Barriers and Hesitance of COVID-19 Vaccination in Pakistani Population-A Cross Sectional Study

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Abstract

Introduction: COVID-19 pandemic has affected both developed and underdeveloped world. Vaccines have been proven as main preventive measure against COVID infection; however, its compliance was of concern in many communities.

Objective: To assess the barriers and hesitance towards COVID-19 vaccine in general population of Pakistan.

Methodology: This cross sectional survey was conducted in two hospitals namely; Pakistan Institute of Medical Sciences, Islamabad and Shifa International Hospital, Islamabad. A total of 1274 respondents coming as visitor or caretakers to hospital were enrolled. These were adults over 18 years age, both genders and were literate. Ethical approval was taken and written informed consent was administered.

Results: The mean age was 28.8 ± 10.8 years; females were dominant 695 (54.6%). Majority had easy access to vaccination 1099 (86.3%), while 966 (75.8%) had adequate awareness. Of total, 495 (38.9%) respondents claimed vaccine as against religion. Almost one-half 617 (48.4%) mentioned that their family head rejected vaccine. Older respondents were more likely to have vaccine hesitancy (57.3% *vs.* 47.4%, p-value <0.001) and fear that vaccine is unsafe (60.1% *vs.* 50.6%, p-value 0.001). Moreover, females were more likely to have fears that vaccine is unsafe (58.4% *vs.* 52.8%, p-value 0.04) and their family heads rejected vaccine too (52.1% *vs.* 44.0%, p-value 0.004).

Conclusion: There are numerous barriers to COVID-19 vaccine in Pakistan. More than half study population was hesitant to vaccine due to fears of safety. A significant proportion thought it's against religion, while older respondents and females were more hesitant.

Keywords: COVID-19 infection; Hesitance; Vaccine; Prevention

Introduction

The COVID-19 pandemic starting in late 2019 is still a grave threat affecting populations with various strains in both developed and underdeveloped worlds. The pandemic has had a devastating spree in all regions and corners of the globe [1]. The United States, Brazil, Russia and India are the most affected countries both morbidity and mortality-wise [2]. To date, 410 million people have got infected with COVID-19 globally and close to 6 million have died, thus depicting a global fatality rate of 1.5%. Most of the COVID deaths have been witnessed in the US (1 million), Brazil (0.6 million), India (0.5 million) and Russia (0.3 million) [3]. In Pakistan, so far close to 1.5 million people have caught the COVID-19 infection and approximately 30000 have succumbed to it, resulting in a mortality rate of 2.0% [3].

The COVID-19 vaccines were developed and tested till the late 2020's and were rolled out for use in some parts of the globe at the beginning of 2021. Since then the vaccine has been at the forefront as a safety wall against COVID infection [4]. Initially, COVID affected the adults and old age strata of the population, however, now every segment of the population is the target.

Vaccine hesitancy and rejection have been alike in both developed and underdeveloped countries [5,6]. Some segments of the population have taken a stance against vaccinations, while many others have become a victim of Propaganda campaigns. Experts believe that 70%-80% of the global population needs to be vaccinated for controlling the pandemic to gain complete herd immunity against COVID infection. As the demand for vaccines was huge many countries and pharma industries began developing and testing them. Initially, there was an issue of demand and supply as the vaccine was rolling out in phases; some were less effective than others [7].

Later on, the confusion became more severe when numerous other strains of the Coronavirus were identified; this uncertainty introduced disbelief in communities and led to more hesitancy in already rigid people. The first groups who got vaccinated were the healthcare workers; however, studies have reported hesitancy and rejection of the COVID vaccine in even them. So far, till February 2022, around 53.0% of the global population has been vaccinated for COVID-19. Some countries such as China, Brazil and Canada have more than 80.0% of the population vaccinated. Surprisingly, the two most Corona-affected countries of the world *i.e.,* US and India are lagging in vaccination coverage with 64.0% and 52.0% inoculations to date, respectively [8].

Evidence regarding vaccine hesitancy and rejection is popping up from every corner of the world irrespective of developed or underdeveloped status. A local study reported that 44.0% of respondents said that the COVID-19 vaccine is safe and effective whereas only 53% of respondents believed that the vaccine is the best way to avoid COVID infection [9]. Another study from the United States by Shih SF and colleagues witnessed that 33.0% of participants were vaccine-hesitant while around 19.0% completely rejected it [10]. There is evidence on the effect of vaccination and its relation to less severity in various virus strainsrus [11]. The general population is still skeptical and their beliefs are also not certain. As social distancing, face masks, hand hygiene and other such preventive strategies have helped in curtailing the infection rate; vaccination is the main preventive measure against Coronavirus. Thus, vaccine compliance is pivotal for the stoppage of Corona infection and resultant mortality. This study was planned to assess the barriers to COVID-19 vaccination and also to look for possible solutions for its acceptance in the general population in Pakistan.

