

Original Article

Experience of COVID-19 vaccination among healthcare workers in Iran: a descriptive phenomenological study

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Abstract

Background: Healthcare professionals have been the most severely affected by the global pandemic known as COVID-19. The aim of this study was to explore the experiences and perceptions of healthcare workers in Iran regarding COVID-19 vaccination using a descriptive phenomenological approach to gain a deeper understanding of the challenges and concerns involved.

Methods: A qualitative, descriptive phenomenological approach was employed to carry out the present investigation. Twelve medical doctors and nurses who previously administered the vaccine or are still unsure about administering it have been chosen using a purposive sampling method. The data was acquired by employing a semi-structured in-depth interview, and the data was analyzed using Colaizzi and Max software's 7-step technique.

Results: This study explores health personnel's attitudes toward COVID-19 vaccination. Among 12 participants, common reasons for vaccine hesitancy included distrust, perceived ineffectiveness, and concerns about vaccine safety. Conversely, motivations for vaccination included a sense of social responsibility, disease prevention, and advice from health experts. "Reasons for vaccine hesitancy" (vaccination infrastructure, social infrastructure, and personal infrastructure) and "justifications for administering vaccines" (sense of inevitability, comfort, social accountability, and disease management) are considered as principal and sub-categories classes, respectively.

Conclusion: The health personnel reported diverse experiences related to vaccination. Overall, it can be concluded that as society and even medical professionals have become more accepting of the vaccine, there has been a significant improvement in the attitudes of healthcare professionals toward accepting the COVID-19 vaccine, along with an increase in trust.

Keywords: COVID-19; COVID-19 Vaccines; Health; SARS-CoV-2; Workforce.

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Introduction

One of the most significant and pervasive public health disasters in recent decades was the 2019 COVID-19 pandemic. Severe respiratory

issues and other deadly symptoms are among the disease's most serious manifestations. The difficulty of controlling people's infection and treating this disease

is attributed to its unique characteristics (1). Vaccination to prevent the rising dissemination of COVID-19 is one of the most intriguing and practical issues highlighted in disease control. Thus, it can be claimed that universal immunity can be developed at the community level by vaccination (2). Health personnel and people at risk of serious sickness or death should receive vaccinations initially (3). Due to a lack of awareness about vaccination safety, many healthcare personnel are hesitant to administer vaccines, often postponing or avoiding them altogether (4). Economic and political restrictions are the most significant barriers to the application of the COVID-19 vaccination by Iranian health personnel. Iran's access to all sorts of vaccines may be hampered by economic restrictions. Iran's epidemic control failure has resulted in the ongoing transmission of this disease. Trust to the efficacy of vaccines and a lack of adequate information about potential adverse effects, particularly the Sputnik vaccine is the subsequent challenging issue that health personnel in Iran (5). Another significant concern is that medical professionals are more likely to develop coagulation following an AstraZeneca vaccine injection (6). The outcomes of an investigation carried out to examine the mindset of Iranian academics toward vaccination revealed that 46.3% of individuals lack sufficient confidence in the COVID-19 vaccine's safety and efficacy. Free vaccination is suggested by 67.2% of people instead of paying for it. Additionally, 73% of respondents articulated their reluctance to an internal vaccine, indicating that their top priority would be to administer a COVID-19 vaccine manufactured in a foreign country. The majority of Iranian investigators prioritize the COVID-19 vaccine manufacturing process based on the US vaccine, with Germany coming in second (5). The vaccination approval rate in this nation was 42.2% (7). Given the short time since vaccination began in Iran, little

research has been conducted on the acceptability of vaccination among healthcare workers. The process of implementing and developing vaccination in distinct communities is influenced by conflicting and disparate results from research on the experiences of medical professionals during epidemics. The COVID-19 pandemic has had a profound global impact, highlighting the crucial role of vaccines in mitigating the spread of the virus. While many countries have made significant strides in vaccination efforts, healthcare workers, as the frontline defenders, face unique challenges in terms of vaccine acceptance. Global vaccination rates among healthcare workers vary significantly. For instance, in high-income countries like the United States and the United Kingdom, vaccination rates have been relatively high, with over 90% of healthcare workers vaccinated.

