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Face Mask Usage During COVID-19 Pandemic: Prevalence and Associated Factors in a Malaysian Medical School

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Coronavirus disease 2019 (COVID-19) is a contagious disease caused by a newly discovered coronavirus strain. Anxiety, anticipation, and lack of knowledge in the previous experience on severe acute respiratory syndrome (SARS) and influenza A virus subtype H1N1 (H1N1) pandemic have a substantial impact on significant public health behaviours including wearing face mask in public spaces. We investigate the prevalence of face mask usage and its associated factors during COVID-19 amongst students and staff of the Faculty of Medicine and Health Sciences (FMHS), Universiti Putra Malaysia (UPM). Using a cross-sectional study, 220 respondents participated in an electronic version of a self-administered questionnaire. Analyses were performed using the Chi-square test, IBM SPSS Statistics 25, with statistical significance at $p<0.05$. Out of the 220 respondents, 197 (89.5%) reported that they wore face masks all the time. Most of the respondents (90.3%) had a high level of precautionary measures against COVID-19, 89.6% selected the internet as their source of information and 90.9% had a good attitude level towards measures against COVID-19. There were significant associations between hygienic practices ($p=0.001$), source of information (internet) ($p=0.025$), and attitude towards COVID-19 ($p=0.001$) with face mask usage. This study demonstrated a high prevalence (89.5%) of face mask usage during the COVID-19 outbreak.

Keywords: face mask; COVID-19 pandemic; lack of knowledge; hygienic practice

I. INTRODUCTION

The use of face masks has become omnipresent in China and other Asian countries such as Japan and South Korea during the outbreak of coronavirus disease 2019 (COVID-19) (Goh *et al.*, 2020). Similarly, in Malaysia, the face mask supply is in high demand following the announcement of a movement control order that requires citizens to adhere to strict standard operating procedures (SOPs) to help curb the spread of this disease.

Past events have proven that anxiety and misunderstandings of infectious outbreaks may lead to unjustified anxiety and anarchy in public (Blendon *et al.*, 2004). Misconceptions and concerns have led the public to adopt hazardous behaviours such as refusal to adhere to precautionary measures (wear a mask or accept a vaccination), and refusal to go to the healthcare facilities due to apprehension of acquiring the infection (Tang & Wong, 2003; Rubin *et. al.*, 2009; Larson *et al.*, 2010).

According to the World Health Organisation (WHO), current information suggests that respiratory droplets and direct touch are the two main routes of transmission of the COVID-19 virus. When an infected person coughs or sneezes, respiratory droplets are produced. There is a risk of being

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exposed to possibly infective respiratory droplets in a person who is in close contact (within one meter) with someone who has respiratory symptoms such as cough and sneezing. The infective droplets may spread on either metal or non-metal surfaces where the virus may remain viable. Therefore, the environment of an infected individual can act as a place for transmission (contact transmission) (WHO, 2020).

Wearing a face mask is one of the preventive measures that can limit the spread of certain respiratory viral diseases, which include COVID-19 (WHO, 2020). According to Tang & Wong (2004), respondents who were likely to wear face masks (1) were women; (2) belonged to the older age group; (3) were married; (4) have higher income; (5) felt more susceptible to contract SARS; (6) think SARS have a more serious impact; (7) believed greater benefits in wearing face masks; (8) encountered greater barriers in wearing face masks; and (9) were more aware of environmental cues. This face mask measure and positive hand hygiene practice have been demonstrated to reduce the risk of contracting respiratory illness in households with relatively high adherence to mask-wearing.

However, some other researchers have reported that compliance to wearing face mask is poor since asymptomatic participants preferred not to wear face mask as they think it has no benefit (Aiello *et. al.*, 2010; Larson *et. al.*, 2010; Ferng *et. al.*, 2011; Wu *et al.*, 2020).

According to a Japanese study, face mask usage is correlated with good personal hygiene habits and good health behaviours among adults (Wada, Oka-Ezoe & Smith, 2012). Additional preventive hygiene steps were more likely to be carried out by participants using face masks. These include handwashing, gargling, crowd avoidance and close interaction with sick people, good quality sleep, and influenza vaccination.

In this study, we aimed to investigate the prevalence of face mask usage and its associated factors during COVID-19 pandemic amongst students and staff of the Faculty of Medicine and Health Sciences (FMHS), Universiti Putra Malaysia (UPM).

