ORIGINAL ARTICLE

Knowledge and Acceptance of COVID-19 (SARS CoV2) Vaccination among Foundation students in a College in Kedah, Malaysia

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ABSTRACT

Introduction: To combat the COVID-19 pandemic, Malaysia started vaccination of front-liners and adults in the community. The latter group might have insufficient knowledge to accept COVID-19 vaccination, therefore this research was to assess the knowledge and acceptance of COVID-19 vaccination among youths, specifically students in a Malaysian college. **Methods:** A cross-sectional study was conducted among 481 foundation students in Kolej MARA Kulim (KMKU). The minimum sample size, using Epi Info was 214. Students answered an online questionnaire using google form which included demographic data (age, gender) and ten questions on knowledge and acceptance of COVID-19 vaccination. For knowledge questions, students answered "yes", "no" or "don't know", correct answer scoring 1. For acceptance questions, a 5-point Likert scale was used ranging from "strongly disagree" to "strongly agree". EXCEL and SPSS version 23 were used for analysis with Chi-square test done to test association (significant for p-value <0.05). **Results:** The response rate was 65.1% with 313 students, (45.4% males, and 54.6% females) aged 18-19 years. The majority (83.7%) had satisfactory to excellent knowledge scores (mean = 6.66 (SD=2.299, 95% CI 6.40-6.91), median = 7 (± IQR =3), while 16.3% obtained poor scores (≤ 4). The majority (90%) accepted vaccination. Higher knowledge scores were associated with higher acceptance rates in both genders (p-value= 0.000). Significantly more females (90.6%) than males (80.3%) had positive attitude towards vaccination (p-value = 0.009). **Conclusions:** The majority of the foundation students in KMKU were knowledgeable on COVID-19 vaccination and willing to receive the vaccination against the novel coronavirus.
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Keywords: Knowledge, Acceptance, COVID-19, Vaccination, College youth

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INTRODUCTION

In December 2019, a new virus, named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) appeared in Wuhan, China (1). This novel coronavirus caused coronavirus disease 2019 (COVID-19) which quickly spread across other continents. The World Health Organisation (WHO) declared a pandemic in March 2020 (2). Although it has been over a year since the first outbreak, the virus shows no signs of slowing down in infecting more individuals. However, there is a hope of controlling the pandemic through mass vaccinations to achieve herd immunity (3).

At least 23 million lives were saved through vaccination against infectious diseases between 2011 and 2020 (4). Developing a vaccine requires multiple stages of trials before finally deemed safe and applicable for public use and to avoid serious adverse reactions (5). Today, newer vaccine-producing technologies are developed to deliver the best outcome with fewer adverse effects. Examples include viral vector-based vaccines and nucleic acid vaccines using plasmid DNA or RNA encoding antigens, such as messenger RNA or viral replicons (6). Vaccines provide personal protection for those who are vaccinated and protect communities by reducing the spread of diseases among the population (7).

Nevertheless, while the insertion of antigenic properties into the host system is vital to produce the much-needed immunity against pathogens, some individuals doubt these methods. Hence, they reject the idea of vaccination. In the past, the Malaysian Ministry of Health conducted many programmes including health talks and

forums, to restore confidence in current vaccine policies and overcome public doubts about vaccination (8). However, research has revealed that the main reason why many Malaysian parents were hesitant about childhood vaccines such as DPT (Diphtheria, Pertussis, Tetanus) was due to their misunderstanding about vaccines from information obtained through unproven Internet internet resources and mass media (9). Thus, Hence, it is also important to identify the perception of the community towards vaccines available to combat COVID-19.

Knowledge about vaccination among the younger generations is also important as they will decide the future of immunisation level of a country. A survey on 2,482 14-year-old female students who received the HPV vaccine showed insufficient and incorrect knowledge about HPV and HPV vaccines (10). In May 2020, a cross-sectional study of adults aged 18 and above in the United States found that 69 per cent of participants were willing to get the COVID-19 vaccination (11). Other studies done abroad have shown the acceptance and willingness to get COVID-19 vaccination contributes to the development of herd immunity. A more vaccinated mobile younger population would protect the elderly ones with comorbidities who are more homebound. There are currently few publications on the acceptance of the COVID-19 vaccine among young Malaysians. Two papers were published after this study was done which included a survey on Malaysians aged 18 years and above but not confined to youths (12,13). The mean age was 37 years in one study (12) whereas in the second study 40.7% were aged 18-29 years with almost 60% in the older aged group from 30-70 years (13). The first study (12) had shown a high acceptance rate COVID-19 vaccine (78%) whereas the second study (13) showed those with better knowledge of COVID-19. The objectives of this study were to determine the knowledge and acceptance of COVID-19 vaccination among Foundation programme students (youths aged 18-19 years) in Kolej MARA Kulim, Kedah, Malaysia. This college was chosen by convenience sampling being situated in the hometown of one of the authors, making contact easier under currently restricted movement imposed by the COVID-19 pandemic lockdown.

