J Caring Sci, 2023, 12(2), 79-83
doi: 10.34172/jcs.2023.30508
https://jcs.tbzmed.ac.ir

Short Communication

Acceptance of COVID-19 Vaccine and Related Factors in Iran: A Cross-sectional Study

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Article Info
Article History:
Received: January 12, 2022
Accepted: June 23, 2022
e-Published: February 26, 2023

Keywords:
COVID-19, Vaccine, Pandemic, Corona

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Abstract
Introduction: One of the most important strategies to control COVID-19 pandemic is vaccination. Effective vaccination coverage is necessary to control this pandemic. Therefore, in this study we investigated acceptance of COVID-19 vaccine and associated factors among Iranian population.
Methods: A cross-sectional study conducted through Pors Line in South Khorasan Province of Iran. 1043 people participated in this study. Results were analyzed with SPSS software version 13.
Results: 85.2% of the participants wanted to receive the vaccine. Vaccine acceptance was higher in participants that were over 41 years old. Moreover, rate of vaccine acceptance was higher in men than women. Major concern about vaccination was fear of its side effects. Vaccine acceptance increased with increasing education level.
Conclusion: Results of this study showed that one of the most important reasons for vaccine rejection is the fear of vaccine side effects.

Introduction

COVID-19 vaccine is the most effective approach to control pandemic.[1] Studies showed that if a vaccine is available, high and effective coverage of vaccination needs to be accepted by the individuals.[2] In addition to the problems in vaccine distribution in different countries, vaccine hesitancy is one of the most challenges ahead, as World Health Organization (WHO) identifying it as one of the top 10 global health threats in 2019. Although clinical trials have shown that vaccines are effective and safe, there are various reasons for vaccine hesitancy, including distrust of governments, concerns about vaccine side effects and misinformation about vaccines in the media.[3-6] A global study reports that in 90% of countries people are hesitant about getting the vaccine and generally hesitancy about vaccine varied between 8% to 15%.[7-11] Therefore, in each country the public health officials must pay special attention to this issue.

low vaccine acceptance can slow down the vaccination and delay control of COVID-19 pandemic. It also imposes an enormous burden on governments and medical staff. In Iran, as in other countries, there is misinformation about the vaccine which affects the vaccine acceptance. So it is necessary to conduct studies to identify the factors affecting vaccine acceptance and provide solutions to improve public acceptance. Accordingly, this study designed to investigate COVID-19 vaccine acceptance and associated factors among Iranian population.

Materials and Methods

We did a cross-sectional study that conducted between 28 February 2021 and 18 March 2021.

PASS software version 11 was used to determine the sample size. So considering a margin of error 5% and confidence level 95%, the sample size was determined 1043.

Using proportional stratified sampling method, the participants were selected from 5 city (Birjand, Tabas, Nehbandan, Ferdows and Boshrouyieh) of South Khorasan province of Iran. Using Cochran's formula (with precision of 0.01 and 95% confidence level) validity and reliability was determined (Cronbach's alpha= 0.78). This survey was produced by Pors Line, an Iranian online survey platform (https://survey.porsline.ir/s/76HZY9K).

We shared the link of survey through social media (WhatsApp and Telegram channel).

The questions of questionnaire consisted of several sections: demographic characteristics of participants, vaccine acceptance, barriers of vaccine acceptance, people's attitudes about the coronavirus and coronavirus vaccine. Exclusion criteria were people over 85 years and under 18 years. Analysis of data were conducted with SPSS software version 13. Normal distributions were

evaluated using Kolmogorov–Smirnov test. The analytical procedure consisted of two tests. First, chi-square test was used to examine relationship between vaccine acceptance and demographic characteristics. Also simple linear regression was used to investigate role of barriers on vaccine acceptance. Significance level was considered to be 0.05. Descriptive statistics were presented as frequencies (n) and percentage (%).

Results

Total number of participants in this study was 1043. The highest number of respondents was belonged to Tabas city 663 (63.6). The majority of respondents were in the age range 19-30 years. 442 (42.4) of participants, were male and 601 (57.6) were female. Most of the participants were married 728 (69). Moreover most respondents had a bachelor's degree 447 (42.9). Most of the participants in this study were employed in government jobs 39.5% and 38.6% of them were unemployed. 831(79.7) of the participants had no comorbidities and most of them had no history of infection with COVID-19.