Methodology

This was a cross-sectional study done at Pakistan Institute of Medical Sciences, Islamabad and Shifa International Hospital, Shifa Tameer Millat University, Islamabad. The study aimed to determine the barriers to COVID-19 vaccination in the Pakistani population and look for possible solutions to enhance its compliance.

COVID-19 infection was defined as Coronavirus disease (COVID-19), an infectious disease caused by the SARS-CoV-2 virus. The barriers were measured as socio-demographic parameters and social perceptions and practices of participants regarding COVID-19 infection.

Ethical considerations and patient selection

The institutional review board approved the study (Reference No. FMTI-ERRB/09/05) and a written informed consent was taken from all participants. Data was collected on a structured closed-ended questionnaire pertaining to demographic details of respondents and questions regarding acceptance and barriers of COVID-19 vaccination. Two data collectors interviewed the attendants and visitors of different departments who were otherwise healthy.

The participants were visitors/caretakers of patients coming to the hospitals who were adult citizens over 18 years age and of both genders, were literate and were able to respond to face-to-face questions. Mentally retarded, blind, or dependent people and those not agreeing to consent or respond to the survey questions were excluded.

Study outcome and variables

The primary study outcomes were acceptance of vaccination and barriers and hesitance to the vaccine. All the study procedures and data collection was conducted by the researcher himself with assistance to minimize selection bias and also to maintain data quality and continuity.

The study variables included baseline characteristics (age, sex, residence, education and profession) and acceptance (safety, effective) and barriers (lack of awareness, religious beliefs, social beliefs, family or community trend and socio-demographic characteristics) of COVID-19 vaccine.

Statistical considerations

The sample size was measured on the basis of 95% confidence level and alpha error of 5% with an anticipated population with vaccine hesitancy of 33.0% 9 taken from literature with a design effect of 1.5 the measured sample size came out to be 1019 cases. Keeping a non-response rate of 15%-20% the final sample size was 1274 participants.

Data was entered and analyzed in SPSS version 22.0. The categorical variables like gender, education, residence, profession, acceptance of vaccine and barriers were analyzed as frequency and percentages. The continuous numerical variables like age were measured as mean and standard deviation. Furthermore, a selective analysis was done to compare the socio-demographic parameters and vaccine barriers according to age and gender of respondents in the study using chi-square test. A p-value of <0.05 was considered significant.

Results

In this study, 1274 respondents were enrolled. The average age of respondents was 28.8 ± 10.8 years. The females were in dominance with 695 (54.6%) proportion and the majority of respondents were from rural areas 1002 (78.6%). There were 552 (43.3%) married and 722 (56.7%) respondents were unmarried. Most of the respondents were educated in this study; 410 (32.2%) had secondary/higher secondary education

while 703 (55.2%) had graduate/postgraduate level education **(Table 1)**.

Table 1: Baseline characteristics of patients (n=1274).

	No. of cases	%Age
Age (years)		
Mean ± SD	28.8 ± 10.8	
Gender		
Male	579	45.40%
Female	695	54.60%
Residence		
Rural	1002	78.60%
Urban	272	21.40%
Marital status		
Married	552	43.30%
Unmarried	722	56.70%
Education		
Illiterate	44	3.50%
Primary/middle	117	9.20%
Secondary/higher secondary	410	32.20%
Graduate/postgraduate	703	55.20%
Profession		
Laborer/technical work	322	25.30%
Professional, Govt./private service	952	74.80%

In this study, 1102 (86.5%) respondents mentioned that if asked they would get vaccinated voluntarily without any hesitation and a similar proportion of 1095 (85.9%) accepted that the COVID-19 vaccine is effective. Almost three-forth 941 (73.9%) of the respondents favored voluntary vaccination while 333 (26.1%) were against mandatory vaccination. Around one-half of the respondents, 674 (52.9%) had hesitancy for COVID-19 vaccination and a similar proportion of respondents 712 (55.9%) had fears that vaccine is unsafe. Most of the respondents had easy access to vaccination 1099 (86.3%) and around three-forth 966 (75.8%) had adequate awareness regarding vaccines.

