



Knowledge, Attitudes, and Perceptions toward COVID-19 Vaccinations in Saudi Population

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Abstract

AIM: The objective is to explore the general perception, knowledge, and attitude of people in Saudi Arabia toward the COVID-19 vaccination.

METHODS: An observational and cross-sectional study was conducted with 332 Saudi adult population attending primary health centers in King Abdul-Aziz Medical City, Riyadh, Saudi Arabia, between May and July 2021 using a self-administered questionnaire. All adults, equal, or older than 18 years old of both genders during the period of the study were included and the only exclusion criteria are the age and patient with psychiatric disorder. We use convenience-sampling technique, due to the difficulty to generate sampling frame. Data are going to be entered and analyzed using Statistics Package for the Social Science version 21 software in August 2021.

RESULTS: Majority of participants (93.4%) had good knowledge about COVID-19 vaccines, regarding attitude more than 50% have positive attitude toward vaccination. Despite this high level on acceptance 48.5% of the participant in this study disclosed that they are not aware of vaccine side effects. With regard to perception, 66.9% of our study subjects believed that vaccination is necessary to eradicate COVID-19 pandemic. Furthermore, 72.4% thought that everyone should be vaccinated, starting with general public 74.5%, then health worker 57.9%.

CONCLUSION: Almost most of Saudi population aware about the COVID-19 vaccines. Most Saudi people knew about it through media. A long-term side effect of getting vaccines is the main obstacles toward vaccine acceptance.

Edited by: Sasho Stoleski
Citation: Al Tulaihi A, Salamah GM, Alshahrani TM, Haikel KAB, Al Eraj SM, Alsaeed RR, Alilaj MO, Alzaid TA. Knowledge, Attitudes, and Perceptions toward COVID-19 Vaccinations in Saudi Population. Open Access Maced J Med Sci. 2023 Feb 12; 11(E):176-181. <https://doi.org/10.3889/oamjms.2023.11369>
Keywords: COVID-19 vaccine; Knowledge; Attitude; Perception
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Received: 12-Dec-2022
Revised: 30-Jan-2023
Accepted: 02-Feb-2023
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Funding: This research did not receive any financial support
Competing Interests: The authors have declared that no competing interests exist
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Introduction

COVID-19 is highly contagious diseases that attack the human respiratory system and can cause mortality in severe cases [1]. The pandemic of COVID-19 is predicted to continue its adverse influences on societies and economies across the world. The novel coronavirus has become an international threat since it is that vaccination is the only solutions that are anticipated to be effective against the novel coronavirus outbreak. Several countries have succeeded to produce a vaccine against this deadly disease, and numerous vaccines are under the trial process. According to Faasse and Newby (2020) [18], the vulnerability people identify with the disease against which a vaccine intends to protect them is considered to be a major factor in their decision regarding vaccination. Most of the individuals would perceive that they would catch the same disease and they may develop adverse symptoms of the illness after vaccination [2]. On the other hand, the existing literature suggests that worry and anxiety are the other factors that contribute to the risk assessment of vaccination for individuals [3]. An analysis of the correlation among risk

perceptions and readiness to accept a possible COVID-19 vaccine showed that US participants who ranked the illness stronger on a risk perception index were more likely to take the vaccine [1]. As per the existing studies, people who think the risk of COVID-19 is greater are more likely to pursue a new vaccine to prevent the outbreak. A further significant consideration in deciding whether or not to get vaccinated is the individual's perception of the vaccine's safety [4]. Vaccines are most probable to be accepted by those who believe they are secure. Since COVID-19 vaccinations are currently in progress, data on their safety are minimal. Individuals prefer to formulate their views centered on perceptions about current vaccines while there is a scarcity of knowledge and awareness regarding the efficacy of a new vaccine, according to research [5]. The Saudi administration has taken a cautious approach in preventing the transmission of the virus since the outbreak began; nevertheless, these measures alone are ineffective, and the rapid deployment of a COVID-19 vaccine continues to be a vital dimension of Saudi Arabia's plan for ending the epidemic [6]. Given the existing general aversion to seasonal flu vaccination in Saudi Arabia, a COVID-19 vaccine is likely to face

