



Investigation of Reasons for the Reluctance to get Vaccinated with COVID-19 in the General Population in the South of Kerman Province (A Cross-sectional Study)

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Abstract:

Aim: This study aimed to determine the reasons for reluctance to get vaccinated against COVID-19 in the general population in the south of Kerman Province.

Background: Identifying factors that reduce the initial hesitancy towards vaccination and increase the acceptance of the vaccine in the general population can contribute to the ongoing efforts for vaccination against COVID-19.

Materials and Methods: This is a cross-sectional study (descriptive and analytical) that was conducted using a multistage multi-stage sampling method on 341 men and women aged 18 to 85 living in the south of Kerman province in 2021. The data were collected using an electronic questionnaire created by the researcher on the reasons for reluctance to be vaccinated with COVID-19 and analyzed using SPSS-22 software. Independent t-tests, analysis of variance, Kruskal-Wallis, and chi-square tests were used at a significance level of less than 0.05.

Results: Three hundred and forty men and women aged 18 to 85 were examined. Lack of trust in vaccines, government, and health officials were the most frequent reasons for not wanting to get vaccinated. The young age group, women, single people, and those with good economic level, and high education level, were less willing to get vaccinated against COVID-19.

Conclusion: Restoring public trust in public health agencies, pharmaceutical companies, and science while also addressing the complexities of the relationship between the public and government is essential for effectively addressing vaccine hesitancy and increasing vaccine uptake.

Keywords: Reluctance, COVID-19, Vaccination, General population, Public, Vaccine, Coronavirus.

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1. INTRODUCTION

Vaccines are one of the most reliable and cost-effective health measures that save the lives of millions of people from diseases every year [1]. Following the discovery of the COVID-19 genome sequence in early 2020, scientists and pharmaceutical companies raced to discover a vaccine as soon as possible [2].

The COVID-19 vaccine has been developed so that COVID-19-specific immunity can be acquired. As a result of previous efforts to develop vaccines against coronavirus diseases such as severe acute respiratory syndrome and Middle East Respiratory Syndrome, we now have a deeper understanding of the structure and function of coronaviruses. Researchers utilized this data to design and develop multiple vaccines that combat COVID-19 more effectively than conventional vaccines [3]. The development of the COVID-19 vaccine has been a rapid and efficient response to a global health crisis [4]. The technology and scientific understanding underlying vaccine development have advanced significantly over the past few decades [5]. This allowed researchers and scientists to build on previous successes and correlations with other vaccines. However, the unique characteristics of the SARS-CoV-2 virus, the causative agent of COVID-19, present some differences that require tailored solutions [6].

Previous vaccines have primarily focused on targeting well-characterized proteins found on the surface of the virus [7]. For instance, the influenza vaccine targets hemagglutinin, a key surface protein, while the measles vaccine targets the measles virus envelope protein. In contrast, the COVID-19 vaccine development has had to account for the novel nature of the spike protein, a unique surface protein of SARS-CoV-2, which mediates viral entry into host cells [8, 9]. This required researchers to work swiftly to understand the structural and functional aspects of this protein, which is essential for developing an effective vaccine. This is one of the key differences in the correlation between previous vaccines and the COVID-19 vaccine. Another difference lies in the diverse approaches taken in developing the COVID-19 vaccine [7, 10]. Vaccine developers had to employ innovative strategies, such as using adenovirus vectors or mRNA technology, due to the urgent need and novel aspects of the virus, which is unlike the more traditional approaches used in the past. These differences highlight the careful balance between utilizing past successes and adapting to the specific challenges posed by COVID-19 [11-13].

Currently, a large number of vaccines have been developed, and following the approval of the COVID-19 vaccine, hopes for an end to the pandemic through herd immunity have been intensified [14]. Meanwhile, to achieve collective immunity, between 50% and 67% of the population needs to be vaccinated [15]. Therefore, despite the existence of a vaccine, achieving collective immunity requires acceptance of the vaccine among the general public; in other words, hesitancy for vaccination among people all over the world is considered one of the most

important obstacles in controlling the pandemic [16].

According to the World Health Organization, hesitancy in vaccination is defined as the delay in accepting or refusing vaccination despite its availability [17]. Refusal of a vaccine due to concerns about it is not a new issue, and it is more so in the case of new vaccines [18]. In 2009, a study was conducted on the attitude of Italian mothers toward the influenza A (H1N1) vaccine, and the results showed that 87.2% of the participants were against or hesitant to inject their children with this vaccine [19].

