Refusing or Accepting the COVID -19 Vaccine in Iranian Society: A Systematic Review

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Abstract

Background: The successful implementation of the vaccination program against COVID-19 is not limited to the efficiency and effectiveness of the vaccine but also requires public trust and acceptance of the target population. This study aims to review the factors associated with COVID-19 vaccination acceptance/refusal in Iranian society.

Materials and Methods: In this systematic review, online databases Medline, EMBASE, EMBASE, CINAHL, Web of Science, Scopus, and WHO database were searched for studies on the acceptance/refusal of the COVID-19 vaccine and related factors from 1 December 2019 through 1 January 2023. Two authors undertook screening selection independently, data extraction, and quality assessment (using the STROBE scale).

Results: The COVID-19 vaccine acceptance rate ranged from 64.2% to 83.6%. Various determinants at the individual (fear of short-term side effects of vaccines, personality traits, and distrust of vaccines and pharmaceutical companies), socio-cultural (conspiracy theory, social learning, misconceptions about COVID-19, and fatalism), and legal-managerial levels (incomplete information, difficult and irregular access to vaccination centers, lack of restrictions and compulsion to be vaccinated, and lack of incentives to be vaccinated) were involved in refusing the injection of the COVID-19 vaccine. Higher education level, older age, male gender, marital status, having chronic diseases or being already infected with severe COVID-19 infection, as well as respect for the rights of others, were associated with better acceptance of vaccination (p<0.05).

Conclusion: Removing barriers to vaccination based on individual, social, legal-managerial, and vaccination factors, as well as informing people about its benefits, should be a priority for health providers. Older age, gender, marital status, education level, and comorbidities were associated with better vaccine acceptance in individuals.

Key Words: Acceptance, COVID-19, Iran, Refusal, Related factors.

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1- INTRODUCTION

Vaccines are one of the most successful and cost-effective public health tools that have substantially contributed to the elimination and control of several serious diseases in the last century. During the COVID-19 pandemic, effective vaccination is needed in addition to public health measures (such as social distancing, wearing a mask, washing hands, avoiding crowded, closed spaces, and educating the general population) to reduce disease spread and mortality (1-5). The successful implementation of the vaccination program against coronavirus cannot be ensured solely through the efficiency and effectiveness of the vaccine. In addition to a coherent and strong health system, there is an urgent need for public trust and acceptance of the target community towards the vaccine (6, 7).

Despite the safety and effectiveness of immunization measures, hesitancy in vaccination has become an emerging global issue and placed by the World Health Organization (WHO) among the top 10 threats to global health in 2019 (8). Vaccination hesitancy is defined as the delay in accepting or refusing vaccination despite the availability of an effective and safe vaccine (9). Therefore, achieving collective immunity requires the acceptance of the vaccine among the general public. In other words, the hesitation in vaccination among people around the world is one of the primary obstacles to controlling the pandemic (1, 10). Studies show that hesitation in vaccination is influenced by many factors, including a lack of confidence and trust in the vaccine (11, 12).

Vaccine refusal due to health and safety concerns is not recent, and it is especially more in the case of new vaccines (13). According to a global report in 2017, vaccine hesitation exists in most countries (14). The results of a study showed that factors such as the fear of transmitting the disease to relatives, fear of long-term side effects, and the presence of depressive symptoms affect the willingness to accept the vaccine (15). The general consensus indicates that immunizing a large percentage of the population is the sole option, and the vaccine is one of the best and safest tools to achieve immunity in a large population in a short period of time (16). Immunity is possible by vaccinating 50 to 67% of the population (17). Several factors influence people's willingness to be vaccinated (11, 18), and they are nearly as important as the discovery of the vaccine itself (10). Therefore, the factors affecting the acceptance of the COVID-19 vaccination should be identified and assessed to remove the obstacles before the acceptance of vaccination by different sections of society.

Examining the impact of community preferences on vaccination can help health providers develop vaccine approval methods, incentives for injecting it, and informing the population to attract them and reach the border of collective safety in society. Some original studies on vaccine acceptability exist that measure the public perception toward vaccination in Iran, but no systematic reviews are available to summarize the findings for different regions in detail. The present study aimed to systematically review the factors associated with COVID-19 vaccination acceptance/refusal rates in Iranian society.

