

Original Article

KNOWLEDGE, ATTITUDES AND PRACTICES TOWARDS COVID-19 AMONG PUBLIC IN MALAYSIA

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ABSTRACT

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The Government of Malaysia have set and implemented various Standard Operating Procedures (SOP) as an effort to mitigate the outbreak of Coronavirus disease 2019 (COVID-19). Compliance and cooperation of Malaysian towards SOP are an indicator of the effectiveness of these mitigation measures. The aim of this research was to study the knowledge, attitudes and practices towards COVID-19 among public in Malaysia. A cross-sectional online survey of 419 Malaysian residents was conducted between 1st May 2021 to 10th June 2021. The survey instrument consisted of demographic characteristics, 11 items on knowledge, 10 items on attitudes and 9 items on practices. Descriptive statistics, chi-square tests, t-tests and one-way analysis of variance (ANOVA) were used to analyse the data obtained. The overall correct rate of the knowledge questionnaire was 84.5%. Most of participants (97.4%) knew that there currently is no effective cure for COVID-19, but early, symptomatic and supportive treatment could help most patients recover from infection and mortality rate of COVID-19. Most of participants have positive attitudes toward COVID-19 (57.5%). 96.2% of participants also agreed that events (e.g: feast, birthday party) were not encouraged to be held during pandemic COVID-19 outbreak. Most of participants (79.4%) have better practice toward COVID-19. 99.0% of participants wore mask when they go out. 98.6% of participants encouraged their family/friends to comply the current SOP. In conclusion, the study findings suggested that most of Malaysian have a good knowledge and moderate attitudes with good practices in reacting to COVID-19 outbreak.

INTRODUCTION

Coronavirus disease (COVID-19) is defined as an illness caused by a novel coronavirus, now known as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2; formerly known as 2019-nCoV) [1]. The novel coronavirus was firstly recognized in December 2019, in Wuhan, China and has rapidly spread around the globe with a high contagious rate [2]. COVID-19 is considered a global public health threat and has evolved to become a pandemic crisis around the world since it causes serious complications and numerous deaths. Besides, COVID-19 can be transmitted easily via respiratory droplets and direct or indirect contact with the mucous membranes of the nose, mouth and eyes of one person to another [3]. COVID-19 patients can be asymptomatic or progress respiratory infection with main clinical symptoms like dry cough, fever, fatigue and in more severe cases, difficulty in breathing. When severe symptoms arise, immediate medical treatments are needed [4].

On January 30th 2020, World Health Organization (WHO) declared the COVID-19 outbreak as a global health emergency (World Health Organization) [5] and constituted Public Health Emergency of International Concern (PHEIC) to call for all countries to take

immediate and serious action against the spread of the virus [6]. In Malaysia, the first positive case involving three Chinese citizens was confirmed on 25th January 2020. They had entered Malaysia via Johor from Singapore on 23th January. Infection rates remained low however precautionary measures had already begun to be taken [7]. For example, the Ministry of Health (MOH) planned to have thermal scanners at every country entry points. As time passed by, the number of positive cases increased which drove the Malaysian government to make a drastic movement and action. Thus, starting on 18th March 2020, the government enforced a Movement Control Order (MCO) [7] as a means of preventing community spread since the virus can be transmitted as rapid human-to-human transmission. The MCO limited most non-essential activities outside of the home. Malaysians were only allowed to leave the house for essential activities like grocery shopping and medical treatment. Malaysians were also barred from leaving the country, as were all foreigners from entry. Non-essential industries were told to shut down or allow staff to work from home. The enforcement of MCO has significantly affected the economic activities, education, manufacturing sector, tourism industry and so on. Malaysia had not

previously experienced such an epidemic thus it was clear that society and healthcare systems are not readily prepared for COVID-19. With the scarcity of clinical measures at that time, the involvement of all parties was essential. Tagline #stayhome actively spread through mass media to encourage the public to stay at home if there is no important matter outside. Production of personal protective equipments for frontliners has been intensified by many factories. Numerous organizations held fund-raising events in order to provide medical supplies to hospitals. A temporary hospital was set up and collaborations with healthcare service providers were permitted, while additional laboratories were assigned to strengthen the capabilities of the ministry of health (MOH).

Implementation of public health protocols such as lockdown procedures, social distancing, scanning MySejahtera QR code, hand washing and wearing a mask as an immigrated efforts to flatten the rising graph of positive COVID-19 cases has caused confusion and massive fear among the society [7]. Malaysians reacted with panic and perplexity when the initial announcement of MCO was made. It leads to panic buying and people crowded public transportation hubs to go back to their hometown. It can potentially increase the risk of virus spreading and infection to other parts of the country. Due to the virus's obscurity, there has been a lot of misinformation and misunderstanding regarding the virus, like how it spreads, and the steps that should be taken to avoid infection. With a large amount of misinformation and deception published on social media, people's comprehension of COVID-19 is becoming increasingly muddled. It eventually raises concerns about Malaysians' understanding and attitudes towards COVID-19. Despite all measures taken in combating the outbreak, the public's behaviour is the one to determine whether these measures succeed or fail. Specifically, public adherence to the established preventive measures is crucial to stop the spreading of the virus. Previous research and lessons learned from global outbreaks suggested that knowledge and attitudes concerning contagious disease are tied to public sentiment, which can further complicate efforts to curb the disease's spread [8].

