

ORIGINAL ARTICLE /ORİJİNAL MAKALE

## Attitude and acceptance toward COVID-19 vaccines among Kabul city's residents: A cross sectional study

Kabil şehri'nde yaşayanlar arasında COVID-19 aşılara yönelik tutum ve kabul kabulü: Kesitsel bir çalışma

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### Abstract

**Objective:** The present study aimed to assess the attitude and perception of Kabul city's residents toward COVID-19 vaccines hesitancy and acceptance.

**Methods:** Applying a cross-sectional study design, the data was collected from 665 participants in Kabul city using a predesigned validated questionnaire. For statistical analysis, Spearman correlation, chi-square, and logistic regression techniques were used.

**Results:** Although the vaccine availability was limited for the public during the survey period, 70.5% of the participants were willing to receive COVID-19 vaccines. Meanwhile, 49.2% participants were concerned about the COVID-19 vaccines side effects. The presence of positive COVID-19 cases among family members and friends (OR: 2.7), presence of fears during COVID-19 pandemic (OR: 4.4) and beliefs that vaccine has important and vital role in people's protection against COVID-19 (OR: 5.3), increase the likelihood of vaccine acceptance among the participants. On the other hand, participant's mistrust of the safety of COVID-19 vaccines (OR: 0.21) and disbelief on ministry of public health "MoPH" advice about COVID-19 vaccine safety and efficiency (OR: 0.27) decrease the odds of COVID-19 vaccine acceptance among the respondents. In addition, a strong correlation was found between vaccine attitude and vaccine acceptance scales (Spearman  $\rho=0.52$ ,  $p<0.001$ ).

**Conclusion:** Although majority of the participants were willing to receive the COVID-19 vaccines, due to high level of participant's concerns about COVID-19 vaccines-related side effects, a great proportion of the respondents were hesitate to receive the COVID-19 vaccines. Accordingly, public awareness about COVID-19 vaccines must be increased to counteract incorrect and misleading propaganda about vaccination and immunization.

**Keywords:** COVID-19, Vaccine Hesitancy, Vaccination Awareness, Cross-Sectional survey, Afghanistan

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## Öz

**Amaç:** Bu çalışmada, Kabil şehri sakinlerinin, COVID-19 aşılara karşı tereddüt ve kabulüne yönelik tutumlarının ve algılarının değerlendirilmesi amaçlanmıştır.

**Yöntem:** Kesitsel bir çalışma tasarımı uygulanarak, önceden tasarlanmış ve doğrulanmış bir anket kullanılarak Kabil şehrinde 665 katılımcıdan veriler toplanmıştır. İstatistiksel analiz için Spearman korelasyonu, ki-kare ve lojistik regresyon teknikleri kullanılmıştır.

**Bulgular:** Anket döneminde aşı bulunabilirliği halk için sınırlı olmasına rağmen, katılımcıların %70.5'i COVID-19 aşısı olmaya istekliken, katılımcıların %49.2'si COVID-19 aşılarının yan etkilerinin olduğunu düşündüklerini bildirdiler. Aile üyeleri ve arkadaşlar arasında pozitif COVID-19 vakalarının varlığını (OR: 2.7), COVID-19 pandemisi sırasında korkuların varlığını (OR: 4.4) ve aşının insanların COVID-19'a karşı korunmasında önemli ve hayati bir role sahip olduğuna dair inançların varlığını (OR: 5.3) katılımcılar arasında aşuya karşı olumlu tutumun arttığını gösterdi. Öte yandan, Katılımcıların COVID-19 aşılara karşı güvensizliği (OR: 0.21) ve halk sağlığı bakanlığının "MoPH" COVID-19 aşısının güvenliği ve etkinliği hakkında tavsiyesine inanılmaması (OR: 0.27) katılımcılar arasında COVID-19 aşısının kabul edilme olasılığını azaltmıştır. Ayrıca, COVID-19 aşısına karşı yönelik tutum ve kabul arasında güçlü bir korelasyon bulunmuştur (Spearman  $\rho=0.528$ ,  $p<0.001$ ).

