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## Preventive Behaviors, Barriers, and Drivers of the COVID-19 Pandemic in Malaysia: A Cross-sectional Survey

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# Preventive Behaviors, Barriers, and Drivers of the COVID-19 Pandemic in Malaysia: A Cross-sectional Survey

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## Abstract

**Background:** Coronavirus disease 2019 (COVID-19) is a public health concern worldwide. This study aimed to assess the preventive behaviors, barriers, and drivers, including the knowledge and self-efficacy of COVID-19 in Malaysia.

**Methods:** A cross-sectional study was conducted during the COVID-19 outbreak by using a self-administered questionnaire. The instrument used was adopted from the World Health Organization resources. Descriptive statistics were used to describe the categorical data. Chi-square and independent t-test were performed to evaluate the associations between the variables and preventive behaviors.

**Results:** A total of 465 (97.3%) respondents were recorded. The mean age was  $34.3 \pm 11.8$  years old. A high percentage of the respondents (99.4%) were aware of the COVID-19 outbreak, and their knowledge mean score was 18.74 (Standard Deviation [SD]: 2.51). The mean scores of self-efficacy, barriers, and drivers were 11.07 (SD: 1.72), 5.20 (SD: 2.81), and 39.71 (SD: 5.17), respectively. Barriers (Odds Ratio [OR]: 1.10; 95% Confidence Interval [CI]: 1.01, 1.21;  $p < 0.05$ ) and drivers (OR: 1.12; 95% CI: 1.07, 1.17;  $p < 0.001$ ) were found to be predictors for social distancing practices.

**Conclusions:** Knowledge and self-efficacy were found to be at good levels, whereas self-efficacy, barriers, and drivers were revealed to be the predictive factors in determining the preventive behaviors. Adherence to preventive measures was largely affected by the behavioral drivers.

**Keywords:** coronavirus, COVID-19, cross-sectional studies, disease outbreaks, self-efficacy

## INTRODUCTION

A pneumonia disease outbreak, which was first identified in the city of Wuhan, Hubei Province of China in December 2019, has become a global concern since early 2020. The novel coronavirus disease has brought the attention of the World Health Organization (WHO) due to an exponentially increasing number of people being infected, involving many countries worldwide. The disease was declared a pandemic on March 11, 2020 by WHO.<sup>1</sup> To date, the number of reported cases has exceeded over 132 million with almost three million deaths globally.<sup>2</sup>

The disease has raised threats to the health system worldwide due to unknown treatments and fast transmission patterns with an ever-growing number of infected cases and mortality rates daily.<sup>3</sup> People of all ages can be infected, and the infection can be transmitted from an asymptomatic person during the incubation period.<sup>4,5</sup> The elderly and those with comorbidities are more vulnerable to COVID-19 infection

than others. The symptoms vary, and severe cases may result in deaths. Therefore, WHO has emphasized the transparent delivery of information from the higher authorities to the public about the preparedness, readiness, and response measures to increase awareness and public health knowledge for reducing the spread of the novel coronavirus.<sup>6</sup> In general, appropriate preventive measures, such as health programs, health education, and awareness, have led to good health behavior practices.<sup>7,8</sup> Thus, knowledge and preventive behavior toward the COVID-19 infection are two of the important areas to reduce anxiety and increase preparedness among communities.

Early recognition of symptoms and provisions of preventive measures help increase recovery and prevent conditions from deteriorating.<sup>9</sup> Risk assessment and preparedness measures are critical in curbing the transmission of the novel coronavirus.<sup>6</sup> Hence, various preventive measures, such as quarantine, travel restriction, strict movement control, and COVID-19 center establishment, have been implemented worldwide and at the national level to contain and mitigate the disease.<sup>10</sup> The preparedness measures at individual levels are those related to the self-preventive behaviors to reduce the risk of transmission, such as frequent hand washing, wearing a face mask, and social distancing.<sup>11</sup> Implementing preventive measures at a

