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COVID-19: Knowledge, Attitude, Practice in Malaysia

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ABSTRACT

Background: Malaysia is no exception to the COVID-19 pandemic, and to date, there is no specific treatment to cure the disease, and the vaccine is still not available. Hence, to stress the importance of practising protective measures.

Objective: This study intended to examine the knowledge, attitude, and practice towards COVID-19 and its preventive measures among Malaysian amid the CMCO (Conditional Movement Control Order) during the COVID-19 pandemic in Malaysia.

Methods: This cross-sectional study was conducted online among Malaysians aged 18 years old and above from May to June 2020 using a self-developed questionnaire through snowball sampling.

Results: A total of 571 respondents were analyzed. The average age was 26 years old, and monthly income was RM1500, about half were females (57.8%), had education level to undergraduate (58.1%), one-third were Indians (34.7%), one-fifth were Malays (23.6%), one-third from Sarawak (31.2%), and one-fifth from Selangor (25.0 %). The correct rate for all three outcome domains was high, 83% for knowledge, 85% for attitude, and 86% for practice. Few respondents still holding the myths regarding COVID-19. No significant factors contributed to the knowledge score. Factors that contributed to higher attitude scores were monthly income and employment status. Factors that contributed to higher practice scores were female, Chinese, and medical employees. The higher the knowledge score, the higher the attitude score and practice score.

Conclusions: Malaysians discerned and optimistic about COVID-19, its preventive measures, and the implementation of MCO. They had confidence with the government in combating COVID-19 and were practising preventive measures.

Key Words: Attitude, COVID-19, Knowledge, Malaysia, Practice

INTRODUCTION

Coronavirus disease (COVID-19) is a pandemic, affecting 216 countries, with 8 061 550 confirmed cases and 440 290 confirmed deaths globally.¹⁻⁵ Malaysia is the earliest to declare positive cases among the Southeast Asian country.^{5,6,7} Following the tremendous increase in COVID-19 cases in Malaysia, the government has enforced the Movement Control Order (MCO). It commenced on 18th March 2020, endeavouring containment and mitigation of the COVID-19 cases to flatten the curve of positive cases, thus lighten the burden of health care systems in Malaysia.⁷⁻¹⁰

The success of MCO permitted the country to substitute MCO to Conditional Movement Control Order (CMCO), whereby more restrictions were lifted. However, the community is demanded to adhere to the Standard Operation

Procedure (SOP) and continuously habituate the new normal to hinder another surge of COVID-19 cases.^{3,9} This new normal comprised wearing a face mask, washing hands frequently with hand sanitiser or soap and water, social distancing, and avoiding crowded places.^{6,11} These practices demand the community to transform their behaviour, which relies on their knowledge and attitude towards the disease and its preventive measures.¹²⁻¹⁷ A prior study by Azlan et al.² had demonstrated a decent level of knowledge concerning COVID-19 among Malaysian before the implementation of MCO.²

This current study intended to re-examine the level of knowledge, attitude and practices regarding COVID-19 encompass sign and symptoms, mode of transmission and preventive measures, among adult Malaysian using self-de-

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veloped questionnaire during the implementation of CMCO. It covers attitudes and practices toward preventive measures, which was not examined in the previous study. Additionally, it includes the practice of proper usage of face mask, myths, and panic buying in the community during CMCO.

This study is imperative to reassess the persistence of knowledge, attitude, and practices regarding COVID-19 and its preventive measures toward the recovery phase of the COVID-19 pandemic in Malaysia. Data gained from this study would gauge the effectiveness and sustainability of health education and promotion delivered to the public via social media and mass media. Additionally, it helps to identify a group of communities with a low level of knowledge, attitude, and practices that require more attention in terms of the provision of information regarding COVID-19. This study would also provide the data concerning compliances to preventive measures, which is the paramount important at the moment to conquer the COVID-19. Furthermore, this study also examines the myths and disinformation regarding COVID-19 and its preventive measures that would be beneficial to be identified and clarified by authorities to avoid scepticism in the community.

MATERIALS AND METHODS

Study design and population

This study was a cross-sectional study. It was conducted online among adult Malaysian aged 18 years old and above from May 2020 until June 2020.

Sampling method

The Snowball sampling method was used to recruit a total of 580 study samples, surpassed a total calculated sample size, which was 460. The sample size was obtained from the *Openepi Application* for calculation of sample size with an unknown total number of study population and frequency of study sample. The calculated sample size, with a 95% confidence interval was 384. With the addition of a 20% non-response rate, the total calculated sample size was 460. A bilingual version of Malay and English online survey was created using google form and distributed through researchers' social network via social media to those who fulfilled the criteria, who then shared the link to others. The inclusion criteria include adult Malaysian aged 18 years old and above who able to understand English or Malay. Whereas, the exclusion criterion was medical students of UNIMAS because they were given the information regarding COVID-19 in the educational platform eLEAP UNIMAS and were involved with other studies regarding COVID-19.

