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Public Attitudes Towards COVID-19 Vaccination: A Cross-Sectional Study in Iran

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Abstract

Background: Vaccination is a strategy for controlling the COVID-19 pandemic. After the vaccine is produced, the utilization of the vaccine becomes crucial.
Objectives: The study aims to investigate the public attitudes toward COVID-19 vaccination in Iran.
Methods: A cross-sectional study was conducted in Iran from March 21 to July 6, 2021. The questionnaire collected attitudes towards the COVID-19 vaccination and priorities for COVID-19 vaccination. Based on the formula for calculating the sample size to estimate the ratio, the sample size was approximately 715 people. A convenience sampling technique was used to select participants. Data were collected both online and face-to-face from individuals over 18 years old. Logistic regression analysis was used to analyze the factors predicting willingness to pay for vaccines.
Results: About 46% of the participants stated that they would use the COVID-19 vaccine, and 36% of them stated that their use of the vaccine depends on the type and specifications of the vaccine. About 71% were willing to pay for a COVID-19 vaccine. The most important reason for not using the vaccine was "concerns about side effects of the vaccine" (44.9%). About 88% of respondents agreed that the COVID-19 vaccine should be free for everyone, and 56.6% favored that COVID-19 vaccination should be mandatory and everyone should be vaccinated. There was a significant relationship between the willingness to pay for the vaccine with educational status and the perceived risk of being infected with COVID-19 (%). Healthcare workers (31.4%) had the highest priority for receiving the COVID-19 vaccine.
Conclusions: Most respondents were willing to receive and pay for the vaccine. The results provide useful information for decision-makers to identify individual and social values for a suitable vaccination strategy.

Keywords: Vaccine, COVID-19, Attitude, Vaccination, Intention

1. Background

The COVID-19 pandemic is a global threat. COVID-19 disease is rapidly spreading around the world. During this pandemic, healthcare providers, patients, and families have encountered many problems (1, 2). As of November 20, 2021, there are over 257 million confirmed cases of COVID-19 worldwide and over 6 million in Iran. Also, the deaths caused by COVID-19 exceeded 5 million worldwide and 128,000 in Iran (3). Despite using some drugs to treat patients with COVID-19, vaccination is one of the most promising strategies to eradicate the disease.

Despite its availability, whether people will accept or buy a safe and effective vaccine against COVID-19 is unclear. Therefore, it is important to calculate the willingness to pay (WTP) and vaccine acceptance rate. Many factors influence WTP, including an individual's sociological and demographic characteristics, attitudes, and beliefs. In other societies, these factors do not necessarily have a constant relationship with WTP. Therefore, governments and other organizations need to identify the determinants related to WTP to design ideal interventions in key populations (4, 5). Worldwide experience shows that the most important and critical elements for the success of immunization programs are high acceptance and coverage levels (6). Studies have assessed public attitudes and WTP towards the COVID-19 vaccine worldwide, but such evidence is limited in Iran (7).

Another problem, once a vaccine becomes available, is

that there are not enough doses to get it in the first place. Therefore, national and international decision-makers are developing strategies to prioritize vaccines (8). The pressure of limited resources and health expenditures has led health system policymakers to prioritize expenditures and resources. The demand gap between services and available resources leads to rationing in the health system. Rationing in the health system leads to prioritizing services, effective resource allocation, and achieving a fairer distribution of resources (9). Studies show that different types of healthcare rationing strategies must have public support. Policymakers' awareness of population attitudes towards the COVID-19 vaccination is very important for the successful implementation of vaccination.

2. Objectives

The present study was conducted to investigate the public attitudes towards COVID-19 vaccination in Iran.

3. Methods

3.1. Study Design and Population

The present cross-sectional study was designed to evaluate the attitudes of Iranian people toward COVID-19 vaccination. Data was collected from provinces in Iran, including Tehran and Khorasan Razavi (see Appendix 1). The sample size determined by using the formula for ratio estimation, with a confidence level of 95% and an accuracy of d = 0.036. Based on previous studies that reported an average vaccination acceptance rate of 60% (ranging from 50% to 70%), obtained a sample size of about 715 people.

$$n = \frac{Z^2_{1-\frac{\alpha}{2}} \times p\ (1-p)}{d^2} \quad (1)$$

Participants were eligible if they were 18 or older and had literacy skills in reading and writing. Individuals who declined to complete the consent form, were below 18 years of age, or failed to finish the questionnaire were excluded from the study.