In contrast, many low- and middle-income countries, including Iran, have encountered obstacles such as vaccine accessibility, misinformation, and cultural resistance, leading to lower vaccination rates among healthcare professionals.

This study aims to explore the experiences of healthcare workers in Iran regarding COVID-19 vaccination, providing a contextual understanding of the factors influencing vaccine acceptance and hesitancy. By examining these experiences, the research seeks to identify gaps in knowledge and support, offering valuable insights to inform vaccination strategies in similar contexts globally.

Methods

Study design and sampling

This descriptive phenomenological study aimed to explore healthcare workers' experiences with COVID-19 vaccination in Iran. The study population consisted of healthcare workers employed in hospitals across the country. The sample size was 12 participants, chosen through targeted sampling with a focus on maximum

diversity to capture a broad range of perspectives. While the sample size may appear small, it aligns with qualitative research norms where saturation theory is often applied. Saturation occurs when no new themes emerge from additional interviews, and this was observed in the data collection process.

A qualitative, descriptive phenomenological approach was employed in the present investigation. Health personnel (including physicians and nurses) who were either undecided to administer the vaccine or had attempted to do so were the subjects of this investigation. Their selection method was with maximum diversity and through targeted sampling. Researchers continued sampling until information saturation was achieved (8). Data were collected using a semi-structured in-depth interview method. All hospitals and educational health centers of Isfahan University of Medical Sciences participated in this study as the target research environment. Sampling among qualified people was done by researchers after visiting these centers. Then, informed consent of people in different work shifts in the department and work environment or outside their occupational environment (based on the recommendations and convenience of the participants), interviews were conducted with 12 participants.

The documented interviews were read several times in order to gain sufficient insight into the interviews, in the first step of Colaizzi's analysis method. From each interview, important phrases associated with the study were determined in the second stage. A special meaning was determined by the researcher in the third step for each of these expressions. The integration of different thematic categories, according to the fourth step of Colaizzi's analysis, led to the development of larger categories similar to the main concepts generated by data analysis. The main classes of the study were formed by integrating the sub-classes.

Inclusion and Exclusion Criteria:

Participants were eligible if they were healthcare workers with direct experience in COVID-19 vaccination. Exclusion criteria included individuals without direct involvement in vaccination efforts or those unwilling to participate in the study.

Sampling Methods:

The participants were selected using purposive sampling to ensure diversity in terms of age, gender, educational background, and clinical experience. This approach allowed the researchers to gather a variety of viewpoints from both nurses with varying levels of experience and from different hospital departments, including those working with COVID-19 patients.

Data collection

Field notes, semi-structured individual interviews, documents, and evidence were employed in this investigation. A series of open-ended questions and other questions that result from the dialogue between the interviewer and the interviewee constitute semi-structured interviews, which are often the only source of data for qualitative research projects. In other words, in qualitative research, in-depth semi-structured interviews in both individual and group forms are the most widely applicable interview methods. Only once, semi-structured interviews are mostly carried out individually or in groups. In this study, conducting individual interviews was largely prioritized. Then, a group interview, in addition to conducting individual interviews in this study, was also conducted with the participants who did not agree with the vaccination because of the advantages of group interviews and focus groups. People's opinions are heard more carefully in group interviews. Hence, different conclusions are drawn by the person who listens and can discuss further. Also, guaranteeing the progress of the session in this type of group interview is the main goal and another point is to ensure that all topics are covered in this session. The data in this

study were also collected using semi-structured individual interviews. First, after receiving written consent to record the content of the interview, the time, duration, and place of the interview were determined with the consent of the participant. While more detailed exploratory questions were asked in the content of the conversations between the interviewer and the interviewees, the semi-structured interview questions included the following. All content of conversations, after the interview, were documented on paper and reviewed several times.

