

COVID-19 Vaccination-Related Concerns Amongst Healthcare Workers

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Abstract

Objective: To assess the concerns regarding the safety and efficacy of COVID-19 vaccination amongst healthcare workers of a medical university in Karachi.

Methods: A cross-sectional study was conducted at Baqai Medical University, Karachi from 15th July 2021 to 30th September 2022. A total of 197 healthcare workers, using a non-probability convenience sampling technique, were interviewed about their concerns regarding the safety and efficacy of COVID-19 vaccination, using a structured online questionnaire. Data were analyzed on SPSS version 20. To determine the association of demographic characteristics with concerns of healthcare workers about COVID-19 vaccination, binary logistic regression was applied for inferential analysis. A two-tailed p-value of <0.05 was considered statistically significant.

Results: The mean age of the study participants was 38.28±11.73 years, the majority were females (n=110, 55.8%), married (n=132, 67.0%), doctors by profession (n=129, 65.5%), non-smoker (n=169, 85.8%) and had no comorbidity (n=155, 78.7%). Out of 197 participants, 66 (33.5%) respondents exhibited their concerns regarding the side effects and efficacy of COVID-19 vaccination. Furthermore, doctors were found to have significantly lower odds of having concerns regarding COVID-19 vaccination than nurses/paramedics (AOR 0.17, 95% CI 0.08-0.34, p<0.001).

Conclusion: A substantial number of healthcare workers revealed their concerns regarding the safety and efficacy of the COVID-19 vaccine. Compulsion for vaccination may lead to inert participation towards COVID-19 vaccination programs. It is therefore imperative to address their concerns on an urgent basis.

Keywords: COVID-19, Vaccination, Health Personnel, Vaccine Hesitancy, Vaccine Efficacy.

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1. Introduction

The outbreak of coronavirus disease in 2019 altered the world dynamics and resulted in worldwide humanitarian and financial crises. On one hand, mortality from the virus created havoc in people's lives, and on the other, the extended lockdown had a backwash of financial crises.¹

Mortality from COVID-19 has been reported to be 3.4%, as compared to the seasonal flu which has mortality of less than 1%.² Global efforts to reduce the burden and to lessen the socioeconomic impact of COVID-19 disease were focused on effective preventive measures. Researchers worldwide teamed up to find ways to prevent the spread of the disease by developing effective vaccines but this effort was hampered by the hesitancy towards uptake of approved vaccines.³

According to the Strategic Advisory Group of Experts on Immunization (SAGE), vaccine hesitancy is defined as "a delay in acceptance or refusal of vaccination despite the availability of vaccination services." This attitude is affected by three factors;

complacency, convenience, and confidence. Complacency refers to presuming a low disease burden which makes one believe that vaccination is not required. Confidence is comprehended as vaccine efficacy and safety, while convenience is regarded as the provision and affordability of vaccines in a comfortable way.⁵

To address the phenomenon of vaccine hesitancy, the factors leading to this problem should be dealt with. Literature reports various environmental and host factors to be responsible for this phenomenon. Lack of trust in health policies launched by the government, substandard healthcare facilities, and negative propaganda by the media are a few factors that may have an impact on the general population. Also, various religious beliefs and lack of education may play a role in impeding effective vaccination campaigns.⁶

With weak healthcare system support, only effective preventive measures could protect the masses from the devastating effects of the COVID-19 pandemic. Unfortunately, though, the vaccine campaign was met with resistance by the Pakistani population.⁷ In a

country where the polio vaccination campaign has also encountered intense defiance, the COVID-19 vaccine faced the same opposition. With a low literacy rate and with the majority of people being under the umbrella of religious beliefs and myths, there was a need to address this issue seriously. Multiple religious and conspiracy theories brewed up and it required a great deal of effort by both the public and private sectors to convince people to vaccination.^{8,9}

Healthcare workers are among the front liners and face a greater risk of acquiring and subsequently transmitting the disease. Their safety is the cornerstone of the smooth functioning of any healthcare system. It is therefore necessary to address their concerns, if any, because being the first ones to interact with the public, their concerns and reservations may trickle down in the community and may flourish the anti-vaccine propaganda.¹⁰

To the best of the author's knowledge, current local literature on vaccine hesitancy towards COVID-19 among healthcare workers is limited at best. This study was therefore conducted to assess healthcare workers' concerns related to COVID-19 vaccination. The study results will help us to better recognize the reservations of healthcare workers regarding COVID-19 vaccinations and will aid in developing future targeted interventions to effectively tackle this important obstacle in realizing the goal of complete COVID-19 vaccination coverage among healthcare workers in Pakistan.