The majority of people stated that COVID-19 is a serious and important disease 910 (87.3) and they said that they were more likely to get COVID-19 633 (60.7). Table 1 indicates acceptance of COVID-19 vaccine among the participants. Most of respondents strongly agreed with this subject: {If you know that getting the COVID-19 vaccine will protect you against this disease, be sure to get vaccinated} 555(53.3) and 332(31.9) of them agreed. This indicates that 888 (85.2) of participants were sure about self-vaccination and only 154 (14.8) of them disagreed or they had not decided. In the second and third questions was asked that: 886 (85) of people agreed with these questions: If you know that the COVID-19 vaccine will protect your family and community from disease, be sure to get vaccinated and If you know that the COVID-19 vaccine will return the community to normal, you will be vaccinated. Furthermore in response to {I follow all health protocols and inject the vaccine} 675 (64.8) of respondents strongly agreed or agreed. 372 (35.7) of participants preferred to use internal vaccine and only 209 (20.1) of them preferred foreign vaccine, 310 (29.8) did not decide about it and 150 (14.4) of participants said type of vaccine is not important. Most of participants said that if a vaccine is confirmed by the WHO, they will inject it 764 (73.3) which shows people's trust in World Health Organization (WHO). Results indicated that vaccination acceptance was higher in participants that were over 41 years old. Moreover, the rate of vaccine admission was higher in men than women and in proportion to the increase in education level, rate of vaccine acceptance also increases.

Table 2 shows the barriers associated with acceptance of COVID-19 vaccination. One of the concerns in most people about vaccine injections was the side effects of vaccine. In our study, in response to the question {I'm worried about the side effects of the COVID-19 vaccine}, most of participants agreed or strongly agreed 806 (77.3). I think COVID-19 vaccine is dangerous for me: only 396 (38) of respondents agreed with this sentence, and about 361 (34.7) of them were neither agree nor disagree, and 219 (21) were opposed to this. Another thing that is considered to be one of the barriers associated with COVID-19 vaccination is the cost of the vaccine, also fear of getting COVID-19 through vaccine injection. In our study, more than 312 (30) of people agreed with these sentences: I'm worried to get COVID-19 from the vaccine and I have to charge much money for this vaccine. Also a small percentage of respondents were afraid of injections 166 (16). 378 (36.3) of respondents were agree or strongly agree with this sentence: I believe in natural remedies and traditional medicine to treat COVID-19 disease. It seems that the role of religious beliefs as an obstacle in vaccination is very low and only 70 (6.8) of people agreed or strongly agreed with: I do not get the COVID-19 vaccine because of my religious beliefs. Most participants were opposed or strongly opposed with this sentence: I do not get the vaccine because I am not at high risk 661 (63.4).

Simple linear regression has been used to investigate role of barriers on vaccine acceptance. Table 3 shows result of Simple linear regression: According to the obtained results, the following linear relationship can be expressed based on regression analysis: Acceptance of vaccine = 4.17-0.16 × Barriers of vaccine acceptance the above relationship shows if the barriers increase one unit, vaccine acceptance will decrease 0.16 ($R^2 = 0.03$, F= 41.08).

Discussion

Results of this study showed that the rate of vaccine

Table 1. Acceptance of COVID-19 vaccine

Items	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
If you know that getting the COVID-19 vaccine will protect you against this disease, be sure to get vaccinated.	32 3.1	40 3.8	82 7.9	333 31.9	556 53.3
If you know that the COVID-19 vaccine will protect your family and friends from the disease, be sure to get vaccinated.	29 2.8	33 3.2	75 7.2	319 30.6	587 56.3
If you know that COVID-19 vaccine protects other people in the community against this disease, be sure to get vaccinated.	26 2.5	32 3.1	77 7.4	332 31.8	576 55.2
If you know that the COVID-19 vaccine will return the community to normal, you will be vaccinated.	21 2	27 2.6	67 6.4	290 27.8	638 61.2
I follow all health protocols and receive the vaccine.	47 4.5	94 9	226 21.7	352 33.7	324 31.1

Table 2. Barriers of COVID-19 vaccine

Items	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I'm worried about the side effects of the COVID-19 vaccine	23 2.2	69 6.6	145 13.9	360 34.5	446 42.8
I think the COVID-19 vaccine is dangerous for me	65 6.2	219 21	362 34.7	240 23	157 15.1
I'm worried to get COVID-19 from the vaccine	99 5.9	271 26	315 30.2	228 21.8	130 12.5
I have to pay a lot of money for this vaccine	131 12.6	264 25.3	317 30.4	217 20.8	114 10.9
I'm afraid of injections	348 33.4	400 38.4	128 12.3	113 10.8	54 5.2
I believe in natural remedies and traditional medicine to treat coronary heart disease	166 15.9	202 19.4	297 28.4	229 22	149 14.3
I do not get the COVID-19 vaccine because of my religious beliefs	438 42	385 36.9	149 14.3	42 4	29 2.8
I do not get the vaccine because I am not at high risk	271 26	390 37.4	223 21.4	111 10.6	48 4.6

Table 3. Results of simple regression model (dependent variable: vaccine acceptance)

