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Original Research Article

Knowledge, attitude and perception of the public towards COVID-19 vaccine in UAE

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ABSTRACT

Background: The Corona virus pandemic spread across the globe in 2019, alarming the world due to the virus's elevated severity and the emergence of its new strains. Vaccination became a necessity to combat the pandemic, however, there is still hesitancy among the public to accept vaccines. This study aims to assess the knowledge, attitude and perception of the public towards the COVID-19 vaccine in the UAE.
Methods: We assessed the readiness and willingness of the public to take the vaccine. Our data was collected using a cross-sectional study. The study was conducted during the period of February 2021 to May 2021 to collect data on the readiness of the population to take the COVID-19 vaccine.
Results: We received 392 responses, and two thirds (250, 63.8%) were females, non-Emirati (374, 95.4%), and with a bachelor degree (263, 67.1%). Slightly more than half (211, 53.7%) reported being frightened of the pandemic. The majority (388, 99%) of the participants know the precautionary measures, but only 313 (79.8%) are committed to the measures and 159 (40.6%) think the available vaccines are safe. There was not a dominant response by the survey participants on whether the vaccine should be compulsory or not. Long-term safety (115, 29.3%), side effects (109, 28.8%), and thinking not at a high risk were the main concerns that prevented some respondents from taking the vaccine. Around 40% of the participants took two doses of various vaccines, but similar percentage of participants do not plan taking the vaccine.
Conclusions: Government priorities should be directed toward increasing general public interest in the vaccine, as well as raising awareness regarding the general public's concern about the pandemic and vaccination program.

Keywords: COVID 19 pandemic, Perceptions, Attitudes, Knowledge, UAE

INTRODUCTION

The Corona virus outbreak that ravaged the world had been declared by the world health organization (WHO) as a pandemic on 11 March 2020.[1] The spread of the corona virus (COVID 19) pandemic influenced every facet of life worldwide and despite the fluctuating numbers of infected people and the death toll around the globe, the deadly influence of the virus is still striking with the massive daily death rates reported for India at the time of writing this article (23-4-2021). Such unfortunate recent reports indicate the severity of the virus is ravaging the world. There was an urgent need for a COVID-19 vaccine as the only hope to fight the pandemic. Efforts to produce effective vaccines to curb the pandemic were successful in China, the US, Europe, Russia, and the Middle East. Several countries started their organized programs for public vaccination. However, several studies showed that a majority of the public was worried about the widespread COVID 19 outbreak, and rates of acceptance of a COVID-19 vaccine were not encouraging.[2-5] Studies also demonstrated that physicians may share some of the same worries expressed by the general population, and also their distrust of health authorities.[6,7] These findings may

indicate that these concerns may contribute to vaccine hesitancy and doubts about vaccine safety.[8] Physicians with vaccine hesitancy are more likely to not recommend vaccines to their patients as compared to non-hesitant physicians.[9,10] In addition, conflicting reports, myths, and rumors about a conspiracy theory regarding a deliberate development of the virus and attempts through vaccination to reduce the world population spread so rapidly through social media. These reports worsened the acceptance rate of vaccines and as a result, many people are still reluctant to be vaccinated despite the efforts of health authorities and employers to encourage the public to take the vaccine. Vaccine hesitancy is defined as a delay in acceptance or refusal of vaccination.[11] The group that has vaccine hesitancy were categorized as some who are against all vaccines, some are against some vaccines, and some have hesitation in this regard.[12] Vaccine hesitancy should not be overlooked as it threatens herd immunity by leading to under-immunization.[13] This can also increase the risk for outbreaks of vaccine-preventable diseases.[14] In the United Arab Emirates (UAE) like in other Arab countries, the efforts of the health authorities and the implementation of strict requirements of vaccination by employers may have successfully increased the rate of acceptance of vaccination among the public. However, studies to investigate the knowledge, attitudes, and perceptions of the public towards the COVID-19 vaccine are crucial to pinpoint areas for improvement in interventions aimed at increasing public awareness towards the benefits of vaccination.

METHODS

Study design

Our stated preferences data for a prospective COVID-19 vaccine in the UAE, was collected using a cross-sectional study conducted during the period February 2021 to March 2021. Our purpose was to collect data on the attitude of the public towards taking the COVID-19 vaccine. A web-based survey link was posted on the internet covering questions dealing with population's preferences, perception and attitudes regarding COVID-19 vaccine.

