

## ORIGINAL ARTICLE

# The Community's Knowledge and Acceptance of the Covid

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**Introduction:** Several types of COVID-19 vaccines have been approved as a safe and effective against COVID-19. However, community knowledge and acceptance of the COVID-19 vaccine are poorly understood and have become a primary concern. The research goal is to measure the knowledge level and acceptance of the COVID-19 vaccine among the community in Klang, Selangor, Malaysia. **Methods:** A survey was carried out from February 2022 to May 2022 using a cross-sectional online survey method. The questionnaire consisted of socio-demographic, knowledge, and acceptance of the COVID-19 vaccine. Google Forms was used to create a bilingual and structured questionnaire. The link was distributed via social media platforms. A total of 422 respondents participated, with the majority age group being 18 to 29 years (73.3%). The data were analysed using SPSS Version 28.0. Categorical data were tabulated in terms of frequency and percentage. **Results:** Two-thirds of respondents were female, 298(70.6%). The median scores of knowledges were 7 (IQR 2). The knowledge score regarding COVID-19 vaccinations was low, with 254(60.2%) participants getting less than 7 correct answers. The acceptance rate of the COVID-19 vaccination was (87.0%). In Chi-square analysis, perceived risk was associated with knowledge score; income and knowledge were associated with the COVID-19 vaccine acceptance. **Conclusions:** The majority of respondents were willing to receive the COVID-19 vaccine despite the community's lack of understanding.

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**INTRODUCTION**

Coronavirus disease is a viral disease that is highly contagious due to SARS-CoV-2 (1). On 30 December, the first cases of COVID-19 were reported in Wuhan City, China. Since it is highly contagious, COVID-19 is rapidly and widely spread globally to more than 200 countries (2). Thus, COVID-19 was declared by WHO a pandemic disease. On 24 June 2021, it was reported that over 179,241,734 reported cases and 3,889,723 deaths worldwide. Meanwhile, in Malaysia, the total COVID-19 cases are 711,006, and the number of deaths is 4,637. Vaccines are the most critical public health measure to protect the population against COVID-19 as it is rapidly spreading to people across the world. Besides, it is also key to stopping the acceleration of COVID-19 pandemic cases by achieving herd immunity (3, 4). On 8 April 2020, more than 100 vaccine candidates were produced (5). Several types of COVID-19 vaccines have been approved by WHO that is safe and effective in fighting against the COVID-19 pandemic (6). These vaccines

have been distributed globally to different countries worldwide, including Malaysia. Concern regarding vaccine hesitancy is growing worldwide. Besides, WHO listed vaccinations in the top ten global health threats in 2019 (7). Thus, it is crucial to begin research into human acceptance of a COVID-19 vaccination to plan and implement the COVID-19 vaccination programs to build community trust and acceptability in the COVID-19 vaccine. However, community acceptance of the COVID-19 vaccine is poorly understood and has become a primary concern. The study on the knowledge of COVID-19 vaccines among the community is critical because knowledge may play a vital role in influencing people's understanding and acceptance of the COVID-19 vaccine. Nevertheless, literature shows that most of the published work on acceptance of the COVID-19 vaccine was carried out abroad, such as in Bangladesh (8,9). In Malaysia, two published studies were conducted (10), whereby the researcher identified factors influencing the receiving of the COVID-19 vaccine, while another study was carried out (11), the author investigated Malaysians' acceptance and concerns for the COVID-19 vaccine. No published article specifically discusses the knowledge level and acceptance of the COVID-19 vaccination among the community in Klang, Selangor. Therefore, this research was carried out to extend the literature and fill the gaps by explicitly examining the knowledge and

acceptance of the COVID-19 vaccination among the community in Klang, Selangor.

## Subjects and Methods

### Study design, setting, and period

This research used a cross-sectional online survey since the exposure and data collection were collected at the same time. The research participants were a community in Klang, Selangor. The study was conducted from 9 February 2022 to 24 May 2022. (Four months). This research was approved by the UiTM Faculty/Branch Ethics Review Committee Universiti Teknologi MARA, (Reference number: FERC/FSK/MR/2021 /0017).

