







RESEARCH PAPER



A qualitative insight into the perceptions and COVID-19 vaccine hesitancy among Pakistani pharmacists

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ABSTRACT

A qualitative exploration of pharmacists' perceptions regarding COVID-19 conspiracies and their willingness to get vaccinated. A semi-structured questionnaire guide was developed using ground theory to conduct in-depth interviews. A total of 36 participants gave consent for an audio-recorded interview. Results have shown that most of the respondents believed that SARS-CoV-2 is a natural virus, not man-made, that causes a disease just like other viruses and it is absurd to believe that the vaccine is being used by foreign powers for the implantation of microchips just to control humans. A general opinion that which reflected from the in-depth interview is that the pharmaceutical companies may be hiding some important information on COVID-19 to promote the sale of their product. Some doubts on the reliability and trustworthiness on the COVID-19 vaccine safety and efficacy data were noticed among the respondents. Factors leading to COVID-19 vaccine hesitancy were adverse reaction, cost of COVID-19 vaccine, and limited data on safety and efficacy profile of COVID-19 vaccine. COVID-19 vaccine hesitancy among health professionals is a major hindrance to our current fight against COVID-19 pandemic. Findings of this study are alarming, and the stakeholders must consider this ongoing vaccination campaign as an opportunity to formulate a mechanism to ensure high vaccination rate among general public and healthcare providers in Pakistan.

KEY POINTS

What was already known?

- According to World Health Organization (WHO), vaccine hesitancy is one of the ten major threats to global healthcare system and it is a major barrier to achieve herd immunity around the globe.
- Pakistan has begun vaccinating its people in a systematic phase-wise manner under which the healthcare workers and elderly people are prioritized for vaccination.
- Previous experience tells us that vaccine hesitancy is a major problem in Pakistan and it is better to understand perceptions of pharmacists about COVID-19 vaccine who are the primary source of information for most of general population.

What this study adds:

- This study is first of its kind to explore vaccine hesitancy among Pakistani pharmacists and the results of this study show that majority of the participants were willing to get COVID-19 vaccine and few of them have even got themselves vaccinated at the start of vaccination campaign.
- Many among the willing participants considered cost of vaccine, adverse reactions, limited data, safety, and efficacy as major hindrance to their decision to get vaccine.
- Few participants were found highly vaccine-hesitant because of their staunch belief in the prevalent myths and rumors about COVID-19 vaccine.

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Introduction

SARS-CoV-2 is a single-stranded RNA-virus that belongs to family *coronaviridae*.¹ Its outbreak originated in Wuhan city of China, which led to high mortality in short time span and caused a lot of perturbation all around the globe.² Till date, there is no specific treatment for COVID-19 and the only way to contain this virus is to achieve herd immunity by using vaccines.³ According to World Health Organization (WHO), timely immunization saves almost 2–3 million lives every year and these immunization programs are major component of preventive healthcare system.⁴ Vaccines remained to be one of the key measures to prevent most of the viral diseases. They not only reduce the incidence of diseases but also produce herd immunity. In addition to the effectiveness and safety of vaccine, acceptance among the masses is another parameter that produces successful outcomes of immunization programs and ensure the accomplishment of herd immunity at the community level.^{5,6} However, it is observed that hesitancy for COVID-19 vaccine may hold down the global task of achieving herd immunity across different regions.

The Strategic Advisory Group of Experts on Immunization (SAGE) Working Group (WG) of WHO defined vaccine hesitancy as “*delay in acceptance or refusal of vaccination despite availability of vaccination services.*”⁷ WHO had already declared vaccine hesitancy as one of the ten major threats to global healthcare system.⁸ Vaccine hesitancy can vary geographically for different kinds of vaccines and at different times due to several reasons which include either the denial of disease itself or the skepticism about the vaccine program. Similarly, there are many rumors and misperceptions about the current COVID-19 immunization campaign, which could lead to high vaccine hesitancy and delay the process of achieving herd immunity.^{9–11}

Addressing the situation in Pakistan, it is one of the two countries in the world, which could not eradicate even the polio virus due to highly prevalent vaccine hesitancy in the society.^{12–14} Unfortunately, similar behavior is observed for COVID-19 vaccine. Many healthcare workers along with general public refused to get COVID-19 vaccine according to one study.¹⁵ Moreover, international conspiracies are further strengthening the misperceptions of the masses regarding COVID-19 vaccine.¹⁶ Healthcare workers, especially the pharmacists, are the first point of contact for any medicine-related information.¹⁷ Pharmacists in Pakistan are playing a vital role in educating public along with other healthcare professionals.¹⁸ Healthcare workers are prioritized for vaccination program in Pakistan. Therefore, it has become vital to assess and understand the perceptions of pharmacists about the vaccine they are being administered.

To date, there are many studies conducted to assess the COVID-19 vaccine hesitancy in general population or specific group of people, but none is specifically targeting the pharmacists to assess vaccine hesitancy. Understanding the vaccine hesitancy in pharmacists is very essential because it will ensure the success of COVID-19 vaccination campaign. It is very important to understand the perceptions of Pakistani pharmacists as they are the primary source of information

for most of the population and their opinions would have serious impact on national vaccination campaign. Moreover, Pakistani pharmacists are also working in various healthcare facilities all across the globe and it is very important that their perceptions about the COVID-19 vaccine should be known. Therefore, the objective of this study is to explore perceptions of pharmacists regarding the prevalent conspiracy theories about the COVID-19 vaccine and their willingness to get vaccinated.

Methods

Study design and settings

A qualitative study design was adapted to explore vaccine hesitancy and perceptions of pharmacists regarding COVID-19 vaccine. Ground theory was used as a framework to develop a semi-structured questionnaire guided to conduct in-depth interviews. Qualitative study design was chosen because it was easier to conduct in the lockdown situation caused due to COVID-19. Besides, it is better to assess a new hypothesis using qualitative study design as it provides insights and it also assures reflexivity. It reduces the chances of miscommunication that may produce false results. It is an open-ended process and seeks authentic data and emotional responses. Unlike the quantitative surveys, qualitative survey was a better approach in this scenario to get a high quality and rich data that could provide abundance of diversified personal accounts and individual perspectives. Therefore, this type of survey focuses more on the quality of data and compensate for a smaller number of participants as compared to the quantitative survey.

