



Barriers to receiving the booster dose of the COVID-19 vaccine among Turkmen people: A Content Analysis Study

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Abstract

Background: Vaccine hesitancy is a significant global issue. This study aims to explore the barriers that prevent Turkmen people from receiving their third or subsequent doses of the COVID-19 vaccine.**Methods:** In this qualitative content analysis study, 35 Turkmen residents of Gonbad-e-Kavous, located in northern Iran, participated in semi-structured phone interviews. These interviews took place in August and September 2022 and focused on individuals who had not received their third or subsequent doses of the COVID-19 vaccine.**Results:** The analysis identified five key factors that hindered individuals from receiving their COVID-19 vaccine booster shots: 1. perceived risk, 2. inaccurate rumors and beliefs, 3. negative experiences with the COVID-19 vaccine, 4. concerns about vaccine effectiveness, and 5. personal freedom considerations.**Conclusion:** To enhance public acceptance of booster vaccines, healthcare policymakers must take action to build public trust in vaccines and offer documented, scientific responses to address inaccurate rumors and beliefs.

Highlights

What is current knowledge?

Vaccine hesitancy is a public health concern globally, which can be attributed to several contributing factors.

What is new here?

We explored some personal and cultural barriers to getting COVID-19 vaccine boosters among the Turkmen population.

Introduction

Until June 26, 2023, there were 7,612,530 COVID-19 cases in Iran, and the death toll reached 146,295. Also, 65,233,075 first doses of vaccine, 58,629,067 second doses, and 31,727,452 third and higher doses were administered (1). Different studies indicate vaccine effectiveness decreases over time, and boosters are required (1-4).

Several foreign and domestic vaccines were offered to the public as COVID-19 vaccination began. Sinopharm, AstraZeneca, Bharat Biotech, and Sputnik V were the foreign vaccines offered to the public as first and second doses. COVIran Barekat vaccine was the primary domestic vaccine on offer. Later, Sputnik V, AstraZeneca, and Bharat Biotech vaccines were no longer used for different reasons. Still, domestic vaccines such as Soberana (PastoCoVac), Soberana plus (PastoCoVac), SpikoGen®, and COVIran Barekat replaced them. Currently, these vaccines and the Sinopharm vaccine are offered to the general public.

Vaccine hesitancy is one of the major public health challenges. WHO's strategic advisory group of experts has defined vaccine hesitancy as a delay in acceptance or refusal of vaccination despite the availability of vaccination services, which can differ based on where, when, and how it happens. Studies have discussed this phenomenon, which is different for every vaccine (5-7). Vaccine hesitancy is a great global concern, and in 2019, WHO identified it as one of the 10 most important global health challenges (8,9).

According to the Ministry of Health, public acceptance of third and subsequent COVID-19 doses has significantly decreased compared to the acceptance of the first two doses (10). This disinclination has not been studied in Iran, but studies worldwide suggest different reasons. For example, a study performed in Poland indicated that vaccine side effects and fear are the two primary reasons why COVID-19 booster shots are not complied with (11). A study performed by Yadete et al. in the United States of America indicated that 38 percent of the population was hesitant to use COVID-19 vaccine boosters, primarily due to mistrust of vaccines (12).

A plethora of research has been performed on vaccine hesitancy in Iran, but they mainly focused on the first dose of the vaccine (13,14). There have been no domestic studies on the low acceptance of boosters. Identifying the causes of booster shots' low acceptance rate can help plan necessary interventions and

healthcare services. Cultural and tribal factors can be responsible for shaping beliefs about healthcare. Turkmen are a populous minority in north Iran who mainly live in the Golestan province and Gonbad-e-Kavous. Experts report a shallow acceptance of third or subsequent COVID-19 vaccine doses among Turkmen residents of Gonbad-e-Kavous. Therefore, this study aimed to use a qualitative content analysis study to identify the obstacles to booster shot injections among Turkmen residents of Gonbad-e-Kavous and use the study results, technical understandings, and experiences about vaccination to assist healthcare policymakers control the COVID-19 pandemic. This study was designed and performed to illuminate the obstacles to booster injections among Turkmen residents of Gonbad-e-Kavous.

