

## ORIGINAL ARTICLE

## ACCEPTANCE TOWARDS COVID-19 VACCINE AMONG ADULTS AGED 18 YEARS AND ABOVE IN MALAYSIA

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## ABSTRACT

The COVID-19 immunisation programme may be a potential strategy for containing the pandemic, but its effectiveness depends on the community's acceptance of the vaccine. Decisions regarding vaccine acceptance may be impacted by a variety of circumstances, and individuals may weigh these aspects differently. The objective of this study was to assess the acceptance towards the covid-19 vaccine among Malaysian adults. Adult Malaysians aged 18 and over were enrolled in a cross-sectional online survey. Google Form was used to deliver an online survey that was used to collect data. The bulk of the 403 responders (90.1%) expressed high acceptance levels for the COVID-19 vaccination. Meanwhile the majority showed low hesitance levels towards covid-19 vaccine with 94.8%. The sociodemographic factors have a correlation with vaccine reluctance. The sociodemographic factors of age ( $p=0.001$ ), education ( $p=0.001$ ), occupation ( $p=0.001$ ), and marital status ( $p=0.032$ ) all significantly correlated with vaccine hesitation. Non-significant factors include gender ( $p=0.097$ ) and monthly income ( $p=0.210$ ). We need to understand the hesitation and acceptance of the COVID-19 vaccine clearly in order to create evidence-based interventions because there are numerous COVID-19 vaccines being developed and significant vaccination rates are required to attain herd immunity.

**Keywords:** Covid-19, Vaccine, Vaccine acceptance, Malaysian adults aged 18 and above.

## INTRODUCTION

Coronavirus illness, also known as COVID-19, was brought on by the SARS-CoV-2 coronavirus, which was just recently identified. The first instance of this was found in Wuhan City, China [2]. In more than 150 countries, it has infected over 108 million people [3]. The spread of infection in the impacted nations does not appear to be slowing down. A recurrence of illnesses with a sharp rise in infection rates started in Malaysia in late September 2020. Malaysia recorded 3968 COVID-19 fatalities as of June 15th, 2021, with a fatality rate of 0.6% out of 662,457 cases [2, 6]. The pandemic still poses a serious threat to the global healthcare system, with disastrous effects on the economy, public health, and social life. There isn't currently a cure for COVID-19 infection. The pandemic, which had terrible medical, economic, and social effects, requires an urgently needed safe and effective preventative vaccination [3]. In order to immunise at least 70% of the population, the Malaysian government has planned to procure COVID-19 vaccinations through a number of organisations and businesses [4].

A major method for raising health outcomes and life expectancy is vaccination. The development of vaccines has advanced significantly, and vaccination will unavoidably become a trend in the fight against this pandemic. The general

public's reaction to the COVID-19 immunisation is still unknown. Complacency, practicality, and confidence are three elements that influence how people feel about vaccination acceptance. Because of complacency and the low perception of the disease danger, immunisation was rejected. Confidence is defined as having faith in the safety, efficacy, and competency of the healthcare systems as well as vaccinations. The availability, accessibility, and distribution of vaccinations in a comfortable setting are all components of convenience [4,5].

A few research have looked into the COVID-19 vaccine's acceptance rates and factors that influence them. In comparison to the general population, a research done among healthcare workers (HCW) in China revealed high vaccine acceptability. Surveys were out among the general public in Saudi Arabia, Indonesia, the European Union, and the United States revealed a high level of acceptance of the COVID-19 vaccination. The COVID-19 vaccination, however, received only average acceptance among the general community, according to a different study by Decanar Ajumbo et al. (2020) among Western Ugandans [3,7,8,9,10,11].

In this study, the general Malaysian population's perception of the COVID-19 vaccine was evaluated. The government and associated

authorities must comprehend the viewpoints of the population in order to develop the most effective strategy for implementing the COVID-19 vaccination program in Malaysia.

## METHODS

This cross-sectional study evaluated adult Malaysians' attitudes towards the COVID vaccination. Adult Malaysians (aged 18 and older) who could read and understand the English questionnaire and gave informed consent before enrolling in the survey were the target population and were considered eligible to take part in this online survey. The questionnaire also had four (4) sections that asked about sociodemographic traits, exposure to Covid-19 information, perceived risk of contracting Covid-19, and willingness to receive a vaccine. Acceptance of a Covid-19 vaccination by the populace was the response variable. The respondents were given the following information, including sections (A): sociodemographic characteristics of the participant, section (B): Assessment of acceptance level of Covid-19 vaccine among individuals aged 18 and above, and section (C): Questions linked to vaccine hesitancy, to help determine the respondents' degree of acceptance. Several questions and scenarios were given to the responders in order to assess the acceptance rate of the vaccine.