Citizen's devotion has been linked to their knowledge, attitudes and practices (KAP) towards COVID-19. KAP is an important primary key in public health regarding health prevention and promotion [9]. It plays a vital role in determining society's willingness and acceptance to practice behavioural change measures set by health authorities. In order to ease the controlling of pandemic COVID-19 in Malaysia, it is highly reliant on everyone's understanding of the virus, cooperation and compliance. KAP studies will give baseline information for determining the type of intervention needed to alter people's misconceptions of the virus [7]. Assessing KAP of COVID-19 among the public will promote better insight and give the right knowledge regarding COVID-19 to ensure suitable interventions and preventions are taken. In this research project, we are mainly focused on conducting a survey to investigate the KAP towards COVID-19 among the

public in Malaysia to implement effective public health interventions.

## **METHODS**

### **Study design**

The study was conducted during MCO 2.0 which started from 1<sup>st</sup> May 2021 until 10<sup>th</sup> June 2021. A quantitative approach was utilised to achieve the objectives of this study. A cross-sectional survey was appropriate to conduct for collecting the information about COVID-19 in Malaysian context. Social media was used to call for participation.

### **Sampling**

The target sample size was at least 385 respondents, determined by identifying the smallest acceptable size of a demographic subgroup with a  $\pm 5\%$  of margin error and 95% of confidential level [10]. The researchers opted to use Google form as an online survey since it is not feasible to conduct a systematic nationwide sampling during this period. Malaysian citizens above the age of 18 and recently residing in the country were eligible to participate in the survey. Several strategies were used to reach as many respondents as possible in Malaysia within 40 days data collection period. Social media (Facebook and Instagram), WhatsApp and Telegram were the platforms used to disseminate this questionnaire. WhatsApp and Facebook were chosen since they were the most popular social and communication platforms nowadays. Instagram are renowned among the younger generations while older Malaysians generally preferred Facebook.

As it was not feasible to conduct a systemic nationwide sampling procedure during this period, the researchers opted to use an online survey. Malaysian Citizens 18 years old and who are currently staying in Malaysia during MCO 2.0 are eligible to participate in the survey. A few techniques are used to reach as many respondents as possible all over Malaysia within a month. Three main platforms were used in disseminating this survey by using social media which are WhatsApp, Facebook and Telegram. WhatsApp message with the standardised general description about the survey was provided before the link was given in both English and Malay language versions of the questionnaire. A total data of 419 respondents have been collected.

### **Study instrument**

The survey instrument was adapted from a study on knowledge, attitudes and practices towards COVID-19 in Malaysia [7]. The questionnaire consisted of four main themes: 1) Demographics which study respondents' socio-demographic information, including gender, race, age, marital status, education, occupation, place of current residence and regional; 2) Knowledge about COVID-19; 3) Attitudes towards COVID-19; 4) Practices relevant to COVID-19. The questionnaire was given in the English and Malay languages versions.

To measure knowledge about COVID-19, 11 items were adapted from the previous research [7]. These items include the participant knowledge about clini-

cal presentations (items 2-5), transmission routes (items 6-9), the incubation period (item 10) and mortality rate (item 11). "Yes" or "No" response options were given to the participants to these items. 1 point was assigned as a correct response to items while 0 point was assigned as an incorrect response. The range from 0-11 is the maximum total score, with a higher score (9-12) indicating good knowledge, a score of 5-8 indicating moderate knowledge and a score of 1-4 indicating poor knowledge.

To measure attitudes towards COVID-19, study participants were assessed whether they agree (yes) or disagree (no) this MCO affected their tradition, psychology, studies and occupation. Also, to evaluate their opinions regarding the conspiracy of COVID-19. The range from 0-10 is the maximum total score, with a higher score (7-10) indicating good attitude, a score of 4-6 indicating moderate attitude and a score of 1-3 indicating poor attitude. Meanwhile, to measure practices, the study participants were asked whether they wore a face mask outside, practised proper hand hygiene and social distancing at public places. The range from 0-10 is the maximum total score, with a higher score (7-10) indicating good practice, a score of 4-6 indicating moderate practice and a score of 1-3 indicating poor practice.

#### Statistical analysis

The data was analyzed using Statistical Package for the Social Science (SPSS) software version 26.

Frequencies and percentages were determined using descriptive analysis. The reliability of the variables was tested by using the Cronbach alpha coefficient to determine the internal consistency of Knowledge, Attitude and Practice. The results showed that Cronbach alpha for knowledge (11 items) was 0.340, attitude (10 items) was 0.413 and practices (9 items) was 0.469. Independent T-test and One-way analysis of variance (ANOVA) followed by post-hoc Tukey test were used to determine the significant level of means (dependent variables) for demographics. Chi-square was used to determine the correlation between independent and dependent variables. *P* value that is less than 0.05 will be considered significant.