Methods

This explorative qualitative study was performed during August and September of 2022 on 35 Turkmen residents of Gonbad-e-Kavous who had not received their third or higher COVID-19 vaccine doses. Sampling was done in a purposive way with utmost diversity. People who had received their first and second doses of vaccine but not the subsequent doses were chosen using the public vaccination system, contacted, and interviewed. After introducing himself and clarifying the study's objectives, the interviewer, a Turkmen resident of Gonbad-e-Kavous who worked at the city's healthcare center, asked the participants why they hadn't received their booster shots. The participants were also asked to discuss their vaccination experiences and explain why they did not complete their vaccination. The next questions were based on the participant's previous answers and the interview guide. The interviews were all recorded, carefully transcribed, prepared, organized, reported, and studied. Our diverse participants included members of both sexes from different ages and educational backgrounds to represent the target population. In the end, the participants' demographic characteristics were recorded in a separate table.

Qualitative analysis methods were used to analyze data. First, the recorded conversations were transcribed and then closely studied to extract their common and general messages. Then, the interviews were organized through open codification. The MAXQDA10 text-organizing software was used to process the extracted codes. Repeated studies on the extracted codes helped organize and spotlight their differences and similarities. Finally, they were analyzed. After each interview, the text was analyzed through content analysis methods. First, units of meaning were identified in the text of each interview (Our study's analysis units). Then, these units of meaning, sentences with the same general meaning, were summarized without losing meaning. The summarized units of meaning were labeled with codes. Different codes were compared based on similarities and differences and then organized into different levels.

Results

The average age of the participants was 43.11 ± 16.51 , with an age range of 21-81. Nineteen participants were women (53.4%), and 26 were married (74.3%). 14 participants had education beyond diplomas (40%), 10 participants had no

diplomas (28.6 %), 6 participants had diplomas (17.1 %), and 5 participants were uneducated (14.3 %). Most participants had received Sinopharm vaccines (77.1 %) (Table 1).

Our findings indicated that there were five main reason categories why our participants had not received their 3rd or subsequent vaccine doses. These levels were (Table 2):

- 1) Perceived risk
- 2) Inaccurate information and beliefs
- 3) Negative COVID-19 vaccine experiences
- 4) Vaccine effectiveness
- 5) Personal freedoms

Table 1. Study participant profile

Participant ID number	Age (Years)	Gender	Marital status	Education	Occupation	Vaccine brand
1	60	Female	Widow	Illiterate	Housekeeper	Sinopharm
2	28	Male	Married	University degree	Teacher	Sinopharm
3	34	Male	Married	University degree	Teacher	Sinopharm
4	46	Male	Married	High school diploma	Driver	Sinopharm
5	28	Male	Single	University degree	Skilled worker	Sinopharm
6	80	Male	Married	Illiterate	Unemployed	Sinopharm
7	47	Male	Married	University degree	Employer	AstraZeneca
8	45	Male	Married	High school diploma	Football coach	Sinopharm
9	28	Female	Married	Primary school	Housekeeper	Sinopharm
10	26	Female	Married	University degree	Employer	Sinopharm
11	42	Female	Single	University degree	Housekeeper	Sinopharm
12	38	Female	Married	University degree	Retailer	Sinopharm
13	42	Female	Married	Primary school	Housekeeper	Sinopharm
14	39	Male	Married	University degree	Teacher	Sinopharm
15	21	Female	Married	High school diploma	Housekeeper	AstraZeneca
16	23	Female	Single	High school diploma	Student	Sinopharm
17	38	Male	Single	Secondary school	Driver	Sinopharm
18	26	Male	Married	University degree	Skilled worker	AstraZeneca
19	30	Female	Single	University degree	Housekeeper	Sinopharm
20	50	Female	Married	Primary school	Housekeeper	AstraZeneca
21	50	Male	Married	Secondary school	Retailer	AstraZeneca
22	40	Female	Married	High school dropout	Housekeeper	Sinopharm
23	49	Male	Married	Secondary school	Mullah	Sinopharm
24	65	Male	Married	Secondary school	Driver	Sputnik V
25	43	Female	Married	Primary school	Housekeeper	Sinopharm
26	21	Female	Single	High school diploma	Student	AstraZeneca
27	74	Female	Widow	Illiterate	Housekeeper	Sinopharm
28	58	Female	Married	University degree	Teacher	Sinopharm
29	33	Female	Married	Secondary school	Housekeeper	Sinopharm
30	62	Female	Married	University degree	Teacher	Sinopharm
31	45	Male	Married	University degree	Farmer	Sinopharm
32	81	Male	Married	Illiterate	Unemployed	Sinopharm
33	63	Female	Widow	Illiterate	Housekeeper	Sinopharm
34	30	Male	Married	High school diploma	Photographer	Sputnik V
35	24	Female	Married	University degree	Housekeeper	Sinopharm