After evaluating numerous articles related to the main purpose of the investigation, the following questions were formed for the interview: "What is your COVID-19 disease experience?", "Have you been infected with this disease before?", "What are the most important vaccination facilitators among health team members from your point of view?", "What were your most prominent motivations for vaccination?", "What are the most important vaccination obstacles among health team members from your point of view?"

Data Analysis:

The data were analyzed using Colaizzi's method, which involves an in-depth, systematic process of extracting meanings from the participants' descriptions. Themes were identified through careful reading and coding of the data. MAXQDA software was used to assist in the organization and analysis of the data. To ensure the reliability of the findings, measures such as inter-coder agreement were implemented. Multiple researchers were involved in the coding process to reduce potential biases. Peer review was also conducted to validate the themes and interpretations.

Ethical Considerations:

Ethical approval was obtained from the institutional review board (IRB), and all participants provided informed consent. They were assured of the confidentiality of

their responses and their right to withdraw at any time without consequence.

Bias and Confounding:

Efforts to minimize bias were made by selecting a diverse sample and ensuring transparency in the data analysis process. However, some potential biases could arise from the self-reporting nature of the data and participants' personal beliefs about vaccination. Confounding factors such as regional differences in vaccine access or the political climate surrounding vaccination in Iran were also considered.

Data integrity and robustness

Guba & Lincoln, criteria including Similarity of reliability equivalent, verifiability of objectivity equivalent, transferability of external validity equivalent, and acceptability of internal validity equivalent were used to assess the data reliability and trustworthiness (10). A data review and analysis process are required to ensure the data's internal validity or acceptability. Participants can also increase acceptability by using a review approach. So, some participants evaluated the text of the interview and the primary codes extracted from it. Data acceptability can also be increased by peer review. External monitoring was an effective approach to cover the internal consistency criterion. For this purpose, the data was delivered to a non-participating researcher. The existence of the internal consistency of the data was proven in the case of data similarity.

Results

The results of this study are organized around the main themes that emerged from the data. The analysis highlighted several key findings related to healthcare workers' attitudes toward COVID-19 vaccination, including concerns about vaccine safety, distrust, and varying motivations for vaccine acceptance. These themes are illustrated by direct quotes from participants.

Distrust and Vaccine Safety Concerns:

A prevalent theme among participants was distrust toward the COVID-19 vaccine, particularly concerning its safety. Several participants expressed skepticism about the rapid development of the vaccine and its potential side effects. One participant, for example, stated:

"The reason I feel that the situation is suspicious and I chose not to trust it is that I could not trust a country that itself played a role in causing this disease (meaning China and the Sinopharm vaccine)." Another participant mentioned: *"The lack of follow-up after vaccination was another issue that discouraged me. For example, we observed a young patient who, despite having no risk factors for heart disease, had heart failure after the vaccination."*

These quotes highlight the deep concerns regarding the perceived safety and effectiveness of the vaccine, underscoring the significant role distrust plays in vaccine hesitancy.

Interviews in this study were conducted on 12 participants in the age range of 23 to 51 years. Mean age of samples was 37.8 years. 10 married participants and 2 singles. Ten nurses with a bachelor's degree and two nurses with a master's degree were present in this investigation. the participants were 11 women and 1 man, and the mean occupational experience was 13.27 years.

Five participants out of 12 participants were working in the care departments of patients with COVID-19 and seven participants were working in other departments. Table 1 shows the participants' demographic information.

Table 1 (Demographic Information):

While Table 1 provides a clear overview of the participants' demographics, the information could be summarized more succinctly. The gender, age, education level, and marital status of participants are clearly defined, but this could be streamlined by combining similar categories into fewer columns, such as grouping age ranges and educational backgrounds.

Regarding the attitude of health personnel about the COVID-19 vaccination, the main classes and sub-classes are presented in Table 2.

In total, based on the participants' statements, 200 concepts were acquired. Ultimately, two main classes and seven subclasses along with 23 subsets were extracted from them. "Justifications for not administering vaccines" (vaccination, social and personal infrastructures) and "justifications for injecting vaccines" (sensing the inevitability, relief, social accountability, and disease management), were the principal classes and sub-classes obtained in this investigation.