After selecting a qualitative approach for this study, it was decided to conduct one-on-one semi-structured interviews instead of a focus group interview. In a one-on-one interview, the interviewer can easily ask additional questions to better understand responses and assess the accuracy of the answer. The outcome is independent of the performance of other candidates as each candidate is interviewed separately, and the response by one candidate has no effect on the response of another candidate, thus more information is shared. Whereas, in focus group, there is a high chance that comment of one respondent may trigger a chain of similar responses from other participants without considering personal beliefs.^{19,20}

Ethical approval

The research protocol was approved by the Institutional Review Committee for Biomedical Research (IRB), University of Veterinary and Animal Sciences, Lahore, Pakistan. Objectives of this study, source of funding, methods, research goals and aims, anticipated impacts, expected outcomes, as well as rights and responsibilities of the participants were clearly explained to the participants before taking consent. Participation in this study was voluntary and participants could leave the interviews if they felt uncomfortable. Personal information was not inquired/recorded; however, coding of the respondents was done, which latter assisted in transcribing the interviews.

Sample size and data collection

A convenient sampling method was adapted to recruit the potential respondent for the interview. Pharmacists working in community pharmacy, hospital settings or recent pharmacy graduates were invited for this interview. A total of 40 participants were approached of whom $n = 36$ gave consent for an audio-recorded interview with the response rate of almost 90%. Structured questionnaire guide was used by the interviewers (MOY and AS) to gather maximum information from the participants. The interviews were conducted until a saturation point was achieved.²¹

Contents of the interview

A semi-structured guide was developed by the team (TMK, MOY, AS, MY, AS,) after rigorous literature review.^{5,10,16,22–24}

To ensure content appropriateness, three experts from the relevant field reviewed to validate and optimize the interview guide. Three main segments of the interview guide were finalized in consultation with the experts:

- To understand the perceptions of the pharmacists regarding various rumors circulating in public about the COVID-19 vaccine,
- To assess the vaccine hesitancy in pharmacist community by asking different questions, and
- To assess the willingness of pharmacists to get COVID-19 vaccine.

A pilot study (sample size, $n = 2$) was conducted by both interviewers MOY and AS in the presence of TMK to test the face validity of items in the interview guide. Each participant was interviewed by one interviewer. Upon completion, the interviews were transcribed word to word by TMK to ensure the consistency in the questions, technique, and probing. Piloted sample was not included in the final analysis of the interviews. Upon completion of this exercise and resolution of any concern, interviews were conducted from the participant agreed to give consent. Factors that either impede or facilitate the participants to get COVID-19 vaccine were thoroughly discussed and participants were given enough opportunity to shape their own personal views relevant to the topic of interest.

Data analysis

All the audiotaped interviews were translated word-by-word from Urdu to standard English language by two interviewers (MOY and AS). To ensure the accuracy, completeness, and unbiasedness, the translated interviews were reviewed by a third researcher (TMK).^{25–27} The transcripts were independently coded by two researchers (MY and AS) and analyzed by using NVIVO®. After coding of the interviews three themes were generated to describe the respondents' perceptions. Detailed sub-themes were identified by deductive, iterative coding of the final data. Final data were then discussed among all the authors to remove any chance of biasness and ensure maximum consistency. A wide range of different perspectives were explicitly incorporated into the research design so that any chance of biasness could be removed, and reflexivity

could be addressed. No particular group/individual or narrative was privileged over any other participating group/individual during the analytical process. The data were analyzed with constant comparisons to find similarities and differences in the views of different participants, which were finally highlighted by identification of common themes. Also, equal importance was given to the comments of individuals with altogether different opinions or views to any particular question.

Results

A total of 36 respondents were interviewed with equal representation of both genders i.e. 18 males and 18 females. The demographic details of all the interviewees are summarized in Table 1. The summary of themes and sub-themes is given in Figure 1.

Theme 1: Perception about vaccine

COVID-19 virus

Overall, majority of participants believed that SARS-CoV-2 is a natural virus that causes a disease just like other viruses, but its spread rate is far greater than other viruses.

The concept that the SARS-CoV-2 is man-made is just a conspiracy. Research has shown that the virus is not man-made, and the disease caused by this virus is natural just like many other diseases. (HP12,13)

One of the respondents highlighted that “*it is not the human nature*” to make a virus just “*to harm humanity to such an extent.*” (HP8)

Respondents also mentioned that man-made viruses require some “*specific conditions to prevail and show the effects*” for which they have been developed and that a virus ‘*cannot survive this long*’ (RPG5).

Table 1. Socio-demographic details of participants.

Characteristics	Mean (SD) or Percentage (N)
Age	25.55 ± 2.85
Gender	
Male	
(RPG1, RPG2, RPG9-RPG12; CP1-CP6; HP3-HP6, HP9, HP12)	50% (18)
Female	
(RPG3-RPG8; CP7-CP12; HP1, HP2, HP7, HP8, HP10, HP11)	50% (18)
Area	
Rural	11.11% (04)
Urban	88.88% (32)
Education level	
Graduate	63.88% (23)
Mphil/PhD	36.11% (13)
Profession	
Recent Pharm-D graduates (RPG)	33.33% (12)
Community pharmacists (CP)	33.33% (12)
Hospital pharmacists (HP)	33.33% (12)
Marital status	
Married	30.55% (11)
Unmarried	69.44% (25)
Diagnosed with COVID-19	
Yes	13.88% (05)
No	86.11% (31)
Vaccinated against COVID-19	
Yes	38.88% (14)
No	61.11% (22)