**Sonuç:** Katılımcıların çoğunluğunun, COVID-19 aşılarını olmayı kabul etmesine rağmen, COVID-19 aşıları ile ilgili yan etkiler konusundaki endişelerin yüksek olması nedeniyle, katılımcıların büyük bir kısmında da tereddüt saptandı. Buna göre, aşılama ve bağışıklama konusunda yanlış ve yanıltıcı propagandaya karşı koymak için COVID-19 aşıları hakkında kamuoyununun bilinçlendirilmesi gerekmektedir.

**Anahtar Kelimeler:** COVID-19, Aşı Reddi, Aşı Farkındalığı, Kesitsel Anket, Afghanistan

## INTRODUCTION

With the emergence of SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) in Wuhan, China in late December 2019<sup>1</sup> and pandemic occurrence of the coronavirus disease 2019 (COVID-19),<sup>2</sup> global efforts to develop safe and effective vaccines against this globally threatening emergency disease have begun.<sup>3</sup>

Vaccines are one of the most effective and cost-benefit intervention tools for many infectious, particularly viral diseases<sup>3</sup> and for the ongoing pandemic of COVID-19 with no effective antiviral therapies, vaccines and hygienic measures are the main

practical measures against the disease.<sup>4</sup> Since the emergence of the COVID-19 pandemic, many pharmaceutical companies across the globe have been struggling to produce safe vaccines against this devastating disease. As of Sep 09<sup>th</sup> 2022, 11 COVID-19 vaccines have been approved by WHO, manufactured by Pfizer, AstraZeneca, Serum Institute of India, Janssen, Moderna, Sinopharm, Sinovac, Bharat, Novavax and CanSinoBio companies;<sup>5</sup> and 172 are on clinical and 199 are on pre-clinical development.<sup>6,7</sup>

Despite the fact that vaccines are accepted as a safe tool for preventing contagious diseases, mistrust, hesitancy and unacceptance of

vaccines are common phenomena in many societies<sup>8</sup> and are considered one of the ten global health threats worldwide.<sup>9,10</sup>

With the identification of the first case of COVID-19 in the west part of Afghanistan (Herat province) on 24<sup>th</sup> Feb 2020;<sup>11</sup> Afghanistan is now experiencing the fifth wave of this pandemic. As of Sep 10, 2022, 195,471 confirmed cases including 7,786 deaths have been reported by the MoPH of Afghanistan,<sup>12</sup> but the real situation of COVID-19 might be different, and it has been confirmed that the actual positive cases of COVID-19 would be much higher than that of reported data.<sup>11</sup>

The first dose of the COVID-19 vaccine was administered in the UK on 8<sup>th</sup> Dec 2020.<sup>13</sup> According to the most recent data (Sep 04, 2022), 12.6 billion doses of COVID-19 vaccines have been administered globally in which 67.7% of the world population has received at least one dose of the vaccine. Meanwhile, only 21.0% of people in low-income countries have received the first dose of the COVID-19 vaccines.<sup>14</sup> In Afghanistan, COVID-19 vaccination campaign has been started on 23<sup>rd</sup> Feb 2021, using Covishield vaccine, a viral vector vaccine which require a booster dose, 4 – 12 weeks after the first dose.<sup>15,16</sup> According to the MoPH-approved national plan for COVID-19 vaccination campaign in Afghanistan, health workers, school and university teachers, security personnel, prisoners, people with co-morbidities (e.g. heart disease, TB, diabetes), and people over the age of 50 were the main prioritized target groups to receive the COVID-19 vaccines.<sup>17</sup> Due to a shortage of available vaccine (Covishield) at the started point of the present study (5<sup>th</sup> June 2021), the vaccination campaign was halted on June 6, 2021 for a week until the

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new batch of Sinopharm-BBIBP China aided vaccine arrived in Afghanistan on June 12, 2021. Accordingly, during the study period, only a limited number of doses of these two vaccines (Covishield and Sinopharm-BBIBP) were available in the country, and they were administered only to high-risk prioritized groups, not to the general public. This scarcity resulted the third wave of COVID-19 cases in Afghanistan.<sup>18,15</sup>

As of Sep 04, 2022, 10.7 million people has received at least one dose of COVID-19 vaccines in Afghanistan and 9.96 million are completely immunized against the disease in the country, which constitutes only 25.6% of total population of Afghanistan.<sup>14,19</sup> Although COVID-19 vaccines are currently available in all health centers across the country, a massive drop in COVID-19 vaccination campaign has been observed following Afghanistan's recent political situation.<sup>20</sup>

Due to misconception, illiteracy, insecurity, and social media misleading propagandas, vaccine refusal is a common practice in other vaccination campaigns including Polio in Afghanistan,<sup>21-24</sup> so it is likely to have the same scenario in COVID-19 vaccination program in the country. The present study aimed to evaluate the knowledge, attitude and perception of individuals regarding COVID-19 vaccines in Kabul city. The results of the present study are likely to contribute in setting further successful strategies for the prevention of COVID-19 in Afghanistan.