Study instrument

The study instrument was an online survey form. It incorporates the information regarding the study, respondent's

consent form, sociodemographic data collection form, and self-developed questionnaire of the Knowledge, Attitude, and Practice (KAP) towards the COVID-19. The KAP questionnaire was validated through a pilot study. It was conducted among 46 undergraduate students of UNIMAS, which was 10% of the calculated sample size. Half of the sample were medical students, and another half were non-medical students. The Cronbach alpha for Knowledge, Attitude, and Practice scales were 0.723, 0.808, and 0.723, respectively.

Sociodemographic data comprises of age, gender, race, religion, marital status, highest education level, employment status, monthly income, and current place of staying. Knowledge domain comprises of 18 items covering signs and symptoms (4 items), high-risk groups (5 items), mode of transmission (3 items), availability of vaccine (1 item), and preventive measures towards COVID-19 (5 items). The possible response was a dichotomous, 'yes' or 'no' with one score given for each correct answer and zero for each incorrect answer. Accordingly, the total score ranges from '0' to '18', whereby the higher score indicates a higher level of knowledge. Attitude domain comprises of 12 items. It includes attitude towards the preventive measures (8 items), abide quarantine order (1 item), willingness to meet a person who had tested positive despite declared cured (1 item), implementation of MCO (Movement Control Order) (1 item), and confidence with government at combating the COVID-19 (1 item). The possible response was a Likert scale, ranging from '1' to '5' from 'strongly disagree' to 'strongly agree.' Accordingly, the total score ranges from '12' to '60', whereby the higher score indicates a more positive attitude. Practice scale comprises of 10 items covering practices of preventive measures (9 items) and disinformation regarding COVID-19 (1 item). The possible response was a Likert scale, ranging from '1' to '5' from 'strongly disagree' to 'strongly agree.' Accordingly, the total score ranges from '10' to '50', whereby the higher score indicates practising more preventive measures. All three scales contain both positive and negative statements, and all negative statements have been given a reversed score before analysis.

Data analysis

Data in an excel spreadsheet was revised and exported to Statistical Package for Social Sciences (SPSS), version 18, then analyzed using multiple linear regression. The P-value of less than 0.05 was considered a significant finding.

Ethical consideration

The Medical Ethical Committee of UNIMAS has approved the study (Reference number: UNIMAS/NC-21.02/03-02 Jld.4 (65)).

RESULTS

Sociodemographic background

A total of 571 respondents were analyzed. The average age was 26 years old (IQR=18, range= 18-73) and monthly income was RM1500 (IQR=4000, range= 0-24 000). More than half were females (57.8%), about one-third were Indian (34.7%), followed by Malays (23.6%) and Chinese (14.4%). About one-third were Hindu (31.3%), Christian (30.8%) and Muslim (28.2%). More than half have the highest education level until undergraduate (58.1%), followed by pre-university (16.6%) and postgraduate and masters (14.5%). Almost two-thirds were single (60.4%). Almost half were students (41.3%), followed by the non-medical employee (31.3%) and medical employee (18%). About one-third of them were from Sarawak (31.2%), followed by Selangor (25.0 %), and another half were from other states throughout Malaysia. Detail displays in Table 1.

Sources of knowledge concerning COVID-19

Most of the respondents acquired knowledge concerning COVID-19 from social media (81.8%), mass media (80.9%), and Ministry of Health, Malaysia website (74.1%). Additionally, more than half acquired knowledge from friends and family (60.1%) and the World Health Organization website (52%). Detail displays in Table 2.

Knowledge, attitude and practice towards COVID-19

As shown in Table 3, the average score for the knowledge was 15 (IQR=3, range= 5-18), the attitude was 51 (IQR=10, range= 27-60), and the practice was 43 (IQR=7, range=16-50). Accordingly, the overall correct answer rate for the knowledge was 83% (15/18* 100), the positive attitude was 85% (51/60* 100), and the correct practice was 86% (43/50* 100).

As shown in Table 4, most of the respondents realized that the elderly (95.6%) and individuals with chronic illnesses (93.7%) are high-risk groups of getting severe COVID-19 disease. Additionally, they realized that people who are less than 1 meter apart from positive cases who are coughing or sneezing could get infected (87.7%). Furthermore, they also realized that a person who touches their eye, nose, or mouth after in contact with an infected object or surface (96%) could get infected. Likewise, most aware of the need to self-quarantine themselves once returned from overseas (94%), avoid crowded places (98.4%), practice cough and sneeze etiquette (94.7%), and wear a face mask in public areas (71.3%).