Table 2. Categories extracted from qualitative data

Category	Subcategory	Description
Unawareness of the dangers	Believing Corona is not as dangerous anymore	People don't believe they are in as much danger as before and think Corona has weakened
Inaccurate rumors and beliefs	Rumors about vaccination being deadly	Rumors are circulating in society about vaccines being deadly
Negative COVID-19 vaccine experiences	Experiencing extreme side effects caused by the first two doses	Experiencing side effects caused by the first two doses of vaccine causes fear and lack of enthusiasm about vaccination
Vaccine's function	Uncertainty about the effectiveness of vaccines Mistrust of the vaccine production procedure Multiple injections Changing the vaccine brand for the third dose	The vaccine does not prevent death or COVID-19, and its injection doesn't make any difference. Vaccine production progressed quickly, and they couldn't have had time for clinical studies. Vaccination every 4 to 6 months makes people doubt its effectiveness and lose interest Changing the vaccine brand for the third dose makes people lose their trust in the vaccine
Personal freedoms	Lack of social restrictions and mandatory vaccination laws	The lack of social restrictions and mandatory vaccination laws has lowered vaccination rates

Perceived risk

One of the extracted levels is ignorance of the dangers of COVID-19. Some participants believed that the COVID-19 virus had weakened and was not as dangerous as it used to be. Consequently, they had no reason to receive their boosters. The opinion of one of the participants regarding this issue was:

"We have no intention to get our third and fourth vaccine doses. It has been so long since our second dose. We were among the first people to get the second dose last summer. We are not going to get the other doses. There is no Corona anymore. Our lives are not in danger. We are very healthy."

Why haven't you received the third and fourth vaccine doses?

"As I said, there's no problem anymore. Our lives are back to normal; we have no more problems. We don't see a need for it anymore. Right now, it seems like the storm has passed us. Things are back to normal." (Participant #2).

Another participant said:

"We were very enthusiastic about the first and second doses. Back then, the disease was very dangerous. Right now, the situation has improved, thank goodness. Things are safe and sound. The new variance was not very intense either; it was a simple cold and runny nose.... The situation in our village is okay right now, thank goodness. I don't know about the city. It's not like it used to be. Back then, one side of the cemetery was filled in a short time. It's not like that anymore, Thank goodness." (Participant#14).

Inaccurate rumors and beliefs

Inaccurate rumors and beliefs formed another one of the extracted levels. Many participants believed vaccination caused death. For example:

"A young boy lost his life when he got vaccinated. He died two days after vaccination. He was my son's friend. He didn't continue his vaccination because of that. Neither did I." (Participant #1)

Another one of the participants said:

"To be honest, I'm scared to have the third dose. My cousin died because of this last week."

After he had his vaccine injected?