	Unstandardized coefficients		Beta standard coefficients	T value	*P* value
	B	Standard error			
Constant	3.07	0.11		29.49	0.0001
Barriers to vaccination	-0.06	0.02	-0.06	-2.18	.030
Encouragements for vaccination	0.24	0.02	0.42	14.33	0.0001
F test	127.27		**P value**	0.0001	
Kolmogorov-Smirnov test (P value)	0.32		Durbin-Watson	1.98	
R square	0.197		Adjusted R square	0.195	

acceptance among respondents was 85.2% which was higher than other studies. In a global study that conducted in 19 countries, 13 142 participants entered in this study to determine acceptance of the COVID-19 vaccine. 71.5% of respondents said that they would be likely to take vaccine if an effective and safe vaccine was available. 48.1% of participants reported that they would inject the vaccine if their employer recommended it. In Asian countries such as China, Korea and Singapore, more than 80% of people wanted to take COVID-19 vaccine.[12] In a study conducted in France, 25% of the French adult population did not want to take COVID-19 vaccine and the main reason they stated was that the vaccine was not safe.[13] These differences in vaccine acceptance between different countries can delay control of the COVID-19 pandemic.

Vaccine acceptance is influenced by beliefs of the people and social factors. For example, in a recent study in several countries, the authors found that Africans experienced medical distrust due to racial discrimination and were less likely to receive the vaccine. Also it has been found that in middle-income countries people are more likely to receive the vaccine.[14]

Results of our study showed that the majority of participants who wanted to receive the vaccine were over 41 years old and also the rate of vaccination was higher in men than women. In line with this evidence in a global study by Lazarus et al older people were more likely to get the vaccine whereas respondents that were in the age range of 25-54 and 55-64 years reported that they would inject the vaccine if their employer recommended it.[12]

In compliance with our results, Troiano and Nardi indicated that vaccine acceptance was higher in men than women.[15] Whereas Lazarus et al reported that this rate was higher in women than men.[12] The results of our study showed that as the level of education increases, the same rate of vaccine acceptance among participants increases which may be related to increasing the level of knowledge and awareness of individuals. In line with this evidence, Salali and Uysal in Turkey reported that low levels of education were associated with low vaccine acceptance.[16]

Vaccine acceptance in people who had not been infected with COVID-19 and participants with a history of COVID-19 disease was same. In line with this, Lazarus et al showed that there was no difference between two groups in receiving vaccine.[12]

Various factors affect the acceptance of vaccine and people have concerns about vaccine. Recognizing these concerns and designing appropriate strategies to solve them increases overall coverage of the COVID-19 vaccine. One of the most important reasons for rejecting the vaccine is the concerns about side effects of vaccine.[1] Results of our study showed that the most important reason for refraining from vaccination was concern about its side effects. Contrary to our results, a recent study

conducted in Iran and several countries showed that the most important reason for rejecting the vaccine was lack of confidence in the vaccine.[14]

In our study, about 77.3% of participants were concerned about the side effects of the vaccine, and this seems to be one of the most important barriers to vaccination. One study by Akarsu et al indicated that the most reasons of COVID-19 vaccine rejection were fear of vaccine, side effects and distrust in vaccine efficacy.[17] In compliance with previous study, Pugliese-Garcia et al reported that fear of infection with the COVID-19 through vaccination and the belief that the vaccine was ineffective were among the most important reasons for not receiving the vaccine.[18] Lazarus et al reported that religious motivation was a negative factor in vaccine acceptance,[12] while the results of our study showed that religious beliefs are not barriers of vaccine acceptance. One of our hypotheses was that people with comorbidities would be more likely to receive the vaccine, and the results showed that vaccine acceptance in this group was higher than healthy individuals. In a study by Harapan et al in Indonesia, people at higher risk for COVID-19 were more likely to be vaccinated.[2]

Also, one of the unique features of our study was evaluating of people's attitude about type of vaccine. The results showed that most people were willing to receive the Iranian vaccine. Our study had some limitations, such as the use of only online questionnaires instead of face-to-face interview Also another limitation was the small number of the studied population, so it is suggested that future studies be conducted in a larger statistical population.

Conclusion

Results of this study showed that there are several factors affects COVID-19 vaccine acceptance. One of the most important factor is the fear of the COVID-19 vaccine side effects. Age, sex and level of education also affected vaccine acceptance. Results of this study can promote vaccine acceptance.

Acknowledgements

This work was supported by a grant from Birjand University of Medical Sciences.

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Research Highlights

What is the current knowledge?
COVID-19 vaccine is the best approach to control pandemic. If a vaccine is available, high and effective coverage of vaccination needs to be accepted by the individuals.

What is new here?
The fear of COVID-19 vaccine side effects was the main barrier of vaccine acceptance.

Competing Interests

The authors declare that they have no conflict of interest.

Data Availability

The findings of this study will be available upon request from the corresponding author.

Ethical Approval

This study was approved by the ethics committee of Birjand University of Medical Sciences (IR.BUMS.REC.1399.485).

Funding

This study was funded by Birjand University of Medical Sciences.

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