MATERIALS AND METHODS

This is a cross-sectional study conducted between 11th – 26th February 2021, using an online questionnaire to determine the knowledge and acceptance of COVID-19 vaccination among the foundation students in a college in Kedah, Malaysia. Prior approval was obtained from the Medical Research and Ethics Committee of Universiti Kuala Lumpur Royal College of Medicine Perak (UniKL RCMP) - approval letter dated 13 February 2021: UniKLRCMP/MREC/2021/SSM-116. The study was conducted by six Year 2 MBBS students as their research project under the supervision of an academician from the university.

All 481 students who were in the Foundation in Science programme were included in the study. The minimum sample size was calculated using the sample size calculator, OpenEpi was 214 (for 95% confidence level). The students were informed through their class representatives to read the participants information sheet explaining the study and the consent form handed to them. Students who agreed to participate have signed the consent form. They then entered their matric number before proceeding to answer the online questionnaire (in Google form) designed to collect the information which included their age and gender and ten questions each on their knowledge and acceptance of COVID-19 vaccination. Besides, Respondents the respondents could withdraw from the study at any time.

For the knowledge questions, students answered “yes”, “no” or “don’t know” (refer to Table I). Correct answers were scored as “1”, “wrong / don’t know” answers were scored as “0”. Total scores were categorised as excellent (8-10 correct answers), satisfactory (5-7) and poor (4 or less). For the acceptance of vaccination questions, a 5-point Likert scale was used (“strongly disagree, disagree, neutral, agree and strongly agree”). Refer Table II. These were categorised into good / poor attitudes after recoding. Those who scored strongly agree in the positive attitude questions were given a score of 5, strongly disagree a score of 1. For the negative attitude questions, those who scored strongly agree for the negative questions were given a score of 1; those who scored strongly disagree for the negative questions were given a score of 5.

A literature search for relevant articles and studies on knowledge and acceptance of COVID-19 vaccines (2,12-31) was accomplished. Knowledge questions were mainly taken from information in WHO, Centers for Disease Control and Prevention (CDC) and Myths versus Facts, University of Missouri Health Care websites (2,14,15) Acceptance of vaccination questions were taken from these publications (16-21). The questionnaire was then reviewed for its content validity by four local experts, who were academicians in public health, family medicine and basic science. The revised questionnaire was then entered into a google form. Two students from the foundation programme in UniKL RCMP had tested the google form before the data collection to ensure there would be no problems while entering the data
Data collected in the Google forms were saved into Microsoft Excel and the Statistical Package for Social Sciences (SPSS) College version (v23) for analysis. The association between the variable (gender) and knowledge and acceptance of vaccination was measured using Chi-Square with a p-value of <0.05 considered to be statistically significant.

RESULTS

Three hundred and thirteen students responded. All were aged 18-19 years. The response rate was 65.1% with the total number of respondents exceeding the 214 minimum sample size required.

Knowledge of COVID-19 vaccination

Table I shows the distribution of respondents by gender and total knowledge scores. There was no significant difference in total knowledge scores of male versus female students except in one question on "Vaccination strengthen the immune system", where significantly more females (93%) as compared to males (86%) answered correctly (p value=0.04). The highest knowledge scores (90%) were obtained in the above question "Vaccination strengthen the immune system", followed by the question on health care personnel and elderly individuals being offered vaccination first (76%). The details on how the students responded to each knowledge question are listed in Table II.

Table I: Gender & total knowledge scores of respondents (N=313)

Item	Number	Percentage
Gender:		
Male	142	45.4
Female	171	54.6
Total Knowledge scores:		
Excellent (8-10 correct answers)	132	42.2
Satisfactory (5-7 correct answers)	130	41.5
Poor (4 or less correct answers)	51	16.3

Note: For total knowledge scores, mean = 6.66 (SD=2.999, 90% CI 6.40-6.91). Median score = 7 (± IQR = 3).