## RESULTS

### Sociodemographic characteristics of participants

This study involved 419 numbers of participants. The majority of the study participants 240 (57.3%) were females and 395 (94.3%) were Malays. Most of the participants were aged between 18 and 29 years old with 40.6% (170), 241 (57.5%) were married, 198 (47.3%) possessed Bachelor's degree, 208 (49.6%) were employed, 290 (69.2%) resided in urban areas and 134 (32.1%) came from Southern Malaysia. Other demographics are enumerated in Table 1.

Table 1: Demographic characteristics of participants (N=419).

Characteristics		Number	Percentage (%)
Gender	Male	179	42.7
	Female	240	57.3
Race	Malays	395	94.3
	Chinese	10	2.4
	Indian	9	2.1
	Others	5	1.2
Age	18-29	170	40.6
	30-39	49	11.7
	40-49	89	21.2
	50-59	90	21.5
	>60	21	5.0
Marital status	Married	241	57.5
	Single	169	40.3
	Others	9	2.1
Education	SPM	59	14.1
	Pre-University and its equivalent	87	20.8
	Bachelor's degree	198	47.3
	Master's degree	42	10.0
	PhD	13	3.1
Occupation	Others*	20	4.8
	Employed	208	49.6
	Unemployed	32	7.6
	Student	132	31.5
	Retired	47	11.2
Place of current residence	Urban	290	69.2
	Rural	129	30.8
Regional	Central	62	14.8
	Northern	124	29.6
	Southern	134	32.0
	Eastern	93	22.0
	Sabah/Sarawak	6	1.4

\*\*Others" includes educations such as Diploma.

\*\*Others" includes marital status such as widow and widower.

### Assessment of knowledge

A total of eleven questions were used to measure knowledge of the COVID-19 virus. The average knowledge score for participants was 9.296 (SD = 1.148, range 0–11). The overall correct answer rate of the knowledge questionnaire was 84.5% (9.296/11\*100) while the range of correct answer rates for all participants were between 1.7% to 100%. About 50.8% of participants were able to obtain scores above 9, representing an acceptable level of knowledge on COVID-19 (Table 2).

Most participants knew that there is currently no effective cure for COVID-19, but early, symptomatic and supportive treatment could help most patients recover from the infection and the mortality rate of COVID-19 patients in the elderly is higher than adults and children 408 (97.4%). Only 325 (77.6%) of participants answered correctly when asked unlike the common cold, stuffy nose, runny nose, and sneezing were less common in a person infected with the COVID-19 virus and just 280 (66.8%) answered correctly when asked eating or touching wild animals would result in the infection by the COVID-19 virus.

Differences in knowledge scores among different demographic characteristics were assessed using t-tests and ANOVA. The results showed that knowledge scores were significantly different across races. Higher knowledge scores were obtained among Malay participants 395 (94.3%) as shown in Table 3.

Association of knowledge category among different demographic characteristics were assessed using

Chi-square test. The results showed that knowledge category was significantly associated across races and regions. 311 (78.7 %) of Malay participants have better knowledge as compared to other races. Additionally, study participants who are living in the eastern region of Malaysia 81 (87.1%) have good knowledge than those who are living in other regions of Malaysia.

### Assessment of attitudes

Participants were asked ten questions in the assessment of attitudes towards COVID-19. Some positive attitudes were observed, for example, the majority of respondents 381 (90.9%) stated that MCO 2.0 was needed to prevent the transmission of COVID-19. 361 (88.1%) were afraid and had a feeling of restlessness when going out during COVID-19 pandemic, and 360 (85.9%) agreed to implement Enhanced Movement Control Order (EMCO) if their residents are infected by COVID-19. Additionally, almost all respondents 403 (96.2%) reported that the COVID-19 pandemic had caused events (e.g. feast, birthday party) to not be held even though it is Malaysian's tradition. The distribution of responses from participants for each attitude question is presented in Table 4.

The results showed that attitudes scores were significantly different across races, ages, marital status, occupation and regional. Higher attitudes scores were obtained among 395 (93.5%) Malays, 170 (37.5%) people aged 18-29, 241 (60.3%) married, 198 (47.8%) bachelor's degree, 208 (50.5%) employed and 134 (30.8%) participants who resides in southern region of Malaysia (Table 5).

Table 2: Participant knowledge of COVID-19 (N=419)

Knowledge questions	Frequency	
	YES	NO
COVID-19 originated from Wuhan, China.	<b>404</b> (96.4%)	15 (3.6%)
The main clinical symptoms of COVID-19 are fever, fatigue, dry cough and body aches.	<b>389</b> (95.0%)	21 (5.0%)
Unlike the common cold, stuffy nose, runny nose, and sneezing are less common in person infected with the COVID-19 virus.	<b>325</b> (77.6%)	94 (22.4%)
There currently is no effective cure for COVID-19, but early, symptomatic and supportive treatment can help most patients recover from infection.	<b>408</b> (97.4%)	11 (2.6%)
Not all person with COVID-19 will develop to severe cases. Only those who are elderly and have chronic illnesses are more likely to be severe cases.	<b>377</b> (90.0%)	42 (10.0%)
Eating or touching wild animals would result in the infection by the COVID-19 virus.	139 (33.2%)	<b>280</b> (66.8%)
Persons with COVID-19 cannot infect the virus to others if they do not have a fever.	43 (10.3%)	<b>376</b> (89.7%)
The COVID-19 virus spreads via respiratory droplets of infected individuals.	<b>379</b> (90.5%)	40 (9.5%)
The COVID-19 virus is airborne.	<b>280</b> (66.8%)	139 (33.2%)
Incubation period of COVID-19 is 14 days.	<b>401</b> (95.7%)	18 (4.3%)
Mortality rate of COVID-19 patients in elderly is higher than adults and children.	<b>408</b> (97.4%)	11 (2.6%)

Correct answers are indicated in bold.