As shown in Table 5, most had a positive attitude towards preventive measures. They believe the importance of self-quarantine once returned from overseas (94.6%), avoiding crowded places (96.4%), social distancing (63.1%), prac-

tising cough and sneeze etiquette (72.7%), washing hands regularly (96.1%), and wearing a face mask in public places (90.2%). Furthermore, most agreed with the implementation of MCO (89.5%) and had confidence in the government to overcome COVID-19 (77.4%)

As shown in Table 6, most undertaken preventive measures such as avoid crowded places (92.3%), wash hands regularly (93%), wear a face mask in public places (93.2%), avoid touching face while wearing a face mask (76.7%), discard the face mask immediately in the closed bin once removed (86.5%), wash hands immediately after removing the face mask (90.1%), and keep social distancing (93.2%)

These findings demonstrated that Malaysians were discerned about COVID-19 and its preventive measures, had optimistic attitudes and undertaken the preventive measures to break the transmission of COVID-19 in the community. Despite that, few were still holding to the myths and disinformation regarding COVID-19 and its preventive measures. Almost half of the respondents thought COVID-19 could spread from pet to human (48%), and more than half thought COVID-19 could spread through food or food packaging (59%). Moreover, about half never disinfect their hand-phone (46.7%), more than half never disinfect their door-knob (54.6%), sprayed or applied disinfectant fluid on their body to prevent COVID-19 (54.1%), drank warm water to prevent COVID-19 (59.9%) and took a hot bath to prevent COVID-19 (44.7%). Besides, most would avoid encounters with people who had tested positive despite declared cured of COVID-19 (78.8%) and had purchased the essentials in larger quantities than usual (75.8%).

Association between total score of knowledge and sociodemographic background

There was a significant linear relationship between age and total score of knowledge ($P < 0.001$). Those with ten years older have a higher total score of knowledge by 0.3 (95% CI: 0.17-0.44). There was a statistically significant difference in the total score of knowledge between those staying in West Malaysia and Sarawak. Those staying in West Malaysia have a lower total score of knowledge by 0.58 (95% CI: 1.03-0.14) as compared to those staying in Sarawak. There was a statistically significant difference in the total score of knowledge between Indians and others compared to Malay ($P < 0.001$ and $P < 0.001$, respectively). Indians have a lower total score of knowledge by 0.75 (95% CI: 1.15-0.35) and other races lower by 0.99 (95% CI: 1.46-0.52) as compared to Malay. There was a significant difference in the total score of knowledge between a group of undergraduate and postgraduate compared to a group of pre-university ($P < 0.001$ and $P < 0.001$ respectively). A group of undergraduates have a higher total score of knowledge by 1.06 (95% CI: 0.64-1.47) and a group of postgraduates and masters by 1.07 (95% CI: 0.56-1.57) as compared to a group of pre-university. There

was a significant difference between a group of medical employees and a group of unemployed ($P=0.002$). A group of medical employees have a higher total score of knowledge by 0.72 (95% CI: 0.27-1.17) as compared to a group of unemployed. Therefore, a total score of knowledge affected by age, current place of staying, races, highest education level, and employment status. Detail displays in table 4.

Association between total score of attitude and sociodemographic background

There was a significant difference in the total score of attitudes between respondents with monthly income RM 5000- RM9999 and respondents with monthly income less than RM5000 ($P=0.009$). Those with monthly income RM5000- RM9999 have a higher total score of attitudes by 1.70 (95% CI: 0.43- 2.98) as compared to those with monthly income less than RM5000. There was a significant difference in the total score of attitudes between students and unemployed ($P=0.005$). Students have a higher total score of attitudes by 1.45 (95% CI: 0.46-2.44) as compared to the unemployed. Therefore, the total score of attitudes affected by monthly income and employment status. Detail displays in table 5.

Association between total score of practice and sociodemographic characteristics

There was a significant difference in the total score of practices between females and males ($P=0.003$), whereby females have a higher total score of practices by 1.84 (95% CI: 1.016-2.664). There was a significant difference in the total score of practices between Chinese and Malays ($P<0.001$), whereby the Chinese have a higher total score of practice by 1.58 (95% CI: 0.54-2.62). There was a significant difference in the total score of practices between medical employees and unemployed ($P<0.001$), whereby the medical employees have a higher total score of practices by 2.24 (95% CI: 1.19-3.30). Therefore, the total score of practice is affected by gender, race, and employment status. Detail displays in table 6.

Relationship between the level of knowledge, attitude and practice towards COVID-19

There was a significant linear relationship between the total score of knowledge and total score of attitudes ($p<0.001$). Those with 1 unit higher in the total score of knowledge have 0.822 units higher in the total score of attitudes (95% CI: 0.084, 0.137). There is a significant linear relationship between the total score of attitudes and a total score of practice ($p<0.001$). Those with 1 unit higher in the total score of attitudes have 0.223 units higher in the total score of practices (95% CI: 0.190,0.367). Therefore, higher knowledge regarding COVID-19 and its preventive measures contribute to higher attitudes and practices towards its preventive measures. Detail displays in tables 7, 8, and 9.