The participants were provided with informed consent before their participation involvement. The community was given an online Google Form questionnaire. The link was generated and distributed to the community via social media platforms such as Facebook, Telegram, and Instagram. Besides, the link also was disseminated personally to the researcher's contact lists through WhatsApp. The data were automatically collected right after the respondents answered the online questionnaires. The records of this study will be kept confidential and solely for academic purposes. The survey was conducted anonymously, and no identity-related information could identify participation, but a specific question for the general Klang participants were collected to ensure appropriate participants were selected. All the Klang Valley participants were randomly selected to participate in this study. The inclusion criteria for this study are a community in Klang, Selangor aged 18 years and above. Besides, the respondent must be able to read and understand either Malay or English. Meanwhile, the exclusion criteria for this study are respondents who are non-Malaysians who have stayed in Klang, Selangor, or have permanent residence status. Finally, respondents with a mental or severe illness should be excluded from this study. This research intends to explore the relationship between socio-demographic; knowledge and acceptance of the COVID-19 vaccine among the community in Klang, Selangor. The questionnaire was developed in English based on the previous research article. Then, the question was translated into Malay, Malaysia's national language. Therefore, the questionnaire was bilingual, making it easier for the respondents to understand. The first sections on the first page contained study information and an informed consent agreement. Participants required about 15 minutes to complete 30 multiple-choice questionnaires comprising three sections; Socio-demographics, Knowledge about COVID-19 Vaccine and Acceptance towards COVID-19 Vaccine. The first sections on the first page contained study information and an informed consent agreement. Participants required about 15 minutes to complete 30 multiple-choice questionnaires comprising three sections.

### Part A: Socio-demographics

This section aims to evaluate the demographic variables, including age group, sexes, marital status, profession, monthly income, academic achievement, having heard about COVID-19, and the COVID-19 infection risk. The item was designed based on previous studies conducted by Syed Alwi et al. (11).

### Part B: Knowledge About COVID-19 Vaccine

This section was adapted from Galli et al. (12), with 15 questions such as the available COVID-19 vaccines that are currently available contain and are administered, do you believe that influenza vaccination can protect COVID-19; effectual against COVID-19 infection; may reduce symptoms of COVID-19; cause the disease to stimulate immunity; alter the DNA of vaccinated individuals; can people who have been immunized against COVID-19 avoid wearing face masks, do you believe that all residents of Klang, Selangor, should be immunized against COVID-19, do you believe that "herd immunity" will be achieved in Klang, Selangor, if all health personnel and the elderly are immunized against COVID-19. Could the COVID-19 vaccines, in your opinion, cause health problems; could the COVID-19 vaccines harm individual privacy, should the COVID-19 vaccination become mandatory, and what source to know about COVID-19 vaccination?

### Part C: Acceptance Towards COVID-19 Vaccine

This section used a 3- Likert scale (Yes/ No/ I don't know) adapted from Robinson et al.,(13). The final section aims to assess the acceptance of the COVID-19 vaccine through 5 questions; do you believe in the COVID-19 vaccine; will you voluntarily receive the immunization; will you receive the vaccine if your employer recommends it; do you believe an individual can still be infected after vaccination, and if so, will you pay to receive the vaccine.

### The sample size and sampling method

The calculation of the sample size was adapted from Israel (14) by using a formula as follows:

$$n = Z^2 p (1-p)/d^2$$

Indicator,

n = The samples number z = 1.96

p = 0.5 of prevalence estimation because no previous study

q = (1-p)

d = 0.05 of precision limit

Due to no previously published prevalence data related to knowledge and obtaining the COVID-19 vaccine in Klang, a formula for a single population  $n = Z^2 p (1-p)/d^2$  will be used to calculate the sample size. The sample size calculation will be based on the assumption that the probability of having an excellent knowledge of the COVID-19 vaccine and good acceptance of the COVID-19 immunization was 50%, confidence level

of 95%, and precision of 5%. Using this formula, the calculated sample size (n) was 384. However, 10% were added in the sample size calculation to indicate a non-response rate. Thus, the sample size required in this study is 422.

Calculation:

$$n = Z^2 p (1-p)/d^2$$

$$n = (1.96)^2 (0.5) (1-0.5)/ (0.05)^2$$

$$n = (3.8416) (0.5) (0.5)/ (0.0025)$$

$$n = 384.16$$

$$n = 384$$

10% were added in the sample size calculation to indicate the non-response rate.

$$n = 384 \times 10\%$$

$$n = 38.4$$

The total sample size required:

$$n = 384 + 38.4$$

$$n = 422.4$$

$$n = 422 \text{ respondents.}$$

### Statistical analysis

The data were analyzed using of the Statistical Package for Social Science system (SPSS), version 28.0. Categorical data were tabulated in terms of frequency and percentage. The total number of correct answers ranging from 0 to 11 (incorrect answer = 0; correct answer = 1) was used to express knowledge level.