substantial public opposition. According to the findings of a survey, approximately half of the participants demonstrated a willingness to be vaccinated under the premise that the vaccine will be given free of charge by the Saudi Page 3 of 7 government [7]. This suggests that a majority of individuals across the Kingdom of Saudi Arabia will have negative perceptions and attitude toward the COVID-19 vaccination [5]. Consequently, this study would aim to explore the general perception, knowledge, and attitude of people in Saudi Arabia toward the COVID-19 vaccination.

Methods

Design and sample

Using a self-administered questionnaire, this cross-sectional study was conducted at three primary health-care centers belonging to King Abdulaziz Medical City, Riyadh region, Saudi Arabia, between April and July of 2021.

Each of the three centers (Health Care Specialty Center, King Abdul-Aziz City Housing, and National Guard Comprehensive Specialized Clinic) delivers primary curative and preventive health services.

All adults, equal to or older than 18 year old, of both genders during the period of the study, were included in the study, and the only exclusion criteria were age and having a psychiatric disorder.

The sample size was calculated using Epi-Info software and it was 385 subjects based on an expected frequency of 50% (Alfageeh *et al.*) 23, a level of confidence of 95%, a margin of error of 5%, and a design effect of 2. However, only 332 people completed the questionnaire (85% completion rate).

Questionnaire

A self-administered paper-based questionnaire was used as a tool to collect data from the participants. validated questions in the previous literature (8–12). The English questionnaire version was translated to Arabic and then retranslated to English to ensure accuracy and meaning. It was field-tested several times on a pilot sample of 20 patients to clarify any ambiguities and determine the reliability of the questionnaire (test-retest), and intraclass correlation coefficient values >0.75 were estimated.

The final questionnaire includes 35 questions divided into six parts. The first part is personal demographic information, including age, gender, marital status, education, nationality, and past medical history (nine questions). The other five parts covered knowledge (six questions), attitude (five questions),

perception (five questions), barriers associated with acceptance of the COVID-19 vaccine (seven questions), and the option to encourage future use of the COVID-19 vaccine (eight questions).

Six questions regarding knowledge and five questions regarding attitude were included, with three options each (“yes,” “no,” and “I don’t know”). Three perception-related questions with three options (“yes,” “no,” and “I don’t know”). In addition, there are two more perception-related questions related to the indication and prioritization of the vaccine. A fixed set of six items (“yes” or “no” questions) were used to assess the barrier to receiving the vaccine, and another set of seven items of different ways to encourage taking the vaccine were used to assess the barrier to receiving the vaccine. All questions were closed-ended (see Supplementary Materials).

Data collection

We use the convenience sampling technique due to the difficulty of generating a sampling frame. The investigator approached the participants in the waiting area, explained the purpose of the study to each participant, and obtained verbal and documented consent to participate in the study before administering the questionnaire.

Ethical principle

This study was approved by the Ethical Review Committee of the King Abdullah International Medical Research Center before its start. Participation in this study was entirely voluntary and without compensation.

Statistical analysis

Data are going to be entered and analyzed using the Statistical Package for the Social Science version 25 software. Descriptive statistics will be performed in the form of frequencies and percentages for categorical variables, while mean and standard deviation will be used to describe the continuous variables. Analytical statistics will be used to assess differences between categorical variables using the Chi-square test. Means will be compared using an independent student-*t* test, and an ANOVA. Statistical significance is set at 0.05 or less.

Results

The study was performed with a total number of 332 participants. Majority of them 67.7% were between 18 and 45 years old. Of the participants, 67.8% were

female and 32.2% were male. A total of 209 (63.0%) of the participant were married and 98 (29.5%) were single. About 98.5% of the subjects were Saudi and 1.5% were Non-Saudi. The study subjects included 45.8% they do not have work, 43.4% working in government sector, and 10.8% working in private sector (Table 1).

