

## ORIGINAL ARTICLE

# COVID-19 Vaccine Acceptance and Its Determinants among Medical Students at the Universiti Malaysia Sabah: A Cross-sectional Study

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## ABSTRACT

**Introduction:** Malaysia has announced the COVID-19 National Immunization Programme (NIP) involving three phases beginning in March 2021, with the target of vaccinating 80 percent of the population. The purpose of this study was to determine whether medical students at the Faculty of Medicine and Health Sciences (FMHS), Universiti Malaysia Sabah (UMS), were accepting of the COVID-19 immunization and the factors that may have contributed to that acceptance. **Methods:** A cross-sectional online study involving 244 medical students from FMHS, UMS, was carried out utilizing a validated electronic questionnaire. The questionnaire was divided into three sections: variables influencing COVID-19 vaccine acceptability, sociodemographic characteristics of the students, and their acceptance of the vaccine. The IBM Statistical Package for Social Sciences (SPSS) was used to statistically analyze the data. **Results:** 91.4% of people accepted the COVID-19 vaccine, which is among the highest rates among studies done in academic settings. Vaccine information from health agencies was found to be significantly associated with the acceptability of the COVID-19 vaccination ( $p=0.02$ ) and confirmed by multivariable analysis as its determinant (prevalence odds ratio 9.535, 95% confidence interval 3.931-15.138,  $p$ -value: 0.004). **Conclusion:** This study merits the attention of the public health department of FMHS, UMS to plan cooperative synergy with regional health organizations like the Malaysian Health Coalition (MHC) to improve knowledge and raise awareness about the COVID-19 vaccination while also giving medical students evidence-based information.

**Keywords:** COVID-19 vaccine; Vaccination; Medical student; Acceptance; Determinants

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## INTRODUCTION

Infection with COVID-19, which has spread to 200 countries globally, is a new public health emergency that is presently endangering the entire planet. The World Health Organization (WHO) has identified COVID-19 as a global pandemic, its first classification since the declaration of H1N1 influenza as a pandemic in 2009 [18]. On January 25, 2020, three Chinese nationals who had previously had close contact with an infected person in Singapore were found to have the first case of COVID-19 in Malaysia [6]. A total of 291,774 positive COVID-19 cases and 1,088 fatalities has been reported to the Malaysian Ministry of Health as of February 25th, 2021 [19].

Malaysia has launched the COVID-19 National Immunization Programme (NIP), which would consist of three phases and start in March 2021 with the goal of immunizing 80% of the population. A total of 500,000 frontline workers who were directly engaged in the pandemic's fight received the first phase of COVID-19 immunization in Malaysia [4]. The effectiveness of COVID-19 vaccination would be highly reliant on people's willingness to receive the vaccine, regardless of the vaccine's availability. Many things may have an impact on this decision. According to Brewer (2018), a theoretical framework for vaccination, such as the Increasing Vaccination Model, postulates that elements from three domains, including individual cognition, social processes, and practice difficulties, could affect vaccine uptake [4].

Medical students are likely to encounter COVID-19 patients among the front-line medical staff. Therefore, as soon as a vaccine is available, it is crucial for this

population to achieve high levels of COVID-19 immunization coverage [11]. Therefore, as shown by Amodio et al [5], achieving a high vaccination uptake in the early stages of a medical career may boost the subsequent uptake of influenza vaccines. They will be responsible for recommending vaccinations and giving patients who are averse to getting shots advice as future healthcare providers. A sufficient workforce to treat patients will be further ensured by maximizing uptake by addressing obstacles in this group [11].

There is, however, insufficient data to assess the incidence of COVID-19 vaccination uptake and its contributing factors among medical students. Nearly one-quarter of medical students in Southeast Michigan were found to be reluctant to obtain vaccinations, with contributory causes including worries about major vaccine adverse effects and a lack of confidence in the information provided by public health specialists [10]. In a different large-scale study, it was discovered that healthcare workers were more in favour of the COVID-19 vaccine than non-healthcare workers were because they knew more about the disease and might be more likely to take precautions to avoid spreading it to their families [9]. Determining vaccine acceptance and the contributing elements among medical students are crucial because it can significantly affect the requirement for a curriculum that develops a positive attitude towards vaccination and fills in knowledge gaps. This study aims to ascertain the acceptance of COVID-19 immunization among medical students at the Faculty of Medicine and Health Sciences (FMHS), Universiti Malaysia Sabah (UMS), as well as the contributing variables to that acceptance.

