implement social and physical distancing by staying at home and maintaining a minimum distance of 1 meter from other people, maintaining hand hygiene, covering mouth and nose when coughing and sneezing,

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using mouth and nose covers when close to other people to prevent exposure to viruses, and do not touch the nose, mouth and eye area. Efforts to cover the mouth and nose by using a mask are one of the efforts that contribute to reducing exposure to respiratory droplets of sufferers (Cheng et al., 2020). However, this effort has certain procedures that must be implemented to be effective. Wash hands before wearing, removing or touching masks, immediately replace masks with new and clean ones if they are dirty and handling used masks in a sanitary manner must be done to prevent transmission of Coronavirus or other pathogens to yourself and others.

The potential exposure of infected people during the pre-symptomatic period can be reduced by the use of masks by healthy people in the community. However, other risks also arise such as the risk of self-contamination that can occur by touching and reusing a mask contaminated with pathogens, the possibility of difficulty breathing depending on the type of mask used, as well as the thought that wearing a mask is sufficient to prevent infection, thus ignoring prevention efforts. Others such as physical distancing and hand hygiene (WHO, 2020). Information regarding the proper and sanitary use and handling of masks is not yet known to everyone. In fact, masks can be a transmission medium for transmission of various pathogens released by the respiratory system, not only COVID-19. Meanwhile, the increase in the use of masks during the COVID-19 pandemic is very significant. Therefore, the researcher intends to find out the potential for contamination due to the use of masks during the COVID-19 pandemic.

Method

This study is a descriptive study with a quantitative approach. The study design used was cross-sectional to describe the potential for contamination due to the use of masks during the COVID-19 pandemic. Data collection was

carried out in May 2020 with 152 research respondents aged > 15 years living in the Greater Jakarta area. (DKI Jakarta Province, Bogor City, Bogor Regency, Depok City, Bekasi City, Bekasi Regency, Tangerang City, Tangerang Regency, and South Tangerang City). A previous study related to the presence of pathogens on masks found that there was pathogen contamination on the outside of the masks used by 10.1% of the 148 participants who were health workers in hospitals (Chughtai et al., 2019). Based on the calculation of the sample with this proportion, the sample needed in this study amounted to 138 people with a 95% confidence level and an absolute precision of 5%.

Data collection was carried out online, and although measures to prevent data incompleteness had been implemented at the time of making the questionnaire, to prevent the possibility of data that could not be used and had to be discarded, the researchers added 10% of the total sample, bringing the total sample to 152 people. The selection of research samples will be carried out randomly (simple random sampling) by distributing online questionnaire links. People who work in hospitals, health centers, laboratories, doctors' practices and midwives are excluded in this study to avoid information bias. This is because the people who work in these places generally have SOPs for the use and handling of masks. The ethical clearance of this research was agreed by the Research Ethics Commission of the University of Respati Indonesia based on SK Number: 024/SK.KEPK/UNR/V/2020. All research respondents gave consent to the data collection procedure through informed consent which was given before the questionnaire was displayed.

Result and Discussion

Respondents who participated in this study amounted to 152 people. Characteristics of respondents are quite varied and are shown in Table 1 and Figure 1.

Table 1. Characteristics of Respondents

Characteristics of Respondents	n	%
Gender		
Female	107	70,4
Male	45	29,6
Area of residence		
Province of DKI Jakarta	69	45,4
Bogor City	2	1,3
Bogor Regency	5	3,3
Depok City	19	12,5
Tangerang City	11	7,2
Tangerang Regency	3	2,0
South Tangerang City	4	2,6
Bekasi City	34	22,4
Bekasi Regency	5	3,3
Education status		
Graduated from Elementary school	1	0,7
Graduated from Junior high school	2	1,3
Graduated from Senior high school	45	29,6
Graduated from higher education	104	68,4
(D1/D2/D3/D4/S1/S2/S3)		
Educational background		
Health	40	26,3
Non Health	112	73,7

Source: Primary Data, 2020

Most of the participants are domiciled in the Province of DKI Jakarta (45.4%, 69/152). However, the entire Jabodetabek area has a representative participant in this study. The majority of participants are female (70,4%, 107/152). Respondents aged 15 – 70 years with a mean = 28 and std. deviation = 8.426. The educational status of the respondents consisted of Graduated from Elementary school, Graduated from Junior high school, Graduated from Senior high school and graduated from college which was then categorized as having high school education and above (98%, 149/152) and education below high school (2%, 3/152). Based on educational background, there are 73.7% of participants (112/152) had non-health education background.