The low acceptance of the vaccine has also been reported among health workers; so, regarding the flu vaccine, misconceptions about the effectiveness, side effects, and pathogenicity of the vaccine have been the most important reasons for health personnel to refuse vaccination [20]. According to a global report in 2017, vaccine skepticism is present in most countries [21].

There is almost a consensus that the only way to be immune is the immunity of a large percentage of the population, and the vaccine is one of the best and least dangerous factors for creating immunity in a large population in a short period [22]. This doubles the importance of studying the attitude of the general public in the field of participation in regards to vaccination and accompanying the country's healthcare system [23]. Last year, the World Health Organization considered doubt about vaccination, reluctance or refusal of vaccination despite its availability as one of the ten main threats to global health. Hence, the World Health Organization considers doubt and mistrust of vaccination as one of the ten health-threatening factors. introduced [24]. Certainly, vaccination is widely recognized as an effective method to reduce or eliminate the burden of infectious diseases by health authorities and the medical community. The trust, acceptance, application, and cooperation of people in national immunization programs are considered essential, and the main prerequisite is providing a suitable vaccine for COVID-19 [25].

Understanding the effective factors in the acceptance of vaccination, identifying obstacles, and facilitating decisions in the field of vaccination are important aspects in designing effective strategies to improve vaccination coverage among the people of the society, therefore, investigating the impact of the preferences of people in the society regarding vaccination can be public health issues regarding vaccine approval methods, incentives for injecting it, or informing to achieve more absorption to reach the limit of collective immunity in the society [26, 27].

In the reviewed studies, some studies related factors such as age, sex, marriage, race, insurance, education, job, income, children, and vaccination history to people's desire for the COVID-19 vaccine [28]. Education can be effective because it plays a role in receiving health information. Moreover, people's jobs play a role in people's willingness to get vaccinated due to the extent to which they are exposed to the coronavirus [29, 30].

It seems to be essential and necessary to know the

factors affecting the willingness to get vaccinated against COVID-19, therefore, considering the emergence of the disease of COVID-19, the unpredictability of the willingness to get vaccinated in different societies, including Iran, and the importance of vaccination to terminate the disease and since no study has been conducted to identify the reasons for reluctance to get vaccinated, this research was conducted to investigate the reasons for reluctance to get vaccinated for the COVID-19 disease among the people of southern Kerman province.

2. MATERIALS AND METHODS

This is a cross-sectional descriptive-analytical study. The population under study were all men and women aged 18 to 85 living in the south of Kerman province in 2021. The inclusion criteria were being literate, 18 years of age and older, having a smartphone and messaging tool, and the exclusion criteria were incomplete or completely similar answers. After the approval of the proposal by the thesis committee and obtaining the code of ethics and the necessary permits, the necessary coordination was done with the help of the faculty. The sampling method in this research was done in a multistage manner due to the size of the researched community and limited resources. There were seven cities in the south of Kerman province, which were considered as seven clusters of research. Out of the seven research clusters, four clusters, namely the cities of Jiroft, Anbrabad, Kohnouj, and Faryab, were selected by a simple random method (Lottery). To collect information, the researchers went to the health centers of these four cities. Using the convenience sampling method, the list of people who have an active health record was extracted from the information registration system of the Ministry of Health with the help of healthcare workers working in these health centers. After receiving the telephone numbers of the subjects from the information registration system of the Ministry of Health, the link to the electronic questionnaire created by the researcher was sent to the subjects of the study by SMS. This electronic questionnaire had eight questions related to demographic information and four questions related to the reasons for unwillingness to get the COVID-19 vaccine. These four questions were: mistrust of the vaccine, exaggeration of the dangers of the COVID-19 disease, failure to accept the existence of the COVID-19 disease, and lack of trust in the government and health authorities. To attract the participation of the subjects of the study, in the text message sent to them, explanations were given about the objectives of the study, optional participation and obtaining personal consent to participate in the study, and the confidentiality of the collected information. To collect information, a researcher-made questionnaire was used. The first part of the questionnaire included demographic information (age, gender, education level, marital status, place of residence, economic status, underlying disease, history of COVID-19), and the second part included 4 questions that were designed about trust in the vaccine, trust in the government, non-acceptance of the existence of the COVID-19 disease, and exaggeration of the dangers of the COVID-19 disease. The validity and reliability of this

questionnaire have been confirmed in several studies [31, 32]. The reliability of the questionnaire is estimated with Cronbach's alpha of 0.85 [33].

After inputting the questionnaire data into SPSS software version 22, first, the statistical indicators related to descriptive statistics such as mean, standard deviation, frequency, and frequency percentage were calculated. The data were analysed by chi-square test. The significance level in this research was considered less than 0.05.