II. MATERIALS AND METHODS

This study was conducted in FMHS, UPM. The duration of this study was approximately five months, conducted from June 2020 until October 2020 using a cross-sectional study design.

The estimated sample size was calculated using the single proportion formula by Lwanga & Lemeshow (1990). The calculation gave a minimum sample size of 200. A name list of students and staff of FMHS, UPM who fulfilled the selection criteria was compiled. Each individual was assigned a number and 220 numbers were randomly selected to participate in the study which takes into account a non-response rate of 20% (Case *et al.*, 2004).

Electronic versions of administered questionnaires were distributed via Whatsapp and email to the selected individuals. Consent from the respondents was obtained beforehand. The questionnaire was adopted from previous studies and had undergone a face validity test and was assessed by a supervisory panel (Case *et al.*, 2004).

The questionnaire consisted of six sections. Questions asked in Section A were regarding socio-demographic characteristics; Section B were regarding the prevalence of wearing face mask and knowledge regarding its usage; Section C were regarding knowledge about COVID-19; Section D were regarding attitude and behaviours towards the disease and response on governmental efforts to combat it; Section E were regarding precautionary measures being applied during the pandemic to prevent infection; and Section F were regarding the barriers that prevent them from wearing a face mask.

IBM SPSS Statistics Version 25 was utilised for data analyses. Analysis of descriptive statistics was undertaken using frequencies and percentages regarding sociodemographic factors, hygienic practices, source of information, attitude, barriers to face mask usage, and level of knowledge. The associations between the dependent and independent variables were measured with the Chi-square test, with statistical significance considered at $p<0.05$.

Ethical approval to conduct the study was obtained from the Ethics Committee for Research Involving Human Subject of Universiti Putra Malaysia (JKEUPM) (JKEUPM-2020-216). In addition, we also obtained permission from the Dean of the FMHS, UPM, where the study was conducted.

III. RESULT AND DISCUSSION

A. Socio-demographic Characteristics

All 220 eligible students and staff of FMHS, UPM that were selected to participate in the study responded to our questionnaire leading to a response rate of 100%. Table 1 shows the socio-demographic characteristics of respondents. The majority of the respondents were aged between 20 to 24 years (54.5%), and more than half (65.9%) were female. Most of the respondents were single (60.9%), 80.0% had a degree and 62.7% were undergraduate students.

Table 1. Socio-demographic characteristics of the respondents

Sociodemographic Characteristics	n (%)
Age Group	
20-24	120 (54.5)
25-30	15 (6.8)
31-34	20 (9.1)
35-40	30 (13.6)
>40	35 (15.9)
Gender	
Male	75 (34.1)
Female	145 (65.9)
Marital Status	
Married	72 (32.7)
Single	134 (60.9)
Divorced	14 (6.4)
Education Level	
No Formal Education	1 (0.5)
Secondary School	16 (7.3)
Diploma	20 (9.1)
Degree	176 (80.0)
Master	6 (2.7)
PhD	1 (0.5)
Working Status	
Student	138 (62.7)
Employed	70 (31.8)
Unemployed	12 (5.5)

B. Hygienic Practices

Table 2 shows the responses given by the respondents for each precautionary measure statement. Respondents were asked to report the precautionary measures (hygienic practices) being practised during the pandemic to prevent infection from eight given options. The statement "Wash my hands often" had the highest proportion of selection (97.7%) among the respondents. One (1) point was given for each precautionary measure recorded by the respondent. The total score for the precaution component ranged from 0 to 8 points. For comparison and analysis, the respondents were further classified into those with a high level of precaution (6-8 points), moderate level of precaution (3-5 points), and low level of knowledge (score 2 and below). The majority of the respondents (84.5%) were classified as taking a high level of precautionary measures against COVID-19.

Table 2. Characteristics of the respondents by hygienic practices

Hygienic Practices	Yes n (%)	No n (%)
Wash my hands often	215 (97.7)	5 (2.3)
Avoid touching my eyes, nose or mouth	189 (85.9)	31 (14.1)
Cover my nose and mouth with a tissue when I cough or sneeze	208 (94.5)	12 (5.5)
I throw the tissue in the trash after I use it	196 (89.1)	24 (10.9)
If I have flu symptoms, I avoid normal activities, including work, school, travel, shopping, etc.	186 (84.5)	34 (15.5)
I use hand sanitiser	214 (97.3)	6 (2.7)
I avoid close contact with infected people.	208 (94.5)	12 (5.5)

C. Source of Information

Figure 1 shows the respondents' source of knowledge information. Most respondents (95.9%) used the internet as their preferred source of information, followed by TV (90.9%). The less preferred sources of information were public lectures (33.6%) and radio (46.8%).