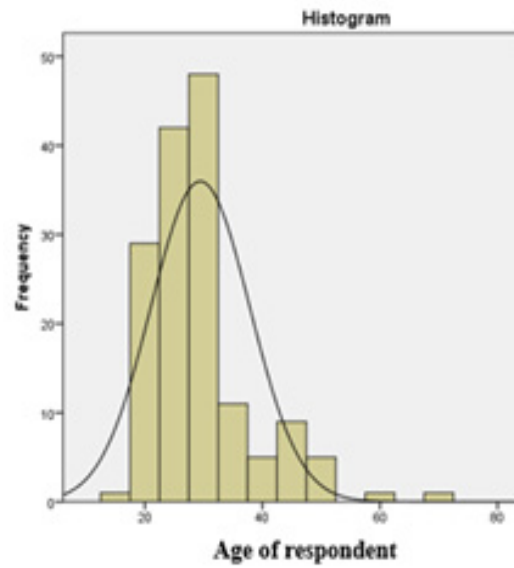


Figure 1. Frequency Distribution of Respondents Age

Source: Primary Data, 2020

Regarding the use of masks, the most frequently used type of mask was cloth masks (80.3%, 122/152). The effectiveness of the use of masks made of cloth, classified as non-medical masks, in the community has not yet been assessed. There is not enough evidence to recommend or prohibit the use of this type of mask. However, to prevent the scarcity of medical masks needed by health workers in riskier environments, healthy people should use this type of mask by considering several criteria such as the number of layers of cloth, the material used allows air to enter and exit, is impermeable to water, shape, and the suitability of the mask (WHO, 2020).

Studies on cloth masks made of cotton, silk, chiffon, flannel, various synthetics with a single layer have an efficiency of 5-80% to filter particles <300nm in size and 5-95% for particles >300nm in size (Konda et al., 2020). The level of risk of infection with diseases such

as influenza in cloth masks made of cotton or polyester cotton with 2 layers is higher than medical masks (MacIntyre et al., 2020). Laboratory test results confirmed a higher risk of viral infection in cloth masks (RR=6.64) compared to medical masks (RR=1.72) (MacIntyre et al., 2015). The poor efficiency of cloth masks is caused by long-term use, frequency of use, and how to wash or clean masks. If not cleaned before use, the cloth can become dirty and contaminated, creating a risk of infection and self-contamination. Ideally, a cloth mask should consist of a waterproof layer, at least consisting of 3 layers, according to the shape of the face and able to filter air well (MacIntyre et al., 2020). Efficiency can also be increased by the use of multiple layers and the use of a combination of materials (Konda et al., 2020).

All respondents had used masks during the COVID-19 pandemic. The frequency of wearing masks was categorized into always (88.2%, 134/152) and sometimes (11.8%, 18/152). Participants used masks when doing activities outside the home (99.3%, 151/152) and when they thought they had COVID-19 symptoms, one of which was coughing (13.2%, 20/152). Most of the participants lived with other people (69.1%, 105/152), 29 of them lived at home with people who had experienced one or more symptoms of COVID-19 (29/152), and a total of 3 participants wore masks when take care of them.

The use of masks plays a role in reducing the risk of infection in several studies related to Coronavirus (aOR = 0,15) (Chu et al., 2020). Another study identified Coronavirus, influenza virus, and rhinovirus released when ARI sufferers (adults and children) breathe and cough. The use of medical masks significantly prevents the transmission of these pathogenic germs from the patient to the environment (Leung et al., 2020). The use of masks is required for all people who come into contact with sick people, not limited to medical personnel. The mask will keep respiratory droplets from reaching other people. Masks should also be used by people caring for patients, although the efficiency of masks (cloth and surgical masks) to protect healthy people from inhaling the virus varies. (CDC, 2020a).

Not all respondents immediately dispose of or wash masks after use (39.5%, 60/152). Some respondents reused masks that had been removed from their faces and stored (51.3%, 78/152) or hung them around their necks (9.2%, 14/152). The average respondent keeps the mask on the table, in the cupboard, or hanging it somewhere open. When removed from the face and stored or hung on the neck, contamination can also occur, considering that 23.1% (18/78) of respondents immediately put the mask into the storage area without folding it first, or left it open on a table or other surface (28, 2%, 22/78). While some others store masks by rolling them up with mask straps (48.7%, 38/78). Improper method of storing the mask can cause the inside of the mask to open outwards thereby allowing contamination of the inside of the mask which will come into direct contact with the face, especially the nose, when the mask is reused.