Table 1: Demographics details of study participants

Characteristic	n	%
Age (n = 332)		
From 18 to 29	122	36.7
From 30 to 45	103	31.0
From 46 to 55	53	16.0
From 56 to 65	44	13.3
66 years and above	10	3.0
Gender (n = 332)		
Male	107	32.2
Female	225	67.8
Marital status (n = 332)		
Single	98	29.5
Married	209	63.0
Divorce	16	4.8
Widow	9	2.7
Education (n = 332)		
Illiterate	15	4.5
Primary	21	6.3
High School	89	26.8
Diploma	41	12.3
University	151	45.5
Postgraduate	15	4.5
Nationality (n = 332)		
Saudi	327	98.5
Non-Saudi	5	1.5
Occupation (n = 332)		
No work	152	45.8
Government	144	43.4
Private/self-employee	36	10.8
Do you have any chronic diseases (such as diabetes, hypertension, or heart disease)? (n = 332)		
Yes	58	17.5
No	274	82.5
Have you been infected with seasonal influenza? (n = 332)		
Yes	185	55.7
No	147	44.3
Did you get the seasonal influenza vaccine before? (n = 332)		
Yes	135	40.7
No	197	59.3
Have you been infected with laboratory confirmed COVID 19 Yourself? (n = 332)		
Yes	89	26.8
No	243	73.2

All values presented as numbers and percentages.

Knowledge toward COVID-19 vaccinations

The mean score was 1.99, which indicates 66% level of knowledge toward COVID-19 vaccinations. The majority 93.4% responded that they knew about COVID-19 vaccine and 50.2% of them received their information from social media. Among them 63.9% reported effectiveness of COVID-19 vaccine but majority 47.3% they did not know about the vaccination side effects (Table 2).

Attitude towards COVID-19 vaccinations

The mean score was (2.62) which indicates 87% level of attitude toward COVID-19 vaccinations. Despite that 48.5% of the participant disclosed that they don't know about the safety of the newly discovered COVID-19 vaccine, most of them 81.0% were not hesitant to take the vaccine. Almost three quarters of the subjects 76.2%, they will encourage their families, friends and relatives to get the vaccine (Table 3).

Table 2: Knowledge toward COVID-19 vaccinations

Question	n	%
Do you know about the COVID-19 vaccine? (n = 332)		
Yes	310	93.4
No	19	5.7
I don't know	3	0.9
If yes, how did you know? (n = 332) (k = 396)		
Friend	28	9.2
Family	156	51.5
Social media	152	50.2
TV	55	18.2
Other	5	1.7
Do you know about the effectiveness of COVID-19 vaccine? (n = 332)		
Yes	212	63.9
No	52	15.7
I don't know	68	20.5
Does vaccination increase allergic reactions? (n = 332)		
Yes	19	5.7
No	160	48.2
I don't know	153	46.1
Does vaccination increase autoimmune diseases? (n = 332)		
Yes	28	8.4
No	129	38.9
I don't know	175	52.7
Does vaccination have any side effect? (n = 332)		
Yes	30	9.0
No	145	43.7
I don't know	157	47.3
COVID-19 vaccines will lead to infertility? (n = 332)		
Yes	6	1.8
No	124	37.3
I don't know	202	60.8

All values are presented as number and percentage. *n = sample size or total number of cases, k = total number of responses in multiple choice questions.

Table 3: Attitude toward COVID-19 vaccinations

Question	n	%
The newly discovered COVID-19 vaccine is safe. (n = 332)		
Yes	155	46.7
No	16	4.8
I don't know	161	48.5
The COVID-19 vaccine is essential for us. (n = 332)		
Yes	248	74.7
No	6	1.8
I don't know	78	23.5
I will take the COVID-19 vaccine without any hesitation (n = 332)		
Yes	269	81.0
No	11	3.3
I don't know	52	15.7
I will also encourage my family/friends/relatives to get vaccinated (n = 332)		
Yes	253	76.2
No	19	5.7
I don't know	60	18.1
It is not possible to reduce the incidence of COVID-19 without vaccination (n = 332)		
Yes	186	56.0
No	37	11.1
I don't know	109	32.8

All values are presented as number and percentage.

