

The Challenges of Mask Wearing Among USIM Medical Students during the Pandemic of COVID-19

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Abstract

Wearing a face mask has become mandatory when going out in public. Besides hand washing and physical distancing, wearing a face mask is a preventive measure used to curb the spread of COVID-19. However, many people do not comply with the rules and have difficulties in wearing masks. This study aims to evaluate current knowledge on the importance of face masks and identify factors contributing to discomfort in wearing face masks. Using a Google form survey, the study was conducted among 155 medical students of Universiti Sains Islam Malaysia (USIM). Data revealed 99.4% of the participants agreed on the importance of wearing masks and 92.35% respondents mentioned compliance in wearing masks. However, only 63.9% reported feeling comfortable while wearing a surgical mask. Certain factors were found to contribute to the discomfort of wearing face masks, such as feeling hot (77.4%), excessive sweating (76.1%), hard to breathe (67.7%) and trapping of odours (67.1%). Most of the respondents (84.5%) agreed that a change or alteration could be made to the current face mask design to make it more comfortable. During this COVID-19 pandemic, the importance of wearing masks has been well-realized by society. However, there

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remain several challenges associated with wearing them. Therefore, inventors should strive towards the innovation of a more comfortable and easy-wearing mask in order to enhance better compliance among users.

Keywords: *Face mask, COVID-19, Survey, medical student, discomfort*

1. Introduction

Coronavirus disease (COVID-19) is an infectious disease caused by a newly discovered coronavirus known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Most people infected with COVID-19 will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness (World Health Organization, 2021). Not to mention, the disease could also cause death. From 22nd January 2020 to 8th February 2021, the USA recorded 464 941 deaths, China recorded 4 822 deaths and Malaysia recorded 896 deaths (Ritchie et al. 2020). The disease has caused widespread concern across the globe. To overcome COVID-19 and slow down its transmission, the public needs to be well informed about the COVID-19 virus, the disease it causes and how it spreads. In this article, the use of the face masks by the worldwide community is discussed alongside the need for innovation of the face mask to improve its acceptability among the public.

Since the outbreak of SARS-CoV-2, the use of face masks has become ubiquitous in China and other Asian countries such as South Korea and Japan (Feng et al., 2020). In Malaysia, it is mandatory for people to wear face masks at public places. According to the Center for Disease Control and Prevention (CDC), certain masks work better than others to help stop the spread of COVID-19 outside of healthcare settings. For example, masks need to be made with breathable fabric (such as cotton) and need to be fit properly around the nose and the chin with no large gaps. Masks made from materials that are hard to breathe through (such as plastic or leather) and from loosely woven fabric or that are knitted, i.e., fabrics that let light pass through are not recommended (Center for Disease Control and Prevention, 2021). In general, face masks are highly recommended for people who have symptoms of COVID-19 such as cough as well as people who are handling the COVID-19 patients because it can reduce the transmission of the virus. Not only that, people with no symptoms are also encouraged to wear face masks as well. As proven by the Human Studies of Masking and SARS-CoV-2 Transmission, a retrospective case-control study from Thailand documented that, among more than 1,000 persons interviewed as part of contact tracing investigations, those who reported having always worn a mask during high-risk exposures experienced a greater than 70% reduced risk of acquiring infection compared with persons who did not wear masks under these circumstances (Doung-Ngern et al., 2020). As people adapt to this new norm, some have found it difficult to wear face masks in public; their reasons include making them feel hot, excessive sweating, trapped with bad odours and feeling suffocated. These dissatisfied comments have disseminated across several journal articles and social media. However, there is a lack of clear collective evidence on the degree of discomfort associated with mask-wearing. Therefore, this research has conducted a study based on literature reviews with an aim to produce a critical evaluation so that further improvements or innovation can be done in the face mask manufacturing field towards minimizing the unpleasant consequences of mask-wearing.

2. Materials and Methods

This study is a cross-sectional analysis involving 155 undergraduate medical students of the Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia (USIM). The study was performed from February 9, 2020 to February 18, 2020 using a Google form survey.

3. Results

Age

Survey data showed that the age of respondents in this study ranged from 20 to 26 years old as shown in Table 1.