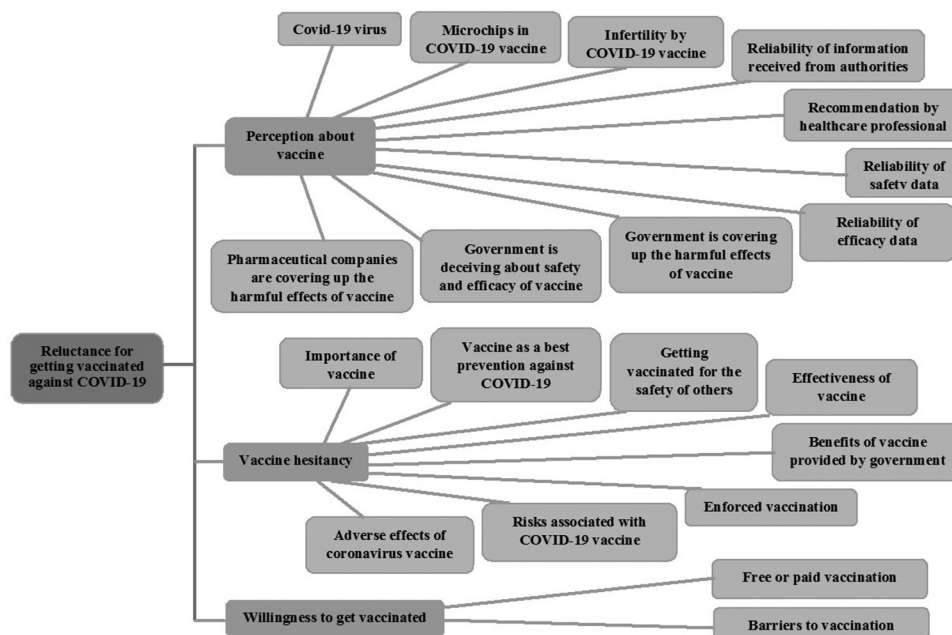


Figure 1. Graphical representation of thematic analysis.

I think it [spread of the COVID-19 virus] is not a conspiracy. COVID-19 is a reality and it's not man-made. If it was man-made then there would have been only one variant of the virus. Creating different variants in a laboratory, all having lethal effects, is quite difficult. (CP3)

Some respondents also shared their opinion that if it is man-made then definitely the death toll would be a lot higher than what is reported.

"It [virus] is not man made, otherwise there would not have been so many deaths" and *"the powerful nations may not have seen such a huge death toll"* (CP9). The participants further elaborated that, in case it is an artificial crisis, *"its [COVID-19] cure would have been available since long"* (RPG6).

Some participants shared their views in a broader context as:

Though it [COVID-19 virus] is not man-made yet there is also a perception that global powers may have developed the virus with some hidden economic agenda. As the virus originated from China, it may have wanted to destroy the American economy and influence the global norms. (RPG9)

Another participant stated that *"Global geopolitics may have motivated the superpowers"* to create a humanitarian crisis so *"they could dominate each other"* (HP4, CP12). Few participants believed that COVID-19 virus was created to be used as a bioweapon by powerful countries.

I think it [the COVID-19 pandemic] is a bio war that involves multiple countries like a world war. Instead of using military weapons, powerful states may have wanted to use bioweapon against other nations to destroy their economy. (CP10)

Microchips in COVID-19 vaccine

Most of the participants rejected the notion that the developed countries are aiming to implant microchips just to control humans.

Why would anyone do that? They [international powers] already have the power to control people through various means. The vaccine is just to protect the people from COVID-19. (CP5)

Some participants highlighted that *"different COVID-19 vaccines are being produced by different companies"* in different countries around the globe and *"all companies cannot use such tactic at the same time."* (RPG6)

Another participant stated that such rumors should be greatly discouraged because the vaccine is *"approved by DRAP [Drug Regulatory Authority of Pakistan]"* and the relevant national authorities cross-check everything before giving permission for use (RPG5).

A community pharmacist elaborated that if the international powers wanted to control humans all around the globe by implanting microchips in a vaccine, *"they could have also done that with other vaccines that every single child get for protection against various diseases. It is easy to insert a chip in children than in adults as they [adults] are reluctant to vaccination."* (CP9)

The vaccine is being administered via injection in the blood and trigger our immune system to develop antibodies against the virus. The participants discussed that the microchip can *"excrete out of body"* if it gets absorbed in the blood, *"then what is the purpose of using it [microchip] in the first place?"* (CP11, HP1)

Infertility by COVID-19 vaccine

The clinical trials of COVID-19 vaccines are *"not at the final stages. Post surveillance studies would give us any evidence"* (CP7) on the likelihood of such misunderstandings.

Many participants emphasized that, at present, there is *"no evidence of the truthfulness of such rumors"*, and these rumors should be *"strongly discouraged to address public fears and suspicions about the COVID-19 vaccine."* (HP5)

In Pakistan, many vaccines had faced such conspiracies and we should not believe in them because authorities like WHO [World Health Organization] have not reported anything like that. (HP8)

It was further stated that due to the misinformation about previously available vaccines, especially against the Poliovirus, “we [as a nation] have not been able to eradicate it [poliovirus] as yet.” (CP6)

Participants believed that such rumors develop vaccine hesitancy among public. “I don’t understand why people believe in such notions and are willing to die of the disease.” a participant (RPG8) showed frustration over the poor knowledge of a common man.

Reliability of information received from authorities

The participants mentioned that the development of “COVID-19 vaccine is new” and every new vaccine “requires at least 3–4 years of excessive research”; therefore, “nothing can be said with certainty” about the reliability and trustworthiness of the information provided by healthcare authorities. However, the data presented “by international health authorities like WHO [World Health Organization] and CDC [Centers for Disease Control and Prevention] are more reliable” because their research is “based on massive sample size” and they have access to more resources. (RPG11, HP4)

Few participants believed that information provided by national authorities is also equally reliable.

I have not received any information, but yes, if the information is from relevant authorities, it would be reliable because these authorities are aware of the current situation [of COVID-19] in the country. (RPG7)

A few participants also highlighted that when the information is provided by multiple officials, it may vary and could have negative impact on the perception of the people about COVID-19 vaccine safety and efficacy data.