## METHODS

### Study Design

A cross-sectional study was conducted in Kabul city, the capital of Afghanistan, from 5<sup>th</sup>

to 27<sup>th</sup> June 2021. The data were collected from nine out of 16 central districts of Kabul city which were selected by convenience sampling method, visiting two to nine locations of each district at different times of the day. According to the most recent estimation of the National Statistics and Information Authority (NSIA) of Afghanistan, the settled population of Kabul city was estimated to be more than 4.6 million which constituted almost 13.7% of Afghanistan's total population in 2020.<sup>25</sup>

### Data Collection Method

For data collection, a structured interview with a well-designed validated questionnaire was used. A predefined questionnaire developed by other researchers<sup>20, 21</sup> was adapted to Afghan custom and translated into Dari language. A pilot study was performed on 40 non-surveyed participants to ensure clarity and comprehension of the questions.

The questionnaire was divided into four sections: (1) respondent's demographic information, including age, gender, marital status, monthly income, education, duty, habits, and history of chronic diseases; (2) respondent's knowledge about COVID-19 preventive measures, and their experiences and history about its cases and deaths in family members, colleagues, and friends, which included six questions; (3) respondent attitude toward vaccines and immunization, including COVID-19 vaccines, their main concern during the pandemic; (4) the perspective toward COVID 19 vaccination, hesitancy and acceptance had nine close-ended questions with a five-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree) and a Cronbach's Alpha value of 0.87, indicating very good reliability.

At the end of the questionnaire, there was a question about COVID-19 vaccine receipt (yes/no) and its types, as well as two open-ended questions about the participant's experience after vaccination and their general ideas about COVID-19 and its vaccines.

### Sample Size and Sampling Strategy

The sample size was calculated by Raosoft calculator (<http://www.raosoft.com/samplesize.html>), assuming 5% accepted margin of error, 99% confidence level and estimated 4.6 million total population, with 50% response distribution, to have maximum possible sample size. By these specifications, the total sample size was estimated to be 664, but 682 questionnaires were filled during the survey, from which 665 were valid for data analysis. Meanwhile, the differences in the total numbers in the result section are caused by missing data. A convenience sampling strategy was applied during data collection, where the enumerators filled the questionnaires in face-to-face interviews. The enumerators approached the study participants in Kabul city's streets, markets, schools, universities, hospitals, national identity card distribution centers and residential areas, and collected the data from those who were agreed and showed willingness to participate in the survey.

### Statistical Analysis

Excel datasheets and SPSS software 20 (IBM, version 20, USA) were used to analyze the data. The p-value was set at  $\leq 0.05$  to determine whether there was a statistically significant relationship between the variables, vaccine attitude and perception. All negatively worded items on the vaccine attitude and acceptance scales were reversed, and the total values of

the vaccine attitude and perception scales were calculated, as well as the correlation between these two scales using the Spearman rho correlation coefficient. The relationship between dichotomous variables was calculated by the chi-square test ( $\chi^2$ ;  $p \leq 0.05$ ). Binary logistic regression model using a dichotomous dependent variable (will receive the COVID-19 vaccine or not) was performed as a final model to calculate the odds ratio (OR) of each factor with their confidence intervals. For this model, the five-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree) variable of vaccine acceptance (dependent variable) was converted into a dichotomous variable, "yes/no" ("strongly agree" and "agree" to yes; "disagree" and "strongly disagree" to no,) but "neutral" category was not considered in the final model. All other independent variables with such characteristics were converted into three main categories (neutral = 0 (ref); strongly agree/agree = 1 and disagree/strongly disagree = 2) for logistic regression model. In the final binary logistic regression model, backward LR condition was applied to identify the most statistically significant variables among those that had  $p \leq 0.05$  in chi-square test results and to find the best-fitted logistic regression model. A second binary logistic regression model was applied with almost the same specifications mentioned above, but the dependent variable (vaccine acceptance) was converted into a different dichotomous variable, "Yes/No" ("strongly agree/agree" to Yes and "neutral" to No) but "disagree/strongly disagree" categories were not considered in the model. It's worth to be mentioned that the independent variables values were manipulated many times to find the effects of such manipulation on the final