3. RESULTS

In this study, 341 men and women aged 18 to 85 living in the south of Kerman province in 2021 were examined. Table 1 shows the information related to the frequency of people's willingness to be vaccinated, out of 341 people surveyed, 226 people were willing to be vaccinated, and 115 people were not willing to be vaccinated.

Table 1. Determining the frequency of the reasons for unwillingness to get vaccinated with COVID-19.

Variables		Frequency	Percent
Reasons for reluctance	Mistrust of vaccines	53	46.1
	Exaggerating the dangers of Covid-19	19	16.5
	Not accepting the existence of COVID-19 disease	10	8.6
	Lack of trust in the government and health authorities	33	28.8
Total		115	100

Table 1 shows information related to the frequency of reasons for not wanting to be vaccinated against the disease of COVID-19, the frequency of distrust in the vaccine, exaggeration about the dangers of the disease of COVID-19, not accepting the existence of the disease of COVID-19 and lack of trust in the government and health authorities. Data were obtained from 53, 10, 19, and 33 participants, respectively, and the highest frequency of unwillingness was related to distrust of the vaccine and, in the next category, lack of trust in the government and health authorities.

Table 2. To determine the willingness of getting vaccinated against COVID-19 among the people of southern Kerman province according to age.

Age Group	Number (%)	Willingness to Vaccination		P-Value
		yes	No	
18-29	58 (17)	20 (15.4)	38 (20)	0.046
30-39	76 (22.2)	56 (24.7)	20 (17.3)	
40-49	81 (23.7)	54 (23.8)	27 (23.4)	
>50	126 (37.1)	96 (36.1)	30 (39.3)	

Table 2 shows the information related to the frequency of willingness to be vaccinated according to age. The highest frequency of unwillingness to be vaccinated is observed in the age group of 18 to 29 years, and the lowest frequency is observed in the group of 30 to 39. In terms of statistical significance, there is a difference between the willingness to be vaccinated against

COVID-19, and a significant relationship with the age of people.

The frequency of unwillingness to be vaccinated is observed in women (59 people), more than in men (56 people), and statistically, there is a difference between the willingness to get vaccinated. There is no significant relationship between COVID-19 and gender ($P > 0.05$).

The frequency of unwillingness to get vaccinated is observed in single people (89 people), more than married people (26 people), and statistically, there is a difference in willingness to get vaccinated. There is no significant relationship between the COVID-19 disease and the marital status of people ($P > 0.05$).

The frequency of unwillingness in the diploma, post-diploma, bachelor's, post-graduate, and above groups was obtained, respectively from 5, 25, 35, and 50 participants. The highest frequency of reluctance was observed in the post-graduate group and above, and statistically, there is no significant relationship between the reluctance to get vaccinated with COVID-19 and the level of education ($P > 0.05$).

The frequency of unwillingness to get vaccinated is observed in urban dwellers (66 people) rather than in rural dwellers (49 people), and statistically, there is a difference in willingness to get vaccinated. There is no significant relationship between COVID-19 disease and people's residence ($P > 0.05$).

The frequency of unwillingness in poor, medium, and good economic groups is 29, 34, and 62, respectively, and the highest frequency of unwillingness is observed in the status group. A good economy is observed, and there is no statistically significant relationship between the desire to get vaccinated against COVID-19 and the economic status ($P > 0.05$).

The frequency of not wanting to be vaccinated in the group that did not have an underlying disease (59 people) is more than in the group that had an underlying disease (56 people), and statistically, there is no significant relationship between reluctance to get vaccinated against COVID-19 disease and the history of the underlying disease ($P > 0.05$).

The lack of willingness was observed in the group that had a history of getting infected more than the other group, and statistically, there is a difference between the willingness to get vaccinated against COVID-19 with a history of getting infected. There is no significant relationship with COVID-19 ($P > 0.05$).

4. DISCUSSION

The COVID-19 pandemic has been a major health challenge worldwide since late 2019. It seems that the availability of a vaccine for COVID-19 is an important step in dealing with the pandemic of this disease, but hesitancy to accept or not to accept a vaccine is a major threat to global health during this pandemic and limits the world's health organizations to control the COVID-19 pandemic. If these challenges are not addressed, they will hinder the efforts to control this epidemic in society. Therefore, it is

necessary to identify important factors in the acceptance or non-acceptance of the COVID-19 vaccine to design an action plan to improve the acceptance of vaccination in certain cases, such as the spread of viral diseases by different sections of society. In past epidemics such as HPV and influenza, one of the challenges in epidemic control was the acceptance or non-acceptance of the vaccine by different sections of society [34-37]. Therefore, in this study, the reasons for the reluctance to be vaccinated against COVID-19 among the people of southern Kerman province in 2021 have been determined.