3.2. Questionnaire Development and Data Collection Procedure

The questionnaire was designed by reviewing studies (8, 10-13) and expert opinions. To validate the content, the questionnaire was sent to 7 experts in virology, health policy, and health economics to obtain their expert opinions. The content validity index was calculated so that for each of the simplicity, clarity, and specificity indicators, the number of experts who chose relevant and fully relevant options was divided by the total number of experts (7 people). The questions' index values of simplicity, clarity, and specificity were obtained as 0.99, 0.98, and 0.98, respectively. To determine the reliability of the questions, in a pilot study, a questionnaire was completed by 30 people; Cronbach's alpha coefficient of the questionnaire questions was 0.83. The final questionnaire included sections on socio-demographic information (11 questions), previous COVID-19 infection (6 questions), attitudes towards COVID-19 vaccination (4 questions), acceptability of COVID-19 vaccination (1 question), reasons for not receiving COVID-19 vaccination (1 question), prioritization for getting COVID-19 vaccine (1 question), and WTP for COVID-19 vaccine (1 question). Socio-demographic data included gender, age, education, employment, marital status, head of household, the number of household members, health insurance, supplementary insurance, monthly household income, and illness. In the COVID-19 infection section, participants were asked about their own and first-degree relatives' history of infection with COVID-19 and their perceived risk of infecting and dying from COVID-19 for themselves and their first-degree relatives. The questions related to the attitude toward COVID-19 vaccination included using domestically produced or imported vaccines, mandatory or optional vaccination, and free or not-free vaccine. In a section based on their acceptability of COVID-19 vaccination, participants responded about the reasons not to get COVID-19 vaccination when it is available in the future. In a question, participants were asked to prioritize people to receive the COVID-19 vaccine. In the last section, the amount of WTP using a question titled "what is the maximum amount to pay for a COVID-19 vaccine (a full course)?" Which had 6 options ranging from not willing to pay any money to over $16 was measured. At the beginning of the questionnaire, declarations of consent and entry criteria were defined. Only those who gave informed consent completed the questionnaire; no financial benefit was provided to the participants.

The data was collected between March 21 and July 6, 2021. Participants were selected using convenience sampling. Data was collected online (415 participants) and face-to-face (300 participants) to increase generalizability. During the online phase of survey collection, we created an online survey through the EPOLL website and sent the questionnaire link to individuals through communication channels. During the face-to-face collection period, the designed survey was completed by participants using a tablet in a public location (hospital, government office, public place, etc.).

3.3. Data Analysis

Data was entered into Stata for analysis. We used logistic regression to identify predictors of willingness to pay for the COVID-19 vaccine. In the first step, the relationship between the dependent variable (willingness to pay) and the independent variable was analyzed by univariate analysis. The adjusted model was generated using a forward stepwise selection strategy with a p-value less than 0.2 in the second step. The significance of crude odds ratios (COR) in univariate analysis and adjusted odds ratios (aOR) in multivariate analysis were assessed with 95% confidence intervals (CI). A p-value of less than 0.05 was considered statistically significant.

The exchange rate for IR. Rials to US dollars at the time of the study were 257,000 IR. Rials = 1 USD.

4. Results

4.1. Sample Characteristics

Table 1 presents general information for the 715 study participants regarding gender, age, education, employment status, marital status, head of household, household size, health insurance, supplementary insurance, monthly household income, and illness. The average age of the respondents was 34.64 years old, and 59% were female.

Table 1. Characteristics of All Respondents

Variables	No. (%)
Gender	
Male	295 (41.3)
Female	420 (58.7)
Age	
18 - 29	252 (35.2)
30 - 39	254 (35.5)
40 - 49	127 (17.8)
> 49	82 (11.4)
Education degree	
Associate degree and lower	190 (26.6)
Bachelor	206 (28.8)
Masters	180 (25.2)
Ph.D. and higher	139 (19.4)
Employment status	
Employed	339 (47.4)
Unemployed	242 (33.8)
Housewife	104 (14.6)
Retired	30 (4.2)
Marital status	
Single	251 (35.1)
Married	443 (62.0)
Widowed/divorced	21 (2.9)
Head of households	
No	491 (68.7)
Yes	224 (31.3)
Household size	
3 ≤	330 (46.1)
≥ 4	385 (53.9)
Health insurance	
Not have	72 (10.0)
Have	643 (90.0)
Supplementary insurance	
Not have	393 (55.0)
Have	322 (45.0)
Monthly household income ($)	
< 78	64 (9.0)
78 - 156	160 (22.4)
156 - 233	179 (25.0)
233 - 311	137 (19.2)
> 311	175 (24.5)
Illness, physical problem, or disability	
No	621 (86.8)
Yes	94 (13.2)

4.2. Perceived Risk of COVID-19 and Attitude Toward COVID-19 Vaccination

About 51% of the participants were not infected with COVID-19. The participants stated that their probability of contracting COVID-19 was between 10 and 20% (27%), and their probability of dying due to COVID-19 was between 10 and 20% (46%). According to the participants, about 66% of the first-degree relatives were infected with COVID-19. The participants stated that the probability of first-degree relatives getting infected with COVID-19 was between 30 and 40% (31%), and the probability of death of first-degree relatives due to COVID-19 was between 10 and 20% (44%). About 46% of the participants will use the COVID-19 vaccine, which is available and free, and the use of 36% of them depends on the type and specifications of the vaccine. 8% of the participants will not use the COVID-19 vaccine. Most participants were willing to pay more than $2 to get a full course of the COVID-19 vaccine. About 29% of the participants were unwilling to get the COVID-19 vaccine. About 42% of the participants will use imported vaccines, and 29% will use domestically produced vaccines. Most participants (57%) agreed that the COVID-19 vaccination should be mandatory and everyone should get vaccinated, but 32% of the participants agreed that the COVID-19 vaccination should be optional and anyone who wanted to get vaccinated. About 88% agreed with the free COVID-19 vaccine for everyone. More than half of the participants agreed with the statement, "until domestic vaccines are produced, buy as many foreign vaccines as possible, but after producing

domestic vaccines, buy domestic vaccines" (Table 2).