logistic regression models and on the beliefs of the participants about COVID-19 vaccines, and to find the most fitted logistic regression model.

### Ethical Declaration

This article does not contain any invasive studies with human participants or animals performed by any of the authors, since all of the data were collected just by face-to-face structured interviews using predesigned questionnaire. The research plan has been approved by Paraclinic department of Faculty of Veterinary Science of Kabul University (April, 2021) and Helsinki Declaration rules were followed to conduct this study. Written informed consent was obtained from the participants prior to data collection and anonymity was also maintained in the questionnaire as well.

### RESULTS

**Demographic information of the participants:** The data was collected from 682 participants in nine (56.3%) of Kabul's central districts, however, due to the high proportion of missing values, data of 17 questionnaires were omitted, resulting in a final sample size of 665. The participants consisted of 83.4% male and 16.6% female with an almost equal proportion of single (51.6%) and married (48.4%). According on the age categories, 15.6% were  $\leq 20$  years old, 62.7% were 21-35 years old, 13.9% were 36-49 years old and only 7.7% were  $\geq 50$  years old. The median and mean age of the participants were 26 and  $29.3 \pm 10.9$  years old (range = 14 – 75 years old). Based on literacy and education level background, 5.5% of them were illiterate, 39.2% of them had education up to high school; 8.5% were graduated from technical institutes (14<sup>th</sup>

grade) and the rest held bachelor (39.2%), master (6.1%) and PhD (1.5%) degrees. From the total of 364 participants that held technical institute and above degrees (bachelor, master, and PhD), 31.5% (n=115) were graduated from medical-related fields. Sixty-seven percent of the participants were employed, representing a diverse range of community branches including doctors, nurses, pharmacists, teachers/professors, students, governmental and private sectors civilian and security employees, farmers, shopkeepers and workers. In turn, 1.3% were retired, while 31.7% were jobless. Almost one-third of the respondents (29.3%) earned less than \$100 per month, 81.5% earned less than \$300 per month, and only 4.0% earned  $\geq$  \$600 per month. Although chronic health problems were uncommon in the majority of participants (85.1%), chronic respiratory (3.5%), cardiac (1.1%), liver (1.2%) and kidney problems (2.3%); high blood sugar (1.2%), high blood cholesterol (1.7%), and high blood pressure (0.8%) were all present. Nevertheless, 3.1% of the participants had more than one mentioned health problems at the same time (Table 1).

**The history of COVID-19 infection in the participants and their main concerns during the pandemic:** Almost four-fifths of the participants (79.9%) have experienced COVID-19 infection themselves, in their family members, colleagues, friends or neighbors. To be specific, 33.2% of the respondents mentioned that they suffered from COVID-19, 34.4% indicated that they had COVID-19 cases in their family members, 40.0% reported cases of COVID-19 in their friends and relatives, 18.7% in their colleagues, and 20.0% in their neighbors. Almost half of the respondents

(48.3%) indicated cases of deaths of their family members, relatives and friends due to COVID-19 infections. The fear was present in 88.2% of all respondents, but it was vary based on the cases and deaths due to COVID-19 infection in their family members or others. The most prominent fear and concerns of the respondents during COVID-19 pandemic was infection in their family members (46.3%), followed by infection in themselves (36.8%), economic problems (36.3%), hospital unavailability (24.9%), and death of family members (24.8%).