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correct time has shown to have major impacts on health outcomes.<sup>12</sup> Meanwhile, incorrect information or messages may trigger an alarm to the public and increase panic, distress, fear, and anxiety level.<sup>13</sup> Transparent communication and adequate knowledge provided by the government to the community are critical to increase awareness and self-efficacy among the public for adopting preventive behaviors in curbing the spread of the virus and thus protecting themselves against it.<sup>14</sup> Governments take various approaches to slow down the spread of the infection, such as close down workplaces and schools, prevent massive gatherings, and impose quarantine restrictions.<sup>15</sup> Information dissemination using official media, newspaper, television, radio or airing at public stations, such as bus stations, varies among countries. Studies have shown that these means of information delivery are effective in engaging the public to adopt the required preventive behaviors, provided the information is appropriate.<sup>16,17</sup> The means of communication and information are also a critical function for the psychological well-being of individuals to go through this pandemic.<sup>18</sup>

Perceived self-efficacy is a concept introduced by Bandura in 1977, and it is related to a person's belief in his or her competency and ability to cope or influence events that may affect his or her life.<sup>19</sup> A person's belief about his or her capabilities has been proven to have a direct impact on what he or she is capable to do and produce desired actions.<sup>20,21</sup> It is a foundation of motivation, performance achievement, and emotional well-being.<sup>22</sup> Studies have also revealed that self-efficacy plays an important role in health behavior.<sup>23-25</sup> As a result, high self-efficacy increases one's engagement in preventive behavior. Behavioral change has been the main primary target in improving preventive behaviors among communities and the public at individual levels. Barriers and drivers to health care also play important roles in engaging them to adopt health behaviors.<sup>26</sup> Studies have indicated that barriers to health care have impacts on health outcomes, such as cost and transportation,<sup>27,28</sup> whereas drivers help increase health outcomes; for example, improving access to healthcare systems through social influences.<sup>29,30</sup>

Therefore, this study aimed to assess the levels of preventive measures, barriers, and drivers, including the knowledge and perceived self-efficacy among the Malaysian community during the pandemic and to gain insights into their practice of preventive behaviors against the novel coronavirus.

## METHODS

This research was a national cross-sectional study conducted during the movement control order period from May 2020 to August 2020 in Malaysia. The study had

been approved by the Ethical Research Committee of the Universiti Kebangsaan Malaysia (reference no: PPI/111/8/JEP-2020-27) and had complied with the STROBE guideline. An online self-administered questionnaire via a Google form was used. It was distributed using convenient sampling through email among private and government agencies or associations and through social media platforms among known individuals. The population comprised people residing in Malaysia with Malaysian nationalities. Three inclusion criteria were considered for this study, namely, participants must be above 18 years old, literate, and have an Internet access. The sample size was 1,000, determined using the WHO guidelines, which recommended it for meaningful findings of studies based on large population sizes.

The survey was conducted using tools adapted and extracted from WHO resources, Guidance and Protocol<sup>31</sup>. The questionnaire comprised items related to sociodemographic information, knowledge, self-efficacy, barriers, drivers, and preventive behaviors. It involved two languages: English and Malay. Forward and backward translations were performed to ensure semantically equivalent versions. The sociodemographic section included questions related to age, gender, level of education, healthcare profession, chronic illness, and state of residence. The knowledge section comprised six main domains: knowledge level (two items), group at risk of severe illness (eight items), symptoms of COVID-19 infection (nine items), treatment of COVID-19 infection (one item-related to availability of drug and vaccine), transmission of the COVID-19 infection (two items), and infection statements (two items-the incubation period and immune system). The perceived self-efficacy section consisted of two items: how well the person knows about ways to protect themselves and whether avoiding the infection is easy. The preparedness questions were measured using three main domains: preventive measures, barriers, and drivers. The preventive measures were divided into two categories: i) the possible preventive measures; "Which of the following are effective measures to prevent the spread and infection of the novel coronavirus?" (23 items) and ii) the taken preventive measures (i.e., the preventive behaviors); "Which of the following measures have you taken to prevent infection from the novel coronavirus?" (23 items). The barriers and drivers comprised 10 items in total.