2. Materials & Methods

A cross-sectional study was conducted from 15th July 2021 to 30th September 2022 at Baqai Medical University, Karachi. Doctors, nurses and paramedics working at Baqai Medical University were included in the study whereas those refusing to provide verbal informed consent were excluded from the study. The ethical approval was taken from the Ethics Review Committee.

Keeping the percentage frequency of the study outcome at 50% for a most liberal estimate, with a 95% confidence level and 7% precision, the required sample size was calculated to be 196 participants using an online openness calculator.¹¹ Against the calculated sample size, a total of 197 participants were included in the study using the non-probability convenience sampling technique.

After obtaining informed consent and explaining the purpose of the study, data were collected by using a structured online questionnaire developed on Google Forms that was sent to the email address of the healthcare workers. Follow-up reminders were sent after 1 week, and the survey was closed after 2 weeks. Participation was voluntary and each questionnaire was kept anonymous.

The questionnaire has been designed and approved by an expert group of Epidemiologists and Senior Internal Medicine Consultants. The content and face validity of the questionnaire have also been assessed. The questionnaire was then finalized after appropriate modifications were done by valuable feedback. The questionnaire was developed in English language and comprised of two sections; section A comprised of demographics including age, gender, marital status, profession, smoking status and comorbid whereas section B consisted of history of COVID-19 infection, COVID -19 vaccination status and concerns regarding side effects and efficacy of COVID-19 vaccination. After data collection, all questionnaires were reviewed for completeness and accuracy to maintain standards of quality control.

Data entry and analysis were performed using SPSS version 20. Categorical variables were described using frequency and percentages whereas continuous variables were summarized using mean and standard deviation. Age was categorized into two groups, up to 35 years and 36 years or above. However, for readiness towards vaccination, those who were 'vaccinated' and those who were 'unvaccinated but registered for vaccination and waiting for their turn' were categorized as one group whereas those who were 'neither vaccinated nor registered' were categorized as another group. For inferential analysis, binary logistic regression was applied to compute univariate odd ratios with a 95% confidence interval for determining the association of demographic characteristics with concerns of healthcare workers about getting COVID-19 vaccination. Variables with $p < 0.25$ and other important variables irrespective of $p < 0.25$ in univariate analysis were used to build a multivariable regression model to compute adjusted odd ratios with a 95% confidence interval.

A two-tailed p -value of < 0.05 was considered statistically significant.

3. Results

A total of 197 healthcare professionals participated in the study with a 92.9% response rate. The mean age of participants was 38.28 ± 11.73 years (range 19-69 years). A majority of participants were aged up to 35 years ($n=100$, 50.8%), were females ($n=110$, 55.8%), married ($n=132$, 67.0%), doctor by profession ($n=129$, 65.5%), non-smoker ($n=169$, 85.8%) and had no comorbidity ($n=155$, 78.7%) (table 1).

Table 1: Participants Profile

Participant Characteristics (n=197)	Count (%)/ Mean $\pm$ S.D.
Age (Years)	38.28 $\pm$ 11.73
Age Group	
Up to 35 Years	100 (50.8)
36 years or above	97 (49.2)
Gender	
Male	87 (44.2)
Female	110 (55.8)
Marital Status	
Married	132 (67.0)
Unmarried	65 (33.0)
Profession	
Doctor	129 (65.5)
Nurse/Paramedic	68 (34.5)
Smoker	
Yes	28 (14.2)
No	169 (85.8)
Comorbidity	
Yes	42 (21.3)
No	155 (78.7)
History of COVID-19 Infection	
Positive	128 (65.0)
Negative	69 (35.0)
Vaccination Status	
Vaccinated	154 (78.2)
Unvaccinated but registered for vaccination (waiting for their turn)	26 (13.2)
Neither vaccinated nor registered	17 (8.6)

Moreover, out of 197 healthcare workers, 66 (33.5%) exhibited their concerns regarding the safety and efficacy of COVID-19 vaccination (Table 2). Out of a total of 197 participants, 154 (78.2%) had received the COVID-19 vaccine, 26 (13.2%) were unvaccinated but got registered and waiting for their turn, whereas 17 (8.6%) were neither vaccinated nor registered for vaccination. Thus the total of vaccinated and unvaccinated but registered group was 180. Among this group, 142 (78.9%) healthcare workers showed willingness by own towards vaccination while 38 (21.1%) were compelled to get vaccinated by their organizations.