A total of 5.3% (9/152) of participants who used surgical masks had washed the masks again for reuse. Unlike cloth masks, which are allowed to be washed before reuse by observing the appropriate protocol by using disinfectants and the recommended drying method, surgical masks cannot be reused (WHO, 2020)). However, given the limited number of personal protective equipment, including medical masks (especially respiratory filtering facepieces), there are several strategies that can be used. Disinfection using several methods, namely hydrogen peroxide vapor, ultraviolet radiation, moist heat, dry heat and ozone is a promising method for reusing disposable masks. The best recommendation is to use hydrogen peroxide vapor. However, some of these methods require special technology or resources which make the decontamination process expensive. In addition, there is a limited frequency of reuse and side effects, such as reduced elasticity or moisture accumulation with a consequent increased risk of virus exposure and self-infection. (Rubio-Romero et al., 2020).

Per day, on average, participants wore masks for 1-6 hours (61.2%, 93/152). Although the number who wore masks for more than 6 hours was also quite large (28.9%, 44/152), the rest used masks for less than 1 hour (9.9%, 15/152). The majority of masks were replaced

with new/clean ones per day (64.5%, 98/152), only 19.7% changed masks after being used for 6 hours (30/152) and 15.8% after masks were dirty, smelly or wet (24/152). The mask is recommended to be replaced after 6 hours of use. However, if conditions are not possible, as a precaution, the mask should be replaced with a new one if the mask is wet, dirty, or when used makes it difficult to breathe, is exposed to chemicals, infectious substances, or body fluids, is removed from the face for any reason, or if touched by hand. Even people with COVID-19 symptoms should use medical masks as much as possible, or if conditions do not allow masks to be changed at least once a day (WHO, 2020). The use of medical masks by health workers without removing them for more than 6 hours can increase the contamination of masks by COVID-19 and other pathogens. Wearing a mask for a long time also increases the chance of accidentally touching the mask. Therefore, hands must be cleaned regularly. The duration of use will also result in the filtration media on the medical mask being closed, resulting in obstructed breathing and the risk of inhaling ambient air that has not been filtered from the side of the mask.

A study on 148 doctors and nurses at 3 hospitals in Beijing showed the presence of respiratory virus contamination on the outer surface of medical masks used in 1 shift that lasted 6-8 hours. The pathogen was found on the outside of the masks of 15 participants. The types of viruses found were adenovirus, bocavirus, respiratory syncytial virus and influenza virus. The presence of pathogens on the outer surface of the mask may cause self-contamination for the wearer (Chughtai et al., 2019). Self-contamination can occur by touching and reusing a contaminated mask. For each type of mask, proper use and disposal is important to ensure its effectiveness and prevent potential transmission (WHO, 2020). The high risk is directly proportional to the duration of wearing the mask (> 6 hours) and with a high level of clinical contact. The study also mentions the possibility of contamination on other parts of the mask besides the outer part of the mask (Chughtai et al., 2019).

The findings indicate the possibility

of contamination with pathogenic bacteria originating from used masks. The general public can also be at risk of being transmitted by the same transmission media, considering that the health protocol in place to prevent the transmission of COVID-19 requires everyone to wear a mask when doing activities outside the home, in addition to keeping a distance from other people and avoiding crowds. The use of masks during the day and their use which may not be in accordance with procedures due to lack of information, can also pose a health risk. There will be differences in the potential for contamination of infectious agents in health care facilities compared to air quality elsewhere, given the higher number of sources of infection. However, another factor that needs to be considered is the prevalence of cases of acute respiratory infections (ARI) in Indonesia of 4.4% based on the 2018 National Basic Health Research Report. This figure is based on a doctor's diagnosis, not including patients who experience symptoms but do not seek medical attention to health services and other respiratory system-related diseases such as pneumonia or tuberculosis.