Table 3: Demographic of participants, knowledge score and knowledge category.

Demographic		No. of participants	Knowledge score (Mean ± SD)	Knowledge category (% within group)			p-value
				Poor	Moderate	High	
Gender	Male	179 (42.7%)	9.302 ± 1.271	0 (0%)	42 (23.5%)	137 (76.5%)	p>0.05
	Female	240 (57.3%)	9.292 ± 1.050	0 (0%)	53 (22.1%)	187 (77.9%)	
Race	Malay	395 (94.3%)	9.337 ± 1.131*	0 (0%)	84 (21.3%)	311 (78.7%)	p<0.05
	Chinese	10 (2.4%)	8.000 ± 1.333*	0 (0%)	7 (70%)	3 (30%)	
	Indian	9 (2.1%)	9.111 ± 1.654	0 (0%)	2 (22.2%)	7 (77.7%)	
	Others	5 (1.2%)	9.000 ± 1.000	0 (0%)	2 (40%)	3 (60%)	
Age	18-29	170 (40.6%)	9.188 ± 1.240	0 (0%)	45 (26.5%)	125 (73.5%)	p>0.05
	30-39	49 (11.7%)	9.350 ± 1.182	0 (0%)	9 (18.4%)	40 (81.6%)	
	40-49	89 (21.2%)	9.348 ± 1.046	0 (0%)	19 (21.3%)	70 (78.7%)	
	50-59	90 (21.5%)	9.422 ± 1.060	0 (0%)	19 (21.1%)	71 (78.9%)	
	Above 60	21 (5%)	9.286 ± 1.102	0 (0%)	3 (14.3%)	18 (85.7%)	
Marital status	Married	241 (57.5%)	9.378 ± 1.104	0 (0%)	50 (20.7%)	191 (79.3%)	p>0.05
	Unmarried	169 (40.3%)	9.207 ± 1.200	0 (0%)	42 (24.9%)	127 (75.1%)	
	Others	9 (2.1%)	8.778 ± 1.202	0 (0%)	3 (33.3%)	6 (66.7%)	
Education	SPM	59 (14.1%)	9.424 ± 1.004	0 (0%)	12 (20.3%)	47 (79.7%)	p>0.05
	Pre-University and its equivalent	88 (21%)	9.455 ± 1.203	0 (0%)	20 (22.7%)	68 (77.3%)	
	Bachelor's Degree	198 (47.3%)	9.202 ± 1.162	0 (0%)	47 (23.7%)	151 (76.3%)	
	Master	42 (10%)	9.262 ± 1.231	0 (0%)	11 (26.2%)	31 (73.8%)	
	Others	32 (7.6%)	9.250 ± 1.047	0 (0%)	5 (15.6%)	27 (84.4%)	
Occupation	Employed	288 (49.6%)	9.341 ± 1.083	0 (0%)	42 (20.2%)	166 (79.8%)	p>0.05
	Unemployed	32 (7.6%)	9.500 ± 1.164	0 (0%)	6 (18.8%)	26 (81.3%)	
	Student	132 (31.5%)	9.152 ± 1.251	0 (0%)	38 (28.8%)	94 (71.2%)	
	Retired	47 (11.2%)	9.362 ± 1.111	0 (0%)	9 (19.1%)	38 (80.9%)	
Residence	Urban	290 (69.2%)	9.286 ± 1.133	0 (0%)	69 (23.8%)	221 (76.2%)	p>0.05
	Rural	129 (30.8%)	9.318 ± 1.186	0 (0%)	26 (20.2%)	103 (79.8%)	
Regional	Central	62 (14.8%)	9.081 ± 1.135	0 (0%)	17 (27.4%)	45 (72.6%)	p>0.05
	Northern	124 (29.6%)	9.307 ± 1.156	0 (0%)	29 (23.4%)	95 (76.6%)	
	Southern	134 (32%)	9.261 ± 1.117	0 (0%)	32 (25.4%)	100 (74.6%)	
	Eastern	93 (22.2%)	9.505 ± 0.983	0 (0%)	12 (12.9%)	81 (87.1%)	
	Sabah & Sarawak	6 (1.4%)	8.833 ± 1.148	0 (0%)	3 (50%)	3 (50%)	

\*\*Others" includes educations such as Diploma.

\*\*Others" includes marital status such as widow and widower.

Table 4: Frequency of response for attitude questions of participants in Malaysia.