4.3. Reasons for Unwillingness to Be Vaccinated

The study indicated that 58 (8.1%) respondents did not want to be vaccinated against COVID-19. Reasons for unwillingness to be vaccinated include concerns about side effects of the vaccine (44.9%), no need for vaccines because of a strong immune system (16.9%), and no belief in stopping the virus with a vaccine (15.7%) (Table 3).

Table 3. Reasons for Unwillingness to Be Vaccinated

Reasons	Responses, No. (%)
I am worried about the side effects of the vaccine	40 (44.9)
I do not need the vaccine because my body has a strong immune system	15 (16.9)
I do not believe in stopping the virus with a vaccine	14 (15.7)
I do not need a vaccine because I take preventive measures seriously	7 (7.9)
I have taken COVID-19 once and do not see the need for a vaccine	6 (6.7)
Fear of needles and ampoules	4 (4.5)
I have a disease or physical condition, or I am taking medicines that I should not get the COVID-19 vaccine.	3 (3.4)

4.4. Priority of the Population to Receive the COVID-19 Vaccine

According to the participant's attitudes in the study, healthcare workers (31.4%), people with underlying diseases (26.9%), and the elderly (15.8%) had the highest priority for receiving the COVID-19 vaccine. Children (3.3%) and People in deprived groups (3.1%) had the lowest priority of receiving the COVID-19 vaccine (Table 4).

Table 4. Priority of the Population to Receive the COVID-19 Vaccine

Items	Responses, No. (%)
Healthcare workers	620 (31.4)
People with underlying diseases such as diabetes, high blood pressure, etc.	532 (26.9)
Elderly	313 (15.8)
People who are more likely to transmit the disease to others (such as public transport drivers)	251 (12.7)
People whose jobs are essential for society (employees of the country's production and services sector)	135 (6.8)
children	66 (3.3)
People in deprived groups of society, such as working children, sleeping cartons, etc.	61 (3.1)

4.5. Predictors of Willingness to Pay for a COVID-19 Vaccine

In a multiple logistic regression analysis, educational status and perceived risk of being infected with COVID-19 (%) were statistically significantly associated with WTP for vaccines. Regarding factors associated with WTP, higher education and higher perceived risk were positively correlated with WTP of the COVID-19 vaccine (Table 5).

5. Discussion

Vaccination is one strategy for controlling the COVID-19 pandemic. Nevertheless, even after universal access to safe vaccines, general vaccination cannot be guaranteed; because of hesitancy to get a vaccine. Therefore, it is important to determine the public attitudes towards COVID-19 vaccination.

Our findings showed that 46% were willing to be vaccinated, and 36% were hesitant to receive the COVID-19 vaccine. In European countries, the willingness to accept was between 62% (France) and 80% (Denmark and the United Kingdom) (14). A study from Pakistan showed that 70.8% intended to take the vaccine (15). Studies whose participants were the general population from China (16), the United States (12), Indonesia (11), Ecuador (17), and Africa (18) report acceptability rates of 63 - 97%. Studies in Iran showed that between 66 and 70% of the participants are willing to accept the COVID-19 vaccine (7, 19). Based on the results of a rapid review study published in February 2022, the percentage of people who want to receive the COVID-19 vaccine ranged from 23.1% to 92% in the global survey (20). Although the results obtained from the present study are within the mentioned numerical ranges and there is no strange difference with the general results, it should be noted that the estimates reported in the studies were made in different periods. The difference in these results can be influenced by scientific advances, more information, and changes and developments in combating the disease of COVID-19, as well as reports and clarifications related to vaccines produced under testing. In any case, the important point about the results is that at a critical point in time when the epidemic and the spread of the disease were at their peak, a significant percentage of people did not have a significant desire to receive the vaccine.

About 8.1% of the respondents did not want to be vaccinated against COVID-19, and the most important reason for them was concern about the vaccine's side effects. This result is consistent with the findings of previous studies (14, 18, 21, 22). Also, a study showed that the belief that vaccines are not safe/effective was a common factor associated with increased vaccine hesitancy (23).

Our results showed that about 42% of respondents would use the imported COVID-19 vaccine. Therefore, it can be said that people have less trust and desire to use domestically produced vaccines, which indicates the need for planning to build people's trust in domestically produced vaccines. However, contrary to the results, it seems that most people in other countries have preferred domestically produced vaccines over imported types (16, 22), and only one study showed that in the Chinese sample, there was a greater preference for the imported vaccine (24).

Among 715 respondents, 405 (56.6%) were in favor of COVID-19 vaccination should be mandatory and everyone should be vaccinated. The previous studies showed that 27.8% and 77.4% of participants favored mandatory vaccination (18, 25, 26). Mandatory immunization provides herd immunity against COVID-19, as people without medical contraindications are also vaccinated.