The results of the interview showed that 64.5% (98/152) of the participants had coughed or sneezed while wearing a mask. In addition, more than half of the participants had been around someone who was coughing or sneezing while wearing a mask (55.1%, 99/152). A study found respiratory droplets expelled when coughing or sneezing can be thrown more than 2 meters, even up to 8 meters (horizontally). (Bahl et al., 2020). These droplets can be directly inhaled into the lungs of people in the vicinity or attached to the surface of objects. Coughing and sneezing is one of the body's mechanisms to remove disease agents from the host's body. The upper respiratory tract is the initial site of replication for many respiratory viruses that are inhaled or transferred by contact with the nasal mucosa. Symptoms of viral infection of the upper respiratory system, including cough, reflect loss of cellular tight junctions, leakage of blood vessels, edema, increased mucus production, apoptosis, necrosis, and shedding of epithelial cells. The recruitment of neutrophils and mononuclear cells to the

upper respiratory tract will increase swelling and mucus hypersecretion, worsen nasal congestion, and cause sneezing and coughing in patients. (Newton et al., 2016).

Surveys related to viral respiratory infections found the infective form of respiratory viruses and different genetic structures of viruses, unique entry receptors, replication modes, causing similar clinical symptoms and sequelae. Several types of viruses, such as Rhinovirus, Coronavirus, Adenovirus, Seasonal Influenza, RSV, Enterovirus D68, Pandemic Influenza, SARS-CoV, and MERS-CoV, cause general clinical symptoms in the form of coughing (Newton et al., 2016). A study of 45 healthy people found that the diameter of the droplets expelled when coughing was 0.1 – 900 μm , with 97% of participants expelling droplets under 1 μm (Zayas et al., 2012).

The sneezing reflex can be caused by various factors, one of which is stimulation by chemical or physical irritants in the nasal mucosa which will cause stimulation of the eyes closed, inhale deeply, then exhale forcibly, and increase the pressure in the lungs. The sudden dilation causes the release of large amounts of air through the mouth and nose thereby expelling all irritants and impurities present in the mucosa. The number of particles expelled when sneezing, with a size of 0.5 – 5 μm , estimated up to 40.000, with estimated speed up to 150 – 1.045 km/hour (Songu & Cingi, 2009). Not only coughing or sneezing, an observation with laser beams on participants with an average sound intensity of 59dBa showed the emission of droplets of various diameters emitted when speaking. In fact, droplets have the potential to survive for 8-14 minutes in the air in a closed room. These droplets can contain pathogens such as the influenza virus, Mycobacterium tuberculosis, measles, or COVID-19 bacteria (Stadnytskyia et al., 2020).

Table 2. Procedures for Using Masks and Personal Hygiene of Respondents

	n	%
Touching the front of the mask while wearing a mask		
Always	15	9,9
Sometimes	100	65,8
Never	37	24,3
Touching the front of the mask when removing the mask		
Always	12	7,9
Sometimes	72	47,4
Never	68	44,7
Cleaning your hands before using and after touching the mask		
Never	5	3,3
Sometimes	44	28,9
Always	103	67,8

Source: Primary Data, 2020

The habit of touching the front of the mask while it is being used is carried out by most of the participants. However, the frequency of touching it varies from person to person (sometimes 65.8% and always 9.9%). Touching the mask when taking it off is also done by 55.3% of respondents (sometimes 47.4% and always 7.9%). In fact, 32.2% of respondents stated that they did not clean their hands (3.3% never, 28.9% sometimes) using soap and water or hand sanitizer before using the mask and after touching the front of the mask (when in use or when removing it). This situation has the potential to become a medium for transmitting disease to others through hands contaminated with pathogenic germs released by the mask wearer himself. Self-contamination can also occur due to contact between hands and pathogenic germs released into the environment by other people and sticking to the masks that the wearer touches without applying hand hygiene.

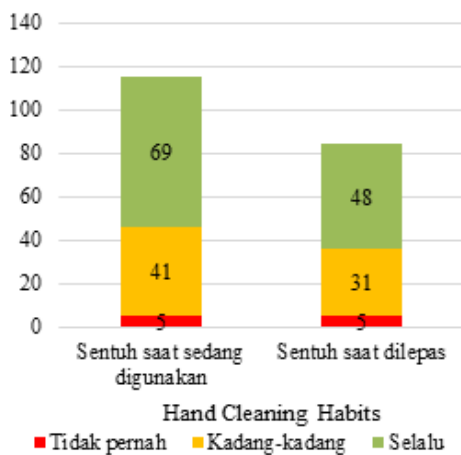


Figure 2. Comparison of Respondents' Habits of Cleaning Hands and Touching Masks
Source: Primary Data, 2020

The habit of touching the front of the mask while it is being worn or when it is removed without cleaning the hands afterwards is quite risky for causing potential transmission for mask users and other people because pathogenic germs can stick to the surface of the mask when the cough or sneeze reflex occurs. Some respondents have coughed/sneezed while wearing a mask, so hands touching the mask can be a medium for transmitting disease to others. Others have the potential to experience self-contamination because they have a habit of touching masks and have been around people who cough/sneeze when wearing a mask especially if afterwards the person touches the nose, mouth, and eyes area without cleaning his hands. An overview of these potential risks can be seen in Table 3 dan Table 4.