DISCUSSION

COVID-19 has attracted the attention of people worldwide since it has affected the population in many aspects. However, there is no vaccine nor the specific medications available to eliminate and cure the COVID-19. Therefore, preventive measures are the key to combat COVID-19, which depends primarily on community adherence to preventive measures. Many studies have shown that practice of preventive measures determined by the knowledge and attitude of the community. Therefore, the authorities obliged to monitor the knowledge, attitude, and practices towards COVID-19, notably the preventive measures among the Malaysian community. Additionally, identifying the attributes to the lower level of knowledge, attitude, and practices would be beneficial for proper planning of any strategies to ensure the standard level of knowledge, attitude, and practice achieved.

Our findings have shown that the Malaysians are educated about COVID-19, and its preventive measures (correct rate was 83%), have optimistic attitudes (85%) and practising the correct preventive measures (86%) to break the transmission of COVID-19 in the community. These findings correspond to a study done by Azlan et al.² among Malaysians. It reported Malaysians to have a high level of knowledge regarding COVID-19 (correct rate was 80.5%), held sound attitudes, and practising preventive measures such as avoiding crowds (83.4%) and practising proper hand hygiene (87.8%). However, our findings have shown that there were more people wearing face masks when going out (93.2%) compared to the previous study done during the initial phase of MCO, which was 51.2%.² This finding related to the accessibility of the face mask, whereby the community could easily purchase it from pharmacies and retail shops compared to the initial phase of the pandemic. A study was done by Praharaj M. also found a high level of knowledge (80.28%) regarding COVID-19 among participants from Odisha, however, the level of attitude was lower (58.03%).²¹

Factors contributed to higher knowledge scores were increasing age ($P<0.001$) and staying in Sarawak compared to West Malaysia ($P=0.011$). Other factors that contributed to higher knowledge scores were Malays compared to Indian and others ($P<0.001$ and $P<0.001$). Likewise, undergraduate and postgraduate or master had higher knowledge scores compared to pre-university ($P<0.001$ and $P<0.001$). Also, medical employees had higher knowledge scores compared to the unemployed ($P=0.002$). However, the discrepancy in scores for all attributes was about 1-2 score only. Therefore, although the discrepancy in scores was statistically significant, it was too little to be considered significant. This study failed to demonstrate the significant attribution of factors such as age, residency, socioeconomic status, gender and education level to knowledge score as shown in other studies done in China, Tanzania, Egypt and Sudan.^{1,18,19}

Factors contributed to higher attitude scores were monthly income of RM 5000- RM9999 as compared to monthly income less than RM 5000 ($P=0.009$) and student compared to unemployed ($P=0.005$). The discrepancy between the total score of attitudes was between 1-3. These findings correspond to other studies done in China and Bangladesh, whereby the higher the education and the income, the more positive their attitude.¹⁹

Factors attributed to higher practice scores were female ($P=0.003$), Chinese compared to Malay ($P<0.001$), and medical employees compared to unemployed ($P<0.001$). The discrepancy between the score was between 1-3. The findings of female attributed to better practice than male correspond to other studies done in China and Sudan.^{10,19} Since the COVID-19 pandemic, there have been some myths and disinformation regarding COVID-19 spreading in the community. These might lead to confusion and malpractices in the community. Therefore, the WHO (World Health Organization) has taken action to debunked most of it through the WHO website.¹¹ Despite that, our findings have shown that a significant number of Malaysians were still holding on a myth about COVID-19. About one-third of respondents thought that COVID-19 could spread from pet to human (31.3%), and more than two-thirds thought that it could spread from food or food packaging (72.5%). More than one-third of respondents had sprayed or applied the disinfectant fluid on their body to prevent COVID-19 (39%), exposed themselves to sunlight (34.8%), drank warm water to prevent COVID-19 (49%) and took a hot bath to prevent COVID-19 (32.6%).

