

Original Article

Vaccine Hesitancy: A new challenge in fight against COVID-19

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Article Processing

Received: 03/02/2022

Accepted: 16/07/2022

Cite this Article: Rashid, H., Haider, T., Abdullah, A., Tariq, A., Saeed, S., Tousif, K., Naseem, A.O., Haider, N. Vaccine Hesitancy: A new challenge in fight against COVID-19. Student Supplement of Journal of Rawalpindi Medical College. 15 Sep. 2022; 26(1): 18-25.

Conflict of Interest: Nil

Funding Source: Nil

Access Online:



Abstract

Background: Vaccination is an important public health intervention for the control of infectious diseases. To tackle the humongous upsurge of COVID-19, vaccines were introduced globally. Prevention can only be achieved if there is a high acceptance rate of the vaccine. On the other hand, vaccine hesitancy is the main challenge faced by the world's health system. It is seen among people mostly because of misconceptions, lack of awareness, and low education levels.

Objective: To investigate the etiological factors of vaccine hesitancy against COVID-19 among general population of Rawalpindi and Islamabad.

Materials and Methods: A cross-sectional study was conducted in Rawalpindi and Islamabad, Pakistan.. Data were collected using a self-designed questionnaire that included questions regarding demographic details, the attitude of people towards getting vaccinated, accessibility and availability of the vaccine, the major reason for reluctance, knowledge regarding pros and cons of getting vaccinated, and prior vaccination history.

Results: Total number of participants were 403. Our results indicate that majority of the population did not believe in myths circulating regarding vaccines (81.1 % , n=327); however, 206 people (51.1%) believe that vaccines can affect the newborn and 247 participants (61.2%) believe that people might get COVID after vaccination. Vaccines were easily available to 88.2% (n=355) of the study population, yet 78.7% (n=317) were doubtful about the adverse effects of vaccines. The highest incidence of hesitancy was found in males (Odds Ratio OR 1.12), married candidates (OR 2.27), housewives (OR 2.5), and individuals belonging to rural areas (OR 2.47).

Conclusion : Our results indicate that majority of the population did not believe in myths circulating regarding vaccine side effects. However, in those who were hesitant, the major factors contributing to vaccine hesitancy were lack of sufficient information about vaccine.

Keywords: Vaccine hesitancy, vaccine, COVID-19, pandemic.

Introduction

Coronavirus disease is a contagious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the first case of which appeared in Wuhan, China, in December 2019 and was declared a pandemic on 11th March 2020. More than 172,666,790 cases have been reported around the world.¹ Vaccine hesitancy was reported globally soon after the commencement of the vaccination drive. It refers to "delay in acceptance or refusal of vaccines despite availability of vaccine services." It is influenced by a number of factors, among which convenience, complacency, and confidence of effectivity of vaccines are significant.² The vaccination campaign will bear fruit if, along with evidence-based uptake strategies, vaccine hesitancy factors are determined and effectively addressed because this seems to be the only way forward in our fight against COVID-19.

Recent research indicated that in order to gain herd immunity, 55 to 82% of the population should be immune through exposure to the virus or vaccination.³ Studies from various countries reported COVID-19 vaccine acceptance rates to be below 60%. The highest vaccine acceptance rates (> 90 %) were found in Malaysia, Indonesia, Ecuador, and China, while the lowest rates (<60 %) were found in Kuwait, Jordan, Italy, and Poland.⁴ In a time when an overabundance of unchecked information and misinformation is widely spread and consumed through social media platforms, the myths and conspiracies regarding COVID 19 vaccines pose a substantial threat to vaccine acceptance rates.⁵ Addressing vaccine hesitancy effectively requires an understanding of the magnitude of the problem, diagnosis of the root causes, tailored reference-based strategies to reduce hesitancy, and monitoring and evaluation of the interventions.⁶ Vaccine hesitancy was higher before the people were provided with adequate safety information.^{7,8} Furthermore, people's faith and preference for the body's natural immunity against the virus increase the rates of vaccine hesitancy.^{9,10} Another study reports less educated individuals to be more hesitant to take the vaccine than those who were well educated.¹¹

Vaccine hesitancy remains a hurdle to full population vaccination against highly infectious diseases. The prime factor contributing to vaccine hesitancy in Pakistan are myths and misconcept of conspiracies related to vaccine efficacies and side effects.¹²⁻¹⁴ Vaccine hesitancy in the case of poliomyelitis proved

to be the major obstacle in eradicating the disease. COVID-19 vaccination drive started in Pakistan on 3rd February 2021. According to the available data, only 2,076,600 people are vaccinated in Pakistan out of a total 216.6 million population.¹⁵ Similarly, a study conducted on health care workers in Pakistan shows that 70.25 % of people received the vaccine while 24.51 % of people were hesitant and wanted some more information regarding its safety.¹⁶

Establishing an effective, secure, and affordable vaccination program is already challenging but vaccine hesitancy confers a distinctive hurdle to the researchers and the community. As Pakistan is facing a massive disease load with a huge rise in daily COVID cases, hesitancy against the vaccine creates an alarming situation. Exposure to a contiguous disease enhances the risk, and individuals are far more likely to spread the disease to others if they are not vaccinated. Statistics from many countries affected by the COVID-19 pandemic have proven a huge fatality rate in unvaccinated people.