Attitude questions	Frequency	
	Yes	No
In your opinion, is MCO 2.0 needed to prevent the transmission of COVID-19?	<b>381 (90.1%)</b>	38 (9.1%)
In your opinion, if your residential are infected by Covid-19, is Enhanced Movement Control Order (EMCO) needed?	<b>360 (85.9%)</b>	59 (14.1%)
In your opinion, does COVID-19 pandemic caused students need not to go to school/universities?	<b>328 (78.3%)</b>	91 (12.3%)
In your opinion, does COVID-19 pandemic caused places of worship to be closed?	<b>188 (44.9%)</b>	231 (55.1%)
In your opinion, does COVID-19 pandemic caused events (e.g. feast, birthday party) to not be held even though it is Malaysia's traditions?	<b>403 (96.2%)</b>	16 (3.8%)
In your opinion, does COVID-19 pandemic cause you restlessness and fright when going out?	<b>369 (88.1%)</b>	50 (11.9%)
In your opinion, does COVID-19 pandemic cause difficulties for you to maintain your job?	<b>297 (70.9%)</b>	122 (29.1%)
In your opinion, is the COVID-19 virus an agenda from an organization?	153 (36.5%)	<b>266 (63.5%)</b>
In your opinion, does MCO 2.0 cause a person to commit suicide?	181 (43.2%)	<b>238 (56.8%)</b>
In your opinion, does pandemic Covid-19 caused difficulties for students in online learning?	345 (82.3%)	<b>74 (17.7%)</b>

Correct answers are indicated in bold

The results found a significant association of attitude across age, marital status and occupation. 14 (66.7%) people aged more than 60 years old have better attitudes than other age groups. 'Others' marital status people also showed better attitudes rather than married and single people. Furthermore, 21 (44.7%) retired people showed better attitudes as compared to occupation status.

#### Assessment of practices

From an online survey, 9 questions were developed to evaluate Malaysian practice toward COVID-19. This includes prevention efforts, responsibility, cleanliness, and a healthy lifestyle. The majority of the respondents 415 (99%) are very responsible for wearing masks when going out. Most of them 405 (96.7%) do wash or sanitize their hands before and after going somewhere else. For the third question, 397 (94.7%) of participants noted that they try to avoid crowded places like banks, mosques, and night markets. When the respondents were asked whether they encourage their family or friends to follow the current SOP, the majority of the 408 (98.6%) did say yes. Moreover, 403 (96.2%) of the respondents try to avoid confined spaces like surau, ATM, lift and lecture hall.

Furthermore, 408 (97.4%) of respondents practice social distancing in daily life. In good times, 394 (94%) of them try to avoid close conversations with other people as they do not want to get easily infected. Last but not least, when the participants were asked whether they usually go to crowded or confined places, most of them 389 (92.8%), would not go as they are aware that poorly ventilated places have a high risk of infection (Table 6).

The results showed that attitudes scores were significantly different in gender, education, occupation and regional. Higher practice scores were obtained among 240 (58.1%), 198 (47.8%)

Bachelor's degree, 208 (49.2%) employed and 134 (31.1%) participants who reside in southern regions of Malaysia (Table 7).

The results showed a significant association of practices across gender, education and regional. 187 (77.9%) females have good practices towards COVID-19 as compared to males. 'Others' education background participants 27 (84.4%) showed good practices than people with SPM, pre-university, Bachelor's degree, Master's degree and PhD. Furthermore, good practices are also shown by participants who are living in the eastern region of Malaysia 81 (87.7%) than participants from the other regions of Malaysia.

#### DISCUSSIONS

The large number of Malaysians with high scores in knowledge indicated that information on COVID-19 was successfully delivered to the public despite them being in rural areas. Public television, newspapers, the official portal of the Ministry of Health (MOH) and Telegram official account of MOH are the media sources on COVID-19 information. Mobile vans which helped to spread information on COVID-19 was one of the effective initiatives to increase awareness among the public especially in the rural areas, where internet access is limited [11]. This was done by the Department of Information Malaysia with the collaboration of MOH. On the other hand, social networks always become a threat to Malaysians because of their misinformation which may explain why there were numbers of Malaysians with moderate knowledge [12].

The study reported that there was a significant association between races (Malay and Chinese)

Table 5: Demographic of participants, attitude score and attitude category.