Study population, validation and link

The survey was built using Google forms platform. We commenced a cross-sectional, web-based anonymous survey using an online questionnaire. The questionnaire was developed in a bilingual (Arabic and English) format, the survey was validated by circulating it to college professors, friends, and family members, and their feedback was considered in the final edition of the survey. The survey then has been sent out on a voluntary basis to participants across all seven emirates of the UAE (i.e., Abu Dhabi, Dubai, Sharjah, Ras Al Khaimah, Ajman, Fujairah, and Umm al Quwain). We (each co-investigator in the project) initially shared the web-based survey link through WhatsApp (the most popular social media platform in UAE) and other social media applications on February 20th, 2021 to our primary contacts living in the UAE to advertise and circulate the survey link to their network members. Network members were requested to distribute the survey invitation to all their contacts throughout the country. The participants where informed that participation in the study is voluntary, and filling questionnaire is considered approval to participate in the study. Inclusion criteria were that the respondents were UAE residents who were at least 18 years old. Links for both English and Arabic versions of survey were respectively made available at: https://docs.google.com/forms/d/e/1FAIpQLSdj_qZ7iI7Jv0JS226Bx3_wdFcaOtLNqjK7nyaYdgWHFGLFrg/viewform and https://docs.google.com/forms/d/e/1FAIpQLScwS96wNfTPcL1vokkIQHTidY84dSsUnjjnT3XuThk0PphLUg/viewform.

The questionnaire

The questionnaire consisted of 27 questions and was divided into five sections.

The first section consisted of 5 questions covering the demographic characteristics of the participants including age and nationality, gender, level of education, work status, and marital status. Questions in the second section focused on the knowledge of participants regarding COVID-19 precautionary measures. Questions included "On a scale from 0 to 10, how worried are you about the coronavirus pandemic?" "Do you know the precautionary measures to protect yourself from the corona virus?" "Do you take all the precautionary measures when leaving your house?" "Have you been tested for the corona virus?" "How frequently do you perform the COVID-19 test?" "Do you know what a vaccine is?" "Do you think the available vaccines are safe and effective?" "Which of the following do you think will help curb down the speed of the coronavirus". The third section of the questionnaire inquiries about the source of information from which the participants obtained their knowledge regarding the vaccine. The questions covered "Do you think the vaccine should be mandatory?" "Where did you get information about the vaccine?" "Will you change your mind once initial results about the effectiveness of the vaccine is released?" "How concerned are you about the coronavirus vaccine". The fourth section of the questionnaire addresses the participants' response toward the administration of vaccine: "Have you taken the corona virus vaccine?" "Why did you take the vaccine?" "Have you taken both doses of the vaccine?" "Do you think taking the vaccine is necessary?" "How concerned are you about the corona virus vaccine?" Which of the following reasons prevented you from taking the vaccine?" The fifth section of the questionnaire covers side effects reported by participant's who took the vaccine: "Have you experienced any of the following side effects after the first dose of the vaccine?" "Have you experienced any of the following side effects after the second dose of the vaccine?" "Have you tested positive for corona virus after taking the vaccine?" "Do you know anyone who has had a bad reaction to vaccine?"

Statistical analysis

The participants' responses were encoded, and the data were analyzed using statistical package for the social sciences (version 20 SPSS, Chicago, IL, US). The data were summarized as frequencies and percentages. Descriptive analysis was used to calculate the proportion of each group and significant association between demographic characteristics of the participants who respond to each statement in the questionnaire and their responses was determined at a level of significance set at $p<0.05$ by Chi square test. The test was also used to assess

association of the independent variables with participants' knowledge and perception about COVID-19 vaccination with a level of statistical significance at a $p<0.05$.

Ethical approval

The study was approved by the ethical committee of the university of Sharjah with reference number REC-21-04-12-03-S.

RESULTS

We received back 392 filled questionnaires. As shown in Table 1 about two thirds of the participants were females (250, 63.8%), non-Emirati (374, 95.4%), having a bachelor degree (263, 67.1%), and working in private sector (131, 33.4%), or students (112, 28.6%).

Table 1: Demographic characteristics of the participants, (n=392).