The information we receive from WHO [World Health Organization], NHS [National Health Service] and government helpline is quite reliable but at national level, the information should be presented by a single government body as we have seen some ministers who say such things that may increase the vaccine hesitancy. (CP6)

Recommendation by healthcare professional

Participants were inclined to listen to their doctor regarding the COVID-19 vaccine because they believed that “doctors have a keen insight of the current pandemic situation” and are “dealing with the COVID-19 patients.” (CP4)

Those participants who were in the favor of vaccination also elaborated that a healthcare professional’s recommendation would strengthen their belief on the benefits of vaccine.

I will go for vaccination if my doctor recommends it because it will strengthen my resolve to get vaccinated. (HP2)

It was also discussed by the participants that the healthcare professionals should have proper knowledge about what they are recommending, and their way of recommendation should be “encouraging for building confidence” in COVID-19 vaccine. (HP12)

Their [healthcare professionals] way of recommendation should be convincing. Doctors are neither serious about it [COVID-19 vaccine] nor they are giving proper information. No doubt if a doctor is recommending then he knows better, but the information should be given in a proper way. (RPG1)

Some participants stated that the healthcare professionals should verify the risk to benefit ratio of the vaccine rather than “blindly” trusting their peers. (CP8)

I will follow their [doctors] instructions after doing some research of my own because they [doctors] frequently interact with COVID-19 patients and are aware of the current situation. (CP7)

Reliability of safety data

Most of the participants were hesitant to rely on the safety data of COVID-19 vaccine because the sample size used in the clinical trials of these vaccines was not large enough. Therefore, the vaccine may show “variation on individual or geographical basis.” (RPG3, CP1, HP9)

Data are not much reliable because very little is available at this moment. Something new may happen in future. Just like the virus started showing new strains, the vaccine could also show some new effects. (HP10)

Participants highlighted the possibility of “false positive or false negative results of the tests” conducted to check the safety of the vaccine because clinical trials were conducted in a hurry. (RPG4)

Some participants said that they rely only on the “evidence-based” safety data provided by relevant national and international “health authorities or published in some reputable scientific journals.” (RPG7, CP4, HP3)

The data are reliable because it is based on research. We cannot doubt it in the current situation. We must have some kind of proof if we are to doubt something. (CP8)

Reliability of efficacy data

Many participants believed that the data on the efficacy of COVID-19 vaccine are reliable only if they are “provided by higher authorities,” who present their statistics “on the basis of ground realities” and “extensive research.” (RPG7, CP3) A hospital pharmacist shared her experience and said,

In our hospital, they [vaccinated individuals] were tested for the antibodies against SARS-CoV-2, and their antibody titer was very high which convinced us to rely on the data provided by the authorities. (HP7)

Another participant shared a similar opinion and stated,

We don’t have much data on the basis of which we can say if it [COVID-19 vaccine] is effective or not. My personal experience and observation is that if a vaccinated person gets COVID-19 infection, he will recover in short time span as compared to the one who is not vaccinated. He would have only mild symptoms. (CP10)

It was also mentioned that there should be no doubt on the reliability of efficacy data because “no harmful effects [of the vaccine] have been observed so far” (HP2), and if the vaccine would not have been efficacious then the authorities would not have approved it for public use. In words of a participant,

As the COVID-19 infection is still occurring even after getting vaccine, there are some questions on its [efficacy data] reliability, but it [vaccine] has been approved on some sound basis by our authorities. I think it [efficacy data] is quite reliable. (RPG8)

Government is covering up the harmful effects of vaccine

Some participants believed that if the government is covering up any harmful effects of vaccine, it must have verified that such effects would not be of great concern for the public health. Otherwise, it may be covering up such data to avoid mass chaos.

[Government] maybe covering up [the harmful effects of COVID-19 vaccine], but if so, we would have seen such [harmful] effects.

The participant further added to this and said that

If there are some effects being covered up, they must not be of much concern and the government may be doing so to avoid fear [of vaccination]. (CP4)

Participants discussed that in this age of social media, it is not possible for the government to hide any information on the harmful effects of vaccine. A few participants were also of the opinion that the government will never do anything that “*is not in its interest.*” (RPG9)

Today, we use social media, and if someone had some adverse reaction to the vaccine, it would have been widely circulated on social media that the vaccine is not safe and it [vaccine] is showing harmful effects. The participant further elaborated that if I am getting vaccine and it [vaccine] shows adverse reaction, no one can stop me from sharing it [information on adverse effects] with anyone in person, or on social media. (HP6)

Government is deceiving about safety and efficacy of vaccine

Many participants believed that it is not possible for the government to deceive people in this age of “*social media and telecommunication.*” Contrary to this, some participants discussed that the possibility of the government deceiving about the safety and efficacy of COVID-19 vaccine cannot be ruled out because it has “*done this before*” and it has “*no other option to avoid public fear and suspicions*” about the vaccine. It was also discussed that government “*may not have enough data*” on the vaccine to be shared with the public. (HP3, CP6, RPG12)

Even if government is not giving the real data, it [vaccine] still must be safe enough to use at mass level. Government maybe concealing some facts for our benefit to protect us from the severity of pandemic. (RPG3)

Few participants believed that the government could deceive the public for “*its own interest*” or for the interest of pharmaceutical companies so that they could complete the “*post-surveillance studies*” and increase the “*sales of their vaccines*” at the same time. (HP11)

Pharmaceutical companies are covering up the harmful effects of vaccine

Many participants believed that the pharmaceutical companies are more likely to conceal the harmful effects of COVID-19 vaccine for their “*business*” interests. Participants mentioned that the companies had “*previously covered up facts*” about

other medicines, the most recent case of which appeared in 2020, when FDA recalled all the products of “*Ranitidine.*” (CP5, RPG11, HP11)

Participants also mentioned that the pharmaceutical companies may be masking some side effects of vaccine to avoid fear and ambiguity about the vaccine because people would be frightened even if “*mild symptoms such as fever, lethargy or dizziness*” appear after vaccination. (CP11, RPG4)

Participants highlighted that manufacturers of vaccine may not be hiding facts, but there is a chance that they may “*not have enough data*” on the basis of which they could give accurate information. (CP7)

They [pharmaceutical companies] are not hiding anything. Otherwise the clotting observed by COVID-19 vaccine, used in some individuals, would not have been reported. Here, I must also say that the data are not complete and further studies are required. (HP9, CP)

Theme 2: Vaccine hesitancy

Importance of vaccine

Vaccination is important in any pandemic as it helps “*eradicate*” the disease (RPG2). Many participants discussed that vaccine is very important to protect themselves and the community from the severity of symptoms of COVID-19. Participants also mentioned that vaccine will increase the immunity against SARS-CoV-2.