2- MATERIALS AND METHODS

The Preferred Reporting Items for Systematic review and Meta-Analysis (PRISMA) statement was used as the template for this review (19).

2-1. Eligibility criteria

The participants, interventions, comparators, and outcomes (PICO), as a framework, was used to formulate the review objective and inclusion criteria.

2-1-1. Participants: General Iranian population.

2-1-2. Interventions*:* The included studies are non-interventional, so an intervention group did not exist.

2-1-3. Comparison: The study did not have a comparison group.

2-1-4. Outcome: COVID-19 vaccination acceptance/refusal rates.

2-2. Included studies: The review included studies containing any form of quantitative, qualitative, or mixed studies that assess COVID-19 vaccination acceptance/refusal reasons and rates in the Iranian society, published up to January 2023 and written in English or Persian.

2-3. Exclusion criteria: The exclusion criteria were abstracts without the full article, articles not written in English or Persian, review articles, systematic reviews and meta-analyses, letters to the editor, editorials, short reports, commentaries, and case reports.

2-4. Study selection

Database search was done for suitable studies, abstracts of the studies were screened for identification of eligible studies, full-text articles were obtained and assessed, and a final list of eligible studies was made. This process was done independently and in duplication by two reviewers, and any disagreement was resolved by a third reviewer. References were organized and managed using EndNote software (version X8).

2-5. Information sources

A systemic search of electronic databases Medline (via PubMed), Medline, EMBASE, CINAHL, Web of Science, Scopus, and WHO database, as well as the Google Scholar search engine, was conducted for studies on the acceptance/refusal of the COVID-19 vaccine and related factors, from 1 December 2019 through 1 January 2023. The search was done independently and in duplication by two reviewers, and any disagreement was dissolved by the supervisor.

2-6. Search

Search words were combined using appropriate Boolean operators and included subject heading terms using the following keywords alone or in combination: "Corona or Coronavirus", "COVID-19", "Factors Associated", "Vaccine", "Vaccination", "Acceptance", "Refusal", and "Rejection".

2-7. Study selection

Database search was done for possible studies, abstracts of the studies were screened for identification of eligible studies, full text articles were obtained and assessed and a final list of included studies was made. This process was done independently and in duplication by two reviewers and any disagreement was resolved by the superior reviewer. References were organized and managed using EndNote software (version X8).

2-8. Data items

A data collection form was designed and applied by two independent authors. Data collected from the selected studies included authors' names, date of survey, study type, target population, settings, sample size, and main findings.

2-9. Risk of bias in individual studies

The risk of bias was assessed using the standard tool of STROBE (STrengthening the Reporting of Observational Studies in Epidemiology) positioning guidelines (20). STROBE is a valuable tool for evaluating the quality of observational studies. This checklist has 22 items, scored based on the importance of each item according to the present study. The final score of the checklist was 30, and the minimum score was 15.0. The assessment was done by two

reviewers independently and in duplication, and any discrepancies were resolved by the third reviewer.

2-10. Synthesis of results

Due to the difference in the included studies, study designs, sample size, and age groups in studies, a meta-analysis was not conducted. Studies were summarized in a narrative fashion, and an overview of their methods and main findings were presented.

2-11. Ethics

Approval of a research ethics committee was not necessary as the study analyzed only publicly available articles.