Characteristic	N (%)
Gender	
Male	142 (36.2)
Female	250 (63.8)
Nationality	
Emirati	18 (4.6)
Non-Emirati	374 (95.4)
Education	
High school diploma	67 (17.1)
Bachelor's degree	263 (67.1)
Master's degree	54 (13.8)
Undergraduate	2 (0.5)
PhD	3 (0.8)
None of the above	3 (0.8)
Work status	
Housewife	43 (11)
Student	112 (28.6)
Self-employed	24 (6.1)
Government sector	10 (2.6)
Private sector	131 (33.4)
Semi-government sector	35 (8.9)
Retired	13 (3.3)
Unemployed	24 (6.1)
Marital status	
Single	225 (57.4)
Married	162 (41.3)
Separated or divorced or widowed	5 (1.3)

Slightly more than half (211, 53.8%) were frightened of the pandemic (Table 2). The majority (388, 99%) of the participants are aware of the precautionary measures to be taken, with 313 (79.8 %.) of them actually apply the safety measures. More than half (245, 62.5%) undergo testing when necessary. Even though a majority (376, 95.9%) assume they know what a vaccine is, slightly more than half (205, 52.3%) the participants are not sure whether the vaccine is effective or not. The collected responses on what people think would slow down the pandemic were quantitatively close.

There was no clear distinction between responses regarding participants' opinion on whether vaccine should be mandatory/not. About half of the participants received their information either through TV (201, 51.3%)/through internet (236, 60.2%). More than half (218, 55.6%) of participants is willing to reconsider their doubts towards effectiveness of vaccine even though 193 (49.2%) are not concerned about COVID-19 vaccine (Table 3).

As shown in Table 4 the participants' responses were divided between those (136, 34.7%) who are planning to take the vaccine and those (92, 23.4%) who are not took

the Sinopharm vaccine (134, 34.2%). Only a few (15, 3.8%) took Astra Zenaca or Pfizer-BioNTech (15, 3.8%) vaccines. It is worth mentioning that some participants (92, 23.5%) are not considering taking the vaccine. Those whom have decided on taking the vaccine took it mostly to avoid contracting the virus (150, 38.3%), and for ease of travel (69, 17.6%). About two thirds (242, 61.7%) of the participants think it is necessary to take the vaccine, while almost one third (109, 27.8%) remain unsure. Long term safety (115, 29.3%), side effects (113, 28.8%), and feeling not at high risk (107, 27.3%) were the main reasons that forced some participants to not take vaccine.

As shown in Table 5, some participants **(**84, 21.4%) reported only muscle aches, and (93, 23.7%) had no side effects at all after administration of the 1st dose of the vaccine. However, after administration of the 2nd dose, less muscle aches were reported (74, 18.9%), and a higher number (139, 35.5%) of participants reported no side effects. Fortunately, only a low number of participants (17, 4.3%) have tested positive after administration of vaccine.

Around half (183, 46.7%) of participants claim to know someone who has had bad reaction to vaccine administration.

Table 2: Participant's worries, knowledge, testing for corona, and opinion on how to reduce spread of virus.

Question	N (%)
On a scale from the 0 to 10, how worried are you about the coronavirus pandemic?	
(0-3) not worried	56 (14.3)
(4-6) worried	125 (31.9)
(7-10) frightened	211 (53.8)
Do you know the precautionary measures to protect yourself from coronavirus?	
Yes	388 (99.0)
No	4 (1.0)
Do you take all precautionary measures when leaving your house (including mask, social distancing, and sanitization)?	
Yes	313 (79.8)
Sometimes	76 (19.4)
No	3 (0.8)
Have you been tested for the coronavirus?	
Yes, I tested positive.	37 (9.4)
Yes, I tested negative.	248 (63.3)
I did the coronavirus test and I'm waiting for my result	0 (0.0)
No, I have not been tested	107 (27.3)
How frequently do you perform the COVID-19 test?	
Weekly	15 (3.8)
Every 2 weeks	32 (8.2)
Every month	21 (5.4)
When necessary	245 (62.5)
Never	79 (20.2)
Do you know what a vaccine is?	
Yes	376 (95.9)
No	16 (4.1)
Do you think the available vaccines are safe and effective?	
Yes	159 (40.6)
No	28 (7.1)
Not sure	205 (52.3)
Which of the following do you think will help curb down the spread of the coronavirus?	
Opening up slowly	93 (23.7)
Complete lockdown	69 (17.6)
Partial lockdown	123 (31.4)
There should be no restrictions, and everything should go back to normal	107 (27.3)

Table 3: Sources of information on and attitude of participant's towards COVID-19 vaccines, (n=392).