About 88% of respondents agreed that the COVID-19 vaccine should be free for everyone. The previous studies supported this finding (16, 17, 27). In Africa, 78% of all respondents suggested that it should be provided free of charge (18).

In our study, most participants (71%) were willing to pay for a full course of the COVID-19 vaccine. This is comparable with the study conducted in Lebanon, where 71% of the respondents were ready to pay for this vaccine (21). Studies from Pakistan (15), Chile (10, 28), China (27), Indonesia (5), and Ecuador (17) report willing-to-pay rates of 70 - 91%. Studies conducted in Iran have shown that between 65.7% (29) and 80% (7) of the participants were willing to pay for the COVID-19 vaccine. Of course, these differences could be attributed to the state of the COVID-19 disease at the time of data collection.

Educational status was an important predictor of willingness to pay for a COVID-19 vaccine. So, increasing the level of education increases the odds of willingness to pay. Previous studies have also confirmed these results (7, 13, 15, 21, 28). It can be argued that higher education leads to a better understanding and rejection of conspiracy myths and beliefs. Public awareness of infectious diseases increases confidence in vaccines (30). People understand the gravity of the situation and are willing to invest in the actions taken to deal with the crisis to reduce potential losses (31).

The monthly household income had a positive association with the willingness to pay for the vaccine. Previous studies have also confirmed these results (5, 7, 10, 13, 17, 21, 27-29). One reason for the decline in vaccine use is financial constraints (32). Thus, it is understandable why household income plays a crucial role in vaccine willingness to pay. This positive association may justify subsidized vaccinations for low-income people.

The perceived risk of being infected with COVID-19 was another predictor of willingness to pay for vaccines. The findings are similar to previous studies showing that perceived risk or susceptibility correlates with willingness to pay for vaccines (5, 7).

Respondents identified healthcare workers, people with underlying diseases, and the elderly as a high priority for vaccination. Previous studies have also confirmed these results (8, 33).

There are some limitations to this study. First, an online survey can lead to selection bias. People without Internet access or with a low level of literacy were therefore excluded. However, 84% of Iranian residents have internet access, which may have limited this bias. Second, we used a convenience sample due to the COVID-19 pandemic and social distancing that not be representative. Also, one of the conditions affecting the findings was the time of data collection. As the prevalence of the disease at the time of data collection can affect the findings, the generalization of the findings should be made with this in mind.

5.1. Conclusions

Generally, 46% of community members in Iran were likely to receive the vaccine, 36% were hesitant to receive it, and 71% were willing to pay for it. Having higher education and higher perceived risk are associated with WTP. Also, we found that healthcare workers, people with underlying diseases, and the elderly had a high priority for vaccination.

Knowing people's preferences about vaccination, including concerns about serious side effects and willingness to pay for vaccination, may help policymakers decide about a COVID-19 vaccine. Successful implementation of COVID-19 vaccination in national programs requires adequate attention to people's preferences. Also, different population subgroups had heterogeneous or different vaccine preferences, which reminds the importance of considering the needs of specific individuals or social groups for the vaccination program.

Supplementary Material

Supplementary material(s) is available here [To read supplementary materials, please refer to the journal website and open PDF/HTML].

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Footnotes

Authors' Contribution: A. D. participated in designing the study, gathering data, analyzing and interpreting data, and writing the manuscript. R. D. participated in designing the study, analyzing and interpreting the data, and writing the manuscript. A. A. S. participated in designing the study, interpreting the data, and writing the manuscript. M. Y. provided advice on the study's implementation and data collection. All authors read and approved the final version of the article.

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Informed Consent: Participants were informed that their participation was entirely voluntary. Informed consent was obtained from all the respondents included in the study.