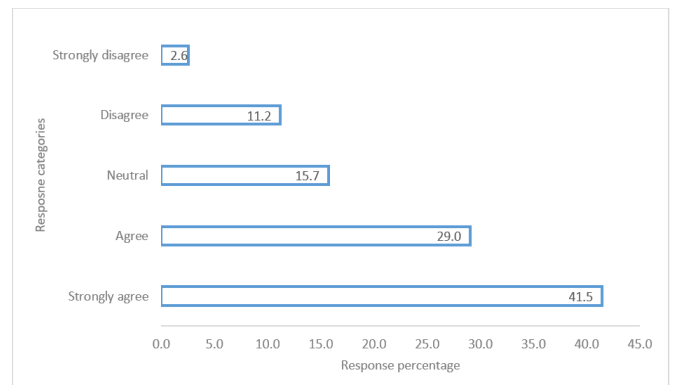
**Table 1.** Demographic information of the participants and history of chronic diseases among Kabul city’s residents, June 2021

Variable	Categories	Frequency	Percent
Sex	Female	107	16.1
	Male	538	80.9
	Non-respondents	20	3.0
Marital status	Single	336	50.5
	Married	315	47.4
	Non-respondents	14	2.1
Age categories	$\leq$ 20 years old	101	15.2
	21-35 years old	405	60.9
	36-49 years old	90	13.5
	$\geq$ 50 years old	50	7.5
	Non-respondents	19	2.9
Education level	Illiterate	36	5.4
	Up to high school	259	38.9
	Community college (14 <sup>th</sup> grade)	56	8.4
	Bachelor and above	309	46.5
	Non-respondents	5	0.8
Employment status	Employed	410	61.7
	Retired	8	1.2
	Jobless	194	29.2
	Non-respondents	53	8.0
Chronic diseases	Yes	97	14.6
	No	554	83.3
	Non-respondents	14	2.1

**The attitude toward routine vaccination and immunization:** Over four-fifths of the respondents (81.8%) agreed that vaccination is necessary for diseases prevention; 55.3% concluded that all vaccines are safe to be administered, but 23.2% believed that almost all freely administered vaccines are of poor quality. The findings of this study also revealed that 75.0% of subjects vaccinate themselves or family members against endemic diseases, and their willingness to vaccinate their children was nearly 90%. According to the data collected, 15.3% of the participants had a negative reaction to vaccination in their life or among their family members. More than half of respondents (53.0%) like and trust public hospitals for vaccination, while 19.2% have no trust in vaccines or service areas at all. The MoPH, private doctors, and pharmacists were the most trusted sources of information about vaccine quality and safety for 93.0% of participants. Despite the fact that limited doses of Covishield and Sinopharm-BBIBP COVID-19 vaccines were available during the survey period; American (32.3%), Chinese (26.7%), and Russian (15.4%) vaccines were the most trusted and vaccines of choice for the participants, respectively.

**Perception toward COVID-19 vaccine acceptance and administration:** From the total of 651 participants who responded to this question, 119 (18.3%) received at least the first dose of COVID-19 vaccine up to the end of the survey period (27<sup>th</sup> June 2021). However, majority of the respondents (70.5%) showed the willingness to receive the COVID-19 vaccines and administrate them in their family members, but 15.7% of them were reluctant about that (Figure 1). Meanwhile, 65.4% of the participants showed the willingness to

take the COVID-19 vaccine if it became freely available, but only 57% were ready to buy and take the vaccine after its availability. More than three-fourths of the respondents (75.5%) believed that receiving the vaccine has a vital role in people's protection against COVID-19 and 68.8% of them agreed that vaccinated individuals will become resistant to infection. Although 46.5% of the participants thought that COVID-19 vaccines are safe and 43.3% trusted on available vaccines, about half of the participants (49.2%) have some concerns about COVID-19 safety and related side effects (Table 2 & Table 3).



**Figure 1.** The attitude of Kabul city's residents for COVID-19 vaccine acceptance when it becomes available, June 2021

### Correlation and logistic regression results:

There was a strong correlation between vaccine attitude and vaccine acceptance scales (Spearman  $\rho=0.528$ ,  $p<0.001$ ) of the study participants. Based on chi-square test results, 23 variables had statistically significant association with COVID-19 vaccine acceptance (yes/no;  $p<0.05$ ; data now shown). Binary logistic regression was performed to assess the impact of specific factors on the likelihood of COVID-19 vaccine acceptance among the participants. The final model contained six independent variables. Hosmer and Lemeshow test results indicated that the model was good fit (chi-square=

4.2,  $p=0.651$ ). The full model containing all predictors was also statistically significant,  $(6, N = 545) = 272.5, p<0.001$  (Omnibus test for model coefficients), indicating that the model was able to distinguish between those who will accept and those who will not accept the COVID-19 vaccine. The model as a whole explained between 39.3% (Cox and Snell R square) and 67.7% (Nagelkerke R squared) of the variance in participant's willingness to

receive the COVID-19 vaccine, and correctly classified 93.3% of respondent's ideas (Table 4). As shown in Table 4, all of the six independent variables made a unique statistically significant contribution to the model.