Knowledge was assessed on the basis of scores. The correct answer was assigned a score of 1, and the items were summed up with total scores ranging from 5 to 22. A higher total score is indicative of greater knowledge about COVID-19. The items on preventive measures were assessed on the basis of the answers given, namely, "yes, no, do not know, or do not apply." The items on perceived self-efficacy were rated using a seven-point

Likert scale from 1 = not at all to very much so ("I know how to protect myself from coronavirus") to 7 = extremely difficult to extreme ("for me avoiding an infection with the novel coronavirus in the current situation is ...."). The scores for this domain could range from 2 to 14 with higher scores reflecting higher perceived-self-efficacy. The items on barriers and drivers were rated using a seven-point Likert scale from 1 = strongly disagree to 7 = strongly agree. The scores could range from 2 to 14 for the barriers and from 7 to 47 for the drivers. The lower scores of barriers and the higher scores of drivers indicated better preventive measures.

Data were analyzed using the Statistical Package for the Social Sciences version 21.0. A descriptive analysis was performed for all sections by using percentages. Chi-square and t-test were conducted to determine the association of participants' background, knowledge, self-efficacy, and preparedness with the preventive behaviors. Multiple logistic regression analyses were performed to determine key factors associated with the preventive behaviors, such as hand washing, wearing a face mask, and social distancing. Adjusted odds ratios (ORs) were used to interpret variables of preventive practices. Univariate analysis was conducted to determine the relationships of knowledge, self-efficacy, barriers, and drivers with the significant variables in the final model.

## RESULTS

### Participant characteristics

A total of 478 respondents received the questionnaire via the online Google form, approximately 48% of the targeted sample size. However, given that 2.7% of the responses were incomplete, only data from 465 participants were included for the analysis. No duplication of the data was observed. The respondents' mean ages were  $34.3 \pm 11.8$  years old. More than half of them were female (65.6%), and 93.5% were not health professionals. Approximately three quarters (77%) of the respondents had bachelor's degrees and higher. Most of them (91%) claimed that they had no chronic illnesses. The respondents were from all states in Malaysia, and almost half of them were from the central region of Malaysia (47.3%), the highest percentage being from the state of Selangor (25.4%). The details are presented in Table 1.

### Knowledge

Most participants (99.4%) were aware of the COVID-19 outbreak. A high percentage of the respondents claimed that their knowledge level of the novel coronavirus and ways to prevent its spread were above moderate; 88.0% and 93.3%, respectively. The mean scores of their knowledge were 18.74 (SD: 2.51) based on the summation of the following items; people at risk of

severe illness, symptoms, treatment, transmission, and infection of COVID-19 (Table 2).

### Self-efficacy

The mean score of their perceived self-efficacy was 11.07 (SD: 1.72). The mean of each item is presented in Table 2.

**TABLE 1.** Demographic profile of the respondents

Variables	Frequency (N)	Percentage (%)
<b>Age</b>		
18-25 years old	184	39.6
26-35 years old	69	14.8
36-45 years old	69	14.8
46-55 years old	102	21.9
>55 years old	16	3.4
Total	440	94.6
<b>Gender</b>		
Male	160	34.4
Female	305	65.6
Total	465	100
<b>School education</b>		
Primary and secondary school	57	12.2
Pre-university	50	10.8
Bachelor's	276	59.4
Master's and higher	82	17.6
Total	465	100
<b>A health professional</b>		
Yes	30	6.5
No	435	93.5
Total	465	100
<b>Having a chronic illness</b>		
Yes	28	6
No	423	91
Do not know	14	3
Total	465	100
<b>Regions in Malaysia</b>		
Central Region	220	47.3
Northern Region	67	14.4
Southern Region	94	20.2
East Coast	71	15.3
East Malaysia (Sabah & Sarawak)	13	2.8
Total	465	100

**TABLE 2.** Mean scores of knowledge, self-efficacy, barriers, and drivers

	Min	Max	Mean	SD
<b>Knowledge domains</b>				
People at increased risk	1.00	8.00	7.39	1.14
Symptoms	1.00	9.00	6.80	1.82
Treatment	1.00	1.00	0.92	0.27
Transmission	1.00	2.00	1.92	0.31
Infection	1.00	2.00	1.72	0.47
<b>Knowledge (Total)</b>	5.00	22.00	18.74	2.51
<b>Perceived self-efficacy</b>	5.00	14.00	11.07	1.72
<b>Barriers</b>	2.00	14.00	5.20	2.81
<b>Drivers</b>	7.00	49.00	39.72	5.17

**Barriers**

The total mean score for barriers was 5.20 (SD: 2.81). Almost 81.3% of the respondents disagreed with the statement “I seldom have access to water and soap,” and 60% of them disagreed with the statement “My hands dry out when I wash them frequently” (Table 2).