Our study is among the first few studies that aim to explore the factors of vaccine hesitancy in the twin cities, Rawalpindi and Islamabad, and to find out association of various demographic variables responsible for vaccine hesitancy. Consequently, it will help the medical fraternity to reinvigorate the role of the community for mass awareness, address myths and misconceptions with evidence-based logical reasoning, and possibly, the involvement of private businesses to promote vaccine procurement for mass vaccination.

The objective of this study is to assess factors associated with COVID-19 vaccine hesitancy in the general population in twin cities of Rawalpindi and Islamabad.

Materials and Methods

A descriptive cross-sectional study was conducted over three months from June to August 2021 using non-probability convenient sampling in the twin cities of Pakistan. The general population of 18 to 80 years of age, regardless of their gender and occupation, was included. Among this population, individuals who were chronically immunosuppressed, currently suffering from COVID-19, and those who refused to give consent were excluded from the study.

Data were collected using a self-designed questionnaire that included questions regarding demographic details, the attitude of people towards

getting vaccinated, accessibility and availability of the vaccine, the major reason for reluctance, knowledge regarding pros and cons of getting vaccinated, and prior vaccination history. Participants were interviewed by 4th year MBBS students.

Data were entered and analyzed using SPSS version 20. Descriptive analysis, i.e., mean and frequency were calculated, and multinomial logistic regression was used to assess the association between dependent and independent variables.

Results

A total of 403 participants took part in this study. Out of which 185(45.9%) were males, and 218(54.1%) were females (Table I). The age distribution and the other demographic details are depicted in Table I.

The details of the perception of people regarding vaccination as well as attitude of the people towards vaccination are given in Table II. Among the study population, 81.1 % of the participants did not believe in myths circulating around regarding the COVID-19 vaccine, while 51.1 % of people had a perception that the vaccine would adversely affect the newborn. The fear of getting COVID-19 after vaccination was found in 61.2% participants.

Figure 1 shows that 88.2 % of participants believed that vaccines are easily available in their cities. 42.4 % of the participants knew someone who did not get the vaccine because of religious or cultural reasons. Most

of the participants (78.7 %) were not confident about their area's tracking facilities working on reporting the adverse effects of the vaccines. The opinion of the participants regarding the vaccine's efficacy, its benefits over risks, and other aspects are depicted in Figure 2.

Table III shows vaccine hesitancy with various demographic factors. Males (OR=1.12 95% CI: 0.75-1.66) had relatively more odds of being hesitant than females. The married participants (OR=2.27 95% CI: 1.52-3.40) were more likely to be hesitant than the unmarried individuals. Housewives (OR= 2.15 95% CI: 1.03-4.45), businessmen (OR= 1.41 95% CI: 0.54-3.71) and private employees (OR= 1.20 95% CI: 0.58-2.47) were more likely to be hesitant in comparison to reference group of students while the government employees (OR= 0.8 95% CI: 0.38-0.65), laborers (OR= 0.96 95% CI: 0.43-2.12) and unemployed (OR= 0.38 95% CI: 0.18- 0.80) candidates had less odds of being hesitant than the reference group. Candidates from rural areas (OR= 2.47 95% CI: 1.18-5.15) had more odds of being hesitant than the individuals living in urban areas. Individuals with intermediate (OR= 0.88 95% CI: 0.29-2.68), graduate (OR= 0.77 95% CI: 0.25-2.28) and post-graduate (OR= 0.64 95% CI: 0.20-2.03) level of education had less odds of being hesitant than the uneducated participants. Vaccine hesitancy was significantly associated with marriage, housewives, unemployment, and the rural background of the candidates.