Table II: Response of students on knowledge questions

Questions	Yes		No		Don't know	
	N	%	N	%	N	%
If I receive the COVID-19 vaccination, I am at a greater risk to become sick from another illness.	21	**6.71**	164	**52.40**	128	**40.89**
Without a coronavirus vaccination, I am likely to catch coronavirus.	186	**59.42**	62	**19.81**	65	**20.77**
Even after vaccination, I am not 100% immune to the disease.	211	**67.41**	26	**8.31**	76	**24.28**
Vaccination strengthen the immune system.	281	**89.78**	6	**1.92**	26	**8.31**
If I get a coronavirus vaccination, I will be protected against coronavirus	207	**66.13**	33	**10.54**	73	**23.32**
COVID-19 vaccination may produce some side effects.	175	**55.91**	17	**5.43**	121	**38.66**
A coronavirus vaccination could give me coronavirus.	10	**3.19**	222	**70.93**	81	**25.88**
Healthcare personnel and elderly individuals are offered the first doses of COVID-19 vaccination.	238	**76.04**	16	**5.11**	59	**18.85**
If I have already had COVID-19 and recovered, I still need to get vaccinated with a COVID-19 vaccine.	184	**58.79**	59	**18.85**	70	**22.36**
I'm not at risk for severe complications of COVID-19 so I don't need to get vaccination.	32	**10.22**	216	**69.01**	65	**20.77**

Acceptance of COVID-19 Vaccinations

The mean scores were highest for the first two questions. Ninety per cent of the students would accept COVID -19 vaccination if the vaccine was successfully developed and approved. The mean was 4.58 (SD=0.726, 95% CI 4.49-4.66). Ninety per cent were confident that healthcare providers had done their research regarding the effectiveness of COVID-19 vaccination (Mean 4.51 (SD=0.743, 95% CI 4.43-4.59). The rest of the questions and students' responses are shown in Table III.

There was a significant difference between male and female students in their responses to three questions. On "religious or cultural concerns may influence me to not to accept the COVID 19 vaccination" significantly more males (20.4%) agreed with the statement as compared to 6.5% female students (p-value = 0.000). On "I might regret getting a coronavirus vaccination if I later experienced side effects from the vaccination", significantly more males (26.8%) agreed with the statement compared to 22.8% females (p value=0.034). With regards to "The pain while receiving a vaccination prevents me from getting one" 19.7% of the males agreed with the statement as compared to 14.6% of the females (p-value = 0.032). Significantly more females (90.6%) as compared to 80.3% males had a positive attitude towards vaccination (p value=0.009).

Association of knowledge scores with acceptance of vaccination

Comparing the students' total knowledge scores to their acceptance of vaccination, 97% of the students with excellent total knowledge scores had a positive attitude towards vaccination, compared to 83.8% and 62.7% in the group with satisfactory and poor scores respectively. This was significant (p-value = 0.000). Analysis showed that the association between higher total knowledge scores and a more positive attitude towards acceptance of vaccination also applied to both male and female students (p-value=0.007)

DISCUSSION

Three hundred and thirteen out of 481 college students (65.1%), aged 18-19 years participated in this study with 142 (45.4%) males and 171(54.6%) females. The majority (262/313 or 83.7%) had satisfactory to excellent knowledge of COVID-19 vaccination while 51 (16.3%) students had poor knowledge. The mean and median total knowledge scores were 6.66 (SD = 2.299, 95% CI 6.40 to 6.91) and 7 (± IQR =3).

In comparison, a recent study just published on

Table III: Response of students on acceptance questions

	Strongly disagree		Disagree		Neutral		Agree		Strongly agree	
	N	%	N	%	N	%	N	%	N	%
I would accept COVID-19 vaccination if the COVID-19 vaccine is successfully developed and approved for listing in the future.	2	**0.64**	2	**0.64**	26	**8.31**	67	**21.41**	216	**69.01**
I am sure that our healthcare providers have made their researches regarding the effectiveness of COVID-19 vaccination.	2	**0.64**	3	**0.96**	26	**8.31**	84	**26.84**	198	**63.26**
If I don't get a coronavirus vaccination and end up getting coronavirus, I would regret not getting the vaccination.	8	**2.56**	12	**3.83**	58	**18.53**	75	**23.96**	160	**51.12**
I might regret getting a corona virus vaccination if I later experienced side effects from the vaccination.	26	**8.31**	51	**16.29**	122	**38.98**	67	**21.41**	47	**15.02**
It is preferable to acquire immunity against infectious diseases naturally (by having the disease) than by vaccination.	46	**14.70**	58	**18.53**	116	**37.06**	47	**15.02**	46	**14.70**
Religious or cultural concerns may influence me to not accept the COVID-19 vaccination.	114	**36.42**	86	**27.48**	73	**23.32**	21	**6.71**	19	**6.07**
A coronavirus vaccination will be too new for me to be confident about getting vaccinated.	32	**10.22**	59	**18.85**	123	**39.30**	58	**18.53**	41	**13.10**
I am willing to be one of the first to receive the COVID-19 vaccination if available.	20	**6.39**	41	**13.10**	112	**35.78**	81	**25.88**	59	**18.85**
I would rather wait and see what other people do when the COVID-19 vaccine is released to the public.	12	**3.83**	23	**7.35**	117	**37.38**	91	**29.07**	70	**22.36**
The pain while receiving a vaccination prevents me from getting one.	86	**27.48**	78	**24.92**	96	**30.67**	34	**10.86**	19	**6.07**

the knowledge, acceptance and perception of the COVID-19 vaccine among Malaysians (32) showed 62% had poor knowledge about COVID-19 (32). However, the mean age in the study was 37.07 (SD = 16.05). Higher knowledge scores were found to be associated with higher education background and lower age group; the lower age group being more willing to get vaccinated. The study also found 64.7% had indicated willingness to get vaccinated (12). This was consistent with the present study where the respondents were young college students aged 18-19 years, with good knowledge of COVID-19 vaccination and 90% willing to accept vaccination.