3- RESULTS

Finally, 14 related studies, including 43,079 individuals, were selected (**Figure 1**). All included studies were of acceptable quality based on the STROBE scale. The main characteristics of the selected studies are summarized in **Table 1** and the following:
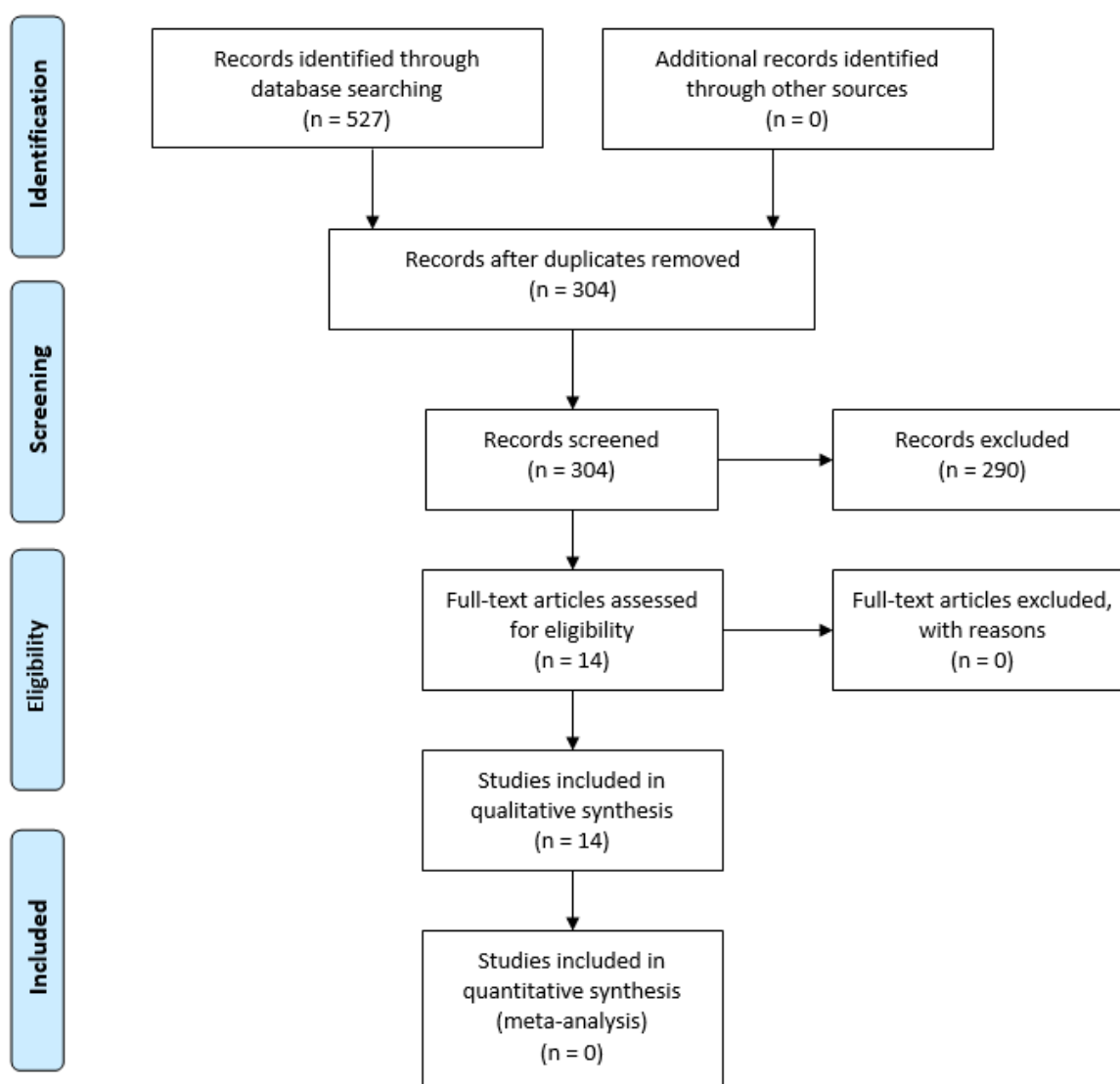

Fig.1: PRISMA flowchart.

1. A phenomenological qualitative web-based study aimed to explore the reasons why people refuse to receive the COVID-19 vaccine despite its availability. The findings included six main themes as follows: ambiguity, ineffectiveness, mistrust, advertising, fear, and needlessness (21).

2. A cross-sectional study in Bushehr province aimed to determine the role of trust in receiving or not receiving the COVID-19 vaccine. The results showed a mean trust of 3.34±1.08 in vaccine products, 3.12±0.29 in vaccine manufacturers, 3.24±0.38 in government and health officials, and an overall trust of 3.23±0.48. This indicates that the confidence in vaccination was higher than average. Of all respondents, 36% had low trust, and 64% had high trust. The relationship between trust and its dimensions with receiving or not receiving the vaccine was confirmed (p <0.05) (1).

