ORIGINAL ARTICLE

PRE-INTRODUCTION VACCINE ACCEPTANCE OF COVID-19 VACCINE AMONG ADULTS IN SELANGOR, MALAYSIA.

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Abstract

Background: The coronavirus disease (COVID-19) pandemic has imposed immunization as one of the most important health interventions to prevent and control the disease. There is a growing concern about vaccine acceptance due to differences in the perception of the vaccines' benefit and risk. This study aimed to determine the acceptance prior to the introduction of COVID-19 vaccine among adults in Malaysia.

Materials and Methods: This online cross-sectional survey included adults aged 18 and above residing for six months at Petaling district, Selangor were recruited by convenience sampling. A descriptive analysis of the participant characteristics and responses of the survey questions were done. Multivariate logistic regression was performed to identify the influencing factors of vaccination acceptance.

Results: Of the 425 people surveyed, 309 (75%) would like to receive COVID-19 vaccine when made available. The decision-making included doctor's recommendation (83%), and others such as vaccination method, frequency and distance to travel for vaccination (76%). Regression analysis showed a higher perceived risk of infection among participants.

Conclusion: Our study found a high level of acceptance of COVID-19 vaccine among adults in Selangor. The high perceived risk of infection among the population is associated with the acceptance of the COVID-19 vaccine.

Keywords: SARS-CoV2, vaccination, perception, decision-making

Introduction

Since the identification of COVID-19 in December 2019, it has infected over 121 million and caused over 2.5 million deaths until mid-March 2021. [1] In the time of writing this article, vaccines to fight against COVID-19 infection were delivered to selected regions in the United States and the globe. Though different vaccine manufacturers claim that the vaccine is safe and effective in reducing the infection by over 90% to 98%, the ability of controlling new infection in the community depends on several factors, [2] one of which is vaccine acceptance among the general population. [3,4] Most countries target healthcare workers and old age population in vaccinating against COVID for the first phase of vaccination as they are at risk of being infected and suffer from serious complications from the virus respectively. [3,4]

Currently, four main types of COVID-19 vaccines are under development and testing by public and private vaccine manufacturing companies in several countries. [1] Some countries have introduced vaccination with COVID-19 vaccines which showed results of providing immunity against the coronavirus and possess the potential in reducing the transmission of the virus in the community. The four types of vaccine that are available or in development are, inactivated or weakened virus vaccines, protein-based vaccines, viral vector vaccines, and RNA and DNA vaccines. [1] As of mid-March 2021, over 140 countries have introduced COVID-19 vaccination programs with initial target of high risk population and further include all the general population. [1, 5] At the same time, around 400 million doses of COVID-19 vaccine have been administered globally. [1]

The World Health Organization (WHO) and health experts define vaccine hesitancy as a delay in vaccine acceptance or refusal of vaccination. [6] The difference of vaccine hesitancy among population is determined by socioeconomic factors, geographical location, cost of vaccine and nevertheless the vaccine itself. [7] The vaccine acceptance depends on various factors, including knowledge of vaccine, perceived benefit from vaccination, perceived side-effects, social norms, previous experience from vaccination like reaction to childhood vaccination, and recommendation from physician. [7,8] Social behavioral theories are used in explanation of vaccine behavior in population and to develop targeted vaccine awareness programs.

The aim of the study is to find the vaccine acceptance of COVID-19 vaccine prior to introduction of vaccination against COVID-19 among the population in Selangor, Malaysia.

Materials and Methods

This is a cross-sectional study that was conducted among residents of Petaling district, Selangor from 18th October 2020 to 30th November 2020. The target population included adult population of Petaling district, Selangor a state with the largest population in Malaysia, representative of the general population in Malaysia in terms of age, gender, education and race. The respondents were recruited using convenient sampling technique where they were chosen from a group of people who were easy to approach and to contact by online survey using Google Forms ™. They were also requested to pass the survey to their close family and friends who were considered eligible. The minimum sample size of 385 respondents was calculated using OpenEpi with expected frequency of 50%, where the respondents are aware about the hypothetical COVID-19 vaccine and 95% confidence level.