Demographic		No. of participants	Attitude score (Mean ± SD)	Attitude category			p-value
				Poor	Moderate	High	
Gender	Male	179 (42.7%)	5.749±1.568	11 (6.1%)	114 (63.7%)	54 (30.2%)	p>0.05
	Female	240 (57.3%)	5.754±1.461	17 (7.1%)	148 (61.9%)	74 (31.0%)	
Race	Malay	395 (94.3%)	5.704±1.508	28 (7.1%)	251 (63.7%)	115 (29.2%)	p>0.05
	Chinese	10 (2.7%)	6.600±0.966	0 (0.0%)	5 (50.0%)	5 (50.0%)	
	Indian	9 (2.1%)	6.333±1.225	0 (0.0%)	4 (44.4%)	5 (55.6%)	
	Others	5 (1.4%)	6.800±1.924	0 (0.0%)	2 (40%)	3 (60%)	
	Age	18-29	170 (37.5%)	5.312±1.460*	18 (10.6%)	117 (68.8%)	
	30-39	49 (12.0%)	5.878±1.495	30 (61.2%)	9 (18.4%)	15 (30.6%)	
	40-49	89 (21.2%)	5.742±1.483*	4 (4.5%)	56 (63.6%)	28 (31.8%)	
	50-59	90 (23.5%)	6.289±1.256*	2 (2.2%)	52 (57.8%)	36 (40.0%)	
	Above 60	21 (5.9%)	5.752±1.506*	0 (0.0%)	7 (33.3%)	14 (66.7%)	
Marital status	Married	241 (60.3%)	6.029±1.470*	10 (4.2%)	140 (58.3%)	90 (37.5%)	p<0.05
	Unmarried	169 (37.3%)	5.314±1.452*	18 (10.7%)	117 (69.2%)	34 (20.1%)	
	Others	9 (2.4%)	6.556±1.509	0 (0.0%)	5 (55.6%)	4 (44.4%)	
Education	SPM	59 (13.9%)	5.695±1.545	2 (3.4%)	40 (69.0%)	16 (27.6%)	p>0.05
	Pre-University and its equivalent	87 (19.6%)	5.425±1.522	11 (12.6%)	55 (63.2%)	21 (24.1%)	
	Bachelor's Degree	198 (47.8%)	5.813±1.378	11 (5.6%)	124 (62.6%)	63 (31.8%)	
	Master	42 (10.8%)	6.191±1.596	2 (4.8%)	25 (59.5%)	15 (35.7%)	
	Phd	13 (3.2%)	5.923±1.656	0 (0.0%)	8 (61.5%)	5 (38.5%)	
	Others	20 (4.7%)	5.700±2.055	2 (10.0%)	10 (50.0%)	8 (40.0%)	
Occupation	Employed	208 (49.6%)	5.851±1.472	12 (5.8%)	128 (61.5%)	68 (32.7%)	p<0.05
	Unemployed	32 (7.5%)	5.656±1.825	3 (9.7%)	17 (19.4%)	11 (35.5%)	
	Student	132 (29.5%)	5.379±1.417	13 (9.8%)	91 (68.9%)	28 (21.2%)	
	Retired	47 (12.5%)	6.426±1.410	0 (0.0%)	26 (55.3%)	21 (44.7%)	
Residence	Urban	290 (69.2%)	5.779±1.490	21 (7.2%)	178 (61.4%)	91 (31.4%)	p>0.05
	Rural	128 (30.8%)	5.752±1.545	7 (5.5%)	84 (65.6%)	37 (28.9%)	
Regional	Central	62 (14.8%)	6.097±1.457	3 (4.8%)	35 (56.5%)	24 (38.7%)	p>0.05
	Northern	124 (29.6%)	5.613±1.601	13 (10.5%)	75 (60.5%)	36 (38.7%)	
	Southern	133 (32%)	5.545±1.530	10 (7.5%)	89 (66.9%)	34 (25.6%)	
	Eastern	93 (22.2%)	5.979±1.277	2 (2.2%)	59 (63.4%)	32 (34.4%)	
	Sabah & Sarawak	6 (1.4%)	6.167±2.041	0 (0.0%)	4 (66.7%)	2 (33.3%)	

\*\*Others\* includes education such as Diploma.

\*\*Others\* includes marital status such as widow and widower.

Table 6: Frequency of response for practice questions of study participants in Malaysia.

Question	Frequency	
	Yes	No
Do you wear mask when go out?	<b>415 (99.0%)</b>	4 (1.0%)
Do you wash or sanitize hands before and after going somewhere else?	<b>405 (96.7%)</b>	14 (3.3%)
Do you try to avoid crowded places? eg: bank, mosque, and night market?	<b>397 (94.7%)</b>	22 (5.3%)
Do you encourage your family/friend to follow the current SOP?	<b>413 (98.6%)</b>	6 (1.4%)
Do you try to avoid confine spaces? (e.g Surau, ATM, lift, lecture hall)	<b>403 (96.2%)</b>	16 (3.8%)
Do you practice social distancing in daily life?	<b>408 (97.4%)</b>	11 (2.6%)
Are you willing to pay the compound for not complying the SOP?	<b>103 (24.6%)</b>	316 (75.4%)
Do you try to avoid close conversation with other people?	<b>394 (94%)</b>	25 (6%)
Do you usually go to crowded/confined place?	30 (7.2%)	<b>389 (92.8%)</b>

Correct answers are indicated in bold.

and knowledge. The finding was unexpected as there was no study done yet regarding races and knowledge on COVID-19 in Malaysia. This was primarily due to the language barrier of Chinese who could not understand Bahasa Malaysia or even English [13]. This has become a problem since most of the source information is delivered in Bahasa Malaysia and English. However, there was still news and information provided in Mandarin such as TV2 news on television, Mandarin newspaper and Mandarin option in the official portal of MOH.

There was no significant association between attitude and gender. This finding showed the contradictory result from the study in America by Sarria-Guzmán et al. (2021) where females have more good attitudes due to women having good knowledge [14]. While in Malaysia, the results from this study showed that the percentage of every gender against attitude has not fluctuated differently between both genders. This study indicated that the same level of attitudes among races in Malaysia is not significant between race and attitude. Thus, this result showed that attitude did not depend on race.