Antibodies [against SARS-CoV-2] are developing and immunity is getting strong through the use of COVID-19 vaccine. If a vaccinated person gets infected with SARS-CoV-2, he will show less symptoms as compared to the one who is not vaccinated. (CP10)

It was also mentioned by some participants that Pakistan is not capable of handling a health crisis for so long.

It [COVID-19 vaccine] develops immunity against SARS-CoV-2. We don't have pace and resources to manage increased number of severe cases and high mortality. The vaccine will reduce the burden from our hospitals. It may provide us with the lifelong immunity and may help us get back to the normal life. (CP 9)

One participant shared her personal observation of improved immunity against SARS-CoV-2 in hospital setting:

Those who got infected by SARS-CoV-2 after getting vaccine, recovered in short period of time as compared to those who didn't get the vaccine. This strengthened our belief that the vaccine is very important for us, our families and our community as well. (HP1)

Participants highlighted that “*Asian population, especially of subcontinent, is more vulnerable*” to SARS-CoV-2 because many people in this region are immunocompromised and suffering from comorbidities due to lack of nutrient rich or healthy food. (HP12)

It [COVID-19 vaccine] is very important specially for the elderly and comorbid individuals whose immunity is less as compared to young and healthy individuals. It gives protection against the severe symptoms of COVID-19. (RPG 5)

Vaccine as a best prevention against COVID-19

Majority of the participants believed that vaccine is the “*best, but not the only option*” for protection against COVID-19 (HP6). Participants elaborated that due to limited effectiveness of vaccine, other precautionary measures should be adopted along with the use of vaccine.

Hummm I think it [vaccine] is effective, but in comparison to other vaccines available against COVID-19, the Chinese vaccine is less effective. Hence, we must follow other precautionary measures like the use of face mask, frequent hand washing, and social distancing because the vaccine alone will not be much beneficial. (CP12)

Another participant had similar point of view and stated

It [vaccine] is not the best [option] because we should also follow other preventive measures like mask, hand wash, and social distancing, as vaccine does not give complete protection (HP7)

It was also emphasized that all other precautionary measures give external protection from the attack of virus but if the body gets exposed to the virus by any means, the only option that will help our immune system to fight against the virus, is vaccine.

Other than following precautionary measures, we only have the choice of vaccine. It is the last option to protect ourselves from COVID-19. All other precautionary measures like sanitizers, hand wash etc. are to be used externally. Vaccine is the only option to be used internally. (RPG10)

Few participants also mentioned that the vaccine is less effective because a person may develop symptoms of COVID-19 even after vaccination and become a carrier. Therefore, other “*preventive measures are the best option*” for the protection against COVID-19. (RPG4)

Getting vaccinated for the safety of others

Most of the participants believed that if a person gets vaccinated, his chances of getting infected with SARS-CoV-2 would be less which would eventually “*reduce the spread of [COVID-19] disease*” (RPG3). Participants considered it a burden on their conscience if someone gets infected just because of their carelessness.

It is very important to get myself vaccinated because if I get infected, I will spread it to other people and my conscience does not allow it. It [vaccine] is necessary to protect our families and the community. (CP8)

Explaining about the interruption of spread chain of SARS-CoV-2, a participant stated that

If you are vaccinated, you will not spread the virus to others, and you will protect your family from the disease. In the long run, it [vaccine] will help in breaking the spread chain of this disease. (RPG10)

Some participants believed that vaccine would give protection only to the person getting vaccinated regardless of the safety of others.

If I am vaccinated, it does not mean that I can avoid using face mask and hand sanitizer because if I come across any person who may be suffering from COVID-19, I can become a carrier of the virus and I will spread the infection to vulnerable population. (HP1)

Effectiveness of vaccine

Most of the participants believed in the effectiveness of vaccine against COVID-19 because it “*reduces the severity of the symptoms,*” while some of the participants showed concern about its “*side effects and relapse of disease.*” (HP4)

Some participants believed that the vaccine is showing somewhat “*promising effects*”; however, “*further studies are needed*” to confirm its effectiveness (HP9, CP2). Participants were concerned, especially, about the efficacy of the vaccine being administered in Pakistan due to lack of data on indigenous population.

The vaccine, being administered in Pakistan, must be effective as it [vaccine] has been approved by national and international health authorities, but nothing can be said with confidence because little is known about its effects on local population. It [vaccine] needs to be studied further and the detailed data will tell us more about its effectiveness. (CP9)

Concerned about mutations of SARS-CoV-2, a participant said:

I don't think it [vaccine] is as much effective as it is claimed. The SARS-CoV-2 is mutating continuously, and it [virus] could mutate further. The vaccine may not be effective against all strains of SARS-CoV-2. (RPG10)

Benefits of vaccine provided by government

Among various benefits of the COVID-19 vaccine offered by the government of Pakistan, cost-effectiveness was mentioned as the major benefit by majority of the participants because per capita income of a huge population of Pakistan does not allow them to pay for the vaccine.

It [vaccine] is totally free from the government. This is the only way to get people vaccinated and to give them protection against the virus. (CP 10)

Participants appreciated that prioritization of healthcare workers and elderly population for vaccination is a good strategy to increase the immunity of most vulnerable segment of society.

Elderly are immunodeficient and the vaccine will help improve their immunity against the virus. It [vaccine] will reduce the number of COVID-19 cases being reported on daily basis. As more people get vaccinated, data on its [vaccine] effectiveness will also increase. (RPG6)

Participants mentioned that people have easy access to vaccine because the whole process is “*smooth and convenient*” due to “*easy registration.*” Moreover, all the arrangements are being “*controlled and supervised by government officials*” (HP12).