## RESULTS

A total of 422 respondents completed the questionnaire entirely. Table I displays the socio-demographic characteristics result among the community in Klang. From table I, about two-thirds of the participants (73.3%) were adolescents (18 to 29 years old), while the minority were the elderly aged 60 years and above (3.6%). The majority of respondents were female (70.6%), single (73.3%), and had post graduated (51.9%). Respondents came from the various profession, with the highest being students (45.0%), followed by education (10.2%), industrial and manufacturing (9.2%), services (7.1%), health and medical (6.6%), management (5.7%), others (4.7%). Other occupations such as security and defense (4.3%) and unemployed (3.3%); meanwhile, both construction and pensioner have the lowest frequency (1.9%), thus contributing to the minority group. Half of the participants have the lowest monthly income category of RM 0 to RM 1200 (50.5%), followed by RM 1201 to RM 4000 (34.6%), RM 4001 to RM 8000 (13.3%), and more than RM 8000 (1.7%). Almost all respondents reported having heard about COVID-19 (99.5%), and a quarter of respondents believe their highest percentage of the COVID-19 infection risk was 30-40% (26.3%). Respondents' understanding of COVID-19 immunization was assessed. Table II presents the number and frequency of respondents' understanding and thoughts about COVID-19 immunization. Based on

table II, about 32.9% of the respondents were aware that the vaccine contained the genetic information to build the antigen "spike." About 87.2% were aware they should be given in two doses. Approximately 52.1% of respondents believe that influenza immunization does not protect against COVID-19. Almost four-fifths of respondents believe the vaccine COVID-19 may effectively prevent COVID-19 infection (79.9%). Furthermore, most respondents believe the COVID-19 vaccine may decrease symptoms (92.4%), does not cause disease to stimulate immunity (42.9%), and does not alter DNA individuals (71.1%). In addition, respondents believe people who have been immunized against COVID-19 cannot avoid other preventive measures (52.1%), and all people in Klang should be immunized (94.3%). Besides, respondents believe that the COVID-19 immunization should not only be given to older people and medical workers (71.6%), as well as herd immunity will not be achieved when only immunizing these aging populations (28.9%). Regarding the opinion question, partially of the respondents believe that the vaccine COVID-19 may not lead to health problems (55.7%) and does not negatively impact individual privacy (74.2%). Finally, 79.1% thought all Klang communities should be immunized against coronavirus disease and believe COVID-19 immunization should be mandatory. There are 11 questions in the knowledge section. Fig. I show a distribution of a bar chart on the level of knowledge about the COVID-19 vaccine among the community in Klang. For the entire sample, the median correct answer was 7 (IQR 2). According to Fig.I, the bar chart shows more than half (60.2%) of the respondents have less than 7 correct answers regarding the knowledge of the COVID-19 vaccine. Fig. II shows summarized results in the form of a pie chart on the source of information being used among the community in Klang regarding the COVID-19 vaccination. According to Fig. II, social media (38.9%) were reported as the primary sources that are used to know about COVID-19 immunization, followed by mass media (38.6%), health personnel (20.4%), and YouTube (2.1%). There are five questions regarding the COVID-19 vaccine acceptance. Table III presents participants' acceptance and hesitancy toward the COVID-19 vaccination; meanwhile, Fig. III shows a summarized result in a bar chart regarding the acceptance of the COVID-19 vaccine. Table III shows more than three-quarters of respondents have confidence in COVID-19 (78.0%), and most will voluntarily receive the vaccine (87.0%). However, a slight decline in number (86.5%) was reported if employers recommended employees receive the vaccine. Based on Fig. III, most think individuals can still become infected after vaccination (97.2%). Lastly, less than half of the respondents (47.2%) are prepared to pay for the vaccine if the vaccination has financial implications. The level of COVID-19 vaccine knowledge score was measured and correlated with socio-demographic variables using a Pearson Chi-square test. Table IV reports the result