The survey questions were framed in an approach that was similar to previous studies. [3,4, 9-12] The questionnaire had five sections, (1) socio-demographic information, such as age, gender, marital status, level of education, employment status, family income and past vaccination history; (2) perceived risk of infection during COVID-19

pandemic; (3) acceptance and preferences for future COVID-19 vaccine; (4) vaccine acceptance group, such as choice of immunization schedules and type of COVID-19 vaccine; (5) vaccine non-acceptance group. The questions were close-ended type with tick boxes for responses. Majority of the questions from the survey were in the form of categorical variables except for perceived risk of infection, which was assessed based on a five-point Likert scale: 0 = totally disagree, 1 = disagree, 2 = neutral, 3 = agree, 4 = totally agree, followed the statements from previous study. [13] For statistical analysis, the participants' responses with scores of 3-4 was considered as a high perceived risk group while scores of 1-2 was considered as a low perceived risk group. For the questions on non-acceptance of vaccine, the participants were allowed to leave their own reasons besides the choices that were provided.

Adults (aged 18 and above) staying in Petaling district, Selangor for at least past 6 months, who were able to read Malay or English language and had access to the internet either via computer or smartphone to answer online survey were targeted for this research. Those who were illiterate and not willing to answer the online survey were not included. The pretest was done with randomly selected residents of Petaling district, Selangor which included four medical students and four experts, to encourage the transparency and fairness, and the questionnaire was finalised accordingly.

After obtaining approval from 'UniKL RCMP Medical Research Ethics Committee', the data were collected using 'Microsoft Forms' and the distribution of the online survey was done by using communication and social media applications such as WhatsApp, Instagram and Twitter. The respondents were provided with the 'Participant information form' and 'Informed consent form' to agree prior to data collection and the identity of the respondents were kept confidential. The time taken to complete the online survey was estimated to be approximately five minutes.

Data analyses was performed using SPSS software (SPSS Inc., Chicago, IL, USA). The frequency and percentage of demographic information, risk perception and vaccination history of respondents, COVID-19 vaccine acceptance and preferences, and groups of acceptance and non-acceptance of vaccine were calculated. Multivariate logistic regression analysis was done to evaluate the associations of demographic factors, perceived risk of infection and vaccination acceptance to future COVID-19 vaccine by calculating the odds ratio (OR), standard error (SE), p-value and 95% confidence interval (CI).

Results

A total of 425 respondents have completed the survey. About 60% of respondents were in the age group between 18 to 25 years which included medical students and more than half were females (69%). Majority of them received tertiary level of education and most of the respondents were in healthcare- related profession (93%), either studying, working or had worked. Approximately 45% belonged to B40 income group whereas, M40 and T20 income group included 32% and 23% respectively. As for the past vaccination history, 90% of respondents received childhood immunization and only 50% had received influenza vaccination. Most of the respondents had high perceived risk of infection (86%) (Table 1).

Overall, 79% of the respondents felt that COVID-19 vaccine will prevent and control COVID-19, and were ready to accept the COVID-19 vaccine on successful development and approval of vaccine. The influencing factors in decision-making included the doctor's recommendation (83%) and other conveniences such as vaccination method, frequency and distance to travel for vaccination (76%). On the other hand, the vaccine price was not considered as an important factor affecting their vaccination

(76%). About 75% would like to receive vaccination as soon as possible, once the vaccine is available and proven to be safe. The reasons for non-acceptance of vaccine were mainly the fear of adverse effects (42%), religion (13%), fear of vaccination pain (13%), and influence by social media or any communication tools (4%) (Table 2).

The correlation of influencing factors such as sociodemographic characteristics, perceived risk of infection, vaccination history and future COVID-19 vaccine acceptance were included in the regression. There were no significant differences between different age groups, gender, level of education and marital status. The perceived risk of infection was associated with vaccine acceptance ($p < 0.05$).