"Yes. The poor soul had it injected. He died last week. Because of that, I'm scared to go near vaccines. Our entire neighborhood is talking about how he died because of the Corona vaccine. His wife is crying out loud, begging people not to get vaccinated. It's so unfortunate. His time was up, right? He didn't even have any other diseases. He was a healthy boy. Very healthy. He was an employee. A rental driver. He would leave for work early in the morning and return late at night. He left three kids behind." (Participant #14)

Participant #18 said:

"We're not getting it for now. Three of my neighbors got the vaccine and died. I'm not doing it yet."

Participant #21 believed:

"As you know, people say vaccines kill people. So, I thought I shouldn't dig my own grave with my own hands and didn't continue with the vaccination. I told myself we won't get Corona, and fortunately, we're still healthy. But when we got vaccinated, we got sick. Even though we were completely healthy before the vaccine, we got sick after it."

Another rumor says that vaccination exacerbates other diseases and physical issues and intensifies them. One of the participants said:

"They say vaccines reveal any diseases you might have in your body. And I got scared. I had already had two doses." (Participant #13).

Negative COVID-19 vaccine experiences

Negative COVID-19 vaccine experiences, especially negative experiences from the second dose, were the major obstacles to complete vaccination and were repeated by the participants numerous times. Negative severe side effects caused by previous doses created mistrust and fear of vaccination among our participants and prevented their complete vaccination. One participant said:

"I have migraines, which get bad sometimes. Before vaccination, it used to get bad once every two or three weeks, but after I got vaccinated, it got bad every day or every other day. I don't have other specific reasons." (Participant #3)

Another participant said:

"My family and I are always in pain and fatigued. Four family members were ready for vaccination, and we had two doses. My family is fatigued like me, too. I personally always have a fatigued and hurting body. My wife also has pains which won't go away."

Did all this start after you get vaccinated?

"Yes, it started after the second dose. The first dose didn't have any side effects. But the second dose caused fatigue, muscular pains, and overall pains. We took multivitamins effervescent tablets. The symptoms would go away periodically, but they would always come back. That's why we didn't continue with the rest of the doses. We didn't want any more problems." (Participant #22)

Observing intense side effects on acquaintances was a sublevel of this level, which many participants mentioned. One participant said:

"Well, I had the first and second doses. I was waiting to get the third dose when my neighbor took their third dose. There was another disease going around back then, too, the Omicron. After getting the third dose, they started experiencing shortness of breath. I was afraid it would happen to me, too, so I didn't continue with the vaccination. We were cleared for our third dose almost at the same time. My neighbor took it first, and all of that happened, which scared

me. I had already had the first and second doses but didn't go for the third and fourth. I was scared. That's why I didn't continue." (Participant #9)

Vaccine effectiveness

Another level extracted in this study was vaccine effectiveness. Four of this level's sublevels were uncertainties about vaccine effectiveness, mistrust of the vaccine production procedure, numerous injections, and changing the vaccine brand for the third dose.

Some of our participants believed that vaccine injection did nothing to prevent death or Corona. One participant said:

"Injecting it or not doesn't matter. Vaccinated people die, too. The ones who didn't get vaccinated are living normal lives. Some people didn't even have the first and second doses. I believe people can't say they're completely safe since they've gotten vaccinated. Even vaccinated people die. You're not safe after getting vaccinated." (Participant #5)

Another participant said:

"I got Corona after having the first and second doses. They didn't have any effects. I got the virus again after getting two shots of the vaccine. That was the second time. First, I got it after the first dose, and then again, I got it after the second dose." (Participant #7)

People mistrusted the high speed of vaccine production. People had negative opinions about how fast vaccines are being produced. One of the participants said:

"In my opinion, vaccines should be thoroughly tested first. Then, they should inject it into people. They haven't tested these vaccines, have they? They made a vaccine in a short time and are forcing people to have it injected. But it's not a vaccine that has been tested and experienced for a long time. I think the Corona vaccine isn't like that. That's my opinion, though. Am I right? They haven't tested it." (Participant #30)

Multiple injections every few months were another reason people didn't want the third and fourth doses. One of the participants said:

"They say you have to keep getting more and more doses every time. Like after a few months you'll have to take the third, fourth, fifth, and even sixth dose. They say that's what it's going to be like. And they say it's harmful." (Participant #4)

Another participant said:

"They say it loses its effectiveness over time, and you have to keep taking it. For example, we would have to get vaccinated every month. They say that has side effects. That's why I'm not continuing with it." (Participant #16)

Changing the vaccine brand for the third dose was another sublevel mentioned by a few participants. Participant #24 said:

"When we went to have our third dose, they didn't have our vaccine anymore. They said we should take another brand. But we didn't. I said if they have Sputnik V we'll have it, we don't want the other brands. And we didn't continue with our vaccination after that."