### Data collections

The information was gathered using a standardised questionnaire that was distributed online and used to assess the level of acceptance for the Covid 19 vaccination among Malaysian people 18 and older as well as learn about the sociodemographic characteristics of the participants.

The questionnaire was divided into two sections: socio-demographic factors, which asked about family income, age, gender, and race as well as about education, occupation, residency, and marital status. Additional questions were also asked related to COVID-19 vaccine symptoms. The total number of questions was 28. It was composed of STRONGLY AGREE/AGREE/DISAGREE/TOTALLY DISAGREE AND YES/NO questions.

Question 1 through 11 formed the basis for scoring the level of vaccine acceptance. Scores of 18 and higher indicate strong acceptability, 12 to 17 indicate moderate acceptance, 6 to 11 indicate low to moderate acceptance, and 0 to 5 indicate low acceptance. Questions 12 through 20 were used to score the questions related to vaccine hesitancy. Scores 10 and higher indicate mild hesitancy, 7-9 indicate moderate hesitancy, 4-6 indicate low to high hesitancy, and 0-3 indicate strong hesitancy. [12]

Two composite challenge scores were produced by adding the scores for each subscale's items. A higher score means that people are more likely to accept immunisations. The first subscale in section B (questions 1-11) focused mostly on vaccination acceptance. The next subscale, question 12-20, was mostly concerned with vaccine hesitancy. Using the Chi Square test, the relationship between demographic characteristics and knowledge levels was examined.

For quality control and to ensure that respondents are sincere, invites to do the survey will be placed on Google Forms and the link will then be distributed individually via social media platforms including WhatsApp, Instagram, Facebook, and Email. Using Raosoft, the minimal sample size estimated was 235 with a 5% margin of error and a 95% confidence level. With the 10% attrition rate taken into account, 259 people were the minimum number of participants needed for this study. However, we included all of the responses (403 total) in our analysis.

To evaluate the questionnaire's reliability and validity, a pilot study was undertaken. The reliability was evaluated using the internal consistency test (Cronbach's alpha). The total Cronbach alpha value was 0.88, and the Cronbach's Alpha Based on Standardized Items was 0.86 [13], both of which were greater than the 0.70 acceptable norm for internal consistency. This indicates that the questionnaire was valid and reliable.

### Statistical analysis

Statistical Package for Social Sciences version 26 was used to examine the data that had been gathered. Three types of analysis were performed: descriptive, univariate, and multivariate. Based on the prior literature, binary logistic regression and "multiple logistic regression" MLogR (backward approach) were employed to investigate the variables linked to significant vaccine acceptance. A p-value of 0.05 or lower was considered statistically significant. The factors that were significant in the data were shown as crude and adjusted odds ratios (OR), along with their respective p values, 95% confidence intervals (CI), and 95% confidence limits (CI). A p-value of less than 0.05 was regarded as statistically significant.

### Ethic approval

Before the survey began, all of the participants were given the opportunity to submit their informed consent. According to the Helsinki Declaration, the ethical permission was obtained by the Centre of Research and Development, Asia Metropolitan University (No. HEC25022022FOM0003).

## RESULTS

Table 1 revealed that, out of 403 respondents, the majority of them were between the ages of 18 and 39, with a mean age of 27. Comparatively more women (66.1%) than men (43.9%) participated in the survey. The majority of respondents (100%) were from Malaysia; 80.6% were of Indian ancestry; and 75.7% had completed tertiary education. In comparison to married respondents (23.3%), the proportion of single respondents (75%) was higher. The majority of respondents (53.8%) were students, followed by those who were in employment (28.8%). The majority (50.6%) belonged to the B40 income bracket. Comparatively more respondents (83.6%) were urban dwellers.

Table 2 revealed that the majority of the 403 respondents (90.1%) selected the vaccine's high level of acceptability. Given the severity of the COVID 19 pandemic, such a degree of acceptance is remarkably high. According to earlier estimations, the Covid-19 herd immunity threshold varies between nations, with a proposed threshold of about 67%. 90.1% of responders who accepted vaccinations showed that the majority were in favour of vaccination. Among 403 responses, 7.2% shown a moderate degree of vaccine acceptability, and 0.7% demonstrated a poor level of vaccine acceptance, indicating that the fewest people were still unwilling to get the COVID 19 vaccine.