Discussion

The study found that adult population of Petaling district had higher COVID-19 vaccine acceptance and would vaccinate against COVID-19 when made available. In general, Asian countries like Singapore, South Korea and China, were found to have higher acceptance of the COVID-19 vaccine, before the introduction of vaccination programs. [14] At the same time, studies done in middle-income countries like India, Brazil, and South Africa, found that the population had a relatively higher tendency of vaccine acceptance to the potential COVID-19 vaccine. [14] Correspondingly, our study found that around 97% of participants had high vaccine acceptance of COVID-19 vaccine. A similar study done in Indonesia found that the vaccine acceptance was around 93%. [3] Three-quarters of the participants of our study mentioned that they would vaccinate against COVID-19 as soon as the vaccine is made available to them and others would delay in vaccinating themselves. This could be due to various barriers and personal belief such as the perception of the efficacy of the vaccine and its safety. [6,8] Additionally, our study found that 80% participants had a higher perceived efficacy of the vaccine and believed that vaccinating against COVID-19 is an effective way to prevent and control the disease. The finding was comparable to a study done in China where around 90% of participants had higher perception on the efficacy of vaccine. [4]

Studies found that the difference in vaccine acceptance among different countries and population could be defined by the differences in the demographic characteristics and the level of impact created by the pandemic adversely. [8] Globally, a population with low education and low income was found to have the least vaccine acceptance. [6, 8, 15, 16] This could be due to the lack of knowledge and awareness about the disease, and the protective behaviors. [15, 16] Also, numerous studies suggest that there is a spread of misinformation about the disease and the information shared among the group of population is hard to be verified. [15, 16] In contrast, population with higher income and educational status had significantly higher vaccine acceptance. [6, 8] Age was identified as one of the main factors that potentiated vaccination against COVID-19, but this study did not employ methodology to explore the potentiating factors of COVID-19 vaccination in the study population. [14] The older population living in old-age homes, or in a community of closed space are at high risk of contracting the disease and develop serious outcomes than other age groups. The serious outcomes among these older population is aggravated in the presence of co-morbidities such as heart and lung diseases, diabetes, and kidney failures. Based on gender, studies found that women were likely to accept vaccination more than men. [14] Though many studies had such finding, it was reported that the positive association between female gender and vaccine acceptance was rather weak and cannot be concluded that the men were against vaccination.

Recommendation of vaccination by a healthcare professional, particularly a physician, increased the perceived benefit of vaccine and was strongly associated to vaccine acceptance. In our study,

over 80% of the participants mentioned that the physician's recommendation to vaccinate against COVID-19 was an important factor in vaccination, while around 14% of the participants would consider vaccination after the physician's recommendation. Interestingly, the study found that non-healthcare workers had a higher vaccine acceptance of potential COVID-19 vaccine than healthcare workers (HCWs). [17] This finding is contrary to findings and belief of studies where HCWs had higher acceptance of H1N1 influenza vaccine [17, 18]

Our study questionnaire included some of the potential barriers in vaccination against COVID-19. The convenience of getting vaccinated included, the method of vaccination, frequency of vaccination, and travelling to vaccination center, which three-quarters of the participants mentioned as one of the important factor in receiving the vaccine. [6, 8] Moreover, 76% of the participants did not perceive the price of vaccine as a factor in decision making in receiving the vaccination. Over half of the participants prefer the COVID-19 vaccine be administered as routine immunization and a comparable proportion of the participants accept both routine and emergency immunization methods of vaccine administration. Majority of the population accepts vaccine manufactured domestically as well as imported vaccines. Among the participants who had less vaccine acceptance of COVID-19 vaccine, over 40% mentioned that the fear of adverse effects was the reason for non-acceptance. Some respondents also mentioned religion, cost of vaccine, pain due to vaccination, and uncomfortable experience with past vaccinations as the reason for non-acceptance of COVID-19 vaccine. [6, 8].

This study is one of the first studies done in Malaysia that captures the general population's COVID-19 vaccine acceptance before its introduction in the country and in the South-Asian region. The results of the study contribute in the monitoring of populations on perception of COVID-19 vaccine and can be used to develop targeted vaccine awareness programs. The limitations of the study are mainly due to the time and logistic constrains imposed by the pandemic. The survey was conducted online using Google Forms™ and was distributed among participants by social messaging applications. Furthermore, the participants were recruited by convenience sampling through snowball sampling method. This required the participants to have access to a device with internet connection, and since the survey was shared among study population for the purpose of recruitment, the study participants many have similar population characteristics and not may not represent the COVID-19 vaccine acceptance of the district, these above mentioned issues may have induced selection bias into the study. Since, over 90% of participants reported to have healthcare related profession the observed vaccine acceptance rate could be higher than in the general population. Also, the questionnaire was made available only in Malay and English language, thus limiting the respondent group to population that was proficient in any of the two said languages, and not include population that are proficient in either Tamil or Chinese language.