**Drivers**

More than 80% of the participants agreed to drivers’ statements such as “I see my family and friends washing their hands frequently” and “Health authorities urge me to wash my hands frequently.” Less than half (33.4%) agreed to protect others by avoiding crowded areas; “I want to protect others by avoiding crowded areas.” The mean score for drivers was 39.72 (SD: 5.17) (Table 2).

**Preventive behaviors**

A high percentage of the respondents claimed that hand washing for 20 seconds (97.2%); wearing a face mask (83.2%); using hand disinfectants (97.6%); avoiding touching eyes, nose, and mouth with unwashed hands (99.4%); covering mouth when coughing (97.4%); staying home when sick (97.5%); and not traveling abroad (99.4%) are the effective preventive measures to prevent

the spread of the disease. A high percentage was also aware of other preventive measures, such as exercising regularly (80.9%) and taking food supplements (81.7%).

More than 90% of the respondents adhered to the recommended preventive measures; hand washing for 20 seconds (96.8%), wearing a face mask (98.5%), using hand disinfectants (92.9 %), covering mouth when coughing (98.1%), staying home when sick (97.0%), and not traveling abroad (98.5%). Less than half of the participants believed social distancing (48.2%), practicing self-quarantine (41.5%), and avoiding crowded places (48.0%) are effective preventive measures. In practice, 75.9% of the participants practiced social distancing, and 98% of them performed self-quarantine. However, less than half (47.3%) avoided touching eyes, nose, and mouth with unwashed hands, and only a low percentage of them (38.3%) avoided crowded places. With regard to other preventive behaviors, a high percentage of the respondents practiced having a balanced diet (91.8%) and taking food supplements (80.4%). Table 3 presents the frequencies of the responses to the effective measures for preventing the spread of COVID-19 and preventive behaviors.