Table 1. Participants' demographic information

| Participants | Gender | Age | Job | Work experience | Education | Marital status |
|--------------|--------|-----|-------|-----------------|-------------------|----------------|
| 1 | Female | 23 | Nurse | 5 months | Bachelor's degree | Single |
| 2 | Female | 26 | Nurse | 2 years | Bachelor's degree | Married |
| 3 | Female | 50 | Nurse | 27 years | Bachelor's degree | Married |
| 4 | Female | 51 | Nurse | 21 years | Bachelor's degree | Married |
| 5 | Female | 32 | Nurse | 7 years | Master's degree | Married |
| 6 | Female | 38 | Nurse | 9 years | Master's degree | Married |
| 7 | Female | 47 | Nurse | 21 years | Bachelor's degree | Married |
| 8 | Female | 44 | Nurse | 17 years | Bachelor's degree | Married |
| 9 | Female | 50 | Nurse | 23 years | Bachelor's degree | Married |
| 10 | Female | 40 | Nurse | 15 years | Bachelor's degree | Married |
| 11 | Female | 27 | Nurse | 3 years | Bachelor's degree | Single |
| 12 | Man | 26 | Nurse | 1 year | Bachelor's degree | Married |

The participants mentioned insufficient evidence of the safety of vaccines as one of the important reasons. In fact, one of the reasons for the majority of participants not believing in the safety and effectiveness of vaccines was the rapid development of vaccines and the lack of sufficient experimental studies.

Participant 7: "The reason I believe in a vaccine like hepatitis injected in high school is because I can see that there are still its antibodies in the body. This shows that scientific research and effective work in this context has been established".

Vaccines ineffectiveness

The participants mentioned the vaccines' ineffectiveness as another reason for not injecting vaccines. In fact, the belief that the vaccines were ineffective was such that the participants stated that there were reports of relapses and even death in people who received two doses of the vaccine.

Participant 8: "One of my important reasons for the ineffectiveness of the vaccine is that the frequency of COVID-19 even in the United States is still high, in spite of the high number of vaccinations and adequate coverage of the population with the Pfizer vaccine, and this country is in the second category of disease outbreaks".

Virus nature

In relation to the uncertainty of people who do not want to be vaccinated about the effectiveness of the vaccine against new strains, the constant change and mutation of the coronavirus is stated. Therefore, according to them, there is no need to inject the vaccine.

Participant 8: "The reason why I myself was against the vaccine and did not inject the vaccine until a few weeks ago was that the vaccine itself caused the creation of a new strain due to the constant presence and mutation of the virus despite the increased activity of the immune system."

Distrust

The biggest reason for some of the participants not to receive the vaccine was the lack of trust in the vaccine's content.

Participant 7: "The reason why I feel that the situation is suspicious and I chose not to trust it is that I could not trust a country that itself played a role in causing this disease (meaning China and the Sinopharm vaccine)".

The lack of follow-up and general monitoring of people's condition after vaccination, as it is not clear what will happen to them, was another reason for avoiding vaccination.

Participant 7: "The lack of follow-up after vaccination was another issue that discouraged me. For example, we observed a young patient who, despite having no risk factors for heart disease and being an athlete, had heart failure and cardiomyopathy and was on the list of heart transplants. All these events happened to him after the vaccination. The fact is that due to the lack of follow-up after the injection, and what unpleasant events and complications occur to people, despite the suggestions of other family members and relatives, I did not want to be vaccinated. I think that no organization or institution will support me after vaccination and suffering from its complications, and this was a big factor for my discouragement towards vaccination".

Social infrastructure

Political issues, waiting for a more suitable vaccine, lack of right to choose the vaccine, and the media were another group of reasons for not injecting the vaccine at the community level.

Political issues

Many internal issues in the country, including vaccination, have been affected by political issues in recent years. The political aspects of not injecting vaccines can be seen as the lack of supply of vaccines

by some countries due to sanctions, the insufficient number of vaccines, etc.