3. A cross-sectional study in Bushehr province aimed to determine the factors affecting vaccine acceptance based on the behavioral change wheel mode and its components (capability, opportunity, and motivation). The results showed that most participants were inclined to receive the Iranian vaccine (65.9%). Among the demographic factors, only gender was associated with vaccination, and men were more likely to accept being vaccinated (p=0.022). Among the model constructs, the constructs of opportunity had the greatest impact on vaccine acceptance. It means that the acceptance of COVID-19 vaccination can be increased by providing opportunities through social support, behavioral regulation, and assigning a social role to vaccination (22).

4. A cross-sectional study aimed to investigate the factors affecting the acceptance of the corona vaccine in the general population of Qazvin province. The results showed that most of the studied people had a desire to receive the Iranian vaccine, and 19.4% said that they would not inject any vaccine. Men and people with university education, rural people, and married people were more likely to receive the COVID-19 vaccine. Of people who did not want to receive the vaccine, 21.1% cited concerns regarding the financing of the vaccine as the reason (23).

5. A mixed-method study in Tehran aimed to investigate the influencing factors and challenges related to the acceptance of the COVID-19 vaccine. The results showed that the most important challenges from the viewpoint of different population groups included low social trust, a lack of confidence in the effectiveness and composition of the vaccine, not feeling the need to inject the vaccine, a lack of confidence in the fairness of vaccine distribution, disbelief in the existence of the disease, the challenges of access to an efficient and acceptable vaccine, and the influence of non-specialists. In general, 83.6% of people were willing to receive the vaccine, 58.3% preferred a foreign vaccine, 25.4% an Iranian vaccine, and 9.6% preferred both vaccine types. The assessment of some determinants affecting the willingness to receive the COVID-19 vaccine showed that the elderly (over 60 years of age) were 1.7 times more willing to get vaccinated, and single people were 46% less willing to receive the vaccine compared to married people (24).

6. A population-based cross-sectional study in Tehran and Kermanshah aimed to estimate the COVID-19 vaccine acceptance and its related factors. The results showed that the COVID-19 vaccine acceptance rate was 66.47%. Moreover, 86.02% of the participants stated that they would use any type of (Iranian/foreign) vaccine approved by the Iranian Ministry of Health. However, 13.98% of the participants stated that they only preferred foreign-approved vaccines (if available). The variables of age, fatalism, and

socioeconomic status had significant associations with COVID-19 vaccine acceptance (9).

7. A descriptive-analytical study aimed to assess the determinants of COVID-19 vaccine acceptance in Gonabad. The results showed that the two factors of living with people at risk (88.5%) and respect for the rights of others (80.9%) were the most important reasons for accepting the vaccine. However, worries about the side effects of the vaccine (63%), concern about the vaccine content, and lack of knowledge on the effectiveness of the vaccine (45.3%) were the most important reasons for not accepting COVID-19 vaccination (25).

8. A cross-sectional study on 1564 people above 18 years aimed to determine the acceptance rate of COVID-19 vaccination in the Iranian population and the factors affecting it. The results showed that 70% of the participants reported the acceptance of vaccines. Ten percent of the people were against vaccination, and 20% were hesitant to get vaccinated. Risk perception (p=0.003), knowledge of the disease (p<0.001), trust in the health system (p<0.001), attitude towards vaccination (p<0.001), and vaccination literacy (p<0.001) were the predictors of vaccine acceptance. People with higher levels of education and mistrust towards the health system had a reduced vaccine acceptance rate. It was concluded that the vaccine acceptance rate in the Iranian population is 70% (26).

9. A cross-sectional study aimed to evaluate the reasons for vaccination refusal in Ahvaz, Iran. The results showed that lower levels of education and older age contributed to a reluctance to vaccination, and having chronic diseases or being already infected with severe COVID-19 infection were associated with higher vaccination acceptance. Mistrust in the existing vaccines in Iran and the unacceptance of vaccination were among

the top reasons for the refusal of vaccination (27).

10. A web-based cross-sectional study with a mixed qualitative-quantitative approach aimed to assess the Iranian people's attitude and confidence in the COVID-19 vaccine and their reasons for accepting or rejecting the vaccination. The results showed that 69% of participants were willing to have the COVID-19 vaccine. Female gender, lower educational levels, following COVID-19 news through sources other than websites and social media, not following COVID-19 news, and loss of a first-degree relative due to COVID-19 were all associated with a more negative attitude toward the COVID-19 vaccine (p < 0.01) (28).