association of knowledge with socio-demographic variables. A Pearson's Chi-square test with  $\alpha < 0.05$  was used to evaluate whether the socio-demographic variables such as age, sexes, occupation, academic achievement, perceived risk, and source of information are related to or not with the knowledge of the COVID-19 immunization. The Chi-square test was not statistically significant for age, gender, occupation, education attainment, and source of information. We accept the null hypothesis since the p-value is  $> 0.05$ . Therefore, we concluded there is no association between age, gender, occupation, educational attainment, and source of information with the knowledge level about the COVID-19 vaccine. Meanwhile, the Chi-square analysis was statistically significant for perceived risk  $X^2 (4, n = 422) = 15.119, p = 0.004$ . The p-value  $< 0.05$  rejects the null hypothesis. Therefore, we concluded there is a relationship between infection risk with knowledge of the COVID-19 vaccine. A Fisher-Freeman-Halton Exact test was used when the result does not fulfill the Chi-square test assumptions, which is all expected count  $\geq 5$  and, in a larger design,  $\leq 20$  expected cell frequency. A Fisher-Freeman-Halton Exact test with  $\alpha < 0.05$  was used to evaluate whether the socio-demographic characteristics such as marital status, income, and have heard about COVID-19 are related to or not with the knowledge of the COVID-19 vaccine. The Fisher-Freeman-Halton Exact Test was not statistically significant for marital status, income, and have heard about COVID-19. We accept the null hypothesis since the p-value is  $> 0.05$ . Therefore, we concluded there is an absent relationship between marital situation, income, and having heard about COVID-19 with the level of COVID-19 vaccine knowledge. A Pearson Chi-square method was used to assess categorical data of acceptance (dependent variables) with categorical data of socio-demographic and knowledge score (independent variables). A Pearson's Chi-square test with  $\alpha < 0.05$  was used to evaluate whether the socio-demographic characteristics such as gender, income, education attainment, perceived risk, source of information, and knowledge score is related to or not to voluntary receiving the COVID-19 vaccine. The Chi-square test was not statistically significant for gender, educational attainment, perceived risk, and source of information. We accept the null hypothesis since the p-value is  $> 0.05$ . Therefore, we concluded no association between gender, educational attainment, perceived risk, and source of information with the acceptability of the COVID-19 vaccine. Meanwhile, the Chi-square analysis was statistically significant for income  $X^2 (3, n = 422) = 11.768, p = 0.008$  and knowledge  $X^2 (1, n = 422) = 4.149, p = 0.042$ . The p-value  $< 0.05$  rejects the null hypothesis. Therefore, we concluded that income and knowledge scores correlate with the COVID-19 vaccine acceptance. A Fisher-Freeman-Halton Exact Test with  $\alpha < 0.05$  was used to evaluate whether the socio-demographic characteristics such as age, marital status, occupation, and having heard about COVID-19 are

related to or not with acceptability towards the COVID-19 vaccine. The Fisher-Freeman-Halton Exact Test was not statistically significant for age, marital status, and having heard about COVID-19. We accept the null hypothesis since the p-value is  $> 0.05$ . Therefore, we concluded there is no relationship between age, marital situation, and having heard about COVID-19 with the acceptance of COVID-19 immunization. Meanwhile, the Fisher-Freeman-Halton Exact Test was statistically significant occupation  $X^2 (n = 422), p = 0.001$ . The p-value  $< 0.05$  rejects the null hypothesis. Therefore, we concluded that occupation correlates with voluntary receiving of the COVID-19 vaccine. The spearman correlation test was used to assess the strength of the correlation. COVID-19 immunization knowledge

**Table 1: Socio-demographic variables among the community in Klang Valley (N=422).**

Socio-demographic variables	Number, n	Percentage, %
<b>Age group</b>		
18-29	311	73.7%
30-39	32	7.6%
40-49	31	7.3%
50-59	33	7.8%
60 and above	15	3.6%
<b>Sex</b>		
Male	124	29.4%
Female	298	70.6%
<b>Marital status</b>		
Single	311	73.7%
Married	97	23.0%
Divorced	10	2.4%
Widow/ Widower	4	0.9%
<b>Profession</b>		
Medical & Health	28	6.6%
Education	43	10.2%
Security & Defence	18	4.3%
Industrial & Manufacturing	39	9.2%
Construction	8	1.9%
Management & Administrative	24	5.7%
Services	30	7.1%
Student	190	45.0%
Pensioner	8	1.9%
Unemployed	14	3.3%
Others	20	4.7%
<b>Monthly income (RM)</b>		
0-1200	213	50.5%
1201-4000	146	34.6%
4001-8000	56	13.3%
More than 8000	7	1.7%
<b>Educational attainment</b>		
Junior/ senior school graduated	83	19.7%
Diploma graduated	120	28.4%
University graduated/ post graduated	219	51.9%
<b>Have you heard about COVID-19?</b>		
Yes	420	99.5%
No	2	0.5%
<b>Percentage of the COVID-19 infection risk</b>		
Table 3.1, continued		
0	29	6.9%
10- 20	100	23.7%
30- 40	111	26.3%
50- 60	110	26.1%
More than 60	72	17.1%