Participant 7: "If there is a more suitable vaccine in the market, common sense says that it should enter the country." Human lives are not an issue that can be ignored or influenced by other issues".

"One of the main reasons for the slowness of the vaccination process or the lack of a vaccine in the country for a while is the political sensitivity of our relations with other countries".

Waiting for a better vaccine

One of the main reasons for some participants was delaying the injection of the vaccine in the hope that a better and safer vaccine would be introduced or developed. Some people were hoping for the Iranian vaccine, and others were hoping for the introduction of more reliable vaccines such as Pfizer and Moderna.

Participant 3: "I will wait until a better type of vaccine is produced, then I will inject. That's why the type of vaccine was effective."

Lack of right to choose vaccine

The lack of right to choose to inject the vaccine was another reason for not injecting the vaccine. In fact, instead of choosing between different vaccines, some participants stated that they had to inject whatever vaccine was available. They state that they could have been vaccinated earlier if they had chosen the vaccines at the time of their injection because some vaccines had more side effects than others.

Participant 7: "The reason why I doubted more is that if Moderna and Pfizer's vaccines are useful, then it is better to enter the country, because there were variations in different countries, and we did not have the right to choose the type of vaccine and we did not have many options. If I had the right to choose, I would choose those vaccines. Maybe I would be less sensitive because of not choosing them. My reason is why we should be limited to the vaccines of

a few countries even though we could receive a variety of vaccines."

Personal infrastructure

Previous negative experiences, lack of feeling of need, and prejudice towards traditional medicine are subcategories in this category.

Lack of need

The reason why some participants did not feel the need to get vaccinated was because they believed that they would not get corona because their immune system was very strong. Some people's reason for not injecting the vaccine was to be far from the place of the outbreak of COVID-19. Also, some people believed that a more effective method than injecting a vaccine was to observe the necessary precautions to prevent corona.

Participant 9: "In my opinion, all kinds of vitamins and vitamin C are among the foods that strengthen the immune system."

Past negative experiences

The reason for the hesitation of some participants in choosing the vaccine injection was their past negative experiences with injected vaccines in the past.

"It is not necessary to mention the necessity of injecting a booster dose after the first or second dose while the antibody titer was zero or very low within 4 months after the second dose. This situation occurred after the injection of two doses of the Sputnik vaccine by one of my friends. I believe that instead of holding ceremonies and meetings, priority should be given to the observance of precautions by using the costs that can be paid for foreign vaccines and importing them."

For example, new models of the flu vaccine come on the market because they change every year.

Prejudice to traditional medicine

Some participants considered the effectiveness of the vaccine to be less than treatment with herbal and traditional medicines due to its unclear content. They believed that the method of preventing or treating Corona is not to inject a vaccine, but to use herbal tea and not to use chemical drugs. They thought traditional medicine was more effective than vaccination.

"Some people, from my point of view, not academically but empirically, have an extreme belief in traditional medicine. For example, there was a master's student who used cupping and drinking tea to prevent illness in his three children. For this reason, they had not been vaccinated. Therefore, I believe that the reason for the strong resistance of these people against vaccination and their protest gatherings, in this case, is that they claim that they are able to protect themselves against contracting the disease with a scientifically unproven method such as cupping. Of course, these people had never injected their children with any vaccine before, and it was not exclusive to Covid-19. Of course, there is a threat to the society that a series of epidemics that have already been eradicated will spread again if the number of these people with this way of thinking increases in the society."

Reasons for vaccination

The feeling of compulsion, reassurance, social responsibility, and controlling the disease were the main subcategories of the most important reasons for injecting vaccines.

Sense of compulsion

The compulsion of the workplace organization was the reason for many nurses who had to inject the vaccine. Lack of support from insurance organizations or taking responsibility for the consequences of the disease in case of non-vaccination were the reasons of some participants for compulsory vaccination. Therefore, people with these conditions put aside their fears and worries and preferred vaccination.

"It was announced that the responsibility of not injecting vaccines and causing danger to people is not related to the hospital or medical organization, and it was said that people who do not want to be vaccinated should fill out a form and take responsibility for not being vaccinated."