Question	N (%)
Do you think the vaccine should be mandatory?	
Yes	153 (39)
No	135 (34.4)
Not sure	104 (26.5)

Continued.

Question	N (%)
Where did you get information about the vaccine? Select all that apply	
TV (Ministry of health)	201 (51.3)
Friends/relatives	134 (34.2)
Employer	45 (11.5)
Internet	236 (60.2)
Health professional	132 (33.7)
Will you change your mind once initial results about the effectiveness of the vaccine is released?	
Yes	218 (55.6)
No	55 (14.0)
Not sure	119 (30.4)
How concerned are you about the coronavirus vaccine?	
Concerned	105 (26.8)
Neutral	94 (24.0)
Not concerned	193 (49.2)

Table 4: Reception of participants toward the administration of vaccine, (n=392).

Question	N (%)
Have you taken the coronavirus vaccine?	
I am planning to take it.	136 (34.7)
I am not planning to take it.	92 (23.5)
Yes, I took the Chinese Sinopharm	134 (34.2)
Yes, I took the Pfizer-BioNTech	15 (3.8)
Yes, I took Astra Zeneca (Oxford)	15 (3.8)
Why did you take the vaccine? Select all that apply	
To avoid contracting the virus	150 (38.3)
Required by my employer	31 (7.9)
For ease of travel	69 (17.6)
None of the above	36 (9.2)
Did not take the vaccine	106 (27)
Have you taken both doses of the vaccine?	
Yes	160 (40.8)
No	126 (32.1)
Did not receive any dose	106 (27)
Do you think taking the vaccine is necessary?	
Yes, it is necessary	242 (61.7)
I am not sure	109 (27.8)
No, it is not necessary	42 (10.7)
Which of the following reasons prevented you from taking the vaccine?	
Long time safety	115 (29.3)
Side effects	109 (27.8)
Effectiveness	78 (19.9)
I am not at a high risk	107 (27.3)

Table 5: Side effects and bad reactions reported by participant's who took the vaccine, (n=392).

Question	N (%)
Have you experienced any of the following side effects after the first dose of the vaccine? Select all that apply	
High temperature	26 (6.6)
Nausea and vomiting	15 (3.8)
Headache	48 (12.2)
Muscle aches	84 (21.4)
Mental cloudiness	20 (5.1)
None of the above	93 (23.7)
Didn't take the vaccine	106 (27)
Yes	13 (3.3)

Continued.

Question	N (%)
No	273 (69.6)
Did not take the vaccine	106 (27)
Do you know anyone who has had a bad reaction to the vaccine?	
Yes	183 (46.7)
No	209 (53.3)

DISCUSSION

Most people are hesitant about taking the vaccine, which limits the effectiveness of the global effort to control the current pandemic. Educating the people about how the vaccine would affect each individual and the population as a whole would increase the acceptance rate towards the COVID-19 vaccines, and build trust in health authorities.

Our study showed that slightly more than half (53.8%) of the participants rated their worry towards the pandemic between 7-10, 10 being the highest level of fright (Table 2). Another study in the Indian population during the COVID-19 pandemic portrayed that approximately (72%) of the participants reported being worried about themselves and their close ones during the ongoing pandemic.[15] The fact that in our study the worry rate is less than the Indian's population worry rate, indicates that our population has greater trust in the medical representatives and governmental institutions in the country who are offering and recommending the vaccine on a daily basis on multiple social media platforms.

We also addressed whether the vaccine should be mandatory or not (39%) of our participants agreed that it should be mandatory; and (34%) agreed that it should not be. While the remaining respondents did not have a definitive answer. Even though the difference between those who believe it should be mandatory and those who disagree, is minor, the majority agree that the vaccine should be mandated. This further supports the fact that the population trusts the vaccine, as if they had low confidence levels in the vaccine, they would not want it to be mandatory (Table 3).