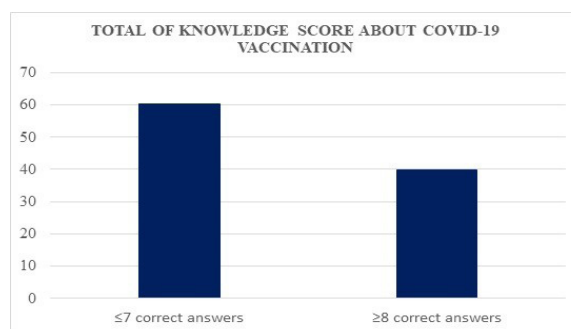
**Table II: Respondents' understanding of COVID-19 immunization**

Question	n	%
<b>The COVID-19 vaccines consist:</b>		
The coronavirus	96	22.7%
A virus similar to coronavirus	32	7.6%
The antigens of the virus (the protein "spike")	155	36.7%
The genetic information to build the antigen "spike." *	139	32.9%
<b>The immunization is given</b>		
In a single dose	8	1.9%
In two doses *	368	87.2%
In two doses only for those subjects who are not immunized with the first administration	46	10.9%
<b>Could the influenza vaccine protect against coronavirus disease?</b>		
Yes *	202	47.9%
No	220	52.1%
<b>Could COVID-19 vaccines effectual against infection of COVID-19</b>		
Yes *	337	79.9%
No	85	20.1%
<b>Could COVID-19 immunization lower the symptoms of COVID-19?</b>		
Yes *	390	92.4%
No	32	7.6%
<b>Could COVID-19 immunization cause the disease to stimulate immunity?</b>		
Yes	241	57.1%
No *	181	42.9%
<b>Could COVID-19 immunization alter the DNA of individuals?</b>		
Yes	122	28.9%
No *	300	71.1%
<b>Could people immunized against COVID-19 avoid other preventive measures, such as face masks?</b>		
Yes	220	52.1%
No *	202	47.9%
<b>Should all the Klang, Selangor populations need to be vaccinated against COVID-19?</b>		
Yes *	398	94.3%
No	24	5.7%
<b>Could you believe only medical workers and older people need to be immunized against COVID-19?</b>		
Yes	120	28.4%
No *	302	71.6%
<b>Could "herd immunity" be achieved in Klang, Selangor, if all medical personnel and the elderly are immunized against COVID-19?</b>		
Yes	300	71.1%
No *	122	28.9%
<b>Could the COVID-19 immunization lead to health problems?</b>		
Yes	187	44.3%
No	235	55.7%
<b>Could the COVID-19 vaccines jeopardize individuals' privacy?</b>		
Yes	109	25.8%
No	313	74.2%
Table 3.2, continued		
<b>Should the COVID-19 vaccination become compulsory?</b>		
Yes	334	79.1%
No	88	20.9%
<b>What sources are used to know about COVID-19</b>		
Healthcare personnel, scientists	86	20.4%
Mass media (i.e., television, general interest magazines)	163	38.6%
Social media (i.e., Facebook, Twitter, Instagram, WhatsApp)	164	38.9%
YouTube or a similar web channel	9	2.1%
<b>Knowledge score</b>		
≤7 correct answers	254	60.2%
≥8 correct answers	168	39.8%

\*Correct answer

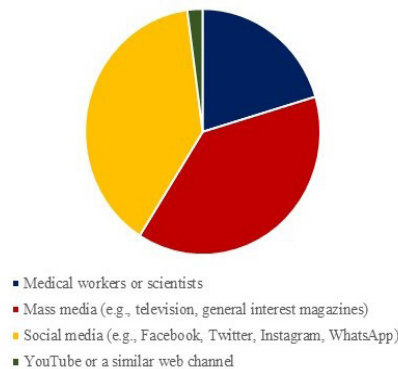
**Table III: Acceptance of COVID-19 vaccine**