Table 1 classifies the participants involved in this study according to age. From the table, 112 (72.3%), 14 (9.0%), 15 (9.7%), 1 (0.65%), 1 (0.65%) and 12 (7.7%) participants were at the age of 20, 21, 22, 23, 24, and 26 years old, respectively.

Table 1: Distributions Of The Number Of Respondents According To Their Age

Age	Number	Percentage (%)
20	112	72.3
21	14	9
22	15	9.7
23	1	0.65
24	1	0.65
25	0	0
26	12	7.7
Total	155	100

Importance of Wearing Mask

Most of the respondents stated that mask wearing is a must especially during this COVID-19 pandemic to prevent infection. Furthermore, most respondents mentioned having experience with wearing masks (Figure 1).

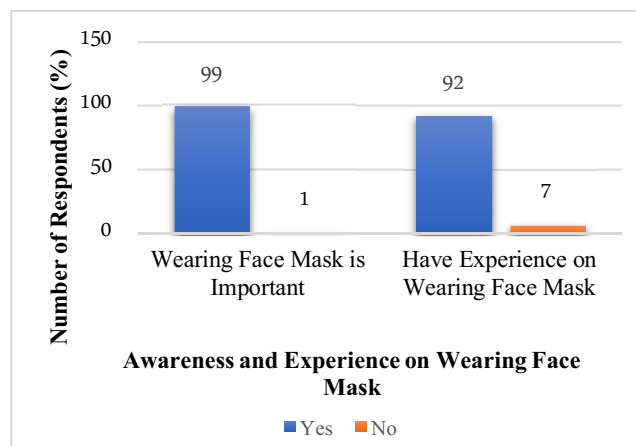


Figure 1: The percentage of their awareness and experience on mask wearing.

It was found that 155 (99%) of all respondents were aware of the importance of wearing face masks, and only 1 person (1%) did not see it as important. Besides, out of 100% of respondents, 143 (92%) of them had experienced wearing a face mask, and only 12 (7%) respondents had not experienced it. They commonly wore face masks during heavy outdoor activities, haze or when having breathing problems such as cough and flu.

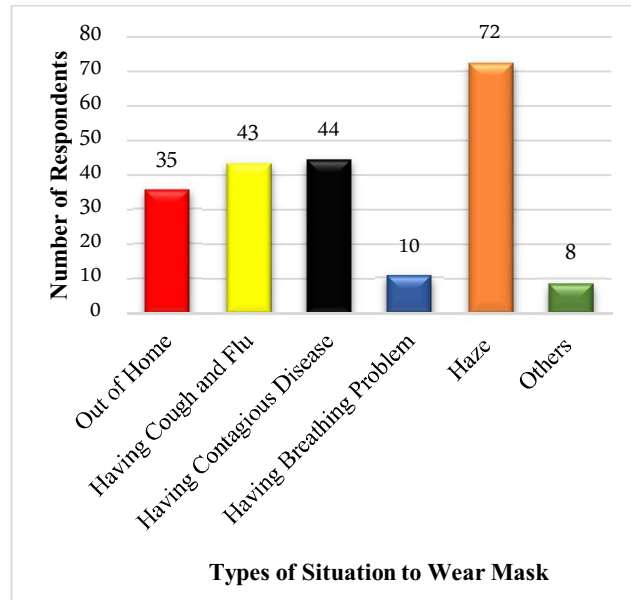


Figure 2: Distribution of respondents by multiple types of situations to wear masks.

Figure 2 illustrates the distribution of the respondents in percentage by multiple situations that might cause them to wear face masks. Most of the respondents, about 72% (111) claimed to wear masks because of haze. However, it was also found that having cough and flu, as well as contagious disease commonly caused respondents to wear face masks, at 43% (66) and 44% (68), respectively. Then, this is followed by wearing a mask when leaving the house at 35% (54) and having breathing problems comprising 10% (15). The open-ended question for the respondents to give other reasons for wearing face masks received responses such as when doing experiments in the laboratory, performing dental treatment and if someone is allergic to dust; this only represents 8% (12) of respondents.