## MATERIALS AND METHODS

### Study Design

This study employed a cross-sectional study design and was conducted from February until March 2021. A validated self-administered electronic questionnaire was distributed online through social networking sites such as WhatsApp. The study targeted the population of medical students in a university. The population of interest for this study were Year 1 to Year 5 medical students in the FHMSUMS.

### Sample size

Based on Qiao et. al., 2020 as reference, the calculated sample size were 204 students by using Cochran's Formula. After 20% of each stratum by year of study is being added, the final sample size is 244 students. Convenience sampling has been implemented to sample the population. Respondents that meet the inclusion criteria which was Medical Student from Year 1 to Year 5 of Faculty of Medicine and Health Sciences in Universiti Malaysia Sabah was taken as sample.

### Study Material

An anonymous self-administrated questionnaire was used to collect data for this study via Google form. This questionnaire consisted of three sections, which was divided into Section A, B, and C. In Section A, participants were required to fill up their sociodemographic details which consisted of age, race, religion, place of origin, year of study, and monthly family income. In Section B, the participants were required to rate their acceptance of the COVID-19 vaccine on a 5-point Likert scale ranging from 1 "Definitely not to take it", 2 "Unlikely to take it", 3 "Not sure", 4 "Likely to take it" and 5 "Definitely to take it". Based on this section, the participants were categorized into acceptance (4-5) and refusal (1-3). In Section C, there were 18 items regarding the factors associated with COVID-19 vaccine acceptance among medical students in UMS. The participants were required to choose Yes or No regarding the factors which they think are important when considering getting vaccinated. This questionnaire was retrieved and modified from two previous studies by Tam et al. 2020 and Qiao et al. 2020. A pilot test was conducted, and content validation of the questionnaire was done. The calculated Cronbach's alpha values for the questionnaire were 0.75. All questionnaires were self-reported and completed by the participants themselves.

### Statistical Analysis

Data collected were compiled using google forms and analyzed using IBM Statistical Package for Social Sciences (SPSS) Statistics version 27. Descriptive statistics were carried out on demographic data such as sociodemographic factors as well as the acceptance of the COVID-19 vaccine and the factors associated with COVID-19 vaccine acceptance. These were recorded as frequencies and percentages. While bivariate analysis for categorical data were used to identify associations between dependent and independent variables using Chi-square and Fisher's exact test. In addition, simple logistic regression analysis followed by multiple logistic regression was performed to determine the risk factors for COVID-19 vaccine acceptance. The analysis was performed with  $p < 0.05$  level of significance.

### Ethical approval

Permission to conduct research was applied from the Research Ethics Committee from Faculty of Medicine and Health Sciences, University Malaysia Sabah with the approval number of JKETika 1/21 (3).

## RESULTS

### Participant's Characteristics

The majority of the participants were female (72.1%) and Bumiputera Sabah (51.2%). 47.5% of the participants were Muslim and 65.5% of them originated

**Table I : Sociodemographic Characteristics of the participants (n = 244)**

Item	n (%)
Gender	
Male	68 (27.9)
Female	176 (72.1)
Race	
Malay	41 (16.8)
Chinese	38 (15.6)
Indian	32 (13.1)
Bumiputera Sabah	125 (51.2)
Bumiputera Sarawak	1 (0.4)
Others	7 (2.9)
Religion	
Islam	116 (47.5)
Christian	64 (26.2)
Buddha	31 (12.7)
Hindu	31 (12.7)
Others	2 (0.8)
Place of Origin	
Urban	160 (65.6)
Rural	84 (34.4)
Year of Study	
Year 1	49 (20.1)
Year 2	47 (19.3)
Year 3	55 (22.5)
Year 4	44 (18.0)
Year 5	49 (20.1)
Monthly Family Income (Ringgit Malaysia)	
B40 (<4850)	115 (47.1)
M40 (4850 -10959)	119 (48.8)
T20 (>10959)	10 (4.1)

from urban areas. Year 3 was the most participants in this study which accounted for 22.5% and 48.8% of the participants were reported monthly family income from M40 (48.8%), followed by B40 (47.1%) and T20 (4.1%) (Table I). Out of 244 participants, 91.4% of the participants were considered as acceptant (ie. 'definitely to take it' or 'likely to take it) while the other 8.6% were considered as hesitant/refusal (ie. 'not sure' or 'unlikely to take it' or 'definitely not to take it) (Table II).