**Table 2.** Descriptive statistics of vaccine attitude and COVID-19 vaccine acceptance scale's items among Kabul city's residents, June 2021

The five-point Likert scale (5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree) questions	Mean	Median	Standard Deviation
Vaccination is necessary for diseases prevention	1.7	1.0	0.95
All vaccines are safe	2.4	2.0	1.1
All freely available vaccine have poor quality	3.1	3.0	1.1
I trust on the information and suggestion of the MoPH about COVID-19 vaccines	2.0	2.0	1.0
Vaccination is one of the most effective measures against COVID-19 infection	1.9	2.0	0.97
COVID-19 vaccines are safe	2.6	3.0	0.92
I trust on all those COVID-19 vaccines that are available in Afghanistan	2.8	3.0	1.2
When COVID-19 vaccine becomes available, I will vaccinate myself and my family members	2.0	2.0	1.1
Due to the side effects of COVID-19 vaccines, I will not vaccinate myself and my family members	2.6	3.0	1.3
If COVID-19 vaccine becomes freely available, I will vaccinate myself and my family members	2.2	2.0	1.2
Even if COVID-19 vaccines are sold, I will buy them and vaccinate myself and my family members	2.4	2.0	1.2
The vaccinated individuals become resistant to COVID-19 infection	2.2	2.0	0.98

**Table 3.** The attitude toward COVID-19 vaccination among Kabul city's residents based on the three categories of the responses, June 2021

Questions	Strongly agree / agree		Neutral		Disagree/ strongly disagree	
	n	(%)	n	(%)	n	(%)
When COVID-19 vaccine becomes available, I will vaccinate myself and my family members	466	70.5	104	15.7	91	13.8
Due to the side effects of COVID-19 vaccines, I will not vaccinate myself and my family members	325	49.2	164	24.8	171	25.9
If COVID-19 vaccine become freely available, I will vaccinate myself and my family members	429	65.4	114	17.4	113	17.2
Even if COVID-19 vaccines are sold I will buy them and vaccinate myself and my family members	381	57.5	139	21.0	142	21.5



**Table 4.** Binary logistic regression model results of predictor variables for the acceptance of COVID-19 vaccines in Kabul city population in June 2021

Variable	B	Standard error	Wald	df	p-value	OR	95% CI for OR
Positive COVID-19 cases among family members and friends	0.978	0.425	5.299	1	0.021	2.66	1.16-6.11
Presence of fears and concerns during COVID-19 pandemic	1.488	0.480	9.628	1	0.002	4.43	1.73-11.34
Trust on COVID-19 available vaccines in Afghanistan			13.833	2	0.001		
Neutral (ref)*							
Strongly agree/agree	-0.314	0.575	0.298	1	0.585	.73	0.24-2.26
Disagree/strongly disagree	-1.586	0.497	10.183	1	0.001	.21	0.08-0.54
Trust on MoPH recommendations about COVID-19 vaccines			15.329	2	0.000		
Neutral (ref)							
Strongly agree/agree	0.910	0.484	3.536	1	0.060	2.48	0.96-6.41
Disagree/strongly disagree	-1.319	0.644	4.201	1	0.040	0.27	0.08-0.94
Receiving the vaccine has an important and vital role in people's protection against COVID-19			31.988	2	0.000		
Neutral (ref)							
Strongly agree/agree	1.676	0.412	16.521	1	0.000	5.34	2.38-11.99
Disagree/strongly disagree	-1.776	0.751	5.594	1	0.018	0.17	0.04-0.74
The vaccinated individuals become resistant to COVID-19 infection			13.661	2	0.001		
Neutral (ref)							
Strongly agree/agree	1.464	0.427	11.739	1	0.001	4.32	1.87-9.99
Disagree/strongly disagree	-0.105	0.579	0.033	1	0.856	0.90	0.29-2.80
Constant	-1.59	0.718	4.918	1	0.027	0.20	

\*Assigned as reference category.