Moreover, most of the respondents responded that they would avoid meeting a person who had COVID-19, although they have cured (78.8%). This finding verified the statement by CDC (Centre for Disease Control and Prevention), which stated that the possible group that might stigmatize during the COVID-19 pandemic were the people who had COVID-19, had recovered, or had released from quarantine. These groups of people might be discriminated in the form of avoided or rejected by other people, turned down from healthcare, education, housing, or employment and, verbally and physically abused. Stigmatized persons and even the communities they live in can have adverse effects on their emotional, mental, and physical wellbeing.⁴

Furthermore, more than half of the respondents confessed that they had purchased the essentials in larger quantities than usual (53.8%). This finding justified the statement regarding the socioeconomic implications of the COVID-19 pandemic worldwide, whereby the food sector was among few sectors that have been under pressure as a result of people's panic buying and stocking up food supplies.¹³ Nevertheless, most of the respondents agreed with the implementation of MCO (Movement Control Order) to break the transmission of COVID-19 (89.5%) and assured that Malaysia would con-

quer the COVID-19 (77.4%). These correspond to the previous study, which stated that the participants held positive attitudes toward the achievement of control of COVID-19 (83.1%) and the capability of Malaysia to vanquish the disease (95.9%).²

Our findings have shown that there was a significant interrelationship between knowledge score and attitude score with practice score. The higher the knowledge score, the higher the attitude score and the practice score. This finding corresponds to the study done in China and Saudi Arabia, whereby higher knowledge scores are associated with lower negative attitudes and practising preventive measures.^{19,20}

LIMITATIONS

The sampling of respondents was performed through convenience sampling, which was a snowball sampling method, and the survey form was distributed through researchers' social networks via social media platforms like WhatsApp, Facebook, and Instagram. Therefore, the underprivileged population that does not have access to the internet and not using social media platforms were unable to participate in the study. Random sampling is required to ensure that the findings can be generalized to the population.¹⁸⁻²² The questionnaire used to measure Knowledge, Attitude, and Practice towards COVID-19 and its preventive measures were self-developed. It was developed based on the information obtained from the Ministry of Health (MOH) website, World Health Organization (WHO) website, online news, previous studies, peer review, and feedback from the pilot study, without subjected to proper validation process due to the limited time to conduct the study. Although it has been tested in a pilot study to improve the reliability of the questionnaire, further processes are required to validate the questionnaire thoroughly.

Lastly, the possibility of respondents giving socially desirable responses is inevitable.

CONCLUSIONS

In summary, this study has contributed to additional information for further understanding of the knowledge, attitudes, and practices towards COVID-19 among Malaysians. It has demonstrated that Malaysians are discerned about COVID-19 and its preventive measures, have optimistic attitudes towards the preventive measures, implementation of MCO and the ability of Malaysia to win the battle against COVID-19, and practising preventive measures as demanded by the authorities. However, a particular group of people were still holding on to the myths and disinformation regarding COVID-19; thus, authorities obliged to clarify the issues to

avoid malpractice and negative consequences related to it. Furthermore, particular groups of people have been identified to have a lower level of knowledge, attitude, and practice towards COVID-19. Hence, the particular actions must be taken to ensure the achievement of the standard level of knowledge, attitude, and practice towards COVID-19 and its preventive measures among different groups of people in the community to safeguard the country from COVID-19. A continuous effort from the authorities is required to maintain a gratifying level of knowledge, attitude, and practice towards COVID-19 and its preventive measures among Malaysians.

Supplementary Information

Supplementary information accompanies this paper in a PDF format attached.

Abbreviations

COVID-19: Coronavirus Disease 2019; KAP: Knowledge, Attitude and Practice; FMHS: Faculty of Medicine and Health Sciences; WHO: World Health Organization; UNIMAS: Universiti Malaysia Sarawak; SPSS: Statistical Package for Social Sciences (SPS).

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Authors' Contributions: The questionnaire was self-designed and distributed online to the study population by all authors. Rafidah Elias provided guidance throughout the study, reviewed the manuscript, and submitted the article.

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Ethics Approval and Consent to Participate: Ethics approval from the Ethical Committee of Faculty of Medicine and Health Sciences, UNIMAS, Sarawak attained. (Ref: UNIMAS/NC-21.02/03-02 Jld.4 (65)). All participants consented to participate voluntarily in the study.

Consent for Publication: Not applicable

Conflict of Interest: The authors have no conflict of interests to proclaim.

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Table 1: Sociodemographic background of respondents (N=571)