Regarding association between sociodemographic factors and acceptance of the COVID-19 vaccine among the participants, this study found that there was no statistically significant association between sociodemographic factors and the acceptance of the COVID-19 vaccine. Nevertheless, 92.4% of female students would like to accept the COVID-19 vaccine compared to 89.7% of male students ( $p = 0.56$ ). Lastly, 93.8% of clinical year students would like to accept the vaccine compared to 88.5% of pre-clinical year students ( $p < 0.20$ ) (Table III).

Out of 18 factors, only one factor showed a significant association. Vaccine information from health agencies was the only factor that is found to affect the acceptance of the COVID-19 vaccine among medical students of FMHS, UMS ( $p = 0.02$ ). While the other 17 factors showed no statistically significant association which includes the efficacy of the vaccines ( $p = 0.60$ ), the duration of vaccine protection ( $p = 0.05$ ), side effects of the vaccines ( $p = 1.00$ ), long term negative consequences of the vaccines ( $p = 0.46$ ), the administration route of the vaccine ( $p = 0.24$ ), the origin of the vaccine ( $p = 0.19$ ), schedules of the vaccines ( $p = 0.73$ ), local availability of the vaccines ( $p = 0.42$ ), the cost of the vaccines ( $p = 1.00$ ), recommended by the school/college ( $p = 0.58$ ), recommended by the government ( $p = 0.29$ ), recommended by the doctors ( $p = 0.60$ ), vaccine information from social/mass media ( $p = 0.20$ ), vaccine information from the government ( $p = 1.00$ ), vaccine information from health providers ( $p = 0.47$ ), vaccine

**Table II : The Acceptance of COVID-19 Vaccine and Factors Associated with COVID-19 Vaccine Acceptance among the participants (n = 244)**

Item	n (%)
<b>Acceptance of COVID-19 Vaccine</b>	
Acceptance	223 (91.4)
Hesitancy/Refusal	21 (8.6)
<b>Factors Associated with COVID-19 Vaccine Acceptance</b>	
The efficacy of the vaccines	
Yes	239 (98.0)
No	5 (2.0)
The duration of vaccine protection	227 (93.0)
Yes	17 (7.0)
No	

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The side effects of the vaccines	
Yes	202 (82.8)
No	42 (17.2)
Long-term negative health consequences of the vaccines	
Yes	219 (89.8)
No	25 (10.2)
The administration route of the vaccines (oral / injection)	121 (49.6)
Yes	123 (50.4)
No	
The origin of the vaccines (domestic / overseas; China, UK)	
Yes	118 (48.4)
No	126 (51.6)
Schedules of the vaccines (one time / multiple times)	
Yes	148 (60.7)
No	96 (39.3)
Local availability of the vaccines	
Yes	222 (91.0)
No	22 (9.0)
The cost of the vaccines	
Yes	212 (86.9)
No	32 (13.1)
Recommended by school/college.	
Yes	193 (79.1)
No	51 (20.9)
Recommended by the government.	
Yes	215 (88.1)
No	29 (11.9)
Recommended by the doctors.	
Yes	234 (95.9)
No	10 (4.1)
Vaccine information from social / mass media	
Yes	180 (73.8)
No	64 (26.2)
Vaccine information from government	
Yes	233 (95.5)
No	11 (4.5)
Vaccine information from health agencies (eg. WHO, UNICEF, CDC etc.)	
Yes	236 (96.7)
No	8 (3.3)
Vaccine information from health providers (eg. specialist, doctors, nurses)	
Yes	237 (97.1)
No	7 (2.9)
Vaccine information from pharmaceutical companies	
Yes	217 (88.9)
No	27 (11.1)
Vaccine information from personal social networks (eg. family, friends, acquaintances)	
Yes	163 (66.8)
No	81 (33.2)

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**Table III : Association between Sociodemographic Factors and the Acceptance of COVID-19 Vaccine among the participants ( n = 244)**