Enforced vaccination

Many participants believed that Government of Pakistan should create awareness and try to convince the public by presenting facts about the COVID-19 vaccine rather than enforcing everyone to get vaccinated.

Government can only guide the people [about vaccination]. Consent of the individual is important for vaccination. Government should spread awareness in local language and advertise about the vaccine as it did for the polio vaccine, so the misconceptions about the vaccine can be addressed. (HP9)

A few participants highlighted the need for enforcement of vaccine to everyone because public is not aware of the harm being caused by COVID-19. Moreover, other precautionary measures are also ignored by the people.

Government should force everyone to get vaccinated as it is a matter of concern for the health of entire nation. Otherwise, the morbidity and mortality rate will increase, and eventually, the economy will collapse. (RPG4)

Another participant stated:

People with weak immunity and elderly population should be forced to get vaccinated, even if it is against their fundamental right, because they are more vulnerable to the disease. Government should try to convince the public and if it is not convinced, then force the vaccination. (CP11)

Risks associated with COVID-19 vaccine

Due to lack of data on COVID-19 vaccine, participants expressed greater concerns about the risk associated with COVID-19 vaccine than that of previously available vaccines against chickenpox, polio, measles, mumps, and rubella etc.

COVID-19 vaccine is new, and we don't know its adverse reactions. There is uncertainty about it [adverse effects of COVID-19 vaccine]. In future, not only side effects but adverse effects may also appear especially in immuno-deficient individuals. (HP11)

Similar comment was made by another participant:

There is increased risk with COVID-19 vaccine because little is known about its side effects. We just know the immediate side effects of the vaccine but for the long-term side effects, we are not sure. Data on the risk to benefit ratio of previous vaccines are available, so there is little risk regarding their use. (RPG9)

Participants also highlighted that, people tend to resist change and it takes time for the public to believe in and get used to the new discovery no matter if it is a medicine or anything else.

As the risk of COVID-19 [disease] is greater than the previous diseases so do the risk associated with its vaccine. Vaccine for polio is very common now and it may not be considered as much riskier as COVID-19 vaccine. Moreover, acceptance for novel innovation and practices is not easy for everyone. (CP2)

Some participants also believed that "*risk is associated with every medicine*" and it cannot be said that the risk associated with COVID-19 vaccine is more than that of previously used vaccines for other pathogens. (HP10)

Adverse effects of COVID-19 vaccine

Most of the participants said that side effects "*depend upon the overall health of the individual*" getting vaccinated (CP2, RPG11). Participants clarified that the vaccine has shown some side effects, but adverse effects have not been observed so far. Furthermore, the severity of harmful effects may vary from individual to individual.

At present, body reactions like fever, headache, mild cough, weakness and dizziness have been observed. It [vaccine] may have some adverse effects, but they will vary from person to person. Adverse reactions are more likely to appear in comorbid population while mild side effects may occur in healthy individuals as well. (CP11)

Participants also mentioned that the occurrence of side effects should not cause hindrance in getting vaccine because it is more important to be protected against the lethal disease than to be worried about temporary side effects.

I have heard a little about adverse effects of the vaccine, but its side effects are common. Despite these [harmful effects], we must go for vaccination because our focus should be on the pandemic rather than the curable symptoms of the vaccine. (RPG1)

Another participant shared similar opinion and stated:

There is no doubt that the COVID-19 vaccine has side effects, but not all vaccinated individuals are experiencing these effects. Moreover, these side effects are not severe enough that one would be hesitant to get vaccinated. (HP5)

Theme 3: Willingness to get vaccinated

Free or paid vaccination

Although few participants were hesitant to get vaccinated because of "*limited availability of data*," but majority of the participants showed interest in getting vaccinated "*if the vaccine is to be provided free of cost*." Participants believed that vaccine is for the protection of community against SARS-CoV-2, and that "*it is better to be vaccinated than to be infected with COVID-19*." (RPG6, HP3)

If you are getting an opportunity you must get yourself vaccinated. Free vaccine does not mean that it is fake, especially when it [vaccine] is being administered to large population at national and international level. (CP12)

Some of the participants showed reluctance in getting vaccine if there is some cost associated with the vaccine.

If you are in a system [like healthcare centers] where it is mandatory to get vaccinated, then you must go for vaccination no matter what its price is. But if it is not mandatory and your budget does not allow you to pay for the vaccine, then it is better to follow the precautionary measures only. (RPG12)

Despite the cost of the vaccine, few participants were willing to go for vaccination after "*analyzing its safety and efficacy data*" (RPG2). A Participant explained that a healthcare professional comes in contact with a lot of people and many of them may be asymptomatic carriers of SARS-CoV-2 and could become the source of virus.

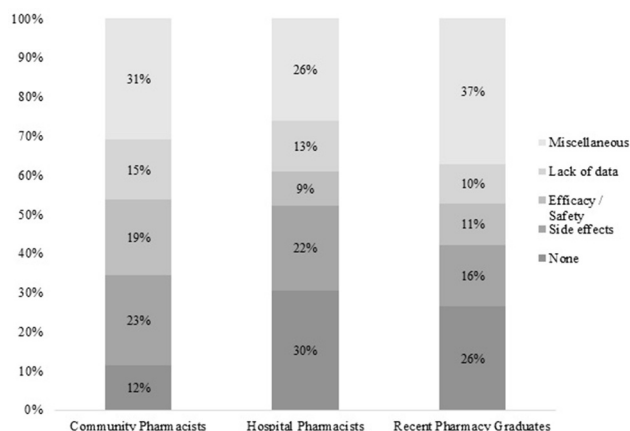
In our hospital, I am dealing with a lot of COVID-19 patients, which means that my chances of getting infected with SARS-CoV-2 are much greater than a common man. So, even if it [vaccine] is not free, I'll get myself vaccinated. (HP2)

A couple of participants were not in the favor of getting vaccinated whether it is free or not. One of them stated

I will not get myself vaccinated because my immunity is strong enough to fight against SARS-CoV-2. Furthermore, the vaccine is not as much effective, and it is showing side effects in vaccinated individuals. Moreover, the recurrence of COVID-19 even after vaccination, concerns me a lot. (CP3)

Table 2. Five most repeatedly outlined factors associated with COVID-19 vaccine hesitancy.