Variable	n (%)	Median (IQR)	Mean (SD)
Age (Year)	-	26 (18) ^a	33 (13)
Monthly Income (RM)	-	1500 (4000) ^a	2596 (3393)
Gender			
Male	241 (42.2)		
Female	330 (57.8)		
Race			
Malay	135 (23.6)		
Chinese	105 (18.4)		
Indian	198 (34.7)		
Iban	51 (8.9)		
Bidayuh	27 (4.7)		
Others	55 (9.6)		
Religion			
Islam	161 (28.2)		
Buddha	46 (8.1)		
Hindu	179 (31.3)		
Christian	176 (30.8)		
Others	9 (1.6)		
Highest Education Level			
No education	1 (0.2)		
Secondary school	47 (8.2)		
Pre-university	95 (16.6)		
Undergraduate	332 (58.1)		
Postgraduate/Masters	83 (14.5)		
PhD	13 (2.3)		
Marital Status			
Single	345 (60.4)		
Married	215 (37.7)		
Divorced	6 (1.1)		
Others	5 (0.9)		
Employment Status			
Unemployed	53 (9.3)		
Student	236 (41.3)		
Employed (Medical)	103 (18.0)		
Employed (Non-medical)	179 (31.3)		
Current Residency			
Johor	19 (3.3)		
Kedah	50 (8.8)		
Kelantan	4 (0.7)		
Kuala Lumpur	44 (7.7)		
Labuan	2 (0.4)		
Melaka	7 (1.2)		
Negeri Sembilan	11 (1.9)		
Pahang	11 (1.9)		
Perak	26 (4.6)		
Pulau Pinang	18 (3.2)		
Putrajaya	2 (0.4)		
Sabah	45 (7.9)		
Sarawak	178 (31.2)		
Selangor	143 (25.0)		
Seremban	1 (0.2)		
Terengganu	4 (0.7)		
Unknown	6 (1.1)		

^a Skewed to the right; SD = Standard deviation
IQR = Interquartile range; RM = Ringgit Malaysia

Table 2: Source of knowledge concerning COVID-19 (N=571)

Variables	n (%)
Social Media	
Yes	467 (81.8)
No	104 (18.2)
Mass Media	
Yes	462 (80.9)
No	109 (19.1)
MOH (Ministry of Health Malaysia Website)	
Yes	423 (74.1)
No	148 (25.9)
Friends and family	
Yes	343 (60.1)
No	228 (39.9)
WHO (World Health Organization Website)	
Yes	297 (52.0)
No	274 (48.0)
Others	
Yes	39 (6.8)
No	532 (93.2)

Table 3: Knowledge, attitude and practice towards COVID-19 (N=571)

Variable	Number of items	Mean (SD)	Median (IQR)
Knowledge	18	14.2 (2.2)	15.0 (3) ^a
Attitude	12	50.3 (6.1)	51.0 (10) ^a
Practice	10	42.2 (5.2)	43.0 (7) ^a

SD=Standard deviation; ^a = Skewed to the left

IQR=Interquartile range

Table 4: Knowledge regarding COVID-19 (N= 571)

Items	Correct	
	n	%
1. COVID-19 is a pandemic disease (widespread)	567	99.3
2. COVID-19 is highly infectious from one individual to another	565	98.9
3. Cough is one of the most common symptoms of COVID-19	543	95.1
4. Runny nose is one of the symptoms of COVID-19	161	28.2
5. Asymptomatic person is unlikely to have COVID-19	370	64.8
6. In general, when will a person show signs and symptoms of COVID-19	434	76
7. Children are at risk of serious COVID-19 infection and death	331	58
8. Adolescents are at risk of serious COVID-19 infection and death	520	91.1
9. Adult are at risk of serious COVID-19 infection and death	451	79
10. Older people are at risk of serious COVID-19 infection and death	546	95.6
11. Individual with chronic illnesses are at risk of serious COVID-19 infection and death	535	93.7
12. A person can be infected with COVID-19 if they are less than 1 meter from a coughing or sneezing patient	501	87.7
13. A person can be infected with COVID-19 if they touch their eye, nose or mouth after touching an infected object or surface	548	96
14. COVID-19 can spread from pets to human	392	68.7
15. COVID-19 can spread through food or food packaging	157	27.5
16. Antibiotic is a treatment for COVID-19	395	69.2

Table 4: (Continued)

Items	Correct	
	n	%
17. There is no vaccine for COVID-19	451	79
18. Self-quarantine at home for 14 days after coming back from overseas can prevent transmission of COVID-19	537	94
19. Not going out to crowded places can prevent COVID-19	562	98.4
20. *Maintain social distancing at least 1 meter (3 feet) from others, particularly those who are coughing, sneezing and having a fever can prevent COVID-19	548	96
21. The practice of proper cough and sneeze etiquette can prevent transmission of COVID-19	541	94.7
22. *The practice of regular handwashing with water and soap is better than using a hand sanitizer to prevent COVID-19	33	5.8
23. The practice of wearing face masks when going out cannot prevent COVID-19	407	71.3
24. Disinfection of frequently touch objects or surfaces cannot prevent transmission of COVID-19	392	68.7

*Not included as part of the total score of knowledge scale

Table 5: Attitudes toward COVID-19 (N= 571)