Sociodemographic Factors		Acceptance of COVID-19 Vaccination		p-value
		Acceptance, n (%)	Hesitancy/Refusal, n (%)	
Gender	Male	61 (89.0)	7 (10.3)	0.56 <sup>a</sup>
	Female	162 (92.0)	14 (8.0)	
Race	Malay	39 (95.1)	2 (4.9)	0.54 <sup>b</sup>
	Non-Malay	184 (90.6)	19 (9.4)	
Religion	Muslim	105 (90.5)	11 (9.5)	0.64 <sup>a</sup>
	Non-Muslim	118 (92.2)	10 (7.8)	
Place of Origin	Urban	148 (92.5)	12 (7.5)	0.40 <sup>a</sup>
	Rural	75 (89.3)	9 (10.7)	
Monthly Family Income	B40	105 (91.3)	10 (8.7)	0.40 <sup>a</sup>
	M40	110 (92.4)	9 (7.6)	
Year of Study	T20	8 (80.0)	2 (20.0)	0.20 <sup>a</sup>
	Pre-Clinical year	85 (88.5)	11 (11.5)	
	Clinical year	138 (93.2)	10 (6.8)	

<sup>a</sup> P value by Chi-square test and<sup>b</sup> P value by Fisher's exact test**Table IV : Association between the Factors Associated with COVID-19 Vaccine Acceptance and the Acceptance COVID-19 Vaccine among Medical Students of FMHS, UMS (n = 244)**

Factors Associated with COVID-19 Vaccine Acceptance		Acceptance of COVID-19 Vaccine		p-value
		Acceptance, n (%)	Hesitancy/Refusal, n (%)	
Efficacy of vaccines	Yes	220 (92.1)	19 (7.9)	0.06 <sup>b</sup>
	No	3 (40.0)	2 (60)	
The duration of the vaccine protection	Yes	210 (92.5)	17 (7.5)	0.05 <sup>b</sup>
	No	13 (76.5)	4 (23.5)	
Side effects of the vaccines	Yes	184 (91.1)	18 (8.9)	1.00 <sup>b</sup>
	No	39 (92.9)	3 (7.1)	
Long-term negative health consequences of the vaccines	Yes	201(91.8)	18 (8.2)	0.46 <sup>b</sup>
	No	22 (88.0)	3 (12.0)	
The administration route of the vaccine	Yes	108 (89.3)	13 (10.7)	0.24 <sup>a</sup>
	No	115 (93.5)	8 (6.5)	
The origin of the vaccine	Yes	105(89.0)	13 (11.0)	0.19 <sup>a</sup>
	No	118(93.7)	8 (6.3)	
Schedules of the vaccines	Yes	136(91.9)	12 (8.1)	0.73 <sup>a</sup>
	No	87 (90.6)	9 (9.4)	
Local availability of the vaccines.	Yes	204 (91.9)	18 (8.1)	0.42 <sup>b</sup>
	No	19 (86.4)	3 (13.6)	
The cost of the vaccines	Yes	193 (91.0)	19 (9.0)	1.00 <sup>b</sup>
	No	30 (93.8)	2 (6.3)	

Recommended by the school/college	Yes	175 (90.7)	18 (9.3)	0.58 <sup>b</sup>
	No	48 (94.1)	3 (5.9)	
Recommended by the government	Yes	198 (92.1)	17 (7.9)	0.29 <sup>b</sup>
	No	25 (86.2)	4 (13.8)	
Recommended by the doctors	Yes	214 (91.5)	20 (8.5)	0.60 <sup>b</sup>
	No	9 (90.0)	1 (10.0)	
Vaccine information from social mass media	Yes	167 (92.8)	13 (7.2)	0.20 <sup>a</sup>
	No	56 (87.5)	8 (12.5)	
Vaccine information from government	Yes	213 (91.4)	20 (8.6)	1.00 <sup>b</sup>
	No	10 (90.9)	1 (9.1)	
Vaccine information from health agencies	Yes	218 (92.4)	18 (7.6)	0.02 <sup>b</sup>
	No	5 (62.5)	3 (37.5)	
Vaccine information from pharmaceutical companies	Yes	199 (91.7)	18 (8.3)	0.71 <sup>b</sup>
	No	24 (88.9)	3 (11.1)	
Vaccine information from personal social networks	Yes	149 (91.4)	14 (8.6)	0.99 <sup>a</sup>
	No	74 (91.4)	7 (8.6)	

<sup>a</sup> P value by Chi-square test and <sup>b</sup> P value by Fisher's exact

**Table V : Predictor for the Acceptance of COVID-19 Vaccine using multiple logistic regression**

Variables	Simple logistic regression			Multiple logistic regression		
	b	95% CI	p value	b	(95% CI)	p value
Efficacy of vaccines (Yes: 1, No: 0)	1.387	(3.756-6.530)	0.596			
Duration of the vaccine protection (Yes: 1, No: 0)	0.807	(5.608-7.993)	0.815			
Vaccine information from health agencies (Yes: 1, No: 0)	8.897	(2.161-15.638)	0.047	9.535	3.931- 15.138	0.004

Adjusted r<sup>2</sup> = 0.02.