Table 3. Cough/Sneezing Reflexes and Hand-Cleaning Habits Based on Respondents' Behavior of Touching the Front of the Mask While Wearing

		The habit of cleaning hands after touching or removing the mask					
		Never		Sometimes		Always	
		n	%	n	%	n	%
Have ever coughed or sneezed while wearing a mask	Ever	3	3,8	31	39,2	45	57,0
	Never	2	5,6	10	27,7	24	66,7
Have ever been around someone who is coughing or sneezing while wearing a mask	Ever	3	3,8	32	40,0	45	56,2
	Never	2	5,7	9	25,7	24	68,6

Source: Primary Data, 2020

Based on Table 3, it can be seen that about 3.8% of the respondents, who touched the outer part of the mask when it was being used, had coughed/sneezed or were around people who were coughing/sneezing while wearing a mask and never cleaned their hands afterwards, either by wash hands with soap and water or hand sanitizer. The same thing happened to respondents who touched the front of the mask while it was being removed

(Table 4). About 5% of respondents who touched the front of the mask while it was being removed had coughed/sneezed or been around people who cough/sneeze while wearing a mask and never cleaned their hands. The potential risk of contamination for respondents who do not regularly (sometimes) clean their hands must also receive attention because the percentage is quite high.

Table 4. Cough/Sneezing Reflexes and Hand-Cleaning Habits Based on Respondents Touching the Front of the Mask While Taking It Off

		Cleaning hands after touching or removing the mask					
		Never		Sometimes		Always	
		n	%	n	%	n	%
Have ever coughed or sneezed while wearing a mask?	Ever	3	5,2	23	39,7	32	55,2
	Never	2	7,7	8	30,8	16	61,5
Have ever been around someone who is coughing or sneezing while wearing a mask	Ever	3	5,1	25	42,4	31	52,5
	Never	2	8,0	6	24,0	17	68,0

Source: Primary Data, 2020

SARS-CoV-2, as the cause of COVID-19, is transmitted from person to person through respiratory droplets and close contact with sufferers. This fact explains the importance of the practice of using personal protective equipment (especially respiratory system protection) and hand hygiene (Lotfinejada et al., 2020). Regular hand hygiene, along with wearing a mask, has been shown to contribute to preventing influenza infection (Saunders-Hastings et al., 2017). Mask users are required to clean their hands, by washing their hands with soap and water or using a hand sanitizer that contains alcohol, before wearing and after touching/removing the mask (WHO, 2020). These efforts are made to prevent the transfer of pathogens from and to masks through the hands that touch them. This is also the basis for the recommendation not to touch the mask while it is in use and the procedure for removing the mask from behind and being careful not to touch the outer part of the mask. The risk of transmission to a healthy person may increase as a result of inappropriate mask removal procedures, handling contaminated masks or from touching the face while wearing a mask (European Centre for Disease Prevention and Control, 2020).

The main sources of transmission of COVID-19 are respiratory system droplets and direct contact. Everyone who has direct contact with the patient will be at risk for exposure to potentially infective droplets. Droplets can also stick to the surface of objects and survive for a certain period of time. Thus, the immediate environment of an infected person can be a source of transmission (WHO,

2020). A study shows the possibility that SARS-CoV-2 (the cause of COVID-19) can survive for approximately 30 minutes on paper and tissue surfaces, on cloth for about 1 day, 4 days on stainless steel surfaces, 7 days on exterior surfaces of medical mask. Virus resistance on the surface of an object can vary depending on the temperature and humidity of the environment (Chin et al., 2020).