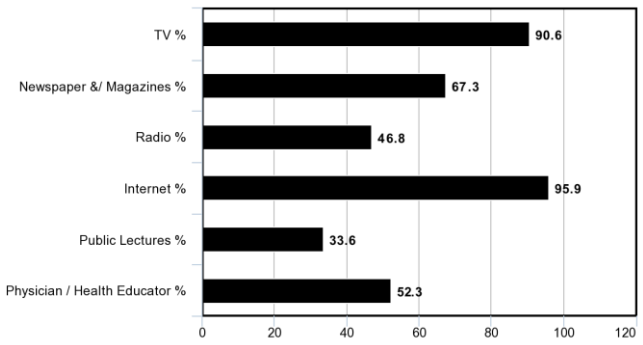

Figure 1. The respondent's source of information

D. Attitude and Behaviour Towards COVID-19

Table 3 shows the distribution of answers given by respondents on their attitudes and behaviour towards COVID-19. Attitude and behaviour towards the disease and response on governmental efforts to control it was evaluated by six attitude statements; respondents replied with "strongly agree", "agree", "neutral", "disagree", or "strongly disagree". More than half of the respondents strongly agreed to the statements "The government should restrict the travel from and to the areas of the disease" and "The government should avoid importing workers from the areas of the disease" (69.1%).

A Likert 5-point scale was used to apply the scoring system; 5 points were attributed to "strongly agree," and 1 point was attributed to "strongly disagree." Total attitude scores range from 6 to 30 points. For comparison and analysis, the respondents were further classified into three categories depending on their level of concern: extremely concerned (agree for 5-6 statements), quite concerned (agree for 3-4 statements) and little concerned (agree for 2 or fewer statements). Most respondents (94.1%) showed extreme concern towards COVID-19, followed by moderate concern (4.5%) and little concern (1.4%).

Table 3. Attitude and behaviour towards COVID-19

Attitude	Strongly Agree n (%)	Agree n (%)	Neutral n (%)	Disagree n (%)	Strongly Disagree n (%)
We should avoid getting outside homes nowadays	90 (40.9)	82 (37.3)	39 (17.7)	7 (3.2)	2 (0.9)
If I decided to travel, COVID-19 may prevent me	74 (33.6)	77 (35.0)	19 (8.6)	26 (11.8)	24 (10.9)
The government should restrict the travel from and to the areas of the disease	152 (69.1)	50 (22.7)	11 (5.0)	2 (0.9)	5 (2.3)
Government should cancel all mass gatherings for this year	133 (60.5)	61 (27.7)	19 (8.6)	2 (0.9)	5 (2.3)
The government should isolate patients with COVID-19 in special hospitals	148 (67.3)	54 (24.5)	12 (5.5)	2 (0.9)	4 (1.8)
The government should avoid importing workers from the areas of the disease	152 (69.1)	51 (23.2)	9 (4.1)	4 (1.8)	4 (1.8)

E. Barrier to Face Mask Usage

The respondents were asked to report any barrier or hindrance that prevent them from wearing face masks from six given options. The most commonly reported barrier (56.8%) was "I feel discomfort when wearing a face mask".

Each participant was given 1 point for each barrier reported. Total barrier scores range from 0 to 6 points. For comparison and analysis, the respondents were further classified into those with a high level of barriers (5-6 points), moderate level of barriers (3-4 points), and low level of barriers (score 2 points and below). Most respondents (92.3%) had a low level of barriers to face mask usage, while only a few (1.4%) had a high level of barriers.

F. Knowledge on Face Mask Usage and COVID-19

The respondents were assessed on their knowledge regarding face mask usage and COVID-19 in two different sections. For the first section, 15 factual statements regarding face mask usage were given, to which they answered with "yes" or "no." The level of knowledge of the subject was assessed by

applying a scoring system: each correct answer was given 1 point, and for each incorrect answer was given 0 points. There are three categories of participants that have been grouped according to their level of knowledge: low (less than 8 points), moderate (8 to 11 points), and high (12 or more points).