Question	n	%
<b>Do you have confidence in the COVID-19 immunization?</b>		
Yes	329	78.0%
No	25	5.9%
I don't know	68	16.1%
<b>Will you voluntarily receive the vaccine?</b>		
Yes	367	87.0%
No	32	7.6%
No opinion	23	5.5%
<b>If recommended by your employer, will you receive the vaccine?</b>		
Yes	365	86.5%
No	24	5.7%
No opinion	33	7.8%
<b>Do you think an individual can still be infected after vaccination?</b>		
Yes	410	97.2%
No	7	1.7%
I don't know	5	1.2%
<b>Will you pay to receive the vaccine if the vaccination requires financial implications?</b>		
Yes	199	47.2%
No	133	31.5%
No opinion	90	21.3%

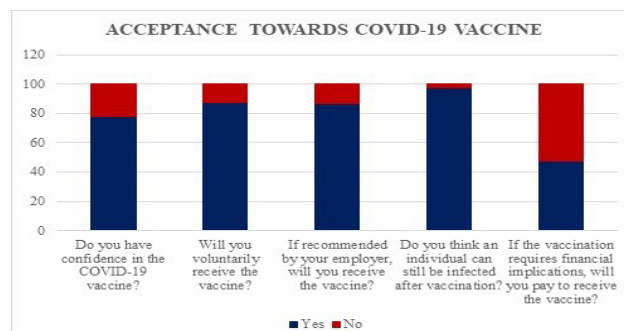


**Fig 1: Total knowledge score distribution regarding COVID-19 vaccination**

**INFORMATION SOURCE**



**Fig 2: Respondent's source of information on COVID-19 vaccination among the community in Klang, Selangor**



**Fig 3: COVID-19 vaccine acceptance questions**

**Table IV: Shows the Results of COVID-19 vaccine knowledge with other variables (N=422)**

Socio-demographic characteristics	n	The level of COVID-19 vaccine knowledge		X <sup>2</sup> statistic (df)	P value <sup>a</sup>
		≤7 correct answers, n (%)	≥8 correct answers, n (%)		
<b>Age (year)</b>				1.454 (4)	0.835
18-29	311	191 (61.4)	120 (38.6)		
30-39	32	18 (56.3)	14 (43.8)		
40-49	31	19 (61.3)	12 (38.7)		
50-59	33	17 (51.5)	16 (48.5)		
60 and above	15	9 (60.0)	6 (40.0)		
<b>Sex</b>				0.089 (1)	0.766
Male	124	76 (61.3)	48 (38.7)		
Female	298	178 (59.7)	120 (40.3)		
<b>Marital status</b>					0.333 <sup>b</sup>
Single	311	190 (61.1)	121 (38.9)		
Married	97	55 (56.7)	42 (43.3)		
Divorced	10	5 (50.0)	5 (50.0)		
Widow/ Widower	4	4 (100.0)	0 (0.0)		
<b>Profession</b>				9.709 (10)	0.466
Medical & Health	28	16 (57.1)	12 (42.9)		
Education	43	25 (58.1)	18 (41.9)		
Security & Defence	18	9 (50.0)	9 (50.0)		
Industrial & Manufacturing	39	24 (61.5)	15 (38.5)		
Construction	8	4 (50.0)	4 (50.0)		
Management & Administrative	24	19 (79.2)	5 (20.8)		
Services	30	20 (66.7)	10 (33.3)		
Table 3.4, continued					
Student	190	108 (56.8)	82 (43.2)		
Pensioner	8	7 (87.5)	1 (12.5)		
Unemployed	14	8 (57.1)	6 (42.9)		
Others	20	14 (70.0)	6 (30.0)		
<b>Monthly income (RM)</b>					0.817 <sup>b</sup>
0-1200	213	128 (60.1)	85 (39.9)		
1201-4000	146	89 (61.0)	57 (39.0)		
4001-8000	56	34 (60.7)	22 (39.3)		
More than 8000	7	3 (42.9)	4 (57.1)		
<b>Educational attainment</b>				0.708 (2)	0.702
Junior/ senior school graduated	83	47 (56.6)	36 (43.4)		
Diploma graduated	120	75 (62.5)	45 (37.5)		
University graduated/ post graduated	219	132 (60.3)	87 (39.7)		
<b>Have you heard about COVID-19?</b>					0.158 <sup>b</sup>
Yes	420	254 (60.5)	166 (39.5)		
No	2	0 (0.0)	2 (100.0)		
<b>Percentage of the COVID-19 infection risk</b>				15.119 (4)	0.004
0	29	19 (65.5)	10 (34.5)		
10-20	100	63 (63.0)	37 (37.0)		
30-40	111	54 (48.6)	57 (51.4)		
50-60	110	63 (57.3)	47 (42.7)		
More than 60	72	55 (76.4)	17 (23.6)		
<b>What sources are used to know about COVID-19</b>				4.639 (3)	0.200
Healthcare personnel, scientists	86	59 (68.6)	27 (31.4)		
Mass media (i.e., television, general interest magazines)	163	99 (60.7)	64 (39.3)		
Social media (i.e., Facebook, Twitter, Instagram, WhatsApp)	164	92 (56.1)	72 (43.9)		
YouTube or a similar web channel	9	4 (44.4)	5 (55.6)		