Class/Category	Problem/Concern	Number of quotes
Vaccine	Side effects/adverse effects	14
Research	Safety/Efficacy	09
Vaccine	Insufficiency of data	09
Finance	Cost	07
Facts	Conspiracies	07

**Figure 2.** Frequency distribution of barriers to vaccination.

Barriers to vaccination

Majority of participants mentioned that they will only “*check the facts about the vaccine*” before getting vaccinated, while some of the participants were concerned about the “*lack of data on the safety and efficacy*” of COVID-19 vaccine (RPG8, CP7). Some of the participants were also reluctant to get vaccinated because of the side effects they had observed personally or possible adverse effects that the vaccine may show in future.

Side effects of the vaccine are making me reluctant to get vaccinated against COVID-19. Furthermore, the vaccine is in phase-IV trials and may show some serious side effects in future, which may lead to its withdrawal from the market. (HP8)

Few participants were bothered by the “*misconceptions and rumors*” spreading around against the COVID-19 vaccine (RPG1). Some participants were hesitant due to the possibility of getting infected with the same or different variants of SARS-CoV-2 even after vaccination.

I am hesitant to get vaccinated because I am not sure about its [vaccine] effectiveness. Furthermore, it [vaccine] may not give me protection against different strains of SARS-CoV-2. I may get infected with the virus and show symptoms of disease even after vaccination. (CP5)

Five most repeatedly outlined factors associated with vaccine hesitancy are shown in Table 2. Figure 2 shows frequency distribution of barriers to vaccination highlighted by community pharmacist, hospital pharmacist and final year pharmacy students.

Discussion

The current study was perhaps the first to explore general perception about COVID-19 vaccine and vaccine hesitancy among pharmacists practicing in Pakistani healthcare settings. A qualitative design with one-on-one semi-structured

interview approach was used to achieve the study objective. This approach was helpful in extracting the responses even from the introverted participants. Participants were given ample time to shape their own views while minimizing the Hawthorne effect at the same time. Moreover, this approach provided more flexibility to the direction of the conversation.

Overall, it was observed that majority of the pharmacists did not believe in the rumors and conspiracies associated with COVID-19 and its vaccination. The results of our study were almost similar to other studies exploring COVID-19 vaccine hesitancy among healthcare workers in different countries.^{28–31} However, some respondents believed that global geopolitical rivalries might have aggravated the crisis situation during COVID-19 pandemic. The presence of similar kind of rumors among general public of Pakistan suggests a high possibility that such rumors may influence the opinions of pharmacist community as well.³² Such type of narratives even from a single pharmacist could reinforce public misconceptions about COVID-19 vaccine. It is crucial to explore the causes of such misperceptions in pharmacist community. Such misperceptions need to be addressed through specialized vaccine education programs. These educational interventions should not just address the common misperceptions and rumors about COVID-19 vaccine, but also highlight the importance of vaccine for an individual and its community.³³

Almost all the pharmacists straightaway rejected the popular perception of microchips being implanted through COVID-19 vaccines. They think it is impossible to control human beings remotely with microchips. The findings of our study is in marked contrast to another study in Jordan and Kuwait where almost a quarter of the respondents believed in similar kind of rumors.³⁴ However, in our study, some participants believed that there may be a possibility of developing such type of technologies in future that could influence human behavior. Therefore, the very notion of implanting microchips for the sake of controlling humanity seems flawed.

Many people in Pakistan believe that vaccination leads to infertility and COVID-19 vaccine would cause similar harms. Though majority of the pharmacists did not agree with that statement, yet a couple of pharmacists considered the possibility of COVID-19 vaccine-led infertility. Such type of opinions, even from small percentage of pharmacists, could significantly affect the ongoing vaccination campaign aiming to achieve herd immunity because pharmacists are often the first point of contact for getting medicine by most of the public in Pakistan.¹⁷ Similar type of mind-set had derailed polio vaccination campaign in past and it is still present in remote areas of Pakistan. The continuous struggle between science and religion shapes the opinion of many laymen in Pakistan.³⁵ It is their fear of technology and innovation, especially the western innovation, that would have a significant effect on the acceptability of current COVID-19 vaccine.

Many pharmacists believed that pharmaceutical companies may be hiding some important information on COVID-19 to promote the sale of their product and avoid triggering people's concern about harmful effects of the vaccine. However, almost all the participants rejected the idea that government is somehow involved in covering up important information on harmful effects of COVID-19 vaccine. Besides, it is very difficult

these days to control the spread of information due to the development of vast social media network.³⁶ Some participants considered that hiding information would be for the greater good because it would help in gaining more trust of public in COVID-19 vaccine and avoiding mass chaos in times of crisis. Majority of participants believed that the government should forcefully vaccinate everyone even if it is against the fundamental rights of a person. While the rest of the participants considered enforced vaccination as violation of fundamental rights of people. They emphasized that government should work harder on campaigns that encourage the public for vaccination instead of forcefully vaccinating everyone. Such campaigns should particularly target the most vulnerable sections of the community that are highly vaccine-hesitant. Many participants responded with satisfaction when asked about the importance of COVID-19 vaccine currently provided by the government. It may be due to the fact that current vaccination drive is very systematically arranged to vaccinate people in a phase-wise manner by prioritizing healthcare workers and elderly people.³⁷

All participants had some doubts on the reliability and trustworthiness of COVID-19 vaccine safety and efficacy data. Some of the participants even believed that the government may be giving false information on safety and efficacy data. Many pharmacists believed that safety/efficacy data of COVID-19 vaccine are incomplete because mass studies have not been reported yet. It may be true because sufficient number of people are yet to be vaccinated. Additionally, many experts are also casting doubts on the safety and efficacy data of COVID-19 vaccine because of the hasty clinical trials.³⁸ Majority of the participants considered World Health Organization (WHO) and Centers for Disease Control and Prevention (CDC) a reliable source to get information on COVID-19 vaccine safety and efficacy data. They believed that these organizations were actively involved in conducting research and disseminating reliable information. Their trust on these organizations may be because of high level of collaboration between regional offices of these organizations and local healthcare authorities of many countries in almost every health crisis situation.³⁹

Almost all the participants acknowledged the importance of COVID-19 vaccine for everyone. However, majority of the participants had some doubts on the effectiveness of vaccine because of limited data on Pakistani population. Many participants considered this vaccine riskier than the previously used vaccines against other diseases because of the availability of ample data on other vaccines. All participants had reservations on the adverse reactions of COVID-19 vaccine. It may be because some vaccinated participants experienced minor adverse reactions after receiving COVID-19 vaccination. The global reports on adverse effects of COVID-19 have also triggered a lot of anxiety among the participants.⁴⁰ However, almost all of them believed that people should be vaccinated regardless of these minor adverse events.