Peace of mind

Consulting with infectious disease specialists and receiving training instructions from reliable people and sources were the reasons for injecting vaccines by some of the participants.

"I concluded that vaccinating was better than not vaccinating because several infectious disease doctors gave me this advice and said that these vaccines are used all over the world."

Social responsibility

Being indebted to the blood of the martyrs, participating in the eradication of the disease, and protecting the family, and community members were among the reasons for many people who tried to inject the corona vaccine.

"I took the vaccine because my family members were not worried about me."

"Not infecting children, in my opinion, is their most important reason."

Disease inhibition

The participants, believing that it is easier to control the disease by injecting the vaccine, expressed their positive opinion about the vaccine injection. The complications of the disease in the case of re-infection after the injection of the vaccine will be much milder and the number of hospitalizations and deaths will decrease.

"Many of my colleagues thought that the only way to eradicate the disease was to complete the vaccination, for this reason, they were getting the vaccine to prevent contracting the corona" in Table 2.

Table 2 (Theme Classification):

Table 2. Main and secondary themes regarding the attitude of health personnel about vaccination

| Theme | Class | Sub-class |
|-----------------------------|----------------------------|---|
| Reasons for non-vaccination | Vaccination infrastructure | Insufficient evidence of the safety of vaccines |
| | | Ineffectiveness of vaccines |
| | | Virus nature |
| | | Distrust |
| | Distrust | Lack of follow-up of individuals |
| | | Fear of side effects |
| | Social infrastructure | Political issues |
| | | Waiting for a more suitable vaccine |
| | | Lack of right to select vaccine |
| | | Media |
| | | Lack of enough training for people at the community level |
| | | Lack of need |
| | Personal infrastructure | Past negative experiences |
| | | Prejudice to traditional medicine |
| Reasons for vaccination | Feeling of compulsion | Compulsion |
| | | Compulsion |
| | | Lack of support for the unvaccinated |
| | Peace of mind | Consult with experts |
| | | Global vaccine approval |
| | Family protection | Media |
| | | Family protection |
| | Social responsibility | Responsibility towards society |
| | | Minimizing the severity of corona disease |
| | Disease inhibition | Belonging to the high-risk group of covid-19 |

The classification of the themes derived from the participants' responses is presented in Table 2. To improve readability, we suggest enhancing the visual presentation by grouping related themes using color coding or a hierarchical structure. This would make it easier to identify clusters of themes related to similar concepts, such as "distrust" and "vaccine safety concerns."

Information on the complications of COVID-19 vaccine injection was collected in this study. After vaccination, common complications were reported, as follows: Four participants had fever symptoms and 8 had no symptoms. Eight participants experienced pain at the injection site and four did not. Five participants had body pain and 7 did not Table 3.

Table 3 (Vaccination Complications):

Table 3 outlines the reported complications after receiving the COVID-19 vaccine. While the data is presented concisely, a

deeper analysis could contextualize these findings. For example, it would be beneficial to compare these complications with those reported in other studies. Many participants reported mild symptoms such as fever and pain at the injection site, consistent with findings from previous research. However, further exploration of the implications of these side effects in the context of the participants' overall attitudes toward vaccination would provide more valuable insights.

Table 3. Complications caused by the injection of the COVID-19 vaccine

| Vaccination complications | Participants | |
|---------------------------------|--------------|----------|
| | Positive | Negative |
| Occurrence or non-occurrence | | |
| Fever | 4 | 8 |
| Injection site pain (body pain) | 8 | 4 |
| Body pain | 5 | 7 |

Discussion

This study highlights two major categories affecting the acceptance and non-acceptance of the COVID-19 vaccine among healthcare workers: "reasons for

vaccine injection" and "reasons for not injecting the vaccine." The lack of trust in vaccines was a significant barrier to vaccination, as participants expressed doubts about the safety and efficacy of imported vaccines in Iran. These findings align with a previous study in Iran, which found that individuals who received the vaccine exhibited higher levels of trust in vaccine manufacturers and government officials, underscoring the vital role trust plays in vaccine acceptance (11).