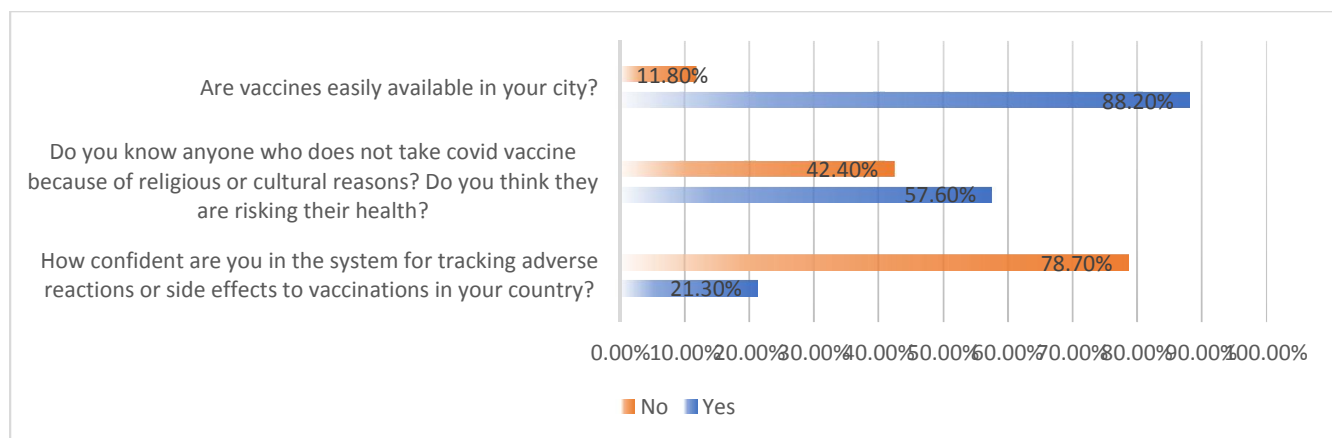


Figure 1: Current availability and confidence in the COVID-19 Vaccine among study population (n=403)

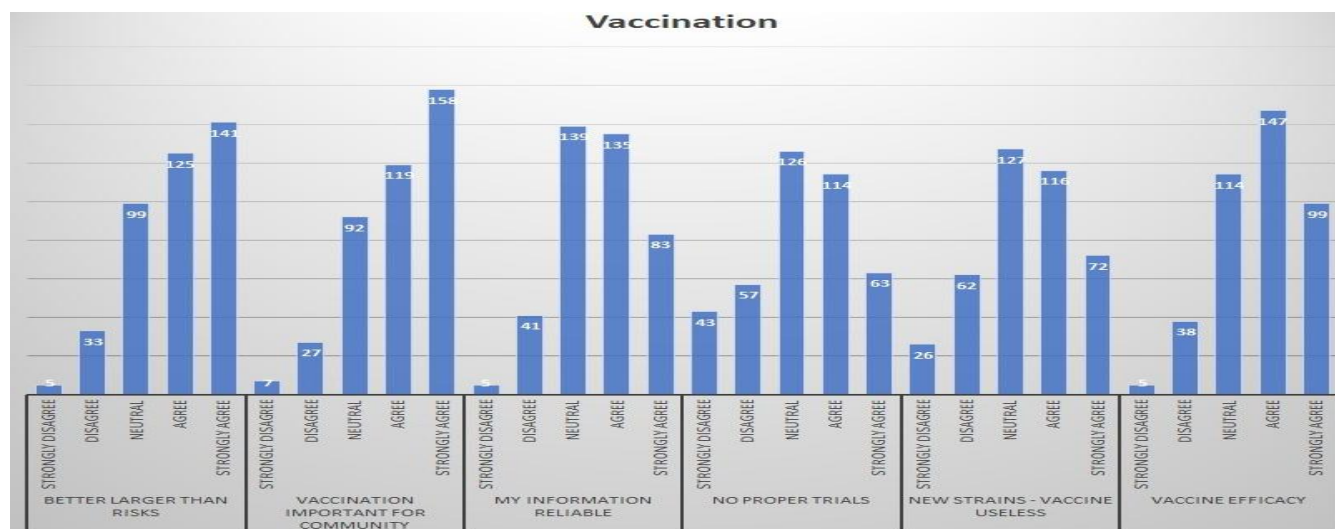


Figure 2: Vaccine-oriented behavior of individuals (n=403)

Table I : Awareness, socio-economic issues of parents and influence of this disorder on child's mental health (n=403)

Variables	n	%
Age Groups		
18-30	209	51.9
31-40	71	17.6
41-50	73	18.1
51-60	38	9.4
61-70	07	1.7
71+	05	1.2
Gender		
Male	185	45.9
Female	218	54.1
Marital Status		
Married	191	47.4
Unmarried	212	52.6
Occupation		
Government Employee	65	16.1
Private	64	15.9
Businessman	24	6.0
Housewife	67	16.6
Unemployed	82	20.3
Labour	45	11.2
Student	55	13.6
Residency		
Urban	369	91.6
Rural	34	8.4
Educational Status		
≤ Matric	28	6.9
Intermediate	115	28.5
Graduate	177	43.9
Post-Graduate	69	17.1
Uneducated	14	3.5

Table-II : Perception of people towards COVID-19 vaccination (n=403)