**TABLE 3.** Effective measures to prevent the spread and infection of COVID-19 (N = 465)

Variables	Effective measures			Taken effective measures		
	Yes N (%)	No N (%)	Do not know N (%)	Yes N (%)	No N (%)	Do not apply N (%)
Hand washing for 20 seconds	452 (97.2)	9 (1.9)	4 (0.9)	450 (96.8)	14 (3.0)	1 (0.2)
Wearing a face mask	387 (83.2)	44 (9.5)	34 (7.3)	458 (98.5)	4 (0.9)	3 (0.6)
Social distancing	224 (48.2)	188 (40.4)	53 (11.4)	353 (75.9)	76 (16.3)	36 (7.7)
Use of disinfectants to clean hands when soap and water is not available for washing hands	454 (97.6)	7 (1.5)	4 (0.9)	432 (92.9)	27 (5.8)	6 (1.3)
Avoid touching eyes, nose, and mouth with unwashed hands	462 (99.4)	3 (0.6)	0(0.0)	220 (47.3)	171 (36.8)	74 (15.6)
Covering mouth when cough	453 (97.4)	0 (0.0)	12 (2.6)	456 (98.1)	5 (1.1)	4 (0.9)
Staying home when you are sick or when having a cold	453 (97.4)	10 (2.2)	2 (0.4)	451 (97.0)	10 (2.2)	4 (0.9)
Self-quarantine	193 (41.5)	191 (41.1)	81 (17.4)	456 (98.1)	4 (0.9)	5 (1.1)
Avoiding close contact with someone who is infected	348 (74.8)	82 (17.6)	35 (7.5)	459 (98.7)	3 (0.6)	3 (0.6)
Avoiding places where many people gather	223 (48.0)	170 (36.6)	72 (15.5)	178 (38.3)	211 (45.4)	76 (16.3)
Not traveling abroad	462 (99.4)	3 (0.6)	0 (0.0)	458 (98.5)	5 (1.1)	2 (0.4)
Exercising regularly	376 (80.9)	55 (11.8)	34 (7.3)	346 (74.4)	80 (17.2)	39 (8.4)
Ensuring a balanced diet	214 (46.0)	167 (35.9)	84 (18.1)	427 (91.8)	30 (6.5)	8 (1.7)
Taking herbal supplements	354 (76.1)	81 (17.4)	30 (6.5)	354 (76.1)	94 (20.2)	17 (3.7)
Taking food supplements	380 (81.7)	68 (14.6)	17 (3.7)	374 (80.4)	73 (15.7)	18 (3.9)
Taking antibiotics	251 (54.0)	165 (35.5)	49 (10.5)	307 (66.0)	122 (26.2)	36 (7.7)
Using homeopathic remedies	351 (75.5)	88 (18.9)	26 (5.6)	112 (24.1)	279 (60.0)	74 (15.9)
Getting a flu shot	83 (17.8)	235 (50.5)	147 (31.6)	359 (77.2)	87 (18.7)	19 (4.1)
Drinking ginger tea	354 (76.1)	92 (19.8)	19 (4.1)	283 (60.9)	138 (29.7)	44 (9.5)
Drinking coconut juice	62 (13.3)	296 (63.7)	107 (23)	358 (77.0)	93 (20.0)	14 (3.0)
Practicing caution when opening the mail	343 (73.8)	91 (19.6)	31 (6.7)	168 (36.1)	225 (48.4)	72 (15.5)
Avoiding eating meat	345 (74.2)	112 (24.1)	8 (1.7)	204 (43.9)	210 (45.2)	51 (11.0)

Hand washing for 20 seconds was not associated with the background of the respondents, such as gender, age, level of education, having a chronic illness, and region of living ( $p > 0.05$ ) but was significantly associated with work as a health provider ( $p < 0.001$ ). Hand washing for 20 seconds was also insignificantly associated with knowledge, self-efficacy, barriers, and drivers ( $p > 0.05$ ). Meanwhile, wearing a face mask was not associated with participants' background, knowledge, self-efficacy, and barriers ( $p > 0.05$ ) but was significantly associated with drivers ( $p < 0.01$ ). Social distancing was significantly associated with age ( $p < 0.05$ ) and drivers ( $p < 0.001$ ). Other preventive behaviors were significantly associated with the background of the respondents, namely, age, level of education, presence of illness, region of residency, and whether they are healthcare providers. The presence of chronic illnesses was significantly associated with staying home when sick ( $p = 0.037$ ), covering mouth when coughing ( $p = 0.005$ ), avoiding contact with an infected person ( $p < 0.001$ ), and practicing self-quarantine ( $p < 0.001$ ).

A regression analysis was performed to determine the predictive factors associated with preventive behaviors: hand washing, wearing a face mask, and social distancing. The results showed that perceived self-

efficacy was the predictive factor for wearing a face mask (OR: 1.70; 95% CI: 1.11, 2.60;  $p < 0.05$ ). For every unit increase in the self-efficacy score, the chance of the participants wearing a face mask increased 1.7 times as likely. Barriers were found to be a predictive factor for wearing a face mask (OR: 1.69; 95% CI: 1.03, 2.76;  $p < 0.05$ ) and social distancing (OR: 1.10; 95% CI: 1.01, 1.21;  $p < 0.05$ ). These results indicate that those who agreed to having problems with access to water and soap and hands drying out when washed frequently had 1.10 times as likely barriers compared with those who disagreed. Last, the high mean score of drivers was 1.12 times as likely predictors of social distancing (95% CI: 1.07, 1.17;  $p < 0.001$ ) compared with those with lower scores (Table 4).