References

1. Niaraees Zavare AS, Akbari F, Rezaei F. The Need for Palliative Care During COVID-19 Pandemic in Iran; a Letter to Editor. *Health Scope*. 2020;**9**(3):e103727. https://doi.org/10.5812/jhealthscope.103727.
2. Mohammadzadeh Z, Keikha L, Maserat E. Toward Controlling Coronavirus Disease 2019 (COVID-19) Pandemic by Integrated Registry Systems. *Health Scope*. 2020;**9**(3):e104753. https://doi.org/10.5812/jhealthscope.104753.
3. Worldometer. *COVID-19 coronavirus pandemic*. 2021, [cited 20 November 2021]. Available from: https://www.worldometers.info/coronavirus/?utm_campaign=homeAdvegas1.
4. Palanca-Tan R. The demand for a dengue vaccine: a contingent valuation survey in Metro Manila. *Vaccine*. 2008;**26**(7):914–23. [PubMed ID: 18206277]. https://doi.org/10.1016/j.vaccine.2007.12.011.
5. Harapan H, Wagner AL, Yufika A, Winardi W, Anwar S, Gan AK, et al. Willingness-to-pay for a COVID-19 vaccine and its associated determinants in Indonesia. *Hum Vaccin Immunother*. 2020;**16**(12):3074–80. [PubMed ID: 32991230]. [PubMed Central ID: PMC8641577]. https://doi.org/10.1080/21645515.2020.1819741.
6. Ozawa S, Stack ML. Public trust and vaccine acceptance–international perspectives. *Hum Vaccin Immunother*. 2013;**9**(8):1774–8. [PubMed ID: 23733039]. [PubMed Central ID: PMC3906280]. https://doi.org/10.4161/hv.24961.
7. Meshkani Z, Zarei L, Hajimoladarvish N, Arabloo J, Rezapour A, Farabi H, et al. Private Demand for Covid-19 Vaccine: A Contingent Assessment from a Low-and Middle-income Country. *Iran J Pharm Res*. 2021;**20**(3):223–34. [PubMed ID: 34903984]. [PubMed Central ID: PMC8653656]. https://doi.org/10.22037/ijpr.2021.115008.15153.
8. Luyten J, Tubeuf S, Kessels R. Who should get it first? Public preferences for distributing a COVID-19 vaccine. *Covid Economics, Vetted and Real-Time Papers*. 2020;**57**:1–19.
9. Hicks LL. Making hard choices. Rationing health care services. *J Leg Med*. 2011;**32**(1):27–50. [PubMed ID: 21391054]. https://doi.org/10.1080/01947648.2011.550825.
10. Garcia LY, Cerda AA. Contingent assessment of the COVID-19 vaccine. *Vaccine*. 2020;**38**(34):5424–9. [PubMed ID: 32620375]. [PubMed Central ID: PMC7315946]. https://doi.org/10.1016/j.vaccine.2020.06.068.
11. Harapan H, Wagner AL, Yufika A, Winardi W, Anwar S, Gan AK, et al. Acceptance of a COVID-19 Vaccine in Southeast Asia: A Cross-Sectional Study in Indonesia. *Front Public Health*. 2020;**8**:381. [PubMed ID: 32760691]. [PubMed Central ID: PMC7372105]. https://doi.org/10.3389/fpubh.2020.00381.
12. Reiter PL, Pennell ML, Katz ML. Acceptability of a COVID-19 vaccine among adults in the United States: How many people would get vaccinated? *Vaccine*. 2020;**38**(42):6500–7. [PubMed ID: 32863069]. [PubMed Central ID: PMC7440153]. https://doi.org/10.1016/j.vaccine.2020.08.043.
13. Wong LP, Alias H, Wong PF, Lee HY, AbuBakar S. The use of the health belief model to assess predictors of intent to receive the COVID-19 vaccine and willingness to pay. *Hum Vaccin Immunother*. 2020;**16**(9):2204–14. [PubMed ID: 32730103]. [PubMed Central ID: PMC7553708]. https://doi.org/10.1080/21645515.2020.1790279.
14. Neumann-Bohme S, Varghese NE, Sabat I, Barros PP, Brouwer W, van Exel J, et al. Once we have it, will we use it? A European survey on willingness to be vaccinated against COVID-19. *Eur J Health Econ*. 2020;**21**(7):977–82. [PubMed ID: 32591957]. [PubMed Central ID: PMC7317261]. https://doi.org/10.1007/s10198-020-01208-6.
15. Tahir MJ, Saqlain M, Tariq W, Waheed S, Tan SHS, Nasir SI, et al. Population preferences and attitudes towards COVID-19 vaccination: a cross-sectional study from Pakistan. *BMC Public Health*. 2021;**21**(1):1759. [PubMed ID: 34565351]. [PubMed Central ID: PMC8474768]. https://doi.org/10.1186/s12889-021-11814-5.
16. Fu C, Wei Z, Zhu F, Pei S, Li S, Zhang L, et al. Acceptance of and preference for COVID-19 vaccination in healthcare workers: a comparative analysis and discrete choice experiment. Preprint. *medRxiv*. Posted online April 11, 2022. https://doi.org/10.1101/2020.04.09.20060103.
17. Sarasty O, Carpio CE, Hudson D, Guerrero-Ochoa PA, Borja I. The demand for a COVID-19 vaccine in Ecuador. *Vaccine*. 2020;**38**(51):8090–8. [PubMed ID: 33187765]. [PubMed Central ID: PMC7832521]. https://doi.org/10.1016/j.vaccine.2020.11.013.
18. Anjorin AA, Odetokun IA, Abioye AI, Elnadi H, Umoren MV, Damaris BF, et al. Will Africans take COVID-19 vaccination? *PLoS One*. 2021;**16**(12):e0260575. [PubMed ID: 34851998]. [PubMed Central ID: PMC8635331]. https://doi.org/10.1371/journal.pone.0260575.
19. Salimi Y, Paykani T, Ahmadi S, Shirazikhah M, Almasi A, Biglarian A, et al. [Covid-19 Vaccine Acceptance and Its Related Factors in the General Population of Tehran and Kermanshah]. *Iran J Epidemiol*. 2021;**16**(5):1–9. Persian.
20. Fattah A, Fazli B, Eshkil S, Hajzadeh G, Ahmadi R, Rakhshanizadeh F, et al. Factors Associated with COVID-19 Vaccine Acceptance Worldwide: A Rapid Review. *Med Edu Bull*. 2022;**3**(1):375–85. https://doi.org/10.22034/meb.2021.318247.1040.
21. Karam MM, Baki JA, Al-Hajje A, Sraj M, Awada S, Salameh P, et al. Willingness to Pay for a Coronavirus Vaccine and Its Associated Determinants in Lebanon. *Value Health Reg Issues*. 2022;**30**:18–25. [PubMed ID: 35033800]. [PubMed Central ID: PMC8757721]. https://doi.org/10.1016/j.vhri.2021.10.004.
22. Wang J, Jing R, Lai X, Zhang H, Lyu Y, Knoll MD, et al. Acceptance of COVID-19 Vaccination during the COVID-19 Pandemic in China. *Vaccines (Basel)*. 2020;**8**(3):482. [PubMed ID: 32867224]. [PubMed Central ID: PMC7565574]. https://doi.org/10.3390/vaccines8030482.
23. Aw J, Seng JJB, Seah SSY, Low LL. COVID-19 Vaccine Hesitancy-A Scoping Review of Literature in High-Income Countries. *Vaccines (Basel)*. 2021;**9**(8):900. [PubMed ID: 34452026]. [PubMed Central ID: PMC8402587]. https://doi.org/10.3390/vaccines9080900.