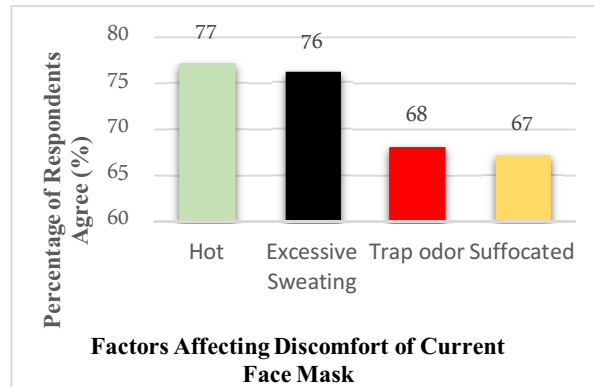


Figure 3: Percentage of respondents agree on the factors affecting discomfort of current face mask.

Figure 3 illustrates the percentage of respondents that agree on the four major factors that were found to cause discomfort while wearing a current face mask. The highest first and second factors are feeling hot which represent 77% (119) of respondents and followed by excessive sweating comprising 76% (117). The third factor of the discomfort is trap odour which is agreed by 68% (105) of respondents while the last major factor is suffocated or hard to breathe that occur 67% (103) of total respondents. The leading factors of discomfort for the current mask include feeling hot, excessive sweating, trap odour and suffocation; these are the factors that need to be improved for as a better face mask design is invented.

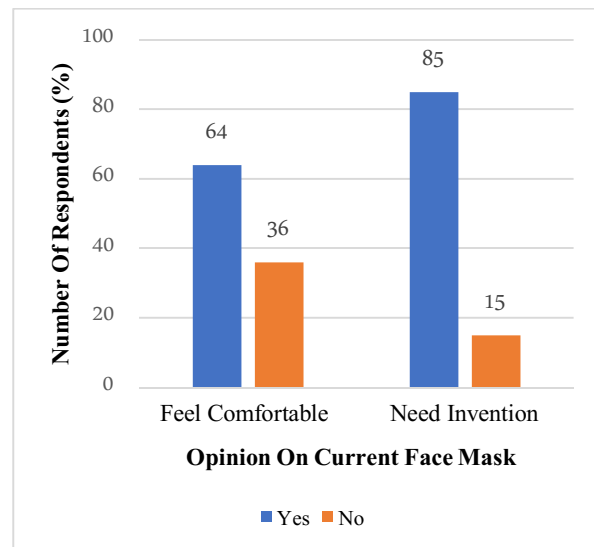


Figure 4: Distribution of respondents' opinion on current face mask.

Figure 4 shows the distribution of the respondents in percentage by their opinions on the current face mask. Based on the results, 64% (99) of all respondents feel comfortable with their current face mask while the other 36% (55) do not feel comfortable wearing them. However, 85% (131) of them

had agreed to have an improvement in invention on the current face mask design, and only 15% (23) remainder do not agree with the idea. These responses indicated that although more respondents felt comfortable with the current mask, they still hoped for a more comfortable face mask in the future.

4. Discussion

Over the past few months, the COVID-19 pandemic has brought worldwide progress to a halt. Due to the absence of vaccines, specific antiviral medicine and awareness on curbing COVID-19, cases continue to increase. To protect humans from the SARS-CoV-2 infection, transmitted commonly by the respiratory route (*vide infra*) (Chua et al., 2020) through the droplets that are released when coughing, sneezing, talking, shouting and singing, the World Health Organization (WHO) released guidelines on June 5, 2020 (Aravindakshan et al., 2020) recommending social distancing, wearing of face masks, handwashing and frequent hand sanitizer usage. The current study has certain weaknesses and limitations. Firstly, it was done with a small sample size limited to the medical students of USIM. Next, it was done over a short period of time which occurred prior to the pandemic from February 9, 2020 to February 18, 2020. Nevertheless, in this study, the focus is placed on identifying the challenges of wearing face masks, especially among medical students wearing face masks during the COVID-19 pandemic. Under the Malaysian Law, if the people fail to comply with face mask wear due to reasons such as feeling hot, excessive sweating, hard to breathe and trapping the odour, they can be fined. COVID-19 cases have dramatically increased the importance of wearing face masks because of the asymptomatic and pre-symptomatic exposure from persons who do not know they are infected. However, compliance is influenced by the convenience of wearing face masks, in particular for long-term usage (Kim, 2020). As a result, some of them feel burdened sometimes because of the factors that make them feel uncomfortable.