11. A web-based cross-sectional study aimed to assess the rate of COVID-19 vaccination acceptance among Iranians and identify factors associated with their willingness. The results showed that 64.2% of individuals intended to receive COVID-19 vaccination. The adjusted odds (aOR) of COVID-19 vaccination intent was higher for individuals with greater exposure to social norms supporting COVID-19 vaccination and higher perceived benefits. The adjusted odds of vaccination intent were lower among individuals with greater COVID-19 vaccine safety concerns. Lower vaccination intent was also associated with increasing age, female sex, and working in healthcare (29).

12. A cross-sectional study in Bushehr province aimed to determine the role of vaccine literacy and hesitancy in the acceptance of the COVID-19 vaccine. The results showed that 64.6% of participants wanted to receive the vaccine. The mean and standard deviation of the vaccine hesitancy was 14.9±4.2. It was found that most vaccine recipients were men (p=0.013), had higher education (p=0.009), and were divorced or single

individuals (p=0.044). Age was vaccine acceptance (p<0.001). Critical literacy, attitude toward vaccines, and vaccine hesitancy were significantly related to vaccine acceptance (p<0.001). Based on the logistic regression model, attitude toward the vaccine (p<0.001), vaccine hesitancy (p<0.001), age (p=0.030), and married status (p=0.007) were predictors of vaccine acceptance. Also, married persons had a lower chance of vaccine acceptance than singles (30).

13. A cross-sectional study aimed to predict the intention to receive the COVID-19 vaccine in four southern provinces in Iran (Hormozgan, Kerman, Bushehr, and Fars). The results showed that 78% were willing to receive the vaccine. Attitude, subjective norms, and the use of social media predicted the COVID-19 vaccine receive intention, with attitude having predictive power. It means the theory of reasoned action could be a significantly related to good predictor of COVID-19 vaccine receive intention so that attitudes and subjective norms significantly predicted COVID-19 vaccine receive intention (31).

14. A qualitative approach and conventional content analysis study aimed to identify the determinants of non-injection of the COVID-19 vaccine in the city of Urmia. The results showed various determinants involved in the non-injection of the COVID-19 vaccine, including individual (fear of short-term side effects, personality traits, and distrust of vaccines and pharmaceutical companies), socio-cultural (conspiracy theory, social learning, misconceptions about COVID-19, fatalism), and legal-managerial factors (incomplete information, difficult and irregular access to vaccination centers, a lack of restrictions, compulsion to be vaccinated, lack of incentives to be vaccinated) (32).

Tabale-1: The general characteristics of included studies (n=24).

Authors, Date of survey, Reference	Study type	Setting	Target population	Sample size	Main findings
Sameni Toosarvandani et al., 2022, (21)	phenomenological qualitative web-based study	Iran	18–55 years old	35	The findings included 6 main themes as follows: "ambiguity", "ineffectiveness", "mistrust", "advertising", "fear", and "needlessness".
Hatami et al., 2021, (1)	cross-sectional study	Bushehr province	>18 years old	384	The mean trust in vaccine products was 3.34±1.08, trust in vaccine manufacturers was 3.12±0.29, trust in government and health officials was 3.24±0.38 and overall trust was 3.23±0.48.
Keshmiri et al., 2021, (22)	cross-sectional	Bushehr province	≥18 years old	1102	The most participants tended to receive the Iranian vaccine (65.9%).
Qazvin University of Medical Sciences, 2021, (23)	cross-sectional study	Qazvin province	>18 years old	10843	Men and people with university education, rural people, and married people were more likely to receive the COVID-19 vaccine.
Farrokhi et al., 2022, (24)	mixed-method study	Tehran	>18 years old	1200	In general, 83.6% of people were willing to receive the vaccine, 58.3% preferred foreign vaccine, 25.4% Iranian vaccine and 9.6% preferred both types of vaccine.