Self-efficacy was also found to be related with barriers and drivers; for every unit increase in barriers, the mean self-efficacy score decreased by 0.07 ( $p < 0.05$ ); and for every unit increase in drivers, the mean of self-efficacy score increased by 0.07 ( $p < 0.001$ ). The nonhealth providers were found to have lower mean scores of barriers than health providers by 1.26 ( $p < 0.05$ ). Respondents older than 55 years old and who have master's degrees and higher had the mean knowledge scores of 18.26 ( $p < 0.001$ ) (Table 5).

**TABLE 4.** Factors associated with the taken preventive measures: Findings from the regression analysis

	Wash hand			Face mask			Social distance		
	OR	CI (95%)	<i>p</i>	OR	CI (95%)	<i>p</i>	OR	CI (95%)	<i>p</i>
<b>Knowledge</b>									
Knowledge	1.14	0.92, 1.42	0.238	0.98	0.68, 1.41	0.906	1.07	0.97, 1.18	0.167
<b>Self-efficacy</b>									
Self-efficacy	0.98	0.73, 1.34	0.925	1.70	1.11, 2.60	0.014*	0.89	0.76, 1.03	0.106
<b>Preparedness</b>									
Barriers	1.12	0.90, 1.40	0.297	1.69	1.03, 2.76	0.037*	1.10	1.01, 1.21	0.034*
Drivers	1.07	0.96, 1.20	0.205	1.07	0.92, 1.25	0.362	1.12	1.07, 1.17	0.000*

Multiple logistic regression,  $R^2_1 = 0.213$ ,  $R^2_2 = 0.500$ ,  $R^2_3 = 0.168$ , \* $p < 0.05$

**TABLE 5.** Relationship of knowledge, self-efficacy, barriers, and drivers with the significant independent variables in the final model

Variables	Estimate	SE	<i>p</i>	Multiple comparison*
<b>Knowledge</b>				
Age				
18–25 yrs old	-0.176	0.639	0.001	1 < 3 < 4
26–35 yrs old	0.790	0.668		
36–45 yrs old	1.010	0.670		
46–55 yrs old	1.326	0.652		
*>55 yrs old				
Education				
Primary and secondary school	-0.968	0.437	0.30	1 < 2
Pre-university	0.445	0.444		
Bachelor's	0.006	0.340		
Master's and higher				
Intercept	18.259	0.648	< 0.001	
<b>Self-efficacy</b>				
Barriers	-0.070	0.028	0.012	

**Table 5.** Continue

Variables	Estimate	SE	<i>p</i>	Multiple comparison*
Drivers	0.070	0.015	< 0.001	
Intercept	8.652	0.612	< 0.001	
<b>Barrier</b>				
Self-efficacy	-0.171	0.075	0.024	
Health Provider				
No	-1.264	0.526	0.017	
Yes				
Intercept	8.269	0.993	< 0.001	
<b>Drivers</b>				
Self-efficacy	0.643	0.136	< 0.001	
Education				
Primary and secondary school	-1.826	0.864	0.003	1 < 3 < 2
Pre-university	1.632	0.900		
Bachelor's	-0.622	0.630		
Master's and higher				
Intercept	33.017	1.605	< 0.001	

ANCOVA analysis of covariance; \* Bonferroni

## DISCUSSION

This study aimed to determine the COVID-19 knowledge, perceived self-efficacy, barriers, and drivers and to investigate the associations between these variables with the preventive behaviors among the population in Malaysia. This research may be the first to assess COVID-19 knowledge, perceived self-efficacy, barriers, drivers, and preventive behaviors by using WHO guidelines in the Malaysian community.

Most of the respondents had good knowledge about the COVID-19 outbreak. The data were collected during the end stages of the second wave of COVID-19 in Malaysia. The results proved that there had been good dissemination of COVID-19 information to the population via official and social media, such as television and telegram. Internet access was also widely used and well established; along with social media, the information dissemination can occur at a fast rate.<sup>32</sup> The information could easily be accessed anywhere and at any time.<sup>33</sup> The values scored in each domain were above average. The highest mean score achieved by the respondents was for the treatment and transmission domains, which indicated that they were in the knowledge about no effective treatment being available for COVID-19 at this stage and about the mode of the disease transmission. This was followed by the infection domain, people at risk of severe illness, and the symptoms of COVID-19 infection.