**Table 1. Sociodemographic characteristics of the participants (N=403)**

Variables	Frequency (n)	Percentage (%)	
Age			
	Young adult (18 - 39)	349	86.6
	Middle adult	47	11.7
	Older adult	7	1.7
Gender			
	Male	177	43.9
	Female	226	56.1
Nationality			
	Nationality Malaysian	403	100.0
	Non-Malaysian	0	0.0
Race			
	Malay	32	7.9
	Chinese	21	7.7
	Indian	325	80.6
	Others	15	3.7
Education			
	No formal education	20	5.0
	Primary	17	4.2
	Secondary	61	15.1
	Tertiary	305	75.7
Occupation			
	Employed	116	28.8
	Unemployed	17	4.2
	Homemaker	23	5.7
	Retired	20	2.5
	Student	217	53.8
Marital Status			
	Single	304	75.4
	Married	94	23.3
	Divorced	3	0.7
	Widowed	2	0.5
Residency			
	Rural	66	16.4
	Urban	337	83.6
Monthly Income			
	B40	204	50.6
	M40	142	35.2
	T20	57	14.1

**Table 2. Levels of vaccine acceptance among participants (N=403)**

Levels of vaccine acceptance	Frequency (n)	Percentage (%)
High acceptance	363	90.1
Moderate	29	7.2
Moderate to low	8	2.0
Low	3	0.7

In contrast to moderate (5.2%), moderate to high (0%), and high (0%), Table 3 showed that the majority of the 403 respondents preferred the degree of low hesitation of the covid-19 vaccination (94.8%). By adopting a low degree of vaccine reluctance, 94.8% of the population is willing to receive vaccinations. Very minimal vaccine reluctance is widely regarded as indicating excellent vaccine uptake.

Table 4 demonstrated that the majority of respondents (326) who were within the age range of 18 to 39 years were determined to be vaccine-accepting. In their respective age groups, 33 (70.3%) were middle-aged adults, and 4 (57.1%) were old-aged people.

Female respondents showed a higher percentage of vaccination acceptance, at 210 (92.9%), than male respondents, at 153 (86.4%). In comparison to married respondents 76(80.9%), unmarried respondents 282(92.8%) showed higher levels of vaccine acceptancy. The acceptance of vaccines was determined to be considerably greater among the 213 students (98.2%), compared to

other professions. 292 (95,7%) of the respondents with tertiary degree completed the survey and reported accepting vaccinations.

Comparatively, a higher level of vaccine acceptance was observed in B40 income group 189 (92.6%). The acceptance of vaccines was found to be significantly greater among respondents from urban regions (308 (91.4%)) than among respondents from rural areas (55 (83.3%).

The acceptance of vaccines was significantly correlated with sociodemographic factors such age (P<0.001), gender (P<0.041), education (P<0.001), and occupation (p-0.001). The significant value must be less than 0.05; any value more than 0.05 is regarded as non-significant, such as monthly income (p-0.245), family type (p-0.179), and marital status (p-0.060).

**Table 3. Levels of vaccine hesitancy among participants (N=403)**

Levels of vaccine hesitancy	Frequency (n)	Percentage (%)
Low	382	94.8
Moderate	21	5.2
Moderate to high	0	0.0
High	0	0.0

The majority of respondents, 337 (96.6%) of the age range of 18 to 39 years, were found to have low vaccine reluctance, while 40 (85.1%) of middle adults and 5 (71.4%) of the old age range were found to have high vaccine hesitancy.

Female respondents showed a larger percentage of low vaccine reluctance, 217 (96.0%), compared to male respondents, 165 (93.2%). The majority of respondents with tertiary education, 299 (98.0%), showed lower vaccine reluctance than other graduates of higher education.

Comparatively more students (216, or 99.5%) than other populations were reported to have minimal vaccine reluctance. More single respondents (290,

95.4%) reported having low vaccine hesitation than married respondents (88, 93.6%). There was less vaccine hesitation among respondents from urban regions (324 (96.1%)) than among respondents from rural areas 58(87.9%).

In comparison to other groups, the B40 income group had a greater rate of low vaccine reluctance at 197 (96.6%). The sociodemographic factors of age (p<0.001), education (p<0.001), occupation (p<0.001), marital status (p-0.032), and family type were significantly associated with vaccine reluctance. Non-significant factors include gender and monthly income (p- 0.097), (p-0.210) respectively.