Novel Coronavirus (SARS-CoV-2) survives on surfaces for the same length of time as SARS-CoV-1 (the cause of SARS). Under certain conditions SARS-CoV-2 can survive in aerosols for up to 3 hours. The virus is more stable on plastic and stainless steel, than on copper and whiteboard, and live virus is still detectable up to 72 hours after application to surfaces (Van Doremalen et al., 2020). Other studies have shown that Coronavirus (SARS, MERS or HCoV) can survive on inanimate surfaces, such as metal, glass, or plastic for up to 9 days (Kampf et al., 2020). The resistance depends on the type of surface, temperature, relative humidity, and the strain of the virus. The same study found viruses can be inactivated within 1 minute by using a disinfectant, such as 70% ethanol or 0.1% sodium hypochlorite (WHO, 2020). An important effort that can be done to prevent pathogen contamination on the surface of objects is to carry out hand hygiene practices at the right time and technique (with soap and water or hand sanitizer made from 60%-80% alcohol) (WHO, 2020). Efforts in hand hygiene include washing hands with soap and water or using an alcohol-based hand rub. Wash hands with soap and water when hands are visibly dirty. Hand hygiene is also required when

using and especially when removing Personal Protective Equipment (PPE), including masks (CDC, 2020a).

A study proved a significant protective effect of hand hygiene as a protective device against influenza infection (OR = 0.62) (Saunders-Hastingsa et al., 2017). Hand washing can prevent the spread of respiratory and digestive infections. Germs can spread from other people or surfaces when we touch our eyes, nose and mouth, prepare food and drink with unwashed hands, touch contaminated objects or surfaces, blow our nose, cough or sneeze into our hands and then touch other people's hands or objects. . The steps for proper hand washing are by wetting your hands with clean running water, using soap, then rubbing all parts of your hands (including the back of your hands, between your fingers and nails) for at least 20 seconds, then wash your hands with clean running water then dry hands (CDC, 2020b).

If soap and water are not available, cleaning your hands can be done with a hand sanitizer that contains at least 60% alcohol. The product should be applied to the entire surface of the palms and fingers in an appropriate amount and allowed to dry for about 20 seconds. The downside is that hand sanitizers cannot remove all types of germs, are not very effective if hands are visibly dirty and may not be able to remove harmful chemicals, such as pesticides and heavy metals, from hands (CDC, 2020b). Another method that can be done is to use a wet towel containing soap or sodium hypochlorite. This method is proven to be able to eliminate most of the viruses on the hands. Water containing 1% soap is also effective at killing viruses, and is safe for skin and clothes (Qing et al., 2020).

To support this, it is necessary to increase access to hand hygiene facilities and take an approach to encourage hand washing habits. All health care facilities should have programs in place to promote proper hand hygiene practices and ensure the availability of the required infrastructure (WHO, 2020). Not only limited to health care facilities, but also in places where disease transmission has the potential to occur, especially in places where many people congregate. A study conducted in 2017 in normal situations found that all participants

(with an age range of 18 – 75 years) did not apply the correct techniques and steps in wearing masks. More than 90% of respondents did not clean their hands before putting on, removing, and disposing of masks. This is different from previous studies, which obtained results that the picture of hand washing habits when using masks was quite good during the epidemic. So that it is suspected that repeated epidemic situations cause fatigue in the community to follow the recommended health protocols. Therefore, efforts to increase community awareness to implement the practice of using masks and hand hygiene are highly important (Lee et al., 2020).

The behavior of washing hands and wearing masks is not only mandatory for adults. Children must also adopt the same habits and responsible adults are obliged to supervise so that preventive measures to prevent the transmission of this disease are carried out according to procedures. In children, the habit of washing hands and using masks is influenced by the education of their parents and friends in their environment. Therefore, publications related to personal hygiene behavior are urgently needed (Chen et al., 2020). The COVID-19 pandemic has discovered the importance of education and information regarding hand washing and the application of correct techniques when washing hands, both for workers in the health sector, as well as for the general public. Short images and videos that are spread through mobile phones, social media, television, radio, print media, and billboards can be a medium for health promotion, an effective method of hand washing and very crucial to stop the spread of COVID-19. Such information can be conveyed by public figures or many others to raise public awareness to wash hands (Alzyood et al., 2020).

Conclusion

Masks can be a place of attachment for pathogens released by the wearer or sourced from other people. Thus, it has the potential to cause contamination to the environment if the mask wearer touches the mask without cleaning his hands afterward. Proper mask use procedures, including hand hygiene practices, are key to program effectiveness and

can be improved by educating the public. It is recommended to recommend the instructions for use and the maximum duration of continuous use of masks, especially for those who have a high level of contact with risky environments, such as crowded public places. The use of masks will only be effective when used in combination with routine hand cleaning before putting on and after touching/removing the mask with soap and water or an alcohol-based hand sanitizer.

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