Perception

With regard to the study subject perception, 66.9% they believed that the COVID-19 pandemic cannot be eradicated without vaccination even if everyone in the society maintains the preventive measures. Of the participants, 72.4% thought that everyone should be vaccinated. Starting with general public 74.5%, then health worker 57.9% (Table 4).

Participants' barriers associated with acceptance of COVID-19 vaccination

The statistical analysis identified that vaccine's side effects was the highest reported factors 42.6% in the refusal to be vaccinated. Followed by the inability of the vaccine to stop the infection 19.6% then the fear of needles 15.8% (Table 5).

Table 4: Perception

Question	n	%
Do you think that if everyone in the society maintains the preventive measures, the COVID-19 pandemic can be eradicated without vaccination? (n = 332)		
Yes	32	9.6
No	222	66.9
I don't know	78	23.5
Who should have been vaccinated, do you think? (n = 332) (k = 690)		
Those who have not yet been infected	179	55.4
People infected with COVID-19	69	21.4
Newly recovered from COVID-19	151	46.7
Everyone	234	72.4
I don't know	57	17.6
Who's supposed to be vaccinated first, you think? (n = 332) (k = 737)		
General public	239	74.5%
Health worker	186	57.9%
Public/private employee	133	41.4%
Teacher/student	136	42.4%
I don't know	43	13.4%
Would you afford the vaccine at your own expense if it was not provided free by the government, do you think?? (n = 332)		
Yes	181	54.5
No	138	41.6
I don't know	13	3.9

All values are presented as number and percentage. *n = sample size or total number of cases, k = total number of responses in multiple choice questions.

Table 5: Participants' barriers associated with acceptance of COVID-19 vaccination

Statement	n	%
I am concerned about the vaccine's side effects	189	42.6
I don't believe that the vaccine will stop the infection	87	19.6
COVID-19 vaccination is a conspiracy	33	7.4
I don't need the vaccine because I do all the right things.	33	7.4
I wash my hands and wear a mask and gloves		
I don't need the vaccine because I'm young and healthy	32	7.2
I don't like needles	70	15.8

All values are presented as number and percentage.

Options to encourage future COVID-19 vaccination

Among the options to encourage future COVID-19 vaccination subjects, the availability of more studies showed that the vaccine is safe and effective was the most chosen option 22.0% followed by recommendation by the treating physician 18.4% (Table 6).

Table 6: Options to encourage future COVID-19 vaccination

Statement	n	%
If my physician recommended it to me	239	18.4
If I know that more studies showed that the vaccine is safe and effective	286	22.0
If it was compulsory by the government (MOH)	221	17.0
If it was mandatory by my job	211	16.2
If my family or friends got vaccinated	177	13.6
If there is a way other than injection	120	9.2
I would not take it in anyway	46	3.5

All values are presented as number and percentage.

Discussion

At present, only three vaccines are approved for use against SARS-CoV-2 infection in Saudi Arabia: Pfizer-BioNTech, AstraZeneca, and lately Moderna. These vaccines have been thoroughly studied, with proven safety profile and efficacy reaching to 95%, 63–90%, and 94%, respectively. They are provided for free by Saudi government for all Saudi and non-Saudi population, age 5 years and more for Pfizer-BioNTech, 12 years and more for Moderna, and 18 years for AstraZeneca [1], [2].

Data from our study showed that majority of participants (93.4%) had good knowledge about COVID-19 vaccines, similar results were found in other studies in SA, turkey, and China [3], [4], [5], [6]. This is not always the case, for knowledge level was found to be low in some populations [7], [8].

Bivariate analysis showed statistically significant relation to marital status in our study. Other studies showed gender [8], and other educational level being the significant factor 4, in addition to education, family type, monthly income, and previous vaccine uptake experience also increased level on knowledge significantly [7]. Data from China and the US indicated that gender, nationality, and occupation beside educational status have a positive influence on the knowledge of the participants [6], [9].