There were 495 (38.9%) respondents who thought that vaccine is against religious beliefs. Most of the respondents 1034 (81.2%) mentioned that their social circle got completely vaccinated. While almost two-thirds of the study respondents 820 (64.4%) mentioned they had a preference for vaccine types. There were 930 (73.0%) respondents who said that they trust vaccine guidelines. Almost one-half of the respondents 617 (48.4%) mentioned that their family head rejected vaccine **(Table 2)**.

Table 2: Barriers to COVID-19 vaccination (n=1274).

	No. of cases	%Age
Voluntarily vaccinated?		
Yes	1102	86.50%
No	172	13.50%
Is COVID-19 vaccination effective?		
Yes	1095	85.90%
No	179	14.10%
Do you favor mandatory vaccination?		
Yes	941	73.90%
No	333	26.10%
Hesitancy in COVID-19 vaccination?		
Yes	674	52.90%
No	600	47.10%
Fears that vaccine is unsafe?		
Yes	712	55.90%
No	562	44.10%
Is vaccine easily accessible?		
Yes	1099	86.30%
No	175	13.70%
Adequate awareness regarding vaccines?		
Yes	966	75.80%
No	308	24.20%
Do you think the vaccine is against religious beliefs?		
Yes	495	38.90%
No	779	61.10%
Is your social circle completely vaccinated?		
Yes	1034	81.20%
No	240	18.80%
Do you have any preference for vaccine types?		
Yes	820	64.40%
No	454	35.60%
Do you trust vaccine guidelines?		

Yes	930	73.00%
No	344	27.00%
Did your family head reject the vaccine?		
Yes	617	48.40%
No	657	51.60%

Further analysis was done to assess the barriers to COVID-19 vaccination in terms of age and gender background. Most of the barriers were found equally distributed according to gender and age of the patients. However, there were few factors found significant. The respondents older than 25 years were significantly more likely to have hesitancy against the COVID vaccine (57.3% *vs.* 47.4%, p-value <0.001). Similarly, older aged respondents had a greater fear that vaccine is unsafe (60.1% *vs.* 50.6%, p-value 0.001). Moreover, it was also noted that the older age respondents (>25 years) were of the point that vaccine is against religious beliefs (41.6% *vs.* 35.4%, p-value 0.02). When barriers were assessed according to the gender of respondents it was witnessed that females were more likely to have fears that the vaccine is unsafe (58.4% *vs.* 52.8%, p-value 0.04). Similarly, significantly more females mentioned that their family heads reject the vaccine (52.1% *vs.* 44.0%, p-value 0.004) **(Table 3)**.

Table 3: Comparison of barriers to COVID-19 vaccination according to age and gender of study respondents (n=1274).

	Age		p-value	Gender		p-value
	<25 years n (%)	**>25 years n (%)**		**Male n (%)**	**Female n (%)**	
Voluntarily vaccinated?						
Yes	482 (85.0%)	620 (87.7%)	0.16	502 (86.7%)	600 (86.3%)	0.84
No	85 (15.0%)	87 (12.3%)		77 (13.3%)	95 (13.7%)	
Is COVID-19 vaccination effective?						
Yes	490 (86.4%)	605 (85.6%)	0.66	496 (85.7%)	599 (86.2%)	0.78
No	77 (13.6%)	102 (14.4%)		83 (14.3%)	96 (13.8%)	
Do you favor mandatory vaccination?						
Yes	411 (72.5%)	530 (75.0%)	0.31	427 (73.7%)	514 (74.0%)	0.93
No	156 (27.5%)	177 (25.0%)		152 (26.3%)	181 (26.0%)	
Hesitancy in COVID-19 vaccination?						
Yes	269 (47.4%)	405 (57.3%)	<0.001	301 (52.0%)	373 (53.7%)	0.54
No	298 (52.6%)	302 (42.7%)		278 (48.0%)	322 (46.3%)	