24. Dong D, Xu RH, Wong EL, Hung CT, Feng D, Feng Z, et al. Public preference for COVID-19 vaccines in China: A discrete choice experiment. *Health Expect*. 2020;**23**(6):1543–78. [PubMed ID: 33022806]. [PubMed Central ID: PMC7752198]. https://doi.org/10.1111/hex.13140.
25. Iguacel I, Alvarez-Najar JP, Vasquez PDC, Alarcon J, Orte MA, Samatan E, et al. Citizen Stance towards Mandatory COVID-19 Vaccination and Vaccine Booster Doses: A Study in Colombia, El Salvador and Spain. *Vaccines (Basel)*. 2022;**10**(5):781. [PubMed ID: 35632537]. [PubMed Central ID: PMC9147164]. https://doi.org/10.3390/vaccines10050781.
26. Giannakou K, Kyprianidou M, Heraclides A. Attitudes and Determinants of Mandatory Vaccination against COVID-19 among the General Population of Cyprus: A Nationwide Cross-Sectional Study. *Vaccines (Basel)*. 2022;**10**(3):438. [PubMed ID: 35335070]. [PubMed Central ID: PMC8953644]. https://doi.org/10.3390/vaccines10030438.
27. Wang J, Lyu Y, Zhang H, Jing R, Lai X, Feng H, et al. Willingness to pay and financing preferences for COVID-19 vaccination in China. *Vaccine*. 2021;**39**(14):1968–76. [PubMed ID: 33714653]. [PubMed Central ID: PMC7914003]. https://doi.org/10.1016/j.vaccine.2021.02.060.
28. Cerda AA, Garcia LY. Willingness to Pay for a COVID-19 Vaccine. *Appl Health Econ Health Policy*. 2021;**19**(3):343–51. [PubMed ID: 33619688]. [PubMed Central ID: PMC7899739]. https://doi.org/10.1007/s40258-021-00644-6.
29. Adeli OA, Rahimi Kah Kashi S. [Estimating willingness to pay for the Covid-19 vaccine using the conditional valuation method]. *Payesh*. 2021;**20**(2):223–36. Persian. https://doi.org/10.52547/payesh.20.2.223.
30. Khan YH, Mallhi TH, Alotaibi NH, Alzarea AI, Alanazi AS, Tanveer N, et al. Threat of COVID-19 Vaccine Hesitancy in Pakistan: The Need for Measures to Neutralize Misleading Narratives. *Am J Trop Med Hyg*. 2020;**103**(2):603–4. [PubMed ID: 32588810]. [PubMed Central ID: PMC7410483]. https://doi.org/10.4269/ajtmh.20-0654.
31. Saqlain M, Ahmed A, Nabi I, Gulzar A, Naz S, Munir MM, et al. Public Knowledge and Practices Regarding Coronavirus Disease 2019: A Cross-Sectional Survey From Pakistan. *Front Public Health*. 2021;**9**:629015. [PubMed ID: 34026708]. [PubMed Central ID: PMC8133216]. https://doi.org/10.3389/fpubh.2021.629015.
32. Bridges CB, Hurley LP, Williams WW, Ramakrishnan A, Dean AK, Groom AV. Meeting the Challenges of Immunizing Adults. *Vaccine*. 2015;**33 Suppl 4**:D114–20. [PubMed ID: 26615170]. https://doi.org/10.1016/j.vaccine.2015.09.054.
33. Craxi L, Casuccio A, Amodio E, Restivo V. Who Should Get COVID-19 Vaccine First? A Survey to Evaluate Hospital Workers' Opinion. *Vaccines (Basel)*. 2021;**9**(3):189. [PubMed ID: 33668695]. [PubMed Central ID: PMC7996211]. https://doi.org/10.3390/vaccines9030189.