In line with the American Psychological Association's concept of informational social influence, trust-building plays a crucial role in shaping individuals' beliefs and behaviors toward vaccination (12). A similar study in Switzerland found that increasing vaccine confidence through clear information about vaccine benefits and risks was essential for promoting vaccination, particularly among families (13). In the United States, a lack of trust and incomplete information about the COVID-19 vaccine was linked to a 69% non-acceptance rate among healthcare personnel (14). Furthermore, a study from the U.S. revealed that cues from trusted individuals, such as healthcare providers, colleagues, and supervisors, significantly motivated healthcare workers to get vaccinated (15).

The findings emphasize the importance of trust-building as a critical strategy for improving vaccine acceptance. Healthcare institutions and policymakers should prioritize transparent and comprehensive communication regarding vaccine safety, efficacy, and post-vaccination monitoring. Clear and consistent messaging can help build the confidence needed for healthcare workers to trust the vaccine and overcome skepticism.

1. **Building Trust Through Transparent Communication:** Given that trust was identified as a key factor in vaccine hesitancy, healthcare organizations must foster transparent communication. Providing reliable, evidence-based

information on vaccine safety, addressing concerns about side effects, and offering assurance about post-vaccination monitoring will be crucial in addressing hesitancy. Healthcare workers, as trusted sources of information for the public, should be empowered with up-to-date, scientifically sound data to make informed decisions. Involving healthcare workers in the communication process could help further build trust and encourage vaccine uptake.

2. **Policy Interventions for Vaccine Mandates:** The perception of being "forced" to vaccinate was one of the key barriers to vaccine acceptance. This finding suggests that mandates, while effective in increasing vaccination rates, should be balanced with opportunities for dialogue and education. Policies should not only focus on vaccine requirements but also ensure that healthcare workers have access to comprehensive information and the space to voice concerns. Mandating vaccination should be accompanied by supportive measures such as counseling, informational sessions, and the opportunity for healthcare workers to make informed choices.
3. **Addressing Vaccine Hesitancy in Healthcare Settings:** Since healthcare workers play a vital role in influencing public perceptions of vaccination, it is critical to address hesitancy within this group. Targeted educational campaigns focusing on the scientific evidence supporting vaccine safety and efficacy are necessary to alleviate concerns. These campaigns should also address the impact of vaccination on the well-being of patients, healthcare workers themselves, and the broader community. Moreover, healthcare facilities should develop long-term strategies for continuous education, ensuring that healthcare workers remain confident in the vaccines they administer.
4. **The Role of Media and Public Information Campaigns:** The deliberate dissemination of both accurate and inaccurate information has influenced vaccine acceptance globally.

In particular, the spread of misinformation about vaccine safety has contributed to vaccine hesitancy, especially in developing countries. Governments and health authorities must work closely with the media to ensure that only accurate, scientifically backed information about COVID-19 vaccines is disseminated. This collaboration can help mitigate the impact of misinformation and reduce vaccine hesitancy among healthcare workers and the general public.

5. **Socio-Political Context and Trust in Vaccine Producers:** Participants expressed concerns about the influence of political factors on vaccine production and importation. This highlights the importance of maintaining the perception of an unbiased and transparent vaccine supply chain. Policymakers should focus on ensuring that vaccine distribution is free from political influence, and that vaccines are produced under strict safety standards. Clear communication about the regulatory processes behind vaccine approval and production will help enhance trust and acceptance.

Globally, vaccine hesitancy persists despite the documented benefits of COVID-19 vaccines. Research in the U.S. identified concerns about vaccine safety and effectiveness, a lack of trust, and the need for more evidence as primary drivers of hesitancy (16). Similarly, participants in the present study cited the perceived ineffectiveness of vaccines and the absence of reliable safety data as key reasons for their reluctance. In Turkey, similar findings were reported, where concerns about vaccine safety, a lack of follow-up regarding side effects, and a belief in the immune system's ability to combat COVID-19 were prominent reasons for healthcare workers' vaccine hesitancy (17). These findings echo the present study's results, where healthcare workers expressed doubts about vaccine safety and side effects and felt confident in their immune systems' ability to fight the disease (19).