Backward linear regression method applied.

Only variables that were included in the final model are presented in the table.

Multicollinearity and interaction term were checked and not found.

Hosmer-Lemeshow test (p = 0.302) and classification table (overall correctly classified percentage = 93.2%), thus the fit of this model is achieved

information from pharmaceutical companies ( p =0.71) and vaccine information from personal social networks (p =0.99) (Table IV).

Following the bivariate analyses, multivariate analyses model was performed for variables with significant results (p-value of <0.05), First, simple logistic regression analysis was performed for each of the significant independent variables in the previous bivariate analysis. The model (Table V) confirmed that an important predictor for the acceptance of COVID-19 vaccine was vaccine information from health agencies (prevalence odds ratio 9.535, 95% confidence interval 3.931- 15.138, p value: 0.004).

## DISCUSSION

The use of vaccinations has been one of the most effective preventive measures in the history of public health, helping to control many of the world's deadliest and most crippling infectious diseases [14]. Unfortunately, since the first vaccines were introduced, there has been anti-vaccination sentiment all over the world [14]. The WHO has named vaccination hesitancy as one of the top ten global public health issues for 2019 [13]. Numerous cases of infectious diseases that had been eradicated have come back because of the vaccination hesitancy group, including poliomyelitis cases in Sabah that returned after 27

years of eradication [20]. The reasons for vaccine reluctance are nuanced and go beyond a lack of vaccine knowledge. The perception of health care providers as a reliable source of information about the vaccination is one of the biggest predictors of its acceptability in the community. In addition to being fabricated these days by social media and conspiracy theories, the reluctance to receive the COVID-19 vaccine is concerning and has been observed in several nations. If this significant problem is not adequately handled, it will worsen and jeopardize Malaysia's hopes of reaching more than 80% herd immunity by the first quarter of 2022. On that basis, a more thorough understanding of the COVID-19 vaccine's acceptance as well as the factors influencing that acceptance should be presented first. Therefore, the current study's objectives are to establish the characteristics that influence COVID-19 vaccination acceptability as well as the prevalence of acceptance of the customized COVID-19 vaccine among medical students at FHMS and UMS.

Estimates of vaccination acceptance rates can thus be useful in designing future interventions and activities. In order to stop the spread of the virus in the community and lessen the negative impacts of this unprecedented pandemic, it is also essential to raise knowledge about the safety and benefits of vaccines and reassure individuals who are apprehensive about them. Additionally, because our healthcare system had just started the COVID-19 vaccine vaccination rollout, this study will aid in understanding the viewpoints of medical students regarding the vaccine.

The results of this study revealed 91.4% acceptance of the COVID-19 vaccine, which was the highest compared to other prior studies conducted among university and/or college students. These studies were conducted in Italy, South Carolina of the United States, and Malta, respectively, and there have been few studies to explore the acceptance of COVID-19 vaccine among medical students, particularly in Malaysia [1,6,14]. The majority of earlier research were carried out when vaccines were still being developed and clinical trials were being undertaken, therefore there was a lack of information about the vaccine's safety, effectiveness, and cost. As a result, the COVID-19 vaccination may be less well received in these investigations. The highest acceptance of the COVID-19 vaccination (>90%) was found in Ecuador (97.0%), Malaysia (94.3%), Indonesia (93.3%), and China (91.3%) in earlier investigations conducted among the public [12]. This presents a general overview of the potential for Malaysia's COVID-19 National Immunization Programme (NIP), which began its first phase on February 26, 2021, to achieve more than 80% herd immunity [3].