Positive COVID-19 cases among family members and friends were a good predictor of vaccine acceptance (OR: 2.7; 95%CI: 1.2, 6.1;  $p<0.05$ ). Those who had positive cases in their family members and friends were 2.7 times more likely to get the COVID-19 vaccine than those who did not, after controlling for other variables in the model. During the COVID-19 pandemic, fears (yes/no) were a statistically significant factor in vaccine acceptance (OR: 4.4; 95%CI: 1.7, 11.3;  $p<0.05$ ). So, when other variables in the model are controlled for, people who had fears during COVID-19 were 4.4 times more likely to take the vaccine than

those who had no fears at all.

Participant's trust in the safety of COVID-19 available vaccines was a good predictor of vaccine acceptance ( $p<0.05$ ), and those who did not trust on COVID-19 available vaccines were less likely to accept the vaccines (OR: 0.205; 95%CI: 0.07, 0.54;  $p<0.05$ ). Furthermore, participants who did not believe/trust MoPH advice on COVID-19 vaccine safety and efficacy were less likely to receive the vaccines (OR: 0.3; 95%CI: 0.07, 0.94;  $p<0.05$ ).

The participants who believed that vaccine played an important and vital role in protecting people against COVID-19 was a statistically significant variable ( $p < 0.001$ ). The respondents who held such beliefs were 5.3 times more likely to receive the vaccine than those who were neutral about such beliefs (95%CI: 2.38, 11.98;  $p < 0.001$ ). On the other hand, the participants who did not believe on the vital role of COVID-19 vaccine in people's protection, were less likely to take the vaccine (OR: 0.17; 95%CI: 0.04, 0.74;  $p < 0.05$ ). Meanwhile, those who believed that, vaccinated individuals become resistant to COVID-19 infection were 4.3 times more likely to take the vaccines (95%CI: 1.9, 9.9;  $p < 0.05$ ), than those who did not believe (Table 4).

In the second logistic regression model, where the effects of predictors were examined based on the COVID-19 vaccines acceptant and neutral participants (data details not shown), the odds of COVID-19 vaccines acceptance among those participants that have administered routine vaccines to themselves and their family members was 2.4 times more than the neutral group (95%CI: 1.4, 4.5;  $p < 0.005$ ). Identical to the previous model, the participant's trust on the MoPH recommendations about COVID-19 vaccines increased the likelihood of vaccine acceptance among the participants by 6.9 times (95%CI: 3.4, 13.9;  $p < 0.001$ ), controlling for the other variables effects in the model. On the other hand, the participants believe that "most of the freely available vaccines have low quality" decrease the odds of COVID-19 vaccine acceptance by almost four times than the neutral group (OR: 3.8; 95%CI: 1.6, 9.3;  $p < 0.005$ ).

## DISCUSSION

The negative attitude and refusal to receive the COVID-19 vaccines are major barriers to control the ongoing SARS-CoV-2 pandemic.<sup>26</sup> In the present study, nearly one-third of the participants (29.5%) did not show the willingness to take the COVID-19 vaccines and this hesitation increased (43%) when vaccines will not be distributed free of charge. The findings of this study were in agreement with a global survey of COVID-19 vaccine acceptance, where Lazarus et al.<sup>27</sup> found that on average only 71.0% of the people surveyed in 19 countries showed the willingness to take the COVID-19 vaccines, in which the highest acceptance rate was in China (90%) and the lowest was in Russia (55%). Meanwhile, Nemate et al.<sup>28</sup> conducted an online survey in Dec 2020 and found that 63% of the respondents showed willingness to take the COVID-19 vaccines after their availability. In addition, based on a survey conducted in Bangladesh, a country with an almost similar demographic profile to Afghanistan, only 68% of the participants were willing to take the COVID-19 vaccine.<sup>29</sup> Meanwhile, based on the Pew Research Center estimates, 39% of Americans may not get a vaccine against COVID-19.<sup>10</sup> Since financial satisfaction is an important determinant in vaccine acceptance worldwide;<sup>30</sup> increment of unwillingness to take the COVID-19 vaccine when it is not distributed with no cost reasonably could be considered a barrier factor, because poverty is prevalent among Afghanistan people, and 81.5% of the study participants in this study had <\$300 income per month and gross national income per capita in Afghanistan is US\$680,<sup>31,32</sup> that might become lower with the current political situation in the country. Paul