Table 2: Concerns Regarding safety and efficacy of COVID-19 Vaccination

Participant's Concerns	n =197 (%)
No	131(66.5)
Yes	66(33.5)
Side effects	43(21.8)
Body aches	35(17.8)
Joint pain	27(13.7)
Hairfall/Rashes	16(8.1)
Stroke/MI	23(11.6)
Neuropathy	11 (5.6)
Cancers	8(4.1)
Infertility	3(1.5)
No Efficacy	18 (9.1)
Others	5 (2.5)

Table 3: Multivariable Analysis of Association between Participant Characteristics and their COVID-19 Vaccination Concerns

Participant Characteristics (n=197)	AOR	95% CI Lower	95% CI Upper	p
Age Group				
Up to 35 Years	1.09	0.51	2.31	0.818
36 years or above			Ref	
Gender				
Female	1.24	0.60	2.59	0.553
Male			Ref	
Marital Status				
Unmarried	1.10	0.50	2.42	0.801
Married			Ref	
Profession				
Doctor	0.17	0.08	0.34	<0.001
Nurse/Paramedic			Ref	
Smoker				
Yes	0.39	0.14	1.07	0.070
No			Ref	
Comorbidity				
Yes	0.63	0.26	1.50	0.298
No			Ref	
History of COVID-19 Infection				
Positive	0.55	0.26	1.15	0.112
Negative			Ref	
Readiness for Vaccination				
Vaccinated/Unvaccinated but registered	0.90	0.42	1.92	0.801
Neither vaccinated nor registered.			Ref	

Multivariable logistic regression analysis of the association between participant characteristics and their COVID-19 vaccination-related concerns showed that after controlling for the potential confounding effects of

all other variables, the healthcare profession was significantly associated with the concerns related to COVID vaccination where doctors had significantly lower odds of having vaccinated related concerns than nurses/paramedics (AOR 0.17, 95% CI 0.08-0.34, $p < 0.001$) (Table 3).

4. Discussion

Healthcare workers have been reported to have a higher perceived risk of COVID-19 with more than 90% agreeing towards their vulnerability and transmission to the patients and relatives resulting in dire consequences. As cited above, they are amongst the most trusted sources of vaccine information and have a direct influence on the vaccination decisions of their patients and social contacts. They should therefore be the preferred target population in the ongoing COVID-19 vaccination strategies. However, studies have shown varying but substantial proportions of reluctance amongst healthcare workers about receiving vaccination.¹²

In our study, 33.5% of healthcare workers exhibited their concerns regarding the side effects and/or effectiveness of COVID-19 vaccination. Likewise, in a study by Kose S et al., amongst 1138 healthcare personnel of Turkey, 31.4% showed vaccine hesitancy and concerns were mainly about the side effects and its ineffectiveness as well as the trust upon their immune system.¹³ On the contrary, a study amongst 1159 healthcare workers in Palestine by Maraqa B et al. reported a vast majority (>60%) of healthcare workers having concerns related to the safety and efficacy of the vaccine.¹⁴ This disparity could be due to multiple reasons such as the availability of vaccine safety and efficacy reports at the time of the study, types of vaccines available, previous vaccination experiences as well as cultural, political and religious beliefs.¹⁵

The qualification has been reported to have an impact on the perception of doctors.¹⁶ Our study also showed that healthcare workers with higher levels of qualification such as “doctors” showed fewer concerns regarding side effects and ineffectiveness of COVID-19 vaccination as compared to paramedics. This is consistent with a previous study amongst 1,965 healthcare workers in France by Paris C et al, which showed that having a doctorate or postgraduate degree is associated with higher (>80%) acceptance of COVID-19 vaccine.¹⁰ Similarly, according to another study by Kashif M et al,