<sup>a</sup> Chi-Square Test

<sup>b</sup> Fisher's Exact Test

and voluntary receiving of the vaccine among the community in Klang, Selangor are directly, linearly, and very weakly correlated.

## DISCUSSION

### Knowledge about the COVID-19

This research aimed to measure knowledge and acceptance of the COVID-19 vaccine among the community in Klang Selangor, Malaysia. An online self-administered survey was used to collect responses from the community in Klang Selangor. The findings indicate greater acceptance of COVID-19 vaccination; despite a low knowledge level about COVID-19. However, knowledge and vaccine acceptance were found to be related. Identical to a study conducted in Ethiopia (15), in which knowledge was discovered to be correlated to the COVID-19 vaccine acceptance. The knowledge score regarding COVID-19 immunization was low among communities in Klang, Selangor, with 254 (60.2%) participants getting less than 7 correct answers (Fig. I). This finding is consistent with previous research conducted in Bangladesh (6). According to our research, we found that females 120 (40.3%) had a better knowledge score than males 48 (38.7%) (Table IV); despite that male were reported to have better knowledge score in Bangladesh (6). The disparities in knowledge may be due to the government disseminating more COVID-19 information via social media, which older adults use less frequently. Furthermore, data on the seriousness of COVID-19 incidence and mortality may be underreported or misrepresented, which may reduce vaccine concerns (16), making the community unwilling to find out more about COVID-19. This can be seen when over half of 241 (57.1%) respondents believe that COVID-19 vaccination causes the chronic disease to trigger immunity (Table II). This may be linked to rumors and misleading information that are spread on social media and have a high potential to influence the correct information (17). Vaccination does not cause disease to trigger immunity but may develop side effects. According to WHO, even though the COVID-19 vaccine can protect an individual from COVID-19, it may produce some side effects for the individual. Despite that, it is normal because it shows that our body initiates the immune system. Some people may not have side effects, and some may have mild to moderate side effects. However, the side effects will leave in a few days. Users may have adverse effects within eight days after vaccination (18). Pain, swelling, or redness in the arm area are common side effects; meanwhile, other side effects include fatigue, headache, muscle pain, chills, fever, and nausea. In this research, knowledge was associated with the percentage of COVID-19 infected risk. People with a 50% to 60% perceived risk of being infected have a better understanding 47 (42.7%) compared to a 0 % risk of infection with COVID-19 10 (34.5%) (Table IV). This knowledge may be due to the high perceived risk of infection, which causes people to

gain more understanding.