Table 2. COVID-19-Related Characteristics and Study Population Comments

Variables	No. (%)
Have you or a first-degree relative been diagnosed with COVID-19?	
Yourself	
Yes	218 (30.5)
No	366 (51.2)
Do not know	131 (18.3)
A family member or A first-degree relative	
Yes	472 (66.0)
No	211 (29.5)
Do not know	32 (4.5)
Perceived risk of being infected with COVID-19 (%)	
Yourself	
0	63 (8.8)
10 - 20	194 (27.1)
30 - 40	185 (25.9)
50 - 60	155 (21.7)
> 60	118 (16.5)
A family member or A first-degree relative	
0	32 (4.5)
10 - 20	142 (19.9)
30 - 40	222 (31.0)
50 - 60	181 (25.3)
> 60	138 (19.3)
Perceived risk of dying due to COVID-19 (%)	
Yourself	
0	190 (26.6)
10 - 20	327 (45.7)
30 - 40	114 (16.0)
50 - 60	53 (7.4)
> 60	31 (4.3)
A family member or A first-degree relative	
0	131 (18.3)
10 - 20	312 (43.6)
30 - 40	153 (21.4)
50 - 60	68 (9.5)
> 60	51 (7.1)
Are you planning to get vaccinated against COVID-19 if it is available and free?	
Yes	331 (46.3)
It depends on the type and characteristics of the vaccine	259 (36.2)
No	58 (8.1)

Have not yet decided	67 (9.4)
What is the maximum amount to pay for a COVID-19 vaccine (a full course)?	
Not willing to pay any money ($)	208 (29.0)
< 2	153 (21.4)
2 - 4	143 (20.0)
4 - 8	86 (12.0)
8 - 16	50 (7.0)
> 16	75 (10.5)
If there are domestically produced and imported vaccines for COVID-19 disease, which one do you use?	
Import	300 (42.0)
In my opinion, there is no difference between domestic and imported production	205 (28.7)
Domestic production	210 (29.4)
Which of the following statements do you agree with?	
COVID-19 vaccination should be mandatory, and everyone should be vaccinated.	405 (56.6)
COVID-19 vaccination should be mandatory only for some people who are at high risk.	81 (11.3)
COVID-19 vaccination should be optional and anyone who wishes to be vaccinated.	229 (32.0)
Which of the following statements do you agree with?	
The COVID-19 vaccine should be free for everyone	627 (87.7)
The COVID-19 vaccine is only free for some people, such as people with low incomes, but those who can afford it can get it themselves.	80 (11.2)
The COVID-19 vaccine is not free; anyone needing it can get it from the market.	8 (1.1)
Given that the price of domestically produced vaccines is much lower than foreign vaccines, but it will take several months to reach the production stage and enter the market, in this situation, the government should do which of the following actions?	
Wait for the domestic vaccines to be produced and then start the vaccination	35 (4.9)
Until domestic vaccines are produced, buy foreign vaccines on a limited basis only for high-risk groups, but start general vaccination after domestic vaccine production.	150 (21.0)
Until domestic vaccines are produced, buy as much as possible from foreign vaccines, but after producing domestic vaccines, buy domestic vaccines.	363 (50.8)
In any case, it is better to purchase foreign vaccines because they are superior.	166 (23.3)

Table 5. Univariate and Multiple Logistic Regression Analysis Showing the Predictors of Willingness to Pay for a COVID-19 Vaccine [a]

Variables	Willing to Pay (%)		Unadjusted	P	Adjusted	P
	No	Yes	COR (95% CI)		aOR (95% CI)	
Gender						
Male	88 (29.8)	207 (70.2)	1.00			
Female	120 (28.6)	300 (71.4)	1.06 (0.77 - 1.47)	0.715		
Age						
18 - 29	65 (25.8)	187 (74.2)	1.00		1.00	
30 - 39	71 (28.0)	183 (72.0)	0.90 (0.60 - 1.33)	0.584	0.80 (0.53 - 1.21)	0.287
40 - 49	38 (29.9)	89 (70.1)	0.81 (0.51 - 1.31)	0.394	0.83 (0.51 - 1.37)	0.474
> 49	34 (41.5)	48 (58.5)	0.49 (0.29 - 0.83)	0.008	0.60 (0.34 - 1.05)	0.075
Educational status						
Associate degree and lower	76 (40.0)	114 (60.0)	1.00		1.00	
Bachelor	54 (26.2)	152 (73.8)	1.88 (1.23 - 2.87)	0.004	1.68 (1.06 - 2.65)	0.026
Masters	46 (25.6)	134 (74.4)	1.94 (1.25 - 3.02)	0.003	1.61 (0.99 - 2.64)	0.057
Ph.D. and higher	32 (23.0)	107 (77.0)	2.23 (1.36 - 3.64)	0.001	1.76 (1.02 - 3.04)	0.043
Employment status						
Employed	95 (28.0)	244 (72.0)	1.00			
Unemployed	63 (26.0)	179 (74.0)	1.11 (0.76 - 1.60)	0.595		
Housewife	42 (40.4)	62 (59.6)	0.57 (0.36 - 0.91)	0.018		
Retired	8 (26.7)	22 (73.3)	1.07 (0.46 - 2.49)	0.874		
Marital status						
Single	67 (26.7)	184 (73.3)	1.00			
Married	134 (30.2)	309 (69.8)	0.84 (0.59 - 1.19)	0.321		
Widowed/divorced	7 (33.3)	14 (66.7)	0.73 (0.28 - 1.88)	0.513		
Head of households						
No	139 (28.3)	352 (71.7)	1.00			
Yes	69 (30.8)	155 (69.2)	0.89 (0.63 - 1.25)	0.496		
Total number of household members						
3 ≤	91 (27.6)	239 (72.4)	1.00			
≥ 4	117 (30.4)	268 (69.6)	0.87 (0.63 - 1.21)	0.409		
Health insurance						
Not have	20 (27.8)	52 (72.2)	1.00			
Have	188 (29.2)	455 (70.8)	0.93 (0.54 - 1.60)	0.796		
Supplementary insurance						
Not have	120 (30.5)	273 (69.5)	1.00			
Have	88 (27.3)	234 (72.7)	1.17 (0.84 - 1.62)	0.348		
Monthly household income ($)						
< 78	21 (32.8)	43 (67.2)	1.00		1.00	
78 - 156	53 (33.1)	107 (66.9)	0.99 (0.53 - 1.83)	0.964	0.82 (0.43 - 1.56)	0.539
156 - 233	52 (29.1)	127 (70.9)	1.19 (0.65 - 2.20)	0.573	1.09 (0.58 - 2.08)	0.784