Items	Correct	
	n	%
1. I believe, self-quarantine at home for 14 days after coming back from overseas is important to prevent transmission of COVID-19	540	94.6
2. I believe, not going to crowded places is important to prevent COVID-19	550	96.4
3. I believe, maintain social distancing at least 1 meter (3 feet) from others, particularly those who are coughing, sneezing and having a fever is not important to prevent COVID-19	360	63.1
4. I believe, practicing proper cough and sneeze etiquette is not important to prevent transmission of COVID-19	415	72.7
5. I believe, frequent hand wash with water and soap, or hand sanitizer is important to prevent COVID-19	549	96.1
6. I believe, wearing face masks when going out is important to prevent COVID-19	515	90.2
7. I believe, disinfection of frequently touch objects or surfaces is not important to prevent transmission of COVID-19	430	76.3
8. I will isolate myself if I have fever and cough	546	95.6
9. I will accept quarantine in a health facility or quarantine center if I get COVID-19	549	96.1
10. I will avoid meeting a person who is declared cured from COVID-19	121	21.2
11. I do not agree with the implementation of MCO (Movement Control Order) to break the transmission of COVID-19	511	89.5
12. I do not have confidence that Malaysia will win the battle against the COVID-19	442	77.4

*Not included as part of the total score of attitude scale

Table 6: Practice of preventive measures of COVID-19 (N= 571)

Items	Correct	
	n	%
I still go to crowded places	355	92.3
I wash my hands often with water and soap or hand sanitizer	531	93.0
I wear a face mask when I am in public places	532	93.2
I avoid touching the face mask while using it	438	76.7
I discard the face mask immediately in a closed bin after use	494	86.5

Table 6: (Continued)

Items	Correct	
	n	%
I clean my hands immediately after removing the face mask	514	90.1
I clean my handphone with soap and water, or disinfectants	304	53.3
I clean my house's doorknob with soap and water, or disinfectants	259	45.4
*I spray/ apply the disinfectant fluid on my body to prevent COVID-19	348	61
I expose myself to sunlight/high-temperature environment to prevent COVID-19	372	65.2
*I drink warm water to prevent COVID-19	291	51
*I take a hot bath to prevent COVID-19	385	67.4
I maintain a social distance of a least 1 meter (3 feet) away from other people when I am in public places	532	93.2
*I purchase the essentials in a larger quantity than usual	265	46.2

*Not included as part of the total score of practice scale

Table 7: Factors associated with total score of knowledge towards COVID-19 among Malaysians (N=571)

Variables	SLR ^a			MLR ^b			
	b ^c	(95% CI)	P value	Adj. b ^d	(95% CI)	t-stat	P value
Age (years)	0.028	(0.014, 0.041)	<0.001	0.031	(0.017, 0.044)	4.497	<0.001
Monthly income							
Less than RM5000	1						
RM5000-RM9999	0.59	(0.12, 1.059)	0.014				
More than RM10000	1.571	(0.713, 2.428)	<0.001				
Current residency							
Sarawak	1						
Sabah	0.606	(-0.049, 1.26)	0.07				
West Malaysia	-0.584	(-0.951, -0.217)	0.002	-0.583	(-1.030, -0.136)	-2.562	0.011
Gender							
Male	1						
Female	0.396	(0.032, 0.76)	0.033				
Race							
Malay							
Chinese	1.232	(0.777, 1.687)	<0.001				
Indian	-0.774	(-1.148, -0.4)	<0.001	-0.752	(-1.154, -0.351)	-3.681	<0.001
Others	-0.343	(-0.769, 0.084)	0.115	-0.992	(-1.461, -0.522)	-4.15	<0.001
Religion							
Islam	1						
Hindu	-0.705	(-1.091, -0.320)	<0.001				
Christian	0.378	(-0.012, 0.768)	0.058				
Others	0.265	(-0.347, 0.877)	0.395				
Education level							
Pre-university and below	1						
Undergraduate	0.163	(-0.203, 0.529)	0.382	1.055	(0.636, 1.474)	4.946	<0.001

Table 7: (Continued)

Variables	SLR ^a			MLR ^b			
	<i>b^c</i>	(95% CI)	<i>P</i> value	<i>Adj. b^d</i>	(95% CI)	<i>t</i> -stat	<i>P</i> value
Postgraduate and above	0.759	(0.28, 1.238)	0.002	1.066	(0.558, 1.574)	4.119	<0.001
Marital status							
Unmarried	1						
Married	0.551	(0.181, 0.922)	0.004				
Employment							
Unemployed	1						
Student	-0.411	(-0.777, -0.046)	0.027				
Employed (medical)	0.806	(0.341, 1.271)	0.001	0.719	(0.272, 1.167)	3.161	0.002
Employed (non-medical)	-0.193	(-0.582, 0.196)	0.331				
Total score of practice	0.073	(0.039, 0.107)	<0.001				
Total score of attitudes	0.123	(0.095, 0.151)	<0.001	0.11	(0.084, 0.137)	8.181	<0.001

Table 8: Factors associated with total score of attitudes towards COVID-19 among Malaysians (N=571)