**Table 4. Association between vaccine acceptance with sociodemographic characteristics among participants using Chi-square test (N=403)**

Variables	High n(%)	Moderate n(%)	Moderate to low n (%)	Low n (%)	x <sup>2</sup> (df)	p-value
<b>Age</b>						
Young adult (18-39)	326 (93.4%)	18 (5.2%)	3 (0.9%)	2(0.0%)	39.166 <sup>a</sup> (6)	<0.001
Middle adult	33 (70.2%)	9 (19.1%)	4 (8.5%)	1(2.1%)		
Older adult	4 (57.1%)	2 (28.6%)	1(14.3%)	0(0.0%)		
<b>Gender</b>						
Male	153 (86.4%)	16 (9.0%)	7 (4.0%)	1 (0.5%)	8.258 <sup>a</sup> (3)	0.041
Female	210 (92.9%)	13 (5.8%)	1 (0.4%)	2 (0.9%)		
<b>Race</b>						
Malay	24 (75.0%)	1 (18.8%)	2 (6.3%)	0 (0.0%)	54.469 <sup>a</sup> (9)	< 0.001
Chinese	21 (67.7%)	1 (22.6%)	2 (6.5%)	1 (3.2%)		
Indian	308 (94.8%)	14 (4.3%)	2 (0.6%)	1 (0.3%)		
Others	10 (66.7%)	2 (13.3%)	2 (13.3%)	1 (6.7%)		
<b>Education</b>						
No formal education	10 (50.0%)	7 (35.0%)	3 (15.0%)	0 (0.0%)	70.743 <sup>a</sup> (9)	< 0.001
Primary	12 (70.6%)	4 (23.5%)	1 (5.9%)	0 (0.0%)		
Secondary	49 (80.3%)	10 (16.4%)	1 (1.6%)	1 (1.6%)		
Tertiary	292(95,.7%)	8 (2.6%)	3 (1.0%)	2 (0.7%)		
<b>Occupation</b>						
Employed	95 (81.9%)	17 (14.7%)	3 (2.6%)	1 (0.9%)	79.166 <sup>a</sup> (15)	< 0.001
Unemployed	16 (94.1%)	1 (5.9%)	0 (0.0%)	0 (0.0%)		
Homemaker	20 (87.0%)	3 (13.0%)	0 (0.0%)	0 (0.0%)		
Retired	8 (80.0%)	1 (10.0%)	1 (10.0%)	0 (0.0%)		
Student	213 (98.2%)	3 (1.4%)	1 (0.5%)	0 (0.0%)		
<b>Marital Status</b>						
Single	282 (92.8%)	4(4.6%)	5 (1.6%)	3(1.0%)	16.352 <sup>a</sup> (9)	0.060
Married	76 (80.9%)	5 (16.0%)	3 (3.2%)	0 (0.0%)		
Divorced	3 (100%)	0 (0.0%)	0 (0.0%)	0(0.0%)		
Widowed	2 (100%)	0 (0.0%)	0 (0.0%)	0 (0.0%)		
<b>Residency</b>						
Rural	55 (83.3%)	7 (10.6%)	3 (4.5%)	1(1.5%)	4.910 <sup>a</sup> (3)	0.179
Urban	308 (91.4%)	22 (6.5%)	5 (1.5%)	2(0.6%)		
<b>Monthly Income</b>						
B40	189 (92.6%)	12(5.9%)	3 (1.5%)	0(0.0%)	7.912 <sup>a</sup> (6)	0.245
M40	122 (85.9%)	13(9.2%)	5 (3.5%)	2(1.4%)		
T20	52 (91.2%)	4 (7.0%)	0 (0.0%)	1(1.8%)		

The majority of respondents, 337 (96.6%) of the age range of 18 to 39 years, were found to have low vaccine reluctance, while 40 (85.1%) of middle adults and 5 (71.4%) of the old age range were found to have high vaccine hesitancy. Female respondents showed a larger percentage of low vaccine reluctance, 217 (96.0%), compared to male respondents, 165 (93.2%).

The majority of respondents with tertiary education, 299 (98.0%), showed lower vaccine reluctance than other graduates of higher education. Comparatively more students (216, or 99.5%) than other populations were reported to have minimal vaccine reluctance. More single respondents (290, 95.4%) reported having low vaccine hesitation than married respondents (88,

93.6%). There was less vaccine hesitation among respondents from urban regions (324 (96.1%)) than among respondents from rural areas 58(87.9%).

In comparison to other groups, the B40 income group had a greater rate of low vaccine reluctance at 197 (96.6%). The sociodemographic factors of age (p<0.001), education (p<0.001), occupation (p<0.001), marital status (p=0.032), and family type were significantly associated with vaccine reluctance. Non-significant factors include gender and monthly income (p= 0.097), (p=0.210) respectively.