This study recommends ease of accessibility of the vaccine to the population when it arrives to the country. Also, information and location of the places where vaccination against COVID-19 could be received should be made readily available. Simultaneously, the population should be educated and made aware of the effects of vaccination on the daily cases and side-effects from COVID-19 to encourage further vaccination and to improve national vaccine coverage.

Conclusion

The study found that COVID-19 vaccine acceptance is high among the study population living in Petaling District in Malaysia, and have awareness about the ongoing pandemic and importance of vaccine in preventing the spread of the disease.

Author contributions

P-KM guided the students throughout the student research project. P-KM and RS-S were conceptualized the topic including the study design. Also contributed in writing and critically reviewing the manuscript. SFH-M, S-MM, SA-A, FH-L were responsible for data collection and analysis.

Conflict of Interest

The authors declare no conflicts of interest in the publication of this article.

Table 1. Socio-demography, risk perception, vaccination history of respondents

Parameters	Respondents n= 425; n (%)
Age	
18-25	256 (60.2)
26-30	40 (9.4)
31-40	52 (12.2)
41-50	38 (8.9)
51 and above	39 (9.2)
Gender	
Male	130 (30.6)
Female	295 (69.4)
Highest level of education	
Primary school	1 (0.2)
Secondary school	18 (4.2)
Pre-University (Form 6)	9 (2.1)
Tertiary education (college, Polytechnic, University)	397 (93.4)

Marital status	
Married	141 (33.2)
Others (single, divorced, widowed)	284 (66.8)
Employment status	
Employed	190 (44.7)
Unemployed	235 (55.3)
Income group classification	
< RM 4849 (B40)	193 (45.4)
RM 4850-10,959 (M40)	134 (31.5)
>10,960 (T20)	98 (23.1)
Healthcare- related profession	
Yes	393 (92.5)
No	32 (7.5)
Perceived risk of infection	
High	363 (85.6)
Low	61 (14.4)
Received childhood vaccination	
Yes	381 (89.6)
No	7 (1.6)
I don’t know	37 (8.7)
Received Influenza vaccination in the past	
Yes	191 (44.9)
No	132 (31.1)
I don’t know	102 (24.0)

Table 2. Factors influencing decision-making and acceptance of the future COVID-19 vaccination of the respondents

Parameters	Respondents n= 425 n(%)
COVID-19 vaccination is effective way to prevent and control	
Yes	336 (79.1)
No	15 (3.1)
I don't know	76(17.9)
Doctor's recommendation for decision making	
Yes	354 (83.3)
No	13 (3.1)
I don't know	58 (13.6)
Vaccine convenience (method, frequency, distance to vaccination site etc.) for decision making	
Yes	321 (75.5)
No	79 (18.6)
I don't know	25 (5.9)
Vaccine price for decision making	
Yes	81 (19.1)
No	324 (76.2)
I don't know	20 (4.7)
Would you accept if vaccine is successfully developed/approved?	
Yes	412 (96.9)
No	13 (3.1)
Want to receive when vaccine is available and proven to be safe	
Yes	309 (75)
No	17 (4.1)
May be	86 (20.9)

Preferred kind of immunization schedule for COVID-19 vaccination	
Routine	218 (52.9)
Emergency	5 (1.5)
Both are acceptable	188 (45.6)
Preferred type of COVID-19 vaccine	
Domestic vaccine	63 (15.3)
Imported vaccine	12 (2.9)
Both are acceptable	337 (81.8)
Reasons for non-acceptance of vaccine	n= 13; n (%)
Religion	3 (12.5)
Financial	2 (8.3)
Fear of vaccination pain	3 (12.5)
Fear of adverse effects	10 (41.7)
Experience with past vaccination	2 (8.3)
Influence by social media/ communication tools	1 (4.7)
Anti-vaccine	0 (0)
Others	3 (12.5)

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