among 208 healthcare workers in Pakistan, significant numbers of HCWs (68.1%) responded that the vaccine is safe and effective, however, those with lesser health literacy expressed strong conviction that they are immune to COVID-19 with low risk of acquiring infection therefore showed higher concerns and fear towards vaccination.¹⁷ Likewise, another study from Teresina, Brazil by Araújo TM showed that medical doctors are more inclined towards vaccination as compared to other healthcare workers and perceived no fear of its side effects.¹⁸ This could be because professionals with higher qualifications are more likely to be aware of the existence and threat of the COVID-19 pandemic as well as the evolution of new vaccines through involvement in the scientific medical literature. However, a contradictory finding was also observed by Adane M et al in an earlier study among 404 HCWs in Dessie City, northeastern Ethiopia that showed nurses and midwives to be more likely to receive vaccination as compared to doctors and other healthcare workers.¹⁹ In our study, 91.4% (180) of healthcare workers showed willingness towards vaccination. Similarly according to Chew NW et al, more than 95% of 1720 healthcare workers in Asia-Pacific study, regardless of location, were willing to receive the COVID-19 vaccine.²⁰ However, in contrast with the above findings, some studies have also found a higher percentage of unwillingness for vaccination,^{21,22} but the participants in these studies were not necessarily healthcare providers rather were from the general population. Similarly, another study in Pakistan also reported a higher percentage of unwillingness towards vaccination in the general population than healthcare workers.¹⁷ This obvious disparity in willingness, whether amongst the general public or healthcare workers, could be associated with the experience of COVID-19 vaccine administration and varying morbidity and mortality of the pandemic over time.²³

Readiness towards vaccines is related to their concerns regarding vaccine safety and efficacy.²⁴ However, in this study, no significant relationship was found between participant's readiness towards vaccine and their concerns regarding vaccination. This is contrary to the findings of the Asia-Pacific study by Chew NW et al., where HCWs who were willing to take the vaccine were more likely to believe that the pandemic is severe and vaccine is effective and safe.²⁰ This could be because, amongst those who were vaccinated or were ready for it, a substantial proportion of participants were compelled

by their organizations which might depict acquiescence with unspoken hesitancy. When healthcare workers are unable to express their reluctance, it becomes more difficult to address their concerns.²⁵ Intrinsically, unspoken hesitancy in healthcare workers can cultivate reduced public trust in COVID-19 vaccination programs through their inert participation and dismal encouragement for vaccination.

Furthermore, the age of the healthcare workers was not associated with their concerns related to COVID-19 vaccination in this study. However, it has earlier been reported that vaccine acceptance was higher in the older age group.¹⁶ Authors suggest that age alone should not be considered a determining factor of outcome in this case, unless other age-related factors such as comorbidities, awareness and prior experience are taken into account. Therefore until more vigorous studies are done on this topic, it would be difficult to interpret the presence or absence of such an association.

Gender was also not shown to be significantly associated with vaccine-related concerns in our study. On the contrary, previous studies have shown that females have less acceptance of vaccination.^{21,26} This disparity could be because in previous studies the target population studied was the general public with a much higher proportion of female participants. Further, the time of data collection was during lockdown which could have enhanced women's fear and anxiety leading to higher concerns and less vaccine acceptance.

Interestingly, the presence of comorbidities and previous COVID-19 infection were also not associated with vaccine-related concerns whereas, in a previous study, a history of co-morbid and previous COVID-19 infection were both reported to be associated with higher acceptance of the vaccine.¹² This discrepancy might be due to the uniformity of our study population as healthcare workers, their majority being vaccinated, having core knowledge of COVID-19 and belonging to a relatively younger age group with fewer comorbidities as compared to the previous study.

Conducting further research to understand the concerns and addressing the hesitancy in vaccine uptake through constructive dialogue is the need of the hour. Building the confidence of healthcare workers in approved vaccines by designing tailored vaccine messages to the target audience is needed to increase the impact of vaccination campaigns.

This study has certain important limitations. Firstly, healthcare workers may have answered questions in a

manner that would be viewed as favourable by others. Secondly, being a single-centre study with a moderate sample size, it is acknowledged that the generalization of study findings is limited.

5. Conclusion

In the present study, despite the high level of readiness towards the COVID-19 vaccine, a third of healthcare workers showed concerns regarding the safety and efficacy of the COVID-19 vaccine, with higher concerns among nurses and paramedics. Furthermore, almost one-fifth of healthcare workers exhibited compulsion for vaccination, pointing towards acquiescence with unspoken hesitancy. This makes them anxious and un-influential towards mass vaccination programs. Therefore, it is imperative to address the important aspects of the decision-making of healthcare workers regarding vaccine safety and efficacy on an urgent basis.

Institutional Review Board Approval

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Contributions:

A.S, B.R - Conception of study

- Experimentation/Study Conduction

A.S, B.R, N.A.D, F.A, M.U, J.A -

Analysis/Interpretation/Discussion

A.S, B.R - Manuscript Writing

A.S, B.R, N.A.D, F.A, M.U, J.A - Critical Review

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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