Moreover, a study in the United Arab Emirates showed that the vaccine is considerably important to the individual's well-being (59.96%).[16] This supports our results as we have concluded that the majority of our respondents believe it should be mandatory, and hence believe it is of high importance as well.

We have also compared our results to a more global study to obtain a more comprehensive analysis on the attitudes of individual's towards COVID-19 vaccines. Determined in 16 countries, the percentage of the respondents who believe the vaccine is very/moderately important ranged from 55% in Norway to 86 in Italy.[17,18] Results of the present study showed that 61.6% of our participants believe that taking the vaccine is necessary.

In a similar study conducted by the Jordan university of science and technology, there were high rates of hesitancy and nonacceptance of the vaccines among the Middle Eastern population overall due to lack of trust in governmental institutions regarding their statements about the vaccine.[19] This greatly correlates with our findings as we have concluded that whenever there is a high level of trust in governmental institutions, there is also a high level of trust in the vaccine supported by the country.

Further, it was evident in our survey that long term safety (29.3%) and side effects caused by the vaccine (28.8%) were the two main reasons that averted individuals from taking the vaccine (Table 4).

According to the Imperial college report, the most common response (47%) was that individuals are worried about the potential side effects of COVD-19 vaccines. Since November 2020, the rate of respondents who are worried has decreased in 9 of the 15 countries which begun COVID-19 vaccine trials. This illustrates that as more individuals take the vaccine, awareness about the side effects increases, enhancing the trust in the vaccine as it becomes evident that the side effects should not be a significant cause of worry. This encourages the public to widen their acceptance rate.[17] These results were also apparent in our survey as when we asked whether participants will "change [their] mind once initial results about the effectiveness of the vaccine are released", (55.6%) agreed that they would (Table 3), supporting the fact that the worry levels towards the vaccine will reduce once vaccine trials are in action.

Long-term safety and side effects are global concerns as illustrated in Latin America where 72.3% of participants were worried about the consequences and side effects of the vaccine.[20,21] Therefore, the vaccine manufacturers should support the authorities with vaccine safety data in order for the authorities to aid in assuring the public.

Additionally, we also questioned our survey participants about whether they know what a vaccine is and whether they believe that the available vaccines are safe and effective. Our survey stated that (95.5%) of the participants acknowledge what vaccine is but (52.3%) are not sure whether the vaccine is effective or not (Table 2).

These results exemplify vaccine hesitancy and the participants' false belief of knowledge as many know what a vaccine is but are unsure about whether they are safe and effective. In an earlier surevy, more than half of the participants (56.9%) know what the vaccine is, and 48% agree that the vaccine is moderately effective,

demonstrating a more realistic representation of the participants' knowledge.[16]

From a different point of view, a study from San Andres university suggested that exposure to social media has increased the public's risk perception towards contracting the virus. This led to the adoption of preventive behaviors and a change in attitudes towards the acceptance of a vaccine.[18] This study indicated that once awareness of COVID-19 risks increases, the acceptance rate of the vaccine increases.

The final significant question addressed in our survey is about the sources from which the participants obtained their information. Most of the participants received their information either through the TV (ministry of health) (51.3%) or the internet (60.2%) (Table 3).

Comparatively, a UAE study showed that most people received their information from either a health worker (45.54%) or the internet (41.66%).[16] Individuals who received their information from healthcare workers may be less apprehensive towards the vaccine as their source of information is from trusted professionals. This may be the underlying reason as to why the UAE's population is less worried than other populations about the vaccine.

CONCLUSION

Present levels of readiness to consider a COVID-19 vaccine in UAE and other sample surveyed from other countries are inadequate to fulfill the criteria for herd immunity. To enhance confidence among the public, the elements that characterize and establish trust must be understood, and initiatives must be tailored accordingly. For example, health authorities can post more health-related data to the public in regard to the clinical trials carried out on patients locally to increase the public's awareness and trust.

The emerging pandemic presents an important potential for the public health sector to improve vaccination awareness and trust in order to promote the adoption of a new COVID-19 vaccine, as well as to enhance immunization for all vaccine-preventable diseases. Until the causes of such significant disparity in willingness to adopt a COVID-19 vaccine are better defined and resolved, inconsistencies in vaccine coverage across countries could lead to tediousness in global recovery and a lengthier period for the society and economy to relapse.

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