According to a prior study by Tam et al. (2020), there

was no significant association between any of the demographic factors and the uptake of the COVID-19 vaccine [15]. This is in line with the study's conclusion, which found no statistically significant correlation between socio-demographic characteristics (such as gender, race, religion, location of origin, year of education, and monthly family income) and the acceptance of the COVID-19 vaccine. There was no consistent correlation between participants' demographic factors (such as age and sex) and vaccination uptake behaviour, according to a systematic evaluation of 10 surveys that examined the acceptability of the influenza vaccine [17]. The results also showed that women, non-Muslims, and people from urban areas were more likely to be immunized, which was inconsistent with the results of previous research conducted by Echoru et al., 2020, which found that male and Muslim participants were more likely to be immunized while people from urban areas were less likely to receive the COVID-19 vaccine [6].

Additionally, this study has demonstrated that the vaccine information provided by health organizations was the only component that was substantially connected with the acceptance of the COVID-19 vaccine ( $p = 0.02$ ). This result differs from that of a prior study by Qiao et al. (16), which found no correlation between the adoption of the COVID-19 vaccination and the sources of vaccine information, including those from health agencies. The remaining 17 risk variables for COVID-19 acceptability did not significantly affect the vaccine's acceptance, according to the research. This finding was contradicted with the previous study carried out by Tam et al. where nine out of the 12 factors (ie. "side effects of the vaccines", "the duration of vaccine protection", "long-term negative health consequences of the vaccines", "the administration route of the vaccines", "the origin of the vaccines", "the cost of the vaccines", "schedules of the vaccines", "local availability of the vaccines", "recommended by the school/college", "recommended by the government", and "recommended by the doctors") have a significant association with the acceptance of COVID-19 vaccine. This huge difference of findings may be due to the homogeneous population from the current study compared to the previous study that includes a large sample size of college students from different curriculum area and level of tertiary education.

These are the top three association between factors associated with COVID-19 vaccine acceptance and the acceptance COVID-19 vaccine that were considered on vaccination decision-making by many of the medical students of FMHS, UMS which is the efficacy of the vaccines ( $p = 0.06$ ), duration of the vaccine protection ( $p = 0.05$ ), and vaccine information from health agencies such as WHO, UNICEF, CDC ( $p = 0.02$ ). However, this study was unable to determine the specific key factors that most favorable during vaccination decision-making among the acceptance as well as hesitancy/refusal. Therefore, further study is warranted to explore different

factors that play a role in vaccine uptake decisions according to the COVID-19 vaccine acceptance as well as to identify the barriers of COVID-19 vaccine acceptance.

To the best of our knowledge, this study represents one of the initial initiatives to gauge medical students' attitudes about the COVID-19 vaccine and the variables influencing those attitudes, particularly in Malaysia. In addition, stratified random sampling was employed in this study to ensure that all study years were equally included and represented in the sample and to give better coverage of the study population. Additionally, it removes selection bias from this study.

However, there are several methodological limitations in this current study. First and foremost, the study is a cross-sectional design that only provides a snapshot of the study population's response at a given point. Thus, the data cannot be used to draw causal inferences. The results obtained from this study cannot be generalized since it was conducted in a specific single study area which is FMHS, UMS and focusing only on medical students. Secondly, self-report data may be prone to response bias such as social desirability, acquiescence and dissent bias. This may be due to vague question-wording and the long list of items asked in the questionnaire. Therefore, it is advisable for a future research study to apply a longitudinal study design to be able to monitor the changes of behaviors in relation to vaccine acceptance which includes students from other faculties at the national level for heterogeneous population. Also, to do the face-to-face interviews instead of the online and self-administered questionnaires in order to avoid response bias.

## CONCLUSION

This study reported 91.4% of acceptance of COVID-19 vaccine among medical students of at the UMS which was the highest out of many studies conducted among university/college students. Vaccine information from health agencies was the significant factor associated with COVID-19 vaccine acceptance. This study merits the attention of the Public Health Department of FMHS, UMS to plan collaborative synergy with local health agencies such as the Ministry of Health (MOH) and Malaysian Health Coalition (MHC) in order to enhance knowledge and raise awareness about COVID-19 vaccination as well as providing evidence-based facts regarding this issue. This is because the COVID-19 vaccination is an important tool to help flatten the curve for a better future in the country. As future healthcare providers, medical students will be responsible for offering recommendations for vaccines and providing advice to vaccine-hesitant patients. Therefore, maximizing vaccine acceptance in their early phases of medical career may help to influence the public in the future to increase vaccine

acceptance in the community.

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