The age group was significantly associated with attitude. This study showed that a group of people older than 60 has a higher good attitude compared to the moderate attitude and has a good attitude rather than a poor and moderate attitude. The findings in this study contradicted the study conducted by Haque et al. (2021), but showed an attitude significantly associated with the age group where people who aged more than 30 years old in Bangladesh have a good attitude beginning in the third decade of their age in the population. There is a significant association between marital status and attitude based on this study, the result showed that other marital statuses have a higher good attitude compared to married and single people. This result is the same as the previous study conducted by [15] where the result also showed that marital status is significantly associated with attitude.

Based on a study in America, where women with higher education levels resulted in a good attitude, which means it is different from Malaysia where most Malaysian citizens mostly have a moderate attitude in any different level of education. This result indicated that occupation was associated with attitude, where retired people have more good attitudes than employed, unemployed and students in Malaysia because retired people mostly were 60 years old, and above which are associated with age groups that also result in good attitudes. Most other countries in the world, like America, where women with rewarded employment and higher education levels resulted in good attitudes [14].

In this study, there was no significant association between places of current residence because the result between rural and urban is quite the same where the most people in these two residences indicates moderate attitude. These findings concluded that this study differed from the study by Zhong B. L et al. (2020) in which current residence and attitude are significantly associated [15]. A study from Azlan et al. (2020) in Malaysia during Movement Restricted Order (MCO) 2020 indicated that regional has significantly associated with attitude [7], while this study in 2021 during MCO 2.0 indicated that regional has no association with attitude ( $p>0.05$ ).

Regardless of whether a small sample size provided a good research output [16] it was predicted that the sample size in this study was considered large enough and has its significant influence [17]. Regarding the studies on Indonesia's KAP level, most of their students had acted negatively during the pandemic situation [18]. Meanwhile, based on this study showed that most of the Malaysians carried out the practice towards COVID-19 very well. It is proved that 98.8% of the participants are classified as good practice because they would score more than 5 marks in the online survey.



Table 7: Demographic of study participants, practice score and practice category.

Demographic		No. of participants	Practice score (Mean ± SD)	Practice category			p-value
				Poor	Moderate	High	
Gender	Male	179 (42.7%)	7.782±1.013*	0 (0.0%)	42 (23.5%)	137 (76.5%)	p<0.05
	Female	240 (57.3%)	8.058±0.735*	0 (0.0%)	53 (22.1%)	187 (77.9%)	
Race	Malay	395 (94.3%)	7.924±1.013	0 (0.0%)	84 (21.3%)	311 (78.7%)	p>0.05
	Chinese	10 (2.4%)	8.500±0.707	0 (0.0%)	7 (70%)	3 (30%)	
	Indian	9 (2.1%)	8.111±0.601	0 (0.0%)	2 (22.2%)	7 (77.7%)	
	Others	5 (1.2%)	7.800±0.447	0 (0.0%)	2 (40%)	3 (60%)	
Age	18-29	170 (40.6%)	7.977±0.973	0 (0.0%)	45 (26.5%)	125 (73.5%)	p>0.05
	30-39	49 (11.7%)	7.918±0.786	0 (0.0%)	9 (18.4%)	40 (81.6%)	
	40-49	89 (21.2%)	7.820±0.972	0 (0.0%)	19 (21.3%)	70 (78.7%)	
	50-59	90 (21.5%)	8.022±0.636	0 (0.0%)	19 (21.1%)	71 (78.9%)	
	Above 60	21 (5%)	7.857±0.655	0 (0.0%)	3 (14.3%)	18 (85.7%)	
Marital status	Married	241 (57.5%)	7.888±0.806	0 (0.0%)	50 (20.7%)	191 (79.3%)	p>0.05
	Unmarried	169 (40.3%)	7.988±0.970	0 (0.0%)	42 (24.9%)	127 (75.1%)	
	Others	9 (2.1%)	8.444±0.527	0 (0.0%)	3 (33.3%)	6 (66.7%)	
Education	SPM	59 (14.1%)	7.593±1.275*	0 (0.0%)	12 (20.3%)	47 (79.7%)	p<0.05
	Pre-University and its equivalent	88 (21%)	8.011±0.856*	0 (0.0%)	20 (22.7%)	68 (77.3%)	
	Bachelor's Degree	198 (47.3%)	8.025 ±0.664*	0 (0.0%)	47 (23.7%)	151(76.3)	
	Master	42 (10%)	8.048 ±0.539	0 (0.0%)	11 (26.2%)	31 (73.8%)	
	Others	32 (7.6%)	8.000 ±0.918	0 (0.0%)	5 (15.6%)	27 (84.4%)	
Occupation	Employed	288 (49.6%)	7.865 ±0.938	0 (0.0%)	42 (20.2%)	166 (79.8%)	p>0.05
	Unemployed	32 (7.6%)	7.781 ±1.157	0 (0.0%)	6 (18.8%)	26 (81.3%)	
	Student	132 (31.5%)	8.106 ±0.754	0 (0.0%)	38 (28.8%)	94 (71.2%)	
	Retired	47 (11.2%)	7.914 ±0.583	0 (0.0%)	9 (19.1%)	38 (80.9%)	
Residence	Urban	290 (69.2%)	7.900 ±0.877	0 (0.0%)	691 (23.8%)	221 (76.2%)	p>0.05
	Rural	129 (30.8%)	8.031 ±0.865	0 (0.0%)	26 (20.2%)	103 (79.8%)	
Regional	Central	62 (14.8%)	8.016 ±0.665	0 (0.0%)	17 (27.4%)	45 (72.6%)	p<0.05
	Northern	124 (29.6%)	7.984±0.826	0 (0.0%)	29 (23.4%)	95 (76.6%)	
	Southern	134 (32%)	7.731±1.125*	0 (0.0%)	32 (25.4%)	100 (74.6%)	
	Eastern	93 (22.2%)	8.140±0.563*	0 (0.0%)	12 (12.9%)	81 (87.1%)	
	Sabah & Sarawak	6 (1.4%)	7.833±0.408	0 (0.0%)	3 (50%)	3 (50%)	