et al.<sup>26</sup> reported that lower annual income is one of the key constraining factors in COVID-19 vaccine uncertainty and refusal. Although vaccine refusal and hesitancy is common in other vaccination campaigns including Polio in Afghanistan,<sup>21-24</sup> with the infectious characteristics of SARS-CoV-2 and its related morbidity, mortality and socio-economic burden,<sup>33</sup> the results of such refusal would be devastating for Afghanistan, and its consequence will affect the whole world. In addition, it has been indicated that COVID-19 vaccine hesitancy is a common but varying phenomenon among people across the globe, which is considered as a stumbling block against achieving the herd immunity in this ongoing pandemic.<sup>30</sup>

Although the psychological conditions of Afghanistan people due to nearly five decades of war, are not normal,<sup>34</sup> but still MoPH and other health service providers (medical doctors and pharmacists) were the main trusted source of information about COVID-19 vaccine safety and efficacy for the participants. Mistrust on MoPH advices and recommendations about COVID-19 vaccines was a key predictor for COVID-19 vaccine unacceptance, indicating that subjects who did not believe on MoPH suggestions on COVID-19 vaccines were less likely to get the vaccine than those who accepted such recommendations and neutral group. It has been approved that poor communication with people, misinformation and mistrust are considered the key drivers in vaccine hesitancy worldwide.<sup>10</sup> El-Elimat et al.<sup>35</sup> reported that untrusted Jordanians on any source of information regarding

COVID-19 vaccines were less likely to take the vaccines (OR = 0.27, 95CI% = 0.18, 0.40,  $p < 0.001$ ) than the trusted group. As the same as this study results, they also found that healthcare providers were the most trusted sources of information for their study participants. Almost the same results were also reported by Cordina et al.<sup>9</sup> which indicated that trust on the advices of health professionals regarding the effectiveness of the COVID-19 vaccines will increase the likelihood of vaccine uptake by the people.

The odds of COVID-19 acceptance were 5.5 times higher among subjects who believed that receiving the vaccine played an important and vital role in people's protection against COVID-19 than among those who did not agree or were neutral about the concept. Meanwhile, respondents who believed that being vaccinated made them resistant to COVID-19 infection, were more likely to receive a COVID-19 vaccine than unbelievers and neutral participants. The findings of this study agreed with those of Cordina et al.<sup>8</sup> who discovered a strong correlation between such beliefs and COVID-19 vaccine acceptance ( $r = 0.79$ ,  $p < 0.001$ ).

Although the study's findings revealed many important aspects of COVID-19 vaccine acceptance and refusal among Kabul city's residents, the study had some limitations. The main limitation of the study was non-random convenience sampling of districts and participants. In addition, disagreements among some people to participate in the interview, cultural constraints during interviews with females, security issues during

the survey period, and the researchers' limited financial resources were the other important factors in this regard. These limitations may have significant impact on the generalization of the study results to Kabul city residents.

## CONCLUSION

The findings of this study indicated a high level of skepticism about COVID-19 vaccine acceptance, particularly if it is not distributed free of charge to the entire population. This could have a significant impact on the herd immunity concept in COVID-19 battle in Afghanistan. This survey was conducted in the capital of Afghanistan, where most of the people have good access to the public health services and are fully covered by public Medias. Misconception about vaccines, infection transmission and prevention, and vaccine refusal might be much higher in the country's deprived rural areas. To counteract incorrect and misleading propaganda about vaccination and immunization with such vaccines, public awareness and communication about COVID-19 infection and vaccine safety and protection must be increased in general.

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**Ethical Declaration:** The research plan has been approved by Paraclinic department of Faculty of Veterinary Science of Kabul University (April, 2021) and Helsinki Declaration rules were followed to conduct this study. Written informed consent was obtained from the participants prior to data collection and anonymity was also maintained in the questionnaire as well.

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