In the next section, the respondents were tested on their knowledge about the disease, its nature, mode of transmission, symptoms and signs, incubation period, and preventive measures. This section consisted of 18 factual statements which participants responded to with "yes" or "no." A scoring system similar to the previous section was applied. Similarly, three categories of participants have been grouped according to their level of knowledge: low (less than 10 points), moderate (10-12 points), and high (13 or more points).

For both sections, the majority of the respondents (82.3% and 72.7%) were found to have a high level of knowledge, while only a few (0.5% and 2.3%) showed a low level of knowledge.

G. Prevalence of Face Mask Usage

Figure 2 shows the prevalence of face mask usage reported by the respondents. Out of 220 respondents, 197 (89.5%) disclosed that they wear face masks all the time. 20 of the respondents (9.1%) disclosed that they wear face masks only when they feel sick. Only 3 respondents (1.4%) reported that they never wear a face mask.

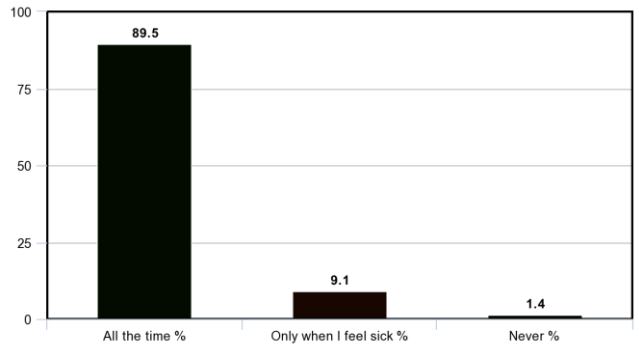

Figure 2. Prevalence of face mask usage

H. Factors Associated with Face Mask Usage

The association between factors and face mask usage is analysed using the Chi-square test. Table 4 shows the association between sociodemographic factors, hygienic practices, source of information, attitude, barriers to using face masks, level of knowledge, and face mask usage.

There was a significant association between hygienic practices and face mask usage (p=0.001), getting information from the internet and face mask usage (p=0.025), and level of attitude towards COVID-19 and face mask usage (p=0.001). All other factors were not associated with face mask usage.

The prevalence of face mask usage among the students and staff of FMHS, UPM in this study was 89.5%. This percentage is considered to be quite high as compared to a study where the prevalence of face mask usage in public spaces when experiencing influenza-like illnesses was only 36.6% (Lau *et al.*, 2008). In the same study, high prevalent usage of face mask behaviour was observed during outbreaks of emerging infectious diseases (e.g., SARS) or being anticipated (e.g., human H5N1). These behaviours may be seen as a response mechanism of self-protection and/or protecting others. The high prevalence of face mask usage among our respondents could be the result of the SOPs requirements in public spaces. These include only those with face masks can enter premises and the heavy penalties imposed upon failure to follow these SOPs. According to recent research by Hariyanayagam Gunasekaran *et al.* (2020), high face mask usage in the general population is an appropriate indicator of a strategy for public hygiene interventions that can help minimise the effect of COVID-19.

Table 4. Association between sociodemographic characteristics, hygienic practices, source of information, attitude, barriers to using face mask, level of knowledge, and face mask usage