\*"Others" includes educations such as Diploma.

\*"Others" includes marital status such as widow and widower.

The increasing level of good practice among the Malaysians was due to the government having done a very good job in handling the crisis of COVID-19 by spreading awareness through all possible platforms [7]. Thus, Malaysian citizens had no excuse for not carrying the responsibility. Moreover, based on a previous study in Bangladesh, a developing country with ~163 million population (2019), indicated that most of the population there are not well aware of COVID-19 crisis, so they are still some of them were not practising well to avoid the upcoming hazardous situation [19]. Contrary to Malaysia, which is a developed country with ~32.73 million population (2021), Malaysians are well prepared with the knowledge, so they are aware of how to do the practice.

There was a significant association between practices and gender. Female 97.9% good at practice compared to the male which is 93.9%. Our findings were similar to a study conducted in China by Xue, B., & McMunn, A. (2021) showed females have better practices compared to males [20]. This happens because females have more awareness toward COVID-19 compared to the male who did not apply good practice through the pandemic. For the male, three have poor practices, eight have moderate and 168 have good practices meanwhile in females, none has poor practices, five have moderate and 235 females have good practices.

The finding in this study was almost similar to the research conducted by Azlan et al. (2020) that showed people age 50 and above have best practices compared to lower ages [7]. This happened because older people may feel afraid of deadly Coronavirus compared to younger people. To be specific, 21 people aged 60 and above have good practices. For 50 -59, two people are moderate and 88 have good practices. For 40-49, one person has poor practice, four have moderate and 84 have good practice. For 30 – 39, two people have moderate practice and 47 people have good practices. For (18-29), two have poor, five have moderate and 163 have a good practice.

Our findings contradicted the study in China that was conducted by Zhong, B. L. (2020) [15]. Of 241 married people, one has poor practice, eight have moderate and 232 have a good practice. Meanwhile, two single people have poor practices, five moderate and 162 have good practices. For the other nine people, they all have good practices.

Our finding was similar to research conducted by Azlan et al. (2020) [7]. This happens because retired people were the smart people before they retired, so they must be the type of people who followed SOP. For the employed people, three have poor practices, seven have moderate and 198 have good practices. For the unemployed, three people have moderate practices and 29 people have good practices. For students, three people have moderate practices and 129 have good practices and 47 people who are retired are having good practices.

The finding of this study was similar to the one that

was conducted in China by Xue, B., & McMunn, A. (2021) [20]. Their study showed that the higher level education, the better the practices. This happened because they might have a good understanding of COVID-19 virus. For SPM level, two people have poor practices, four moderate and 53 good. Meanwhile, pre-university and equivalent, three moderate and 84 good. For Bachelor's degree, four moderate and 194 have good practice. For a Master's degree, all 42 people have good practices. For PhD, one have poor practices and 12 have good practices.

Our findings are correlated with the study conducted by Azlan et al. (2020) [7]. In a similar study that showed Sabah/Sarawak has good practices 75% compared to Southern 73.3%. This happened because the people in Sabah & Sarawak have faced the highest cases before, so they have more awareness. For the central, one person has moderate practices and 61 good practices. For Northern, six people have moderate practices and 118 people have good practices. For Southern, three people have poor practices, six people moderate and 125 people have good practices. In the Eastern, all 93 people have good knowledge. For Sabah/Sarawak, all six people have good knowledge.

Our findings were similar to research conducted by Xue, B., & McMunn, A. (2021) [20]. People who lived in rural areas had good practices because they were not busy like the people who lived in urban areas that broke many SOP to achieve their goals. In this research, three people from urban areas have poor practice, nine moderate and 278 people have a good practice. Meanwhile, in rural areas, four people have moderate practices and 125 people have good practices.

## CONCLUSION

In conclusion, most Malaysians have a good knowledge and moderate attitudes with good practice in reacting to COVID-19 outbreak. Good knowledge of Malaysian citizens has contributed to the success of delivering information on COVID-19. This study also showed a significant association between age groups with attitude and practice. Good attitude was also demonstrated by retired people compared to employed, unemployed and students. Furthermore, about 98.8% of the participants from this study have good practice towards COVID-19. It is due to excellent management from the government in handling the crisis of COVID-19 by spreading awareness through all possible platforms. The higher of knowledge is the better practices among Malaysian towards COVID-19.

## CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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