Among the reasons defined in this research, mistrust of the vaccine was more frequent than other reasons. This finding is consistent with previous studies [38, 39]. In addition, in Hatami *et al.*'s study, trust in the product of the COVID-19 vaccine was significantly related to receiving the vaccine, so the recipients of the vaccine had very high trust. Moreover, they showed a very low rate, and among those who did not receive the vaccine, during the final question of the questionnaire, they were worried about the side effects of the vaccine and their novelty (60%), as well as contracting the disease after receiving the vaccine (25%). According to previous studies, the lack of trust in the vaccine product has been shown [32]. Three-quarters of the studies cited concerns about safety, effectiveness, and side effects as the three main reasons for hesitancy in vaccination and listed a history of disease among other factors [40]. The concerns about vaccination are one of the most important causes of hesitation and refusal to participate in vaccination and are mainly related to the side effects and safety of vaccines, which are common among people in different countries [16, 41]. The results of the study showed that having a lot of information about the disease or types of vaccines does not have a great effect on people's willingness to get vaccinated, but providing information about the effectiveness, safety, spending enough time to test the vaccine and the fact that the vaccines are American affects the acceptance of vaccination [27].

In the next category, lack of trust in the government and health authorities had the highest frequency of not wanting to be vaccinated. In line with the results of the present study, in Hatami's study, trust in the government and health authorities had a significant difference between the two groups; those who received the vaccine showed higher trust, but those who did not receive the vaccine had an average level of trust in the government and health authorities [32]. Moreover, Latkin *et al.* [42], Verger *et al.* [43] and Lazarus *et al.* [44] obtained similar results. Miyachi *et al.* also showed that poor trust in the government was associated with reduced willingness to be vaccinated [45]. Since trust in the government is strongly related to vaccine acceptance and can contribute to public compliance with recommended measures [44], therefore, a serious effort is needed to maintain and increase the sense of mutual trust and cooperation between scientists and citizens. In addition to clarification, the authorities should take measures to address people's concerns [46]. Involving people is important for the development of

vaccination [47, 48], and it builds trust. In general, to strengthen public trust in the government, competence (providing quality goods and services, including two indicators of responding to people's needs and reliability) and value means honesty and accountability in vaccine development (coherence, openness, fairness). People's age is related, therefore, the reluctance to get vaccinated against COVID-19 decreases with age. In a study of US adults in May 2020, Malik and his colleagues reported that the odds of receiving the COVID-19 vaccine in the over-55 age group were 81% higher than in the 18-24 age group, while the rest of the group had a lower chance of acceptance than the age group of 18 to 24 years, which was not statistically significant [49]. In the study of Salimi *et al.*, age groups above 30 years old had a higher chance of accepting the vaccine than the age group 18-29 years old, and this relationship was only significant for the age group 30-39 years old [50]. In Tamimi *et al.*'s study, age was related to vaccine acceptance and was also a predictor of vaccine acceptance, so vaccine acceptance was more in the middle-aged and elderly and less in the young [51]. The greater willingness to accept the COVID-19 vaccine with increasing age can be because older people experience more health problems and have a higher understanding of greater vulnerability to the disease. Therefore, they are more conservative and care more about their health.

Among other findings of the research, people with good economic status were less inclined to vaccination than other groups, in line with the results of the study, in the study of Salimi *et al.*, they also concluded that people with low socio-economic status compared to people with low lowest socio-economic status were less likely to accept the vaccine [50]. An explanation for the present finding is that people with a higher economic status often have more access to information sources and have more knowledge and awareness about the COVID-19 vaccine and the debates raised around it in the field of efficacy and safety. This may cause more doubt about becoming willing to take the vaccine themselves, and the willingness to take the vaccine depends on receiving additional information about the effectiveness of the vaccine and its side effects. This finding is not consistent with similar studies in other countries [52, 53], and this contradiction in the findings can be due to methodological differences in measuring the socio-economic status, variables, differences in the studied sample, and differences in cultural patterns and values in different countries.