Table 6 used simple logistic regression to show the association between participants' sociodemographic traits and vaccine acceptance. In this study, Malaysians who were young adults with an

odd ratio of age were 3.66 times more likely to receive the vaccine than Malaysians who were middle-aged and other age groups. In terms of gender, females were more likely than males (OR0.94) to accept the vaccine. There was a consistent odd ratio across all categories for marital status (OR-0.01).

Indians were found to be 28.66 times more likely to accept the vaccine than Chinese (OR-3.94) and Malay people in terms of race (OR-7.62). No formal education (OR-0.08) had a lower likelihood of accepting the vaccine than secondary education and primary education, according to educational level. When compared to homemaker (OR-0.39), student (OR-0.39), and retired (OR-0.47) in terms of employment status, employed (OR-0.17) individuals were less likely to accept the vaccine (OR-0.414).

The T20 category (OR-1.27) shown a strong acceptability of the vaccine in comparison to others in terms of monthly income. The rural odd ratio (OR-2.53) in the population indicated a high level of acceptance. Non-Malaysians are 10.88 times more likely to accept the vaccine than Malaysians, according to an odd ratio of nationality.

Using simple logistic regression, characteristics like race were used to find a substantial correlation between vaccine acceptance and sociodemographic factors (Indian, p-value: 0.001). Secondary education has a p-value of 0.045, whereas primary education has a P-value of 0.023. (No formal education, p-value 0.004). Vaccine hesitancy (Moderate hesitancy, p-value 0.001). Using simple logistic regression, further relationships with sociodemographic traits are not significant.

Using multiple logistic regression, table 7 demonstrated the relationship between participant sociodemographic factors and vaccine acceptance. When compared to other races in this study, the Indian race shown a 6.74 high likelihood. The secondary education has a high educational status in comparison to other educational levels.

The odd ratio of moderate hesitancy (OR-0.004) in vaccine hesitancy was definitely high. Using

multiple logistic regression, a significant relationship between vaccine acceptance and sociodemographic factors was discovered. These factors included race (Indian, p-value: 0.027), educational status (secondary, p-value: 0.007; primary, p-value: 0.005; no formal education, p-value: 0.002), and vaccine hesitancy (low, p-value: 0.001). Multiple logistic regression analysis revealed no significant relationships between any additional sociodemographic factors.

The Sensitivity of this study was 99.2 meant that this rule allowed to correctly classify 379/382 (99.2%) of the adult participants where the predicted vaccine acceptance was observed. The specificity was 47.5 as well. It was demonstrated that this rule enabled the proper classification of 19/40 (47.5%) of the adult participants in cases where the predicted vaccination acceptance was not present.

The model fit well, as determined by the Hosmer and Lemeshow test, with a p-value of more than 0.05 (not significant), a Chi-square value of 1.954 on 3 df, and a p value of 0.582.

Based on the Cox & Snell R Square value (0.214) in MlogR, we deduced from this study that the major independent variables listed in Table 6 explained. A Chi-square of 101.37 on 7 df was obtained from omnibus tests of model coefficients, which was significant beyond 0.001.

As a result, the ability to predict vaccination acceptance among adults in India was greatly improved by include Indian, no formal education, primary education, and mild hesitation status. Therefore, the model was enhanced by include these variables and their interactions.

The Receiver Operating Curve (ROC Curve), which is depicted in Figure 1, indicates that the model successfully distinguished 85.7% (95%CI: 78.0-93.4) of individuals who were expected to accept the vaccine and significant with p value beyond 0.001. The use of Cook's influential statistics, with a cut-off value of 1.0, was used to check for influential outliers as well. None of the values in our data exceeded 1.0. As a result, our data did not contain any significant outliers.

Table 5. Association between vaccine hesitancy with sociodemographic characteristics among participants using Chi-square test (N=403)