Further studies from Europe revealed similar concerns about vaccine safety and political factors influencing vaccine acceptance (20). Healthcare workers in the U.S. and other countries also reported resistance to vaccination due to fears about side effects and doubts about the vaccine's efficacy (21). This study corroborates these findings, as participants expressed a lack of faith in the COVID-19 vaccine's effectiveness, compounded by insufficient post-vaccination monitoring and follow-up.

In exploring the factors influencing healthcare workers' decisions to vaccinate, participants noted the feeling of being forced to receive the vaccine. A Canadian study revealed that external pressure, such as institutional mandates, played a significant role in motivating healthcare workers to get vaccinated, even when they were unsure about the vaccine's safety (24). Negative past vaccination experiences were also highlighted as deterrents to vaccine acceptance in Canada and other countries, which mirrors the concerns of healthcare workers in this study.

Protection from COVID-19 transmission to patients was cited as a key motivator for vaccine acceptance, a finding consistent with other studies that explored healthcare workers' attitudes toward the COVID-19 vaccine (25). On the other hand, concerns about the vaccine's safety, trial duration, and effectiveness were consistently identified as major reasons for non-acceptance (26). These findings support the notion that vaccine hesitancy among healthcare workers is closely linked to worries about the vaccine's safety profile.

The influence of media and public information campaigns was another factor influencing vaccine acceptance. The deliberate dissemination of both accurate and inaccurate information regarding COVID-19 vaccines has been shown to shape vaccine acceptance, particularly in developing countries. Misinformation about vaccine safety, alongside fears fueled by unverified data, has led to widespread

vaccine hesitancy among healthcare workers (27).

The results of this study also reflect broader global trends, where a significant portion of healthcare workers, despite the availability of the COVID-19 vaccine, have expressed unwillingness to get vaccinated (28, 29). This highlights the need for proactive engagement with healthcare workers, emphasizing trust-building through education and transparent communication. A study in Belgium, Canada, and France reported low vaccine acceptance rates, particularly among healthcare workers, citing concerns about the rapid approval process, potential side effects, and vaccine safety (30).

Ultimately, these findings underscore the need for tailored strategies to improve vaccine uptake among healthcare workers. These strategies should address the specific barriers identified in this study, including concerns about vaccine safety, the need for comprehensive post-vaccination monitoring, and the role of trust in overcoming vaccine hesitancy. Future research should explore effective communication strategies and policy recommendations to mitigate vaccine hesitancy among healthcare professionals, ensuring higher vaccine acceptance and ultimately improving public health outcomes.

Conclusion

Vaccination is a critical measure to end the COVID-19 pandemic. It is important to achieve a high vaccination rate in HCWs, not only because they have a high exposure risk, but because they also have an important and unique role in building the confidence of the general public towards COVID-19 vaccines. Our study revealed the prominent role of different factors, including reasons for injecting and not injecting the vaccine, in the development of different attitudes of health personnel regarding the vaccination of COVID-19. In general, it is shown that two very important

factors in deciding whether or not to receive a vaccine in Iran and at the international level, according to the attitude of healthcare personnel regarding the vaccination of COVID-19, are lack of sufficient trust in the vaccine and its production process and worry and fear of complications. Of course, the attitude of health care personnel regarding vaccination is influenced by other factors such as compulsion and pressure of the medical system and not allocating enough time to make a decision.

Authors' contribution

Atefeh Torknejad and Sima Babaei developed the study concept and design. Zahra Hadian and Amir Shah Zaydi acquired the data. Atefeh Torknejad and Sima Babaei analyzed and interpreted the data, and wrote the first draft of the manuscript. All authors contributed to the intellectual content, manuscript editing and read and approved the final manuscript.

Informed consent

Questionnaires were filled with the participants' satisfaction and written consent was obtained from the participants in this study.

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Conflict of interest

The authors declare that they have no conflict of interests.

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