Variables	SLR ^a			MLR ^b			
	<i>b^c</i>	(95% CI)	<i>P</i> value	<i>Adj. b^d</i>	(95% CI)	<i>t</i> -stat	<i>P</i> value
Age (years)	0.008	(-0.030, 0.046)	0.689				
Monthly income							
Less than RM5000	1						
RM5000-RM9999	1.813	(0.521, 3.105)	0.006	1.704	(0.431, 2.977)	2.63	0.009
More than RM10000	0.818	(-1.571, 3.206)	0.502				
Current residency							
Sarawak	1						
Sabah	0.966	(-0.832, 2.763)	0.292				
West Malaysia	-0.09	(-1.105, 0.925)	0.862				
Gender							
Male	1						
Female	1	(-0.004, 2.005)	0.051				
Race							
Malay	1						
Chinese	1.997	(0.723, 3.272)	0.002				
Indian	-0.484	(-1.529, 0.561)	0.363				
Others	-0.259	(-1.436, 0.918)	0.666				
Religion							
Islam	1						
Hindu	-0.571	(-1.643, 0.501)	0.296				
Christian	0.82	(-0.255, 1.896)	0.135				
Others	0.95	(-0.735, 2.635)	0.269				

Table 8: (Continued)

Variables	SLR ^a			MLR ^b			
	<i>b</i> ^c	(95% CI)	<i>P</i> value	Adj. <i>b</i> ^d	(95% CI)	<i>t</i> -stat	<i>P</i> value
Education level							
Pre-university and below	1						
Undergraduate	0.717	(-0.29, 1.724)	0.163				
Postgraduate and above	0.09	(-1.241, 1.421)	0.894				
Marital status							
Unmarried	1						
Married	-0.152	(-1.18, 0.875)	0.771				
Employment							
Unemployed	1						
Student	0.494	(-0.516, 1.504)	0.337	1.451	(0.463, 2.439)	2.885	0.005
Employed (medical)	0.484	(-0.81, 1.778)	0.463				
Employed (non-medical_	-0.807	(-1.878, 0.264)	0.14				
Total score of knowledge	0.937	(0.723, 1.15)	<0.001	0.822	(0.611, 1.032)	7.668	<0.001
Total score of practice	0.342	(0.251, 0.434)	<0.001	0.278	(0.190, 0.367)	6.17	<0.001

Table 9: Factors associated with total score of practice towards COVID-19 among Malaysians (N=571)

Variables	SLR ^a			MLR ^b			
	<i>b</i> ^c	(95% CI)	<i>P</i> value	Adj. <i>b</i> ^d	(95% CI)	<i>t</i> -stat	<i>P</i> value
Age (years)	0.043	(0.011, 0.076)	0.009				
Monthly income							
Less than RM5000	1						
RM5000-RM9999	1.09	(-0.023, 2.203)	0.055				
More than RM10000	1.198	(-0.851, 3.248)	0.251				
Current residency							
Sarawak	1						
Sabah	1.038	(-0.516, 2.593)	0.19				
West Malaysia	-0.895	(-1.770, -.020)	0.045				
Gender							
Male	1						
Female	1.775	(0.922, 2.629)	<0.001	1.84	(1.016, 2.664)	4.385	0.003
Race							
Malay	1						
Chinese	1.971	(0.879, 3.063)	<0.001	1.579	(0.54, 2.618)	2.984	<0.001
Indian	-0.195	(-1.094, 0.703)	0.67				
Others	0.444	(-0.567, 1.456)	0.388				
Religion							
Islam	1						
Hindu	-0.172	(-1.094, 0.750)	0.714				
Christian	1.128	(0.206, 2.050)	0.017				
Others	1.47	(0.025, 2.914)	0.046				
Education level							
Pre-university and below	1						

Table 9: (Continued)

Variables	SLR ^a			MLR ^b			
	<i>b</i> ^c	(95% CI)	<i>P</i> value	Adj. <i>b</i> ^d	(95% CI)	<i>t</i> -stat	<i>P</i> value
Undergraduate	-0.771	(-1.635, 0.094)	0.081				
Postgraduate and above	1.044	(-0.097, 2.184)	0.073				
Marital status							
Unmarried	1						
Married	0.985	0.106, 1.864	0.028				
Employment							
Unemployed	1						
Student	-0.487	(-1.355, 0.381)	0.271				
Employed (medical)	1.851	0.749, 2.952	0.001	2.242	(1.185, 3.299)	4.167	<0.001
Employed (non-medical_	-0.905	(-1.824, 0.014)	0.054				
Total score of knowl- edge	0.41	0.218, 0.602	<0.001				
Total score of attitudes	0.253	0.185, 0.320	<0.001	0.223	(0.156, 0.290)	6.554	<0.001