Salimi et al., 2021, (9)	cross-sectional study	Tehran and Kermanshah	>18 years old	850	The frequency of the Covid-19 vaccine acceptance was 66.47%.
Pourshahri et al., 2021, (25)	descriptive-analytical study	Gonabad	>18 years old	292	Two factors of living with people at risk (88.5%), and respect for the rights of others (80.9%) were the most important reasons for vaccine accepting.
Omidvar et al., 2021, (26)	cross-sectional study	Iran	>18 years old	1564	70% of the participants reported acceptance of the vaccines. People with higher levels of education and mistrust towards the health system had a reduced vaccine acceptance rate.
Afshari et al., 2021, (27)	cross-sectional study	Ahvaz	>18 years old	800	The lower level of education and older age contributed to reluctance for vaccination, while having chronic diseases or being already infected with severe COVID-19 infection were associated with more acceptance of vaccination.
Nakhostin-Ansari et al., 2020-2021, (28)	cross-sectional web-based study with mixed qualitative–quantitative approach	Iran	>15 years old	1928	The results showed that 69% of participants desired to have the COVID-19 vaccine.
Askarian et al., 2020, (29)	cross-sectional web-based study	Iran	≥18 years old	4933	64.2% of individuals intended to accept COVID-19 vaccination.
Tamimi et al., 2021, (30)	cross -sectional study	Bushehr province	>18 years old	2185	64.6% of participants wanted to receive the vaccine. Most of the vaccine recipients were men, people with higher education, and divorced or single individuals (P<0.05).
Ezati Rad et al., 2021, (31)	cross-sectional study	Hormozgan, Kerman, Bushehr and Fars provinces	>18 years old	3034	78% of people were willing to receive the vaccine.
Yoosefi Lebni et al., 2022, (32)	qualitative approach and conventional content analysis study	Urmia city	>18 years old	36	The various determinants of individuals (e.g. fear of short-term side effects of vaccine), socio-cultural (e.g. conspiracy theory, social learning), and legal-managerial factors (e.g. incomplete information, lack of restrictions), were involved in the non-injection of COVID-19 vaccine.

4- DISCUSSION

This study aimed to review the factors associated with COVID-19 vaccination acceptance/refusal rates in Iranian society. The results showed a vaccine acceptance rate ranging from 64.2% to 83.6%. Various determinants at individual, socio-cultural, and legal-managerial levels were involved in the non-injection of the COVID-19 vaccine. Also, a higher level of education, older age, male gender, marital

status, having chronic diseases or being already infected with severe COVID-19 infection, as well as respect for the rights of others, were associated with more acceptance of vaccination (p<0.05).

Vaccines are among the most successful and cost-effective public health tools that have substantially contributed to eliminating or the control of several serious diseases in the last century (3). Likewise, controlling the pandemic of COVID-19 disease requires vaccination in addition to effective public health measures to reduce its spread and mortality. However, despite the safety and effectiveness of immunization measures, hesitancy in vaccination has become a global challenge introduced by the WHO among the top ten threats to global health in 2019 (8).

Vaccine hesitancy is influenced by many factors, but a primary reason for vaccine hesitancy is mistrust of the vaccine (11, 12). Trust in vaccination is considered on three levels: trust in the product (COVID-19 vaccine), trust in the vaccine provider, and trust in policymakers (government and health care system) (33). Previous studies have shown that concerns about vaccine efficacy and safety (18), fake news in social media and on the Internet, the spread of false, misleading, and pseudo-scientific material by anti-vaccine activists in social networks (34), low confidence, and negative attitudes regarding the rapid process of vaccine development can strengthen the widespread belief that vaccines can cause disease instead of prevention (11), and increase mistrust towards the vaccine.

Another dimension of trust in vaccines is how vaccine manufacturers are perceived (12). The negative perception is that vaccine developers only want to make money (35). Public trust in vaccines is another factor that is positively (or negatively) affected by the trust (or distrust) of people in the Ministry of Health and government officials to recommend safe and effective vaccines.

Therefore, clear and continuous communication by the government authorities is vital to create and increase public trust in important projects such as vaccination, which includes a complete and accurate explanation of how vaccines work and how they are developed from the beginning of production to legal approval. It is based on safety and efficiency (33). A study on the possible acceptance of the COVID-19 vaccine in June 2020 showed that in countries where people have high trust in their government (e.g., South Korea and China), the rate of acceptance of the vaccine by people is higher (12).

In the present study, the vaccine acceptance rate ranged from 64.2% to 83.6%. These results are promising because, according to the studies, a Vaccination rate of 50 to 67% of the population is required to achieve collective immunity (17). The COVID-19 pandemic is a collective experience and affects all citizens, and its control requires the participation of everyone. Hesitance towards vaccination could prevent the achievement of collective immunity against the disease in society (36).