Personal freedoms

Personal freedom was another level extracted in this study. Since vaccination was not mandatory and social restrictions on unvaccinated people had been lifted, people had been less enthusiastic about their remaining vaccine doses. One participant said:

"As long as it is not mandatory, I won't have it. I believe they should make people have their vaccination cards when going around. If vaccination cards are necessary, people will get vaccinated." (Participant #16)

Discussion

Vaccine hesitancy presents a significant health challenge. This challenge has recently grown due to the COVID-19 pandemic, its vaccination, and multiple vaccine doses. This study aimed to identify obstacles that prevented receiving third and fourth COVID-19 vaccine doses among Turkmen residents of Gonbad-e-Kavous City. Ultimately, five primary levels were identified, which will be discussed below.

Perceived risk

One of the main reasons the public did not accept booster COVID-19 vaccine shots was underestimating the dangers of COVID-19. Most participants believed the disease had lessened, and the danger of a severe and deadly virus was behind them. This was true to some extent, and the mortality rates of the previous months indicated that the disease had gotten weaker. This can be attributed to widespread public vaccination. In the summer of 2021, people were enthusiastic about receiving the first and second vaccine doses due to the Delta variant claiming many lives. That enthusiasm led to widespread vaccination, which strengthened the public's immunity levels against the disease. According to healthcare guidelines about understood threats, when people consider themselves vulnerable to a very severe and deadly disease, they will take preventative measures against it (15). In the case of COVID-19, which had a high spreading rate and was severe and deadly, the death of acquaintances forced people to seek vaccination and preventative measures personally. The results of Denis et al.'s study indicated that unawareness of the dangers of the disease resulted in low vaccination rates among British healthcare workers (16). Therefore, people believed the disease weakened, and they saw no reason to get vaccinated. The results of Rzymski et al.'s study in Poland indicated that people who were hesitant about getting their

booster shots did not believe it was necessary (11). The results of the study performed by Wang et al. and Harapan et al. indicated that vaccination rates among people who were aware of possible dangers were twice the vaccination rates of the unaware (17,18).

Inaccurate rumors and beliefs

Many participants mentioned negative rumors and stories as the primary obstacles against vaccination. The most common rumor was death after the third dose. This myth was circulated among Turkmen city residents, became a solid belief, and prevented vaccination. Healthcare policymakers must engage through various channels to rebuild public trust against this myth. Inaccurate information about health threats is a significant threat to the public health (19). This pandemic brought with it a vast amount of misinformation about the characteristics of the disease, its nature, its spreading, preventative measures, and remedies, which damaged the public's trust in healthcare authorities (20,21). Fake news comprises a wide variety of misleading, purposefully included or excluded, accidental or false, and altered information. Fake news combines false information and intentional lies (22). WHO announced that healthcare systems were not facing a pandemic but an infodemic (23).

Studies indicate that fake news and rumors negatively affect public vaccination acceptance; those who recognize inaccurate information are more likely to accept vaccination (24-26). Therefore, the public must be educated about the COVID-19 vaccine to recognize erroneous information about it. Healthcare media should provide scientific and persuasive responses to inaccurate information to raise public awareness.