Factors		Face Mask Usage			X^2	P-value
		All The Time n (%)	Only When I Feel Sick n (%)	Never n (%)		
Age Group						
	20-24	110 (91.7)	8 (6.7)	2 (1.6)	6.616*	0.579
	25-30	15 (100.0)	0 (0)	0 (0)		
	31-34	20 (100.0)	0 (0)	0 (0)		
	35-40	24 (80.0)	6 (20.0)	0 (0)		
	>40	30 (85.7)	5 (14.3)	0 (0)		
Gender						
	Male	65 (86.7)	8 (10.7)	2 (2.7)	1.833*	0.400
	Female	132 (91.0)	12 (8.3)	1 (0.7)		
Marital Status						
	Married	65 (90.3)	7 (9.7)	0 (0)	3.995*	0.407
	Single	116 (86.6)	15 (11.2)	3 (2.2)		
	Divorced	12 (85.7)	2 (14.3)	0 (0)		
Education Level						
	No Formal Education	1 (100.0)	0 (0)	0 (0)	16.436*	0.088
	Secondary School	14 (87.5)	1 (6.3)	1 (6.3)		
	Diploma	20 (100.0)	0 (0)	0 (0)		
	Degree	156 (88.6)	18 (10.2)	2 (1.1)		
	Master	6 (100.0)	0 (0)	0 (0)		
	PhD	0 (0)	1 (100.0)	0 (0)		
Working Status						
	Student	123 (89.1)	12 (8.7)	3 (2.2)	3.360*	0.499
	Employed	63 (90.0)	7 (10.0)	0 (0)		
	Unemployed	3 (100.0)	0 (0)	0 (0)		
Hygiene Practices						
	Poor	3 (75.0)	0 (0)	1 (25.0)	19.438*	**0.001[a]**
	Moderate	25 (83.3)	4 (13.3)	1 (3.3)		
	High	169 (90.9)	16 (8.6)	1 (0.5)		
Source of Information						
	TV	179 (89.5)	18 (9.0)	3 (1.5)	0.321*	0.852
	Newspaper &/or Magazines	130 (87.8)	16 (10.8)	2 (1.4)	1.619*	0.445
	Radio	93 (90.3)	8 (7.8)	2 (1.9)	0.860*	0.650
	Internet	189 (89.6)	20 (9.5)	2 (0.9)	7.392*	**0.025[a]**
	Public Lectures	70 (94.6)	3 (4.1)	1 (1.4)	3.429*	0.180
	Physician or					

	Health Educator	104 (90.4)	9 (7.8)	2 (1.7)	0.694*	0.707
Attitude						
	Little Concerned	3 (100.0)	0 (0)	0 (0)		
	Moderately Concerned	7 (70.0)	1 (10.0)	2 (20.0)	27.449*	**0.001[a]**
	Extremely Concerned	187 (90.3)	19 (9.2)	1 (0.5)		
Barriers to Using Face Mask						
	Low	182 (89.7)	19 (9.4)	2 (1.0)	7.104*	0.130
	Moderate	13 (92.9)	0 (0)	1 (7.1)		
	High	2 (66.7)	1 (33.3)	0 (0)		
Level of Knowledge Regarding Face Mask Usage						
	Low	1 (100)	0 (0)	0 (0)		
	Moderate	35 (92.1)	2 (5.3)	1 (0.5)	1.446*	0.836
	High	161 (89.0)	18 (9.9)	2 (1.1)		
Level of Knowledge Regarding COVID-19						
	Low	5 (100)	0 (0)	0 (0)	1.77*	0.778
	Moderate	47 (85.5)	7 (12.7)	1 (1.8)		
	High	145 (90.6)	13 (8.1)	2 (1.3)		

Note: ([a]) Significant level at p <0.05, (*) Chi Square Test

In this study, socio-demographic factors such as age group, gender, marital status, educational level, and working status of the respondents were determined. There was no significant association between age group and face mask usage (p=0.579). Our results showed that respondents from every age group wore their masks most of the time. According to a recent research, older adults (aged 55–64) were less likely to wear face masks as compared with younger adults (aged 18–24) when having respiratory symptoms (Lee *et al.*, 2020). It is believed that face masks were not applied by older adults because they have limited resources or financial allocation to purchase face masks and instead depend on others to get face masks. In addition, older people have very limited chance and capability to gain knowledge on health promotion.

There was no significant association between gender and face mask usage (p=0.400). Our results showed that the male and female respondents almost equally wear their face masks all the time. In contrast, a previous study regarding gender differences in health beliefs and behaviour reported that men engage in riskier behaviours and hold riskier beliefs than women (Courtenay, McCreary & Merighi, 2002). Similarly, a more recent study by Lee *et al.* (2020) reported that the practice of face masks usage amongst male adults was poorer than that amongst females. This contrasting finding could be because male and female respondents possess equal awareness about the importance of face mask usage during this pandemic.

Next, the association between education level and face mask usage was not significant (p=0.088). In a study by Pereira-ávila *et al.* (2020), most respondents have a degree in higher education, indicating that they had a greater understanding of the value of wearing masks to avoid COVID-19. This result was corroborated by a literature review on the use of masks to avoid respiratory infections which reported that higher education was positively related to the procedure (Sim, Moey & Tan, 2014). This data emphasises the need for education

interventions targeted at the population as a whole, particularly those with fewer years of education. The contradictory finding as compared to our data is probably due to no obvious educational variance among our respondents.