As for the symptoms, a high percentage of the respondents agreed that fever, cough, shortness of breath, and sore throat are related to COVID-19. By contrast, more than half of them agreed that other symptoms, such as runny nose, muscle ache, headache, and fatigue, are related to the disease. Only approximately half of the respondents agreed that

diarrhea is related to COVID-19. The results showed that the most common symptoms were well-known among the public, but not for other related symptoms, such as headache, muscle ache, and diarrhea. A high percentage of the respondents also agreed that no drug treatment or vaccine is currently available for COVID-19. With regard to transmission, a high percentage of them knew that the novel coronavirus is transmissible from person to person; that it can be transmitted via droplets through coughing, sneezing or intimate contact, and the incubation time can be up to 14 days. This result is in contrast to that found in a study conducted on healthcare workers in early March 2020.<sup>34</sup> Although the time frame was different, the results related to the transmission of the disease were alarming, as the participants were healthcare workers. Concerning the immune response, only two thirds of the respondents answered the related question correctly (i.e., after a person has recovered from the disease, he/she is not necessarily immune to COVID-19). Despite the low percentage of respondents in some items, this study showed that the population has good knowledge about the COVID-19 infection. This result is expected, as the government updated and disseminated the information through various means of communication. In addition, social media has been found to be one of the effective ways to deliver the knowledge.<sup>33</sup>

This study also reported high self-efficacy among the respondents, in contrast to the finding in another research measuring self-efficacy related to COVID-19 among a community.<sup>35</sup> They found that the population had a low level of self-efficacy, correlated with perceived severity of infection, although a high level of self-efficacy was reported, which was positively correlated with preventive behaviors. The present study revealed that a high level of self-efficacy was positively correlated with knowledge. The same finding was reported by another

study, which showed that illness perceptions toward COVID-19 had a significant indirect effect on self-efficacy, but a direct effect on the adherence to preventive measures.<sup>36</sup> Thus, self-efficacy has a strong impact on someone's health behaviors.<sup>24</sup> Knowledge of the disease, awareness of risk factors, and subjective perceptions are shown to have positive impacts on self-efficacy.<sup>37,38</sup> Therefore, the public health intervention should focus on enhancing self-efficacy among the community to increase compliance toward preventive behaviors.

In this research, a high percentage of the respondents exhibited preventive behaviors, such as washing hands, using hand disinfectants, wearing a face mask, practicing cough etiquette, avoiding close contact with a COVID-19 positive person, adhering to self-quarantine, and staying home when sick. Less than half of them claimed that they neither avoid crowded places nor avoid touching their eyes, mouth, and nose with unwashed hands. In addition, hand cleaning (hand washing and using hand disinfectants) and mouth covering (wearing a face mask and practicing cough etiquette) were the effective measures and preventive behaviors taken by the respondents to prevent the spread of the infection. Meanwhile, less than half of them claimed social distancing and avoiding crowded places as effective measures. As for preventive behaviors, almost three quarters of the respondents were found to have practiced social distancing measures, whereas only slightly above a quarter of them were reported to have avoided crowded places. Many of the preventive behaviors are voluntary in nature, and ensuring their cooperation requires great efforts. Social distancing measures, especially avoiding places where many people gather, were hardly adhered. This finding is in contrast to that in an earlier study in Malaysia.<sup>39</sup> A research performed at the earlier stage of the second wave pandemic in Malaysia reported that more than three quarters of the participants (83%) avoided crowded places, but wearing a face mask was at a lower percentage (51%). This result was quite expected, as the study was conducted during the earlier period of the pandemic where people were more concerned about the infection. The reason could be due to the lack of belief that wearing a face mask can protect them from the disease, resulting in its low compliance compared with in the later stage of the pandemic. Furthermore, due to a long period of movement control order and the continuing outbreak, a psychological impact might have an influence on the adherence to the preventive behaviors.<sup>40,41</sup>