Negative COVID-19 vaccine experiences

Another important factor identified in our study was negative experiences caused by first and second vaccine doses. Severe side effects caused by the previous two doses caused vaccine hesitancy. Many studies have confirmed the fear of short-term side effects caused by COVID-19 vaccines (13,24,25). In the study by Rzymiski et al., adverse side effects of the previous dose were the most significant reason people didn't want the booster shot (11). It must always be remembered that all vaccines may have side effects. Healthcare authorities should educate the public about these side effects and how to manage them. This will help people understand vaccination and its side effects and alleviate their fears.

Vaccine effectiveness

Vaccine effectiveness was another extracted level. Some participants believed vaccines were ineffective and that they did not prevent COVID-19 infection. Some people reported being reinfecting with the virus despite vaccination, which they viewed as ineffective. Some believed that the fact that multiple vaccine doses were required showed ineffectiveness and meant vaccination was pointless. Other studies have indicated that people did not trust the coronavirus vaccines (26-29). The study's results by Khankeh et al. indicated that people did not trust the effectiveness of vaccines, which decreased public compliance with vaccination (13).

People also believed that the fast production rates of COVID-19 vaccines indicated their ineffectiveness. Some participants highlighted the fast production rates of COVID-19 vaccines and believed that the researchers had no time to perform clinical tests and experiments on them. Other studies also emphasized this problem (14,28-32).

Some participants mentioned not continuing vaccination because they had to change the vaccine brand they had taken for the first two doses. For example, some participants had AstraZeneca or Sputnik V vaccines for their first two doses but were recommended a different brand for their third dose. This problem was caused by removing those vaccine brands from the public vaccination system and replacing them with different brands. This change might have decreased public enthusiasm toward vaccination. To restore public trust, healthcare authorities must provide scientific and convincing evidence of the new brands' effectiveness and clarify why the old ones were replaced.

Personal freedoms

Another extracted level was personal freedom. The lack of social restrictions on unvaccinated people and mandatory vaccination laws reduced the public enthusiasm toward booster doses compared to the first two doses. In 2021, many Iranian governmental organizations did not provide services to unvaccinated people, which forced people to get vaccinated. But lately, these restrictions have been lifted, and mandatory vaccination laws are no longer in place, which caused some people not to continue vaccinating. The results of the study performed by Torabi and Sotodeh on students at Shiraz University in Iran indicated that many students received the vaccine due to public pressure rather than their personal desire for it (33).

Study strengths

This study has several advantages that should be noted. First, it is a qualitative study that reveals the participants' deepest concerns and beliefs. Second, the interviews were performed through phone calls, resulting in better, more honest answers than face-to-face interviews. Third, our participants had already received two doses of vaccines but had not continued with their vaccination, which helped us find out why public enthusiasm toward vaccination decreased after the second dose. All this helped us provide healthcare policymakers with clear insights.

Study limitations

The qualitative nature of the study limited the potential of generalizing the results. Social pressures and orientations might have affected the data collected by our team. To minimize this effect, our interviewer explained the goals of our study before beginning the interview and assured the participants of their anonymity. The third limitation was that this study was performed on Turkmen citizens. Other groups of people might have had different opinions and beliefs.

Conclusion

This study identified five barriers in different categories that prevented third and subsequent COVID-19 vaccine injections among Turkmen citizens: perceived risk, inaccurate rumors and beliefs, negative COVID-19 vaccine experiences, vaccine effectiveness, and personal freedoms.

Educational interventions are essential to enhance public awareness about the dangers of COVID-19, combat misinformation regarding vaccinations, inform citizens about vaccine side effects, restore Turkmen citizens' trust, and boost their motivation for COVID-19 booster shots. Similar studies on other groups in other regions of our country can better help identify the obstacles against COVID-19 vaccination and provide healthcare authorities with proper guidelines to design interventions and increase acceptance of COVID-19 vaccine boosters.

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Ethical statement

This study was approved by the Golestan Medical University's technology and research group's moral committee and given the following identifying code: IR.GOLESTAN.REC.1401.272.

Conflicts of interest

The authors declare that there is no conflict of interest.

Author contributions

MG: data gathering, conceptualization, analysis, and draft preparation. AC: study design, analysis, data interpretation, and writing. All authors read and approved the final manuscript.

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