Variables	Low n (%)	Moderate n (%)	Moderate to high n (%)	High n (%)	$\chi^2$ (df)	p-value
Age (yr)						
Young adult (18-39)	337 (96.6%)	12 (3.4%)	0 (0.0%)	0 (0.0%)	18.875 <sup>a</sup> (2)	<0.001
Middle adult (40-59)	40 (85.1%)	7 (14.9%)	0 (0.0%)	0 (0.0%)		
Older adult (≥60)	5 (71.4%)	2 (28.6%)	0 (0.0%)	0 (0.0%)		
Gender						
Male	165 (93.2%)	12 (6.8%)	0 (0.0%)	0 (0.0%)	1.573 <sup>a</sup> (1)	0.210
Female	217 (96.0%)	9 (4.0%)	0 (0.0%)	0 (0.0%)		
Race						
Malay	28 (87.5%)	4 (12.5%)	0 (0.0%)	0 (0.0%)	25.058 <sup>a</sup> (3)	<0.001
Chinese	27 (87.1%)	4 (12.9%)	0 (0.0%)	0 (0.0%)		
Indian	316 (97.2%)	9 (2.8%)	0 (0.0%)	0 (0.0%)		
Others	11 (73.3%)	4 (26.7%)	0 (0.0%)	0 (0.0%)		
Nationality						
Malaysian	382 (94.8%)	21 (5.2%)	0 (0.0%)	0 (0.0%)	No statistics are computed because Nationality is a constant.	
Non- Malaysian	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)		
Education						
No formal education	13 (65.0%)	7 (35.0%)	0 (0.0%)	0 (0.0%)	47.290 <sup>a</sup> (3)	<0.001
Primary	16 (94.1%)	1 (5.9%)	0 (0.0%)	0 (0.0%)		
Secondary	54 (88.5%)	7 (11.5%)	0 (0.0%)	0 (0.0%)		
Tertiary	299 (98.0%)	6 (2.0%)	0 (0.0%)	0 (0.0%)		
Occupation						
Employed	105 (90.5%)	11 (9.5%)	0 (0.0%)	0 (0.0%)	31.100 <sup>a</sup> (5)	<0.001
Unemployed	16 (94.1%)	1 (5.9%)	0 (0.0%)	0 (0.0%)		
Homemaker	21 (91.3%)	2 (8.7%)	0 (0.0%)	0 (0.0%)		
Retired	9 (90.0%)	1 (10.0%)	0 (0.0%)	0 (0.0%)		
Student	216 (99.5%)	1 (0.5%)	0 (0.0%)	0 (0.0%)		
Marital						
Status Single	290 (95.4%)	14 (4.6%)	0 (0.0%)	0 (0.0%)	8.775 <sup>a</sup>	0.032
Married	88 (93.6%)	6 (6.4%)	0 (0.0%)	0 (0.0%)		
Divorced	3 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)		
Widowed	1 (50.0%)	1 (50.0%)	0 (0.0%)	0 (0.0%)		
Residency						
Rural	58 (87.9%)	8 (12.1%)	0 (0.0%)	0 (0.0%)	7.630 <sup>a</sup> (1)	0.006
Urban	324 (96.1%)	13 (3.9%)	0 (0.0%)	0 (0.0%)		
Monthly Income						
B40	197 (96.6%)	7 (3.4%)	0 (0.0%)	0 (0.0%)	4.660 <sup>a</sup> (2)	0.097
M40	130 (91.5%)	12 (8.5%)	0 (0.0%)	0 (0.0%)		
T20	55 (96.5%)	2 (3.5%)	0 (0.0%)	0 (0.0%)		

**Table 6. Association between vaccine acceptance with sociodemographic characteristics among participants using Simple Logistic Regression (SLogR) (N=403)**