### Acceptance of COVID-19 vaccine

Out of 422 respondents, the rate of acceptance of COVID-19 vaccination in Klang was 367 (87.0%), significantly greater than the rejection rate 55 (13.0%) (Table III). This was contrary to a study conducted in Nigeria (12), where the acceptance rate was only 523 (48.83%). Furthermore, females 264 (88.6%) have a higher acceptance rate compared to males 103 (83.1%), which is similar to the studies conducted among the general population in Indonesia (19) Libya (20), and Saudi Arabia (21). This high acceptance of the COVID-19 vaccination impact may be explained by the increased confidence in immunization among the community in Klang. Exceeding three-quarters of the respondent's confidence in the COVID-19 vaccination (Table III) contrasts with research in China, in which 48.0% of the participants delay immunization until the safety of the vaccines is established (22); the same goes for the study in Jordan (23), participants prefer Pfizer/BioNTech because it was the first vaccine approved by WHO, and in Indonesia, where the respondents only accept COVID-19 vaccine when it has 95% efficacy (18). In addition, acceptance was associated with socio-demographic variables such as income, profession, and knowledge level. Only less than half of the participants reported being ready to spend money for the COVID-19 vaccination (Fig. III), similar to a previous study in Bangladesh (6), in which 95% of the participants thought the COVID-19 vaccine should be free. Another research shows a contrasting result in which the participants in Indonesia showed that most of them agreed to pay for the COVID-19 vaccine (19). Additionally, a study found that participants agreed to pay between \$11.5 to \$23 for the COVID-19 vaccine (24). Different results from other countries may differ depending on the community's financial situation. This may be due to some people becoming unemployed due to lockdown (25), which may lead to the unable to afford the COVID-19 immunization. Based on profession, security and defence 18 (100.0%) were reported to have the highest acceptance of the COVID-19 immunization compared to other jobs. This finding differed from a study conducted in Indonesia in which healthcare workers were more willing to accept the vaccine than non-healthcare workers (18). This high acceptance among security and defence could be because their jobs were considered frontlines, which led them to have an increased risk of infection. Thus, it enhances their information and involvement in life events that may affect them and concern about their health and well-being (26). In this study, most of the respondents that have less than 7 correct knowledge scores have a high acceptance rate 214 (84.3%) compared to a hesitance rate 40 (15.7%). The high acceptance of COVID-19 immunization reflected the high demand for immunization and the high recognition of the importance of immunization in controlling pandemics (23), even though there is still

inadequate knowledge among the community.

### Sources of information

Understanding the most reliable information source about COVID-19 vaccines that people rely on is vital for future vaccination programs (27). Besides, the origins of information can influence an individual's acceptance or hesitance toward COVID-19 immunization. It is vital to spread accurate and transparent information about the safety and effectiveness of vaccines to get the public's confidence, especially the hesitant and skeptical. In this research, the highest respondents' information source to know about COVID-19 was social media 164 (38.9%), followed by mass media 163 (38.6%) (Table II). Furthermore, our findings were consistent and similar to those of a survey conducted in Nigeria (19), in which social media is being used as the primary information source for (22.07%) and (74.41%) respectively. Although that, mass media 350 (82.4%) were reported as the highest information source being used in Vietnam (28). Same as the recent outbreak of Ebola, people tend to seek information regarding treatment and prevention. Despite that, with the advance's information in technology, some irresponsible person creates an opportunity to share information using internet connection to their social media without ensuring the news that their share is correct and comes from the right source. Like the previous virus endemic like Zika and Ebola, the internet is still being used to disseminate false information about the COVID-19 pandemic. Most information on Twitter contains misinformation and has a high potential to influence the correct information (16). However, in Malaysia, there are many reliable websites actively update the latest information about the pandemic (29, 30). This pandemic's information is regularly broadcast on radio, television, and newspapers. Due to the robust information, respondents can easily access current updates. As a result, most of the respondents, 420 (99.5%), have heard about COVID-19 (Table I). This study illustrates how public perception of COVID-19 immunizations changed between 2022 and 2023–2024. Recent studies found that vaccine acceptance among Malaysians has been influenced significantly by public perception and knowledge levels (31). Although vaccination adoption was impacted in 2022 by disinformation and low knowledge, particularly in Klang, public health campaigns and educational initiatives greatly raised awareness by 2023–2024. Because people were better informed about the safety and effectiveness of vaccines, the population accepted them more readily (32). Vaccination uptake remained strong in 2022 despite knowledge gaps, and by 2023–2024, initiatives to counteract misinformation had improved acceptability and made people more knowledgeable.

### CONCLUSION

In conclusion, health initiatives have been successful

in increasing community awareness and acceptability of vaccinations, as demonstrated by our comparison of contemporary data with the 2022 research. New research indicates that public awareness of the COVID-19 vaccination has improved, despite the Klang, Selangor community's initial low knowledge and high acceptance of the vaccine. The success observed can be attributed to the focused education programs of the Ministry of Health Malaysia, truthful information disseminated by the media, and the deliberate efforts of policymakers to counteract misinformation while highlighting the significance of ongoing public health.

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### AUTHOR CONTRIBUTION

This work was carried out in collaboration among all authors. Author NKV conceived the study, concept, and design and conducted most of the laboratory experiments, analysed and interpreted experiment results. Author MB contributed to conceive the study, concept, the supervision of the study, drafting, and critical revision of the manuscript of the article. All authors read and approved the final manuscript.

### CONFLICT OF INTEREST

All authors approved the manuscript and this submission with no conflicts of interest to disclose.

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