All but one participant showed willingness to get COVID-19 vaccine if it is to be provided free of cost. They believed that vaccination was the best way to control the spread of pandemic in addition to other precautionary measures. Many participants were reluctant to get vaccinated if they would have to pay for it

or if the cost of vaccine is unaffordable. Apart from certain other factors, majority of participants considered adverse reaction, cost of vaccine, and limited data on safety and efficacy profile of COVID-19 vaccine an important barrier to vaccination. Many participants claimed that the registration process for vaccination in their respective areas was very simple and easy. However, they believed that it is impossible for the government to vaccinate every single person because of the poor economic conditions of the country.⁴¹

Analyzing the previous history of vaccination campaigns in Pakistan and high prevalence of conspiracies in public,³² any further propagation of rumors and misperceptions about COVID-19 vaccine, would negatively affect the current vaccination campaign. It is high time that government of Pakistan take sufficient measures to curb the disinformation through various means. This article provides a keen insight on the vaccine hesitancy in pharmacist community of Pakistan. It has highlighted the fact that even the well-learned healthcare workers are not immune to various conspiracies and misperceptions. After careful analysis of the comments of participants, one can easily conclude that few of them were more vulnerable to “disinformation pandemic” than that of COVID-19 pandemic, and still fewer are found to be highly vaccine-hesitant.

Pharmacists should get updated information on COVID-19 vaccine from the trusted sources^{37,42,43} instead of believing such information that is not supported by the facts. High prevalence of misinformation among pharmacy students raises the questions on the teaching standards in pharmacy institutes of Pakistan. These institutes must conduct some virtual seminars to spread true information on COVID-19 vaccine and highlight the role of pharmacists in tackling misinformation. Online debates must be conducted among healthcare professionals to understand the mind-set of young pharmacists so that the stakeholders would know where to spend their energy to eradicate misinformation. The role of media and regulatory authorities like Pakistan Electronic Media Regulatory Authority (PEMRA) is very important in this regard. They must screen false information beforehand and provide room for healthcare professionals to educate people. Although PEMRA regularly maintains check and balance on misinformation but it has not taken a single action against anyone spreading rumors about COVID-19 vaccine. PEMRA must work in tandem with National Command and Operation Center (NCOC) to issue regular guidelines about COVID-19 vaccine on state media and bring anyone spreading false information on vaccine under the umbrella of law enforcement agencies. Government must engage the enlightened religious scholars to curb religiously motivated false perceptions about COVID-19 vaccine just like it did during polio vaccination campaign.¹³ The horizon of the Expanded Program on Immunization (EPI) should be broadened keeping in view the current situation by taking the role of busting misinformation about COVID-19 vaccine or any other vaccine for that matter.⁴⁴ Overall, the healthcare workers, especially pharmacists, should build a society that comprises of evidence-based research and that is resilient to any kind of falsehood about COVID-19 vaccine. It is about time that pharmacist community of Pakistan consider this a wakeup call and address the situation accordingly.

Research rigor and limitations

For evaluating qualitative studies, rigor is regarded as the most appropriate criterion. Four criteria including credibility, transferability, dependability, and confirmability must be met in order for the research to be considered rigorous.^{45,46} In this study, credibility was achieved through prolonged engagement and persistent observation to learn the context of the phenomenon in which it is embedded and to minimize distortions that might creep into the data. Transferability was improved by using a purposive sampling method and providing a detailed and accurate description of the participants. An expert qualitative researcher reviewed the transcribed material to validate the themes and descriptors identified to ensure the dependability of the study and reflexivity was maintained throughout the research process to achieve confirmability.

Our study must be assessed under the light of certain limitations. As this study is based on convenient sampling method so this study only provides the snapshot of vaccine hesitancy among pharmacists. The findings of this study cannot be generalized to the whole population of Pakistan. To better understand the situation of vaccine hesitancy, there is a need to conduct more studies of such type on a targeted section of the society. No statistical methods were applied to analyze the relations among different variables or to give a solid statistical explanation of the results because it was a qualitative interview-based study which seeks to get the point of view of pharmacists about COVID-19 vaccine. Although this study initiated a very hot debate, but views of the participants are just self-reported because no psychological techniques, like cotinine test, was applied to verify the truthfulness of their responses. So, there may be a chance of reporting bias. Also, the chance of selection bias can never be ruled out even if the participation is voluntary.

Conclusion

The results of our study illustrate that only a handful of pharmacists are found to be vaccine-hesitant. There is a need for the educational programs for Pharmacists to provide with credible information on COVID-19 vaccine to gain their trust. Moreover, regulatory authorities should collaborate with media outlets to curb the misinformation regarding vaccine. Stakeholders must consider this ongoing vaccination campaign as an unprecedented opportunity to formulate required interventions that will help reduce vaccine hesitancy among Pakistani pharmacists.

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Author contributions

TML, HT, LCM conceived the concept and drafted the preliminary framework of research. MOY, AS, AB, MY, UA, AS, NS, MSI, AASJ conducted the interview and transcribed the data. FA, TMK, HT, LCM, AKS wrote the initial draft. MOY, AS, AB, MY, AS, MRB, YMA, NS, MSI, AASJ finalized the results and methodology. All authors equally contributed in finalizing the paper.

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