The results also identified various factors at the individual (e.g., fear of the short-term side effects of the vaccine, personality traits, and distrust of vaccines), socio-cultural (e.g., conspiracy theory, social learning, and misconceptions about COVID-19), and legal/managerial (e.g., incomplete information, difficult and irregular access to vaccination centers, lack of restrictions, and compulsion to be vaccinated) levels involved in the non-injection of COVID-19 vaccine.

A study by Yoda in Japan (2021) showed that 66% of people intended to be vaccinated against COVID-19, 22% were hesitant, and only 12% did not want to vaccinate. More than 60% of those who

did not intend to be vaccinated stated that they were worried about the side effects of the vaccine and its lack of safety, which was more common among women than men (37). A study on healthcare staff showed that concerns about safety, effectiveness, and side effects are the three main reasons for hesitation regarding vaccination (38). Clarifying the process of vaccine production and the experiments on its quality, along with a realistic explanation of the beneficial effects of vaccination, can increase public trust in the COVID-19 vaccine.

The present study showed that higher levels of education, older age, male gender, marital status, having chronic diseases or being already infected with severe COVID-19 infection, as well as respect for the rights of others, were associated with better acceptance of vaccination (p<0.05). In other studies, factors of age (37-42), gender (39, 41, 43), marriage status (44), and education (45) were related to the willingness of people to get the COVID-19 vaccine. Several studies have found that factors such as race (45, 46), job (29, 41), income (43, 45), having children (47), and vaccination history (41, 44, 48) affect the willingness of people to receive the COVID-19 vaccine.

The present study showed that the willingness to receive the vaccine was higher in men than in women. Shaw et al. (2020) found that doubt about vaccination was higher among women since they are more likely to search for information related to health, as most of the time, they are responsible for taking care of family members and make 80% of decisions related to the health of their children (46). Education can also be effective as it plays a role in obtaining information related to health (49). In addition, the tendency to receive the vaccine was higher among students than graduates, and vaccine acceptance was generally lower among people with lower education (45). In terms

of age, the elderly often felt a greater sense of responsibility toward themselves and others, and they showed a greater willingness to get vaccinated as they were more exposed to the coronavirus and its complications (50). Married people were also more willing to receive the vaccine because they felt responsible toward their families (16). One of the primary reasons for people's willingness to be vaccinated is to protect their own health and that of others, as vaccination is not only effective for individual protection but also provides collective protection (25). In addition, people who had experienced COVID-19, and those worried about themselves and their children being infected with the disease were more inclined to be vaccinated (51).

Many people pay attention to the recommendations of friends and family members about the vaccine. In addition, people trust the recommendations of unknown people if they feel that they have a similar view of life to their own and may believe false information published on social media by people who are not medically qualified. The existence of anti-vaccine campaigns that spread false and fake information on the Internet can harm people's willingness to be vaccinated. Therefore, training and empowering people to reject false information about the COVID-19 vaccine through reputable scientific websites, national media, widely circulated newspapers, and healthcare providers can improve health attitudes and beliefs regarding the COVID-19 vaccine (29, 33, 52).

5- CONCLUSION

The successful implementation of the vaccination program against the coronavirus goes beyond the effectiveness of the vaccine, as public acceptance and trust in the vaccine is a fundamental element in achieving this goal. Therefore, in addition to a coherent and strong health

system, public trust and acceptance of the vaccine are also necessary. Based on this review, the COVID-19 vaccine acceptance rate ranged from 64.2% to 83.6%. Various factors at individual, socio-cultural, and legal-managerial levels were involved in the non-injection of the COVID-19 vaccine. The acceptability of COVID-19 vaccines depends on many variables and cannot be predicted with only a few. Older age, higher level of education, male gender, marital status, having chronic diseases or being already infected with severe COVID-19 infection, as well as respect for the rights of others, were the main factors associated with better acceptance of vaccination. The public should be informed about the safety, usefulness, and effectiveness of vaccination to control the pandemic, and the results of medical research should be published accurately. Also, reliable information should be available to the people with the help of mass media, and actions should be taken to control the COVID-19 pandemic through public participation in vaccination.

6- CONFLICT OF INTEREST: None.

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