In another study for Malaysians aged 18-70 years, the acceptance rates for vaccination was high (78%) with participants expressing a definite/possible intention to take COVID-19 vaccination (20). Another recently published study in Malaysia also indicated a high acceptance rate for COVID-19 vaccination (83.3%) especially in the younger age group (13). Studies overseas also showed similar results with the majority wanting to be vaccinated: 69% in a study in the USA (11), 94.7% among university students in Italy (24) (26), and 91.3% in China (16).

This study found that male students were significantly more concerned than female students about religious/ cultural issues concerning vaccination. One study in the USA showed that religious concerns were associated with people who did not want to vaccinate themselves (31). Another study done by the University of Jordan showed low vaccination acceptance rates in Middle East countries due to their cultural believes toward vaccination (32). Syed Alwi et. al in their study (13), found that minority groups in Malaysia were not willing to accept vaccination due to religious (20.8%) and cultural issues and beliefs in traditional remedies (68%). The study found that Buddhists were more likely to hesitate with regard to vaccination than Muslims. In the present study as the college students were predominantly Malay and Muslims, the above could not be determined.

Studies from the United Kingdom and the United States of America did not show any significant religious issue as deterring factor (34, 35).

With regards to side effects of vaccination, 114 students (36.4%) in this study stated that they might regret COVID19 vaccination if they later had side effects of the vaccine. The male students were significantly more concerned than the female students about the side effects and pain while receiving the vaccination. A study in Indonesia on acceptance of HPV (Human papilloma virus) vaccination in women, found that only six female students (3.1%) were afraid of side effects of the vaccine which could be the barrier to the acceptance of vaccination (36).

Overall in this study, the acceptance of vaccination was significantly higher in females (90.6%) than males (80.3%). In contrast, a recent study of COVID-19 vaccine acceptance in the United States found that males (72%) had higher acceptance of vaccination than females (63%) (37).

There was also a significant association between knowledge and a positive attitude towards vaccination. Those with higher total scores had significantly higher acceptance of vaccination. This was significant for both male and female students. According to another survey of 1563 university students in Turkey, only 113 students (7.3%) knew about HPV vaccination thus only 23 students (1.5%) were vaccinated against HPV (Human papilloma virus) (38).

The majority of the students (59.4%) were aware of the capability of vaccinations to reduce the likelihood of contracting a specific disease (COVID-19 virus in this case). This was proven by studies on other vaccinations in which those who were not vaccinated were more susceptible to certain diseases. For example, in the measles outbreaks in Europe, 87% of cases occurred in unvaccinated people (39).

Sixty-seven per cent of the students understood that receiving a vaccination did not necessarily mean one was protected 100% from the disease. Factors such as mutating strains as seen in cases of COVID-19 proved to be a challenge in producing a full-proof vaccine. Other factors included the presence of multiple serotypes such as in the case of dengue fever which has four related but antigenically distinct serotypes: DENV-1, DENV-2, DENV-3, and DENV-4 (40).

Trust in the healthcare system influenced the acceptance of vaccination. In this study, 90% of students believed that the local healthcare providers had done their research regarding the effectiveness of COVID-19 vaccination. A similar finding was found in a study in Saudi Arabia, where participants were 3.05 (95% CI: 1.13–4.92) times more likely to receive the vaccine if they trusted the healthcare system (27).

The limitations of the study includes that the study was conducted in one college chosen by convenience sampling. The majority of the students were of one ethnic group (Malay), aged between 18-19 years. As such the only independent variable analysed for association with knowledge and acceptance of vaccination was gender. However, this study was completed among Malaysian youth aged 18-19 years have contributed to a better understanding of their knowledge and acceptance of COVID-19 vaccination. However, a bigger study involving more institutions with various ethnic groups is recommended.

CONCLUSION

The majority of the foundation students in the study were knowledgeable on COVID-19 vaccination; scoring either excellent (42.17%) or satisfactory (41.53%) scores and a few scored poorly (16.29%). The students were aware of the various aspects regarding COVID 19 vaccination and the majority were willing to receive the vaccination against the novel coronavirus. More extensive studies on youths from various ethnic groups, educational and cultural/religious backgrounds need to be done to explore any factors that may influence/ hinder vaccination and cause vaccine hesitancy.

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