Social distancing measures impose lifestyle changes, which are against the social norms of most people, mainly in the adolescent group.<sup>42,43</sup> The same finding was revealed in this study where a significant association was observed between social distancing and age. More than half of the younger respondents were found to be not in

compliance with social distancing measures. A similar finding was also obtained with avoiding places where many people gather, although it was insignificant. Another research has revealed that social distancing requires the strongest influential factors, such as wanting to protect themselves and their family members and being able to communicate remotely.<sup>44</sup> Other studies have shown that compliance to social distancing depends on factors such as flexible working time, belief that social distancing plays a role in preventing the spread of the disease, and their responsibility to protect the community.<sup>45,46</sup>

In general, adequate and timely information helps increase preventive behaviors. The dissemination of knowledge or information by using proper means is essential to accentuate the importance of preventive behaviors. Nudges in the forms of prompts, cues, and reminders have also been used in Malaysia<sup>47</sup> as tools to direct or cause people to behave in specific ways, with the potential to change people's behaviors effectively and improve outcomes.<sup>48</sup> A study about social distancing was conducted on a total of 500 adults in Ireland; it reported that an informative public health message via a poster helps motivate social distancing and reduce the spread of COVID-19.<sup>49</sup> Hence, well-designed information is crucial to improve voluntary compliance for ensuring the containment of the COVID-19 infection.

The present study added that respondents take other measures to prevent the spread of the infection, such as exercising regularly, ensuring a balanced diet, taking food and herbal supplements, taking antibiotics, getting a flu shot, and drinking ginger tea and coconut juice. Few other preventive measures, such as using homeopathic remedies, avoiding eating meat, and practicing caution when opening meals, were also thought as being effective, although less than half of them were actually doing them.

Furthermore, barriers such as infrequent access to water and soap and hands that dry out when washed frequently had low scores of agreements. Thus, both factors were not barriers to the participants. Meanwhile, drivers showed high mean scores on most items, such as "I see my family and friends washing their hands frequently" and "Health authorities urge me to avoid crowded areas," except for item "I want to protect others by avoiding crowded areas." Therefore, the participants did not strongly agree that they will protect others by avoiding crowded areas. The results emphasized that social distancing is not a preventive measure that is easily accepted by the population. The causal drivers of the participants in this study were based highly on the norms and higher authorities, different from a research on social distancing in the United States,<sup>50</sup> which involved 2,500 participants; it showed that higher information seeking, higher financial security, and higher worry about



the coronavirus were the causal drivers for social distancing. The differences found in both studies may be related to the culture, lifestyle, and environment of the population. Therefore, policymakers may have to fully understand the impact of social distancing and target an efficient intervention model for social distancing among the targeted population.

A few limitations were identified in the present study, which should be highlighted in future research. First, most of the participants were not health professionals. Therefore, the results might have reflected general population responses, which were unrelated to health professionals. In addition, the results cannot be generalized to the whole population because the sample size was small. In addition, a high percentage of them had bachelor degrees and higher, in agreement with an earlier study conducted in China by Zhong *et al.* (2002).<sup>51</sup> Thus, the results only focus on the higher education population. Second, those who have no tertiary education or those living in rural areas might have no access to the questionnaire, as this study was conducted online. Therefore, any decision to generalize these findings to other categories of the population must be made thoughtfully. Third, the complete set of questionnaires was lengthy and time-consuming. Thus, the number of responses was low, and the sample size could not be achieved within the time frame. Moreover, online survey response rates were reported to be lower than paper-based surveys.<sup>52</sup> Fourth, the questionnaire was adapted directly from WHO. Hence, the validity and reliability were not conducted. Last, the questionnaire was self-administrated, and it might have led to certain types of limitation biases, such as social desirability.

## CONCLUSIONS

The results of this study are expected to have significant application for policy design and future research in Malaysia. This research sheds light on the relevant factors concerning preventive behaviors in reducing the spread of COVID-19 infection. It highlights that barriers and driver, along with self-efficacy, are the most significant factors in predicting individuals' preventive behaviors. Therefore, policymakers have a significant role in ensuring individuals' engagement in effective preventive behaviors, including social distancing, which largely contributes to the reduction of COVID-19 transmission.

## CONFLICT OF INTEREST

No potential competing interest was reported by the authors.

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