Among other investigated variables, the frequency of unwillingness was higher in women than in men. According to the results of Galbadage *et al.* [54] and Askarian *et al.* [55], the results of mortality were higher in men than in women, and this may justify the greater willingness of men to be vaccinated, in addition, in some cultures and countries men work outside the home more than women and are more at risk of contracting this disease. However, Shaw *et al.*'s study conducted in 2020 showed that there is more doubt among women since they are more likely to search for health-related information,

they often take care of family members, and 80% of decisions related to their child's health are taken by them, it is more common [56]. Lin *et al.* showed that demographic characteristics play a significant role in accepting or not accepting COVID-19, and this study also includes gender and personal experiences, doctors' recommendations, and history inoculation is considered effective as other individual factors in the acceptance or non-acceptance of the COVID-19 vaccine [57]. Young has also shown that factors such as age, sex, sexual behavior, vaccine cost, awareness and knowledge about the disease, and perceived susceptibility to the disease are among the factors related to HIV vaccine acceptance in women [58].

Among the other investigated variables, no significant relationship was observed between marital status, place of residence, level of education, history of underlying disease, and history of COVID-19 with reluctance to get vaccinated, but the frequency of reluctance in singles, urban dwellers, postgraduate education and higher, they had no underlying disease and had a history of contracting COVID-19, more than other groups. In this regard, in Hatami's study, there was a significant relationship between gender, education, age, underlying disease, and history of contracting COVID-19 with receiving the vaccine and trust [51]. Robinson *et al.* also stated that individual factors such as gender, age, income level, education level, and belonging to a certain party are important factors in accepting or not accepting the vaccine [59]. In the study of Al-Qerem *et al.* [60] and El-Elimat *et al.* [61], the tendency to get vaccinated was estimated more in married people. In terms of education, it seems that people with more education seek more disease knowledge from reliable sources that are published on social media and have a higher risk perception than people with lower education. Regarding marital status, married people are more willing to receive the vaccine because they feel more responsible towards their family.

5. LIMITATIONS OF THE STUDY

One of the main limitations of the present study is the sampling method, which may have created the possibility of bias in the sample. For example, it is possible that with this sampling method, certain groups in society have been systematically excluded or included less in the study. Conducting research at the level of four cities is another limitation of the present study, which can seriously limit the ability to generalize the findings to a wider population. The small sample size is another limitation of the present study, which has caused the diversity of opinions and attitudes toward COVID-19 vaccination to be insufficient. Additionally, considering the age range of the participants in data collection has reduced the potentially diverse social and demographic characteristics in the research sample. The use of an electronic questionnaire by the researcher, as well as the wording, order, and answer options of the questions, could have created biases in the data collection process, which is another limitation of the present study. The study was conducted in 2021, and

attitudes toward COVID-19 vaccination may have evolved since then due to changes in public health messaging, vaccine availability, and emerging variants of the virus. Therefore, the findings may not reflect the current state of vaccine hesitancy. The study was conducted in the south of Kerman province, which may limit the generalizability of the findings to other regions with different socio-cultural contexts and healthcare infrastructure. Another limitation of the present study is related to those who have been vaccinated but still may be reluctant to receive the vaccine. Moreover, people may have been forced to get vaccinated before returning to work or school. It is suggested that future studies should be conducted with more accurate sampling techniques, increased sample size, validated questionnaires, advanced statistical analysis, and conducted in multiple regions and time points.

CONCLUSION AND RECOMMENDATIONS

The research findings suggest that a lack of trust in the COVID-19 vaccine, as well as a lack of trust in the government and health authorities, have been significant factors contributing to vaccine hesitancy. Trust in the COVID-19 vaccine and trust in governments have emerged as key dimensions influencing vaccination intention and behaviors. These findings collectively suggest that trust is a key determinant of vaccine hesitancy, exerting both direct and interaction effects alongside individual-level factors traditionally associated with a higher risk of vaccine hesitancy.

Addressing vaccine hesitancy necessitates efforts to restore trust in public health agencies, pharmaceutical companies, and scientific institutions, particularly in developing countries where trust deficits may be more pronounced. Tailored interventions should be implemented to address the diverse attitudes towards vaccination, taking into account socio-cultural beliefs, economic disparities, and access barriers prevalent in these settings. Targeted communication strategies, community engagement initiatives, and collaboration with local stakeholders are essential for overcoming vaccine hesitancy and promoting vaccine uptake in developing countries.

LIST OF ABBREVIATIONS

HPV	=	Human Papillomavirus
HCP	=	Health Care Personnel
COVID-19	=	Coronavirus-19

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This article reports the results of a research project approved by Jiroft University of Medical Sciences with the code of ethics IR.JMU.REC.1401.003 .

HUMAN AND ANIMAL RIGHTS

No animals were used for the studies that are the basis of this research. All human procedures followed were per the guidelines of the Helsinki Declaration of 1975.

CONSENT FOR PUBLICATION

Data collection were performed after obtaining written informed consent from the research participants.

STANDARDS OF REPORTING

STROBE guidelines have been followed.

AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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