Variable	B	Wald (df)	Crude OR (95% CI)	p-value
Age (yr)				
Young adults (18-39)	1.297	1.09 (1)	3.66 (0.32-41.73)	0.296
Middle adults (40-59)	1.302	0.98 (1)	0.28 (48.56- 3.68)	0.323
Older adults ( ≥60) <i>ref</i>				
Gender				
Female	-.060	0.01 (1)	0.94 (0.33-2.68)	0.911
Male <i>ref</i>				
Marital status				
Divorced	-6.11	0.01(1)	0.01 (0.01-0.01)	1.000
Married	-23.02	0.01(1)	0.01 (0.01-0.01)	0.999
Single	-21.99	0.01(1)	0.01 (0.01-0.01)	0.999
Widowed <i>ref</i>				
Race				
Chinese	1.37	1.01 (1)	3.94 (0.27-57.42)	0.315
Indian	3.36	6.40 (1)	28.66 (2.13-385.44)	0.011
Malay	2.03	2.04 (1)	7.62 (0.47-124.01)	0.154
Others <i>ref</i>				
Educational status				
No formal education	-2.51	8.14 (1)	0.08(0.01-0.46)	0.004
Primary education	-2.01	5.19 (1)	0.13(0.02-0.76)	0.023
Secondary education	-1.25	4.03 (1)	0.29(0.09-0.97)	0.045
Tertiary education <i>ref</i>				
Employment status				
Employed	-1.78	0.84 (1)	0.17(0.01-7.55)	0.359
Homemaker	-0.93	0.19 (1)	0.39(0.01-23.76)	0.658
Others	-3.13	2.39 (1)	0.04 (0.01-2.31)	0.122
Retired	-0.75	0.12 (1)	0.47 (0.01-30.41)	0.725
Student	-0.88	0.18 (1)	0.414 (0.01-24.21)	0.671
Unemployed <i>ref</i>				
Family Monthly Income				
B40 (<RM 4849)	-.49	0.67 (1)	0.61 (0.18-1.99)	0.412
T20 (>RM 10959)	0.24	0.11 (1)	1.27 (0.30-5.33)	0.743
M40 (RM 4849- RM 10954) <i>ref</i>				
Residence				
Rural	0.93	1.51 (1)	2.53 (0.58-11.15)	0.221
Urban <i>ref</i>				
Nationality				
Non- Malaysian	2.39	1.42 (1)	10.88 (0.22-549.62)	0.232
Malaysian <i>ref</i>				
Vaccine hesitancy				
High	-	-	-	-
Low to moderate	-	-	-	-
Moderate	-3.51	20.86 (1)	0.03 (0.01-0.14)	0.001*
Low <i>ref</i>				



Table 7. Association between vaccine acceptance with sociodemographic characteristics among participants using Simple Logistic Regression (MLogR) (N=403)

Variable	B	Wald (df)	Adjusted OR (95% CI)	p-value
<b>Race</b>				
Chinese	-0.17	0.03 (1)	0.85 (0.14 - 5.31)	0.859
Indian	1.91	4.87 (1)	6.74 (1.24 -36.69)	<b>0.027</b>
Malay	0.56	0.34 (1)	1.75 (0.27 - 11.55)	0.560
Others <i>ref</i>				
<b>Educational status</b>				
No formal education	-2.17	9.61 (1)	0.115 (0.029-0.451)	<b>0.002</b>
Primary education	-1.85	7.84 (1)	0.157 (0.04-3 .574)	<b>0.005</b>
Secondary education	-1.45	7.29 (1)	0.236 (0.083-0.673)	<b>0.007</b>
Tertiary education <i>ref</i>				
<b>Vaccine hesitancy</b>				
High	-	-	-	-
Low to moderate	-	-	-	-
Moderate	-3.31	28.35 (1)	0.04 (0.01-0.12)	<b>0.001*</b>
Low <i>ref</i>				

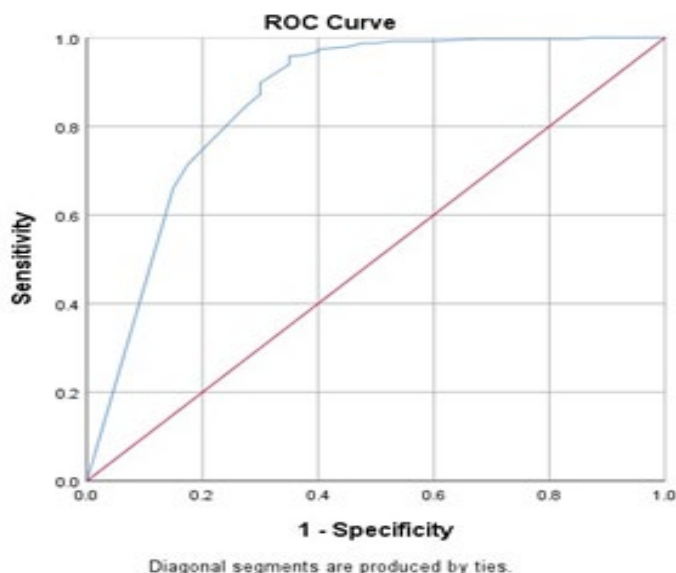


Figure-1, Area Under the Curve (Receiver Operating curve,ROC)

**DISCUSSION**

A major method for raising health outcomes and life expectancy is vaccination. The development of vaccines has advanced significantly, and vaccination will inevitably become a trend in the fight against the COVID-19 pandemic. The population's desire to receive vaccinations, however, determines whether a vaccination scheme will be successful. This study gathered data across Malaysia using an online self-administered questionnaire. [14]

In accordance with the data analysis, among the 403 respondents, 90.1% shown a high degree of covid -19 vaccination acceptance, and 94.8%

demonstrated a low level of hesitation. Age (p: 0.001), gender (p: 0.041), education (p: 0.001), and occupation (p: 0.001) were sociodemographic factors that were significantly correlated with vaccine acceptance. Monthly income (p: 0.245), family structure (p: 0.179), and marital status (p: 0.060) were not significantly correlated with vaccine acceptance. The covid-19 vaccination was found to be largely accepted by respondents in the 18-39 age group. In addition, the majority of tertiary graduates had greater levels of vaccine acceptance than lower education graduates, and the acceptance of vaccines was shown to be higher among females than males. Unmarried people and students both had greater vaccination acceptance rates.