The primary source of information about COVID-19 vaccine was social and mass media, which is in line with other studies [7]. This can explain why educational level did not affect the level of knowledge significantly in our study.

Regarding attitude toward COVID-19 vaccine, majority of participants (more than 50%) have positive attitude toward COVID-19 vaccine, this in coherence with other local [3], [4] and international studies [5], [6], [7], [9], [10].

On the other hand, the level of acceptance was lower in other Saudi studies [11], [12], this could be explained by the timing of the study as we conducted ours after the nationwide vaccination campaign that was associated with extensive education and encouragement to get the vaccine.

This high level of acceptance in this study has no statistically significant association with any factor; however, the previous history of vaccination against influenza was significantly associated with positive vaccine perception [3], [11], [12] and was considered one of the key factors in vaccine acceptance [6], [7], [13]. In addition to these factor, significant associations were also linked to gender, education level 7, and personal history of COVID-19 infection.[5]

Another important factor that significantly affected the vaccine acceptance was health-care provider recommendation to get the vaccine, it was found to be a key determinant of vaccination behavior [9], [10]. Data from our study showed that an important encouraging factor to increase vaccination adherence in our population was physician recommendation.

Despite this high level on acceptance, 48.5% of the participant in this study disclosed that they are not aware of vaccine side effects. In Bangladesh 7.89% of participants assumed that COVID-19 could have some side effects, similar results found in other studies [6], [9].

Being not sure about COVID-19 vaccine safety and its short- and long-term safety is a global

concern and is one of the most important reasons for vaccine hesitancy [14]. When asked about barriers against vaccine acceptance, vaccine safety was the first obstacle to be brought up by most of our study subjects; these concerns are shared by many around the world [4], [5], [7].

This could be due to the relatively rapid base, the vaccine was developed and then mass produced, and the fact that one of the vaccines (Pfizer and BioNTech) was authorized for emergency use only at the beginning. Another reason is the continuously changing information and constant updates on the subject of COVID-19 infection and its vaccinations in addition to the misleading and false information that is spread in social and mass media. Disagreement in the scientific community has also added to the public concerns about vaccine safety [9], [10].

Different studies showed that providing clear information to the people decreases their vaccine hesitancy, which is in coherence with data from our study that showed that our study subjects will be more encouraged to get the vaccine if they knew that more studies showed that the vaccine is safe and effective (22%) [4], [15], [16].

Even with high percentage of ignorance to vaccine safety, most of our study participants 81.0% were not hesitant to take the vaccine, and almost three quarters 76.2% stated that they will encourage their families, friends, and relatives to get the vaccine.

With regard to perception, 66.9% of our study subjects believed that vaccination is necessary to eradicate COVID-19 pandemic. Furthermore, 72.4% thought that everyone should be vaccinated, starting with general public 74.5%, then health worker 57.9%. In Bangladesh, over half (52%) of the participants thought that everybody should receive COVID-19 vaccine, and (61%) thought that healthcare workers (HCWs) should get the vaccine first [7]. This perception might be due to the timing of our study, as per Saudi-MOH guidelines for COVID-19 vaccinations: HCW were already first group to receive the vaccine.

A noteworthy point is that 54.5% of our participants stated that they will try to acquire the vaccine at their own personal expense, if it was not provided for free of charge by the government of SA, which is the case. Similarly in another study, 65.4% of their population would pay for the vaccine if it was not provided freely by the government, even though more than 95% of them agreed it should [7].

Conclusion

This study was intended to explore Saudi population knowledge, attitude, and their acceptance

toward available COVID-19 vaccination. Almost most of our population aware about the COVID-19 vaccines. Most Saudi people know about COVID-19 vaccines through media. Physician advice and instructions play a key role to accept taking COVID-19 vaccines. Almost two-third of Saudi people think vaccines are playing role in virus elimination. Although high acceptance to the vaccines, long-term side effects of getting vaccines are the main obstacles toward vaccine acceptance.

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