Fears that vaccine is unsafe?						
Yes	287 (50.6%)	425 (60.1%)	0.001	306 (52.8%)	406 (58.4%)	0.04
No	280 (49.4%)	282 (39.9%)		273 (47.2%)	289 (41.6%)	
Is vaccine easily accessible?						
Yes	490 (86.4%)	609 (86.3%)	0.93	506 (87.4%)	593 (85.4%)	0.31
No	77 (13.6%)	97 (13.7%)		73 (12.6%)	101 (14.6%)	
Adequate awareness regarding vaccines?						
Yes	439 (77.4%)	527 (74.5%)	0.23	442 (76.3%)	524 (75.4%)	0.69
No	128 (22.6%)	180 (25.5%)		137 (23.7%)	171 (24.6%)	
Do you think the vaccine is against religious beliefs?						
Yes	201 (35.4%)	294 (41.6%)	0.02	230 (39.7%)	265 (38.1%)	0.56
No	366 (64.6%)	413 (58.4%)		349 (60.3%)	430 (61.9%)	
Is your social circle completely vaccinated?						
Yes	451 (79.5%)	583 (82.5%)	0.19	465 (80.3%)	569 (81.9%)	0.47
No	116 (20.5%)	124 (17.5%)		114 (19.7%)	126 (18.1%)	
Do you have any preference for vaccine types?						
Yes	369 (65.1%)	451 (63.8%)	0.63	369 (63.7%)	451 (64.9%)	0.66
No	198 (34.9%)	256 (36.2%)		210 (36.3%)	244 (35.1%)	
Do you trust vaccine guidelines?						
Yes	408 (72.0%)	522 (73.8%)	0.45	429 (74.1%)	501 (72.1%)	0.42
No	159 (28.0%)	185 (26.2%)		150 (25.9%)	194 (27.9%)	
Did your family head reject the vaccine?						

Yes	267 (47.1%)	350 (49.5%)	0.39	255 (44.0%)	362 (52.1%)	0.004
No	300 (52.9%)	357 (50.5%)		324 (56.0%)	333 (47.9%)	

Discussion

This study highlights that half of the respondents had hesitancy against the COVID-19 vaccine, despite easily accessible while a little more than half respondents had fears regarding the side effects of vaccination and doubted its' safety. The purpose of developing COVID-19 vaccines was to prevent the general population from contracting this infection and to restrict the further intensity of the spread of the pandemic. Thus, vaccines have a crucial role in controlling the spread of any outbreak, epidemic and pandemic. Vaccine hesitancy and fears from it have been significant barriers in this study respondent. Many previous trials on COVID-19 patients have found similar trends of barriers. A local study by Kashif, et al. witnessed that fear of side effects of COVID-19 vaccine was the main barrier while close to half of them that COVID-19 is unsafe [12]. A previous study by Dubik SD and colleagues on teachers reported that lack of confidence, belief that vaccine in susceptible and feeling uncomfortable were the main barriers to COVID-19 vaccination [13]. Another study Magadmi RM and colleagues noted that concerns regarding the side effects of vaccination and fear of its safety were the main barriers [14]. The comparative evidence regarding the hesitancy and barriers against vaccination is important and contains huge implications. The lack of awareness, societal taboos and a culture of doubts especially in the context of people's thoughts that COVID-19 vaccine is against religious beliefs is not new [15,16]. In this study, though three-forth respondents were aware of vaccines, more than one-third thought that the vaccine is against religious beliefs. Evidence suggests that there is a huge evidence of creating doubts in Pakistani population especially by some religious leaders and followers. This highlights the importance of engaging religious leaders in overall vaccine campaign and improving its compliance [17-19].

Another hesitance which may turn into a barrier was people's preference for vaccine types in this study and the rich and affording class of the society clearly opted for the Western Countries prepared vaccines. The role of family head is also crucial as almost half of the family heads rejected the vaccines in the current study. This becomes more important in Pakistani society where females have no role in decision making and their family heads rejected the vaccine [20].

Selective analysis in the present study showed that older age respondents were more likely to be hesitant against vaccines and they were the ones along with the female gender who feared that COVID-19 vaccine is unsafe.

This study has many advantages; firstly a large sample of general population was enrolled to assess barriers to COVID-19 vaccine. Since, vaccine acceptability is generally very low in the country. Nationally representative data suggests that close to two-third children are immunized while one-third was not vaccinated [21]. This study adds to the evidence regarding hurdles to vaccination in Pakistan as well as general issues related with vaccine acceptability. Secondly, this is one of the few trials done locally on the topic of barriers to COVID-19 vaccine. Thirdly, various general perceptions regarding religious belief and taboos, role of family heads in our society were validated *via* quantification. There were no significant limitations noted during the study.

Conclusion

There are numerous barriers to COVID-19 vaccine in the Pakistani population. More than half study population was hesitant to vaccine due to fears of side effects and doubts regarding vaccine safety. A significant proportion thought it's against religious guidelines. Moreover, older age respondents and females were more hesitant mainly due to the rejection of vaccine by family heads and beliefs were the main barriers in this study.

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Conflict of interest

All the authors state that "there is no conflict of interest".

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