Additionally, it was discovered that B40 income group members and urban inhabitants accepted vaccines more generally.

Rates of COVID-19 vaccination adoption have been reported to vary greatly between nations and geographical areas. Covid-19 vaccination acceptability levels above 80% tended to be found in Asian countries with high levels of public trust in their central administrations. China, South Korea, and Singapore are among the nations mentioned. In middle-income nations like Brazil, India, and South Africa, a comparatively high inclination towards acceptance was also noted [15]. The results were largely inconsistent across Europe, with 53.7% vaccine acceptance rates reported in Italy and 58.9% in France in nations bordering the Mediterranean. There were no surveys conducted among the in Malta. The outcomes in Italy and France can be interpreted from the standpoint of having little faith in the efficacy of these vaccines, given that this kind of sceptical mindset has been previously documented in these nations [16]. Furthermore, Malta's students and medical staff reported low acceptance rates for the COVID-19 vaccine, at 44.2% and 52.0%, respectively. Other European nations also reported varying outcomes, with Denmark reporting rates as high as 80.0% and Poland reporting rates as low as 56.3% [17],[18].

Given the severe effects of COVID-19 in Russia, the vaccine acceptance rates there were significantly lower (54,9%), necessitating further analysis. Over the duration of the pandemic, variations in vaccination acceptance rates were observed in the UK, the USA, and Canada. The aforementioned low rates are related to a lack of trust in the efficacy and safety of vaccines in these areas. The Middle East was one of the lowest regions.

The country with the lowest acceptance rate was Kuwait (23.6%), which was followed by Jordan (28.4%), Saudi Arabia (64.7%), and Turkey (66.0%). Such low rates can be attributed to the region's pervasive acceptance of conspiratorial views and its associated opposition to vaccination [19].

This study was carried out to evaluate participant sociodemographic factors and the COVID-19 vaccination acceptance rate. This study helped us understand how a vaccine recipient's attitude was affected by their demographic traits. [20] Understanding the outcomes can help raise vaccination knowledge among the general public. [21] The outcome of the study will be an advantage to a few categories.

First, among the age range of 18 to 39 years old, which had the highest acceptance rate, the significance of vaccinations and how it prevents COVID-19 from spreading. [23] However, people in

older age groups would also have understood the value of immunisations during the pandemic. The outcomes then demonstrated that, in comparison to men, females were more willing to accept the immunisations. Our findings were similar to those from other studies when compared. As a result, it was discovered that during the COVID pandemic, women were more concerned with their health than men [24].

The participants' educational backgrounds were clearly different, with individuals with tertiary education having the greatest acceptance rates, demonstrating that the more knowledge a person has, the more aware they can be. This is also applicable if one puts their health first. [5] Additionally, the value and benefits of getting vaccinated against this pandemic were taught to kids. As a result, student admission rates were the highest.

#### **Limitation**

This study was conducted in Malaysia among individuals over the age of 18, which may have limited the findings of other populations due to geography and disease load, such as vulnerable groups, children under the age of 18, people from poorer socioeconomic backgrounds, and illiterate people. The distribution of this survey used American English and was not multi- or bilingual, which would have limited the participation of individuals who could understand English. In addition, since this was an online electronic survey, participants should have a reliable internet connection.

#### **CONCLUSION**

This study was done to examine the results of accepting vaccinations with the sociodemographic traits of the subjects. [25] In the early stages of this pandemic, there were confusions and miscommunications about vaccination; yet, vaccination and immunisation will assist us all battle the COVID-19. As time passed, viewpoints shifted [26] and the general public became more aware of the value of immunisation. Nevertheless, a few people were still hesitant to acquire vaccines due to ignorance. [26] Governments, health policy makers, and media outlets, especially social media corporations, must work together to address the broad occurrence of COVID-19 vaccination reluctance. It is advised to increase the public's trust in COVID-19 immunisation by disseminating timely and concise messaging through reliable sources that support the security and effectiveness of the vaccines that are already on the market.

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