A significant association was reported between hygienic practices and face mask usage (p=0.001). Our result demonstrated that most of our respondents (90.6%) have a high level of hygienic practice or precautionary measures, which may be a factor that affects face mask usage. This result is on par with a study conducted where the evidence indicates that facial mask use is correlated with good personal hygiene practices and health behaviours among Japanese adults (Wada, Oka-Ezoe and Smith, 2012). Additional preventive health steps such as cleaning, gargling, crowd avoidance and reducing close contact with sick people, having good quality sleep, and being vaccinated against influenza were more likely to be adhered to by respondents that use face masks.

Only internet resources had a significant association with face mask usage (p=0.025). Respondents that selected the internet as their source of information were more likely to practice face mask usage. This could be because information regarding transmission of COVID-19 and the preventive measures recommended for it is more readily and quickly available on the internet as compared to the other sources of information. We presume that most of our respondents have greater access to the internet, whereby information is constantly updated, as the majority of them are students in FMHS, UPM. According to the early analysis of the source preferences literature, individuals first use their own experiences and memories to determine whether they will be able to solve a problem and then seek assistance to obtain additional information from external sources (Sawant, 1983). However, the introduction of the internet changed the habits of source preferences drastically. The internet allowed individuals to easily access an overwhelming number of sources outside their personal connections. It has been observed that internet outlets have gradually replaced historically prevalent information sources, such as people, newspapers, magazines, and television (Al-Hanawi *et al.*, 2020). Interestingly, a study by Case *et al.* (2004) demonstrated that people searching for genetic and disease information found that the internet was the most favoured source of first-choice outlets, followed by medical doctors and a public library.

Next, there was a significant association between attitude and face mask usage (p=0.001). Great efforts at all levels by the government, including awareness campaigns via various platforms, were able to provide the public with the recent update and precautionary measures of COVID-19 (Al-Hanawi *et al.*, 2020). Hence, this could be one of the factors that influenced the level of attitudes of the respondents towards COVID-19. Besides, good attitudes towards personal safety, household safety, and community safety were the most significant considerations of face mask usage (Chu *et al.*, 2020). Hence, a good level of attitudes will influence the way the respondents behave thus, enhancing the usage of face masks and other preventive measures.

There is no significant association between the level of knowledge regarding face mask usage and face mask usage (p=0.836). Most of our respondents have a high level of knowledge regarding face mask usage, but it does not seem to affect the usage of face masks. This result conflicts with findings from a study whereby people with a higher level of knowledge are more likely to comply with preventive behaviours (Sim, Moey and Tan, 2014). These behaviours can be explained by the increased understanding of disease and disease hazards of these individuals, which helps them to have a more serious view of the risks associated with non-compliance. Given that these individuals may also have a greater understanding of public health interventions and their efficacy, thus a higher awareness of the advantages of these preventive behaviours, they are more likely to comply with these interventions.

IV. CONCLUSION

In conclusion, there is a high prevalence (89.5%) of face mask usage all the time among students and staff of FMHS, UPM during the COVID-19 outbreak. High demand for precautionary measures, especially face mask usage must be continuously enforced by the health ministry to maintain this level of prevalence and encourage everyone to have a good attitude and behaviour towards the ministry efforts. The Ministry of Health, Malaysia should also continue updating the latest news and knowledge regarding COVID-19 to Malaysians so that they are well informed and maintain a

high level of knowledge. Staying informed will ensure that everyone is aware of what is currently happening and will be knowledgeable enough to include positive practices that can help combat this pandemic.

A. Study Limitations

This study had certain limitations and weaknesses. By administrating online questionnaires only, there were a few disadvantages. Unanticipated communication barriers between the investigator and respondents may have resulted in inaccurate results especially for our respondents with limited or no internet connection. Furthermore, our questionnaire was mostly distributed via Whatsapp and some respondents had trouble accessing, responded late, or overlooked our questionnaire due to an overload of other messages. Although students in FMHS, UPM are from many states of Malaysia, the results may not represent the whole population in Malaysia. There was difficulty in making a generalised finding for the whole population of UPM, not to mention the whole of Malaysia. Besides that, respondents might have deliberately modified their answers on attitude and behaviours to meet the current proper norms instead of expressing their real experience.

Finally, the study should be carried out in a bigger area that could actually represent the whole country and should also include a larger and more diverse demographic population for more significant and generalised results. This will help increase not only the number of respondents but the validity of the study as well.

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