There are three types of face masks usually used by the public, namely cloth face masks, surgical masks and N95 respirators. The CDC recommends everyone to wear cloth face masks to prevent the transmission of the virus from people without symptoms. In a 2008 study by Sande et al. (2020), it was found that homemade face masks may be half as effective as surgical masks and up to 50 times less effective than N95 respirators. Accordingly, N95 respirators are more tight-fitting, protect us from splashes, sprays, and large droplets, as well as filtering out 95 percent of very small particles including viruses and bacteria. However, the CDC currently does not suggest these for public use as it has a poor seal that can lead to leakage and lowering of the respirators' effectiveness as well as the surgical mask. The CDC recommends using the cloth mask in public settings, with practicing physical distancing and proper hygiene. Homemade face masks only offer a small degree of protection, but they may help prevent the transmission of SARS-CoV-2 from asymptomatic people (Centers for Disease Control and Prevention, 2021).

After analysing the respondents' responses on the survey, 143 of them had experienced wearing a face mask since they felt that the face mask is important to wear especially while outdoors, having cough and flu, having contagious disease, having breathing problems, and during haze. Only 12 respondents had not experienced wearing a face mask. Interestingly, the rate of wearing masks during haze recorded the highest result. This is because people were exposed to the effects of haze of either causing lung or airway problems and were aware of it. The factors which contribute to the discomfort of wearing face masks are feeling hot, excessive sweating and foggy eyeglasses for people who wear spectacles as they breathe which makes people less likely to wear masks. Beyond controlling air leakage, designing a better mask involves a trade-off between filtration effectiveness and how well users can breathe. If a mask makes breathing too difficult, users will simply not use

it, thus reducing compliance with masking requirements. However, some of the students also felt suffocated because of the accumulation of the moisture in the wearer's breath with continuous extended use. Regarding that, the mask must wick away the moisture otherwise the wearer will feel clammy and reduce breathability causing them to stop using the mask. The students also complained that wearing a mask also could lead to trapped odour. Since a mask will be worn for long periods of time, it should not impair the wearer's communication. This might impact someone's performance when they are speaking and they would want to remove it, thereby defeating the very reason for requiring a mask (Park and Jayaraman, 2020).

The reason why respondents complained of feeling breathless and hot could be due to the material used in the production of face masks as well as the absence of a valve. Valve masks have a range of advantages. In addition to shielding the wearer when properly fitted, they make it easier to exhale than conventional masks, avoid moisture, and minimise unpleasant heat and carbon dioxide build-up within the mask. Even though valve masks sufficiently shield the wearer, they fall short due to the nature of the valve, which only filters inhaled air but does not filter exhaled air. When people wear masks and breathe, they automatically produce water vapour and heat during their exhalation and inhalation. This traps the heat in the face mask and makes them more uncomfortable. Apart from that, these conditions also will trap water vapour since the mask is quite tight and less breathable because it does not have valves. As the mask fits to the face, the mask filter is quickly broken due to droplets that are contained and trapped inside the mask (Kim, 2020). Also, face masks will become airtight if there is heavy sweating. As a result, air is inhaled and exhaled unfiltered around the edges, removing the protective influence of both the wearer and the atmosphere (Kim, 2020). Furthermore, surgical face masks are intended to be discarded after single use. When they become damp, they become brittle and are no longer protective (Isaacs et al., 2020). This further contaminates the mask since surgical masks especially decreased contamination less than others (Howard et al., 2020).

Due to the discomfort of mask wearing, the respondents were asked for their opinions regarding potential improvements to the current face mask. Most of them agreed that the current face mask can benefit from further innovation.

5. Conclusion

In general, society is well aware of the importance of wearing face masks especially during the COVID-19 outbreak. Mask wearing is now obligatory in order to protect people from the risk of getting infected. It is important to inform the public that the discomfort associated with mask wearing should not lead to unsubstantiated safety concerns as this may attenuate the application of a practice proven to improve public health (Samannan et al., 2020). However, it is undeniable that wearing a face mask is challenging. Despite the challenges, society is now becoming more adapted and accustomed to wear it every day whenever they are out and about. Therefore, the innovation of a more comfortable and easy wearing mask should be prioritized among inventors to enhance better compliance among users.

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