233 - 311	37 (27.0)	100 (73.0)	1.32 (0.69 - 2.51)	0.398	1.09 (0.55 - 2.16)	0.794
> 311	45 (25.7)	130 (74.3)	1.41 (0.76 - 2.63)	0.278	1.24 (0.64 - 2.41)	0.530
Illness, physical problem, or disability						
No	176 (28.3)	445 (71.7)	1.00			
Yes	32 (34.0)	62 (66.0)	0.77 (0.48 - 1.21)	0.258		
Have you been diagnosed with COVID-19?						
No	113 (30.9)	253 (69.1)	1.00			
Yes	66 (30.3)	152 (69.7)	1.03 (0.71 - 1.48)	0.879		
Do not know	29 (22.1)	102 (77.9)	1.57 (0.98 - 2.51)	0.059		
Perceived risk of being infected with COVID-19 (%)						
0	34 (54.0)	29 (46.0)	1.00		1.00	
10 - 20	62 (32.0)	132 (68.0)	2.50 (1.40 - 4.46)	0.002	2.25 (1.24 - 4.08)	0.008
30 - 40	39 (21.1)	146 (78.9)	4.39 (2.39 - 8.06)	0.000	3.94 (2.11 - 7.36)	0.000
50 - 60	47 (30.3)	108 (69.7)	2.69 (1.47 - 4.92)	0.001	2.33 (1.25 - 4.34)	0.008
> 60	26 (22.0)	92 (78.0)	4.15 (2.14 - 8.02)	0.000	3.57 (1.81 - 7.03)	0.000
Perceived risk of dying due to COVID-19 (%)						
0	77 (40.5)	113 (59.5)	1.00			
10 - 20	72 (22.0)	255 (78.0)	2.41 (1.63 - 3.57)	0.000		
30 - 40	30 (26.3)	84 (73.7)	1.91 (1.15 - 3.17)	0.013		
50 - 60	21 (39.6)	32 (60.4)	1.04 (0.56 - 1.93)	0.906		
> 60	8 (25.8)	23 (74.2)	1.96 (0.83 - 4.61)	0.123		
Have a first-degree relative been diagnosed with COVID-19?						
No	68 (32.2)	143 (67.8)	1.00			
Yes	134 (28.4)	338 (71.6)	1.20 (0.84 - 1.70)	0.310		
Do not know	6 (18.8)	26 (81.3)	2.06 (0.81 - 5.24)	0.129		
Perceived risk of being infected a first-degree relative with COVID-19(%)						
0	18 (56.3)	14 (43.7)	1.00			
10 - 20	45 (31.7)	97 (68.3)	2.77 (1.27 - 6.06)	0.011		
30 - 40	63 (28.4)	159 (71.6)	3.24 (1.52 - 6.92)	0.002		
50 - 60	44 (24.3)	137 (75.7)	4.00 (1.84 - 8.70)	0.000		
> 60	38 (27.5)	100 (72.5)	3.38 (1.53 - 7.47)	0.003		
Perceived risk of dying a first-degree relative due to COVID-19(%)						
0	58 (44.3)	73 (55.7)	1.00			
10 - 20	76 (24.4)	236 (75.6)	2.47 (1.60 - 3.80)	0.000		
30 - 40	32 (20.9)	121 (79.1)	3.00 (1.79 - 5.05)	0.000		
50 - 60	22 (32.4)	46 (67.6)	1.66 (0.90 - 3.07)	0.105		
> 60	20 (39.2)	31 (60.8)	1.23 (0.64 - 2.38)	0.536		

Abbreviations: COR, crude odds ratio; aOR, adjusted odds ratio; CI, confidence intervals.
[a] P-value < 0.05 is considered statistically significant.