Questions	Yes		No	
	n	%	n	%
1) Do you believe in any myths regarding the covid-19 vaccine? For example, infertility, microchips, etc.?	76	18.9%	327	81.1%
2) Do you think the COVID vaccine has some effects on a newborn if the mother is vaccinated during pregnancy/lactation?	206	51.1%	197	48.9%
3) Do you think people get covid after vaccination?	247	61.2%	156	38.8%
4) Do you feel social pressure to get the covid vaccine?	181	44.9%	222	55.1%
5) Do you think getting vaccinated is a time-consuming process?	177	43.9%	226	56.1%
6) Have you ever heard something related to shortage of vaccination stock?	283	70.2%	120	29.8%
7) Do you face any transportation issues in reaching the vaccination centre?	76	18.9%	327	81.1%
8) Did anyone you know face any hurdle in getting access to vaccination due to any reason?	118	29.4%	285	70.6%

Table-III : Association of hesitancy with demographics (n=403)

Variables		Vaccine Hesitant (n)		OR (95% CI)
		Yes	No	
Gender	Male	85	100	1.12 (0.75 - 1.66)
	Female	94	124	1
Marital Status	Married	105	86	2.27 (1.52 - 3.40) **
	Unmarried	74	138	1
Occupation	Government Employee	26	39	0.8 (0.38 - 0.65)**
	Private	32	32	1.20 (0.58 - 2.47)
	Businessman	13	11	1.41 (0.54 - 3.71)
	Housewife	43	24	2.15 (1.03 - 4.45) *
	Unemployed	20	62	0.38 (0.18 - 0.80) *
	Labour	20	25	0.96 (0.43 - 2.12)
	Student	25	30	1
Area	Rural	22	12	2.47 (1.18 - 5.15) *
	Urban	157	212	1
Education	Matric	14	14	1 (0.27 - 3.60)
	Intermediate	54	61	0.88 (0.29 - 2.68)
	Graduate	77	100	0.77 (0.25 - 2.28)
	Post Graduate	27	42	0.64 (0.20 - 2.03)
	Uneducated	7	7	1

OR= Odds ratio

* = P-value < 0.05"

** = P-value < 0.01"

Discussion

Our study highlighted the trust of study participants of Rawalpindi and Islamabad on vaccination to curb the coronavirus pandemic. In the current research, 81.1% (n=327) of the participants did not believe in myths circulating around regarding the COVID-19 vaccine. In contrast to this, a study carried out in Jordan and Kuwait showed high rates of vaccine hesitancy associated with conspiracy beliefs regarding the prospective vaccine and the origin of the virus.¹⁷ Another similar study was carried out in Sindh, Pakistan, showing people's belief in myths and conspiracies as a major barrier to the acceptance of the vaccine.¹⁸

Regarding the effects on new borns, 51.1 % (n=206) of the individuals had the perception that the vaccine would have adverse effects on the newborn. Likewise, a survey conducted in Singapore depicts the vaccine acceptance rates in pregnant and lactating women as 30.3% and 16.9%, respectively.¹⁹ Another similar study in Qatar showed the vaccine hesitancy rate of 25% in perinatal women due to concerning effects on newborns.²⁰

In the present study, 61.2% (n=247) of the participants thought that people get COVID-19 after vaccination. A similar study showed the concern of people regarding the vaccine's safety and efficacy as they perceived it to be ineffective and carrying the risk of actual infection.²¹ Another study in Pakistan depicted 0.6 % of participants to be doubtful as people are getting positive after vaccination.²²

Our study revealed that the majority of the participants (88.2 %) believed that vaccines are easily available in their cities. A survey conducted in UAE also showed that 52 % of the participants expected the vaccine to be free and easily available at multiple locations.²³

Cultural and religious factors also contribute to vaccine hesitancy. Our results showed that 42.4% (n=171) of the participants knew someone who did not get the vaccine because of cultural and religious reasons. A study conducted in Pakistan stated that 16.4% of the respondents thought that COVID-19 and its vaccine is the propaganda of non-Muslims to rule the world.²⁴ Similar results were shown by a study conducted in the USA, which suggested that religiosity was significantly and negatively associated with the intention to get vaccinated against COVID-19.²⁵ Failure to receive adequate information also contribute to vaccine hesitancy. Adequate information

builds up the confidence to receive vaccination. In our study, 78.7% (n=317) of individuals were hesitant about getting the COVID-19 vaccine because of a lack of confidence in the system working on reporting the adverse effects of the vaccines. Likewise, a study carried out on Egyptian medical students depicted that the most confirmed and reported barriers to COVID-19 vaccination were deficient data regarding the vaccine's adverse effects (potential 74.17% and unknown 56.31%) and insufficient information regarding the vaccine itself (72.76 %).²⁶

According to the current study, the percentage of males hesitant to COVID-19 vaccination (85 out of 100) is higher in comparison to that of hesitant females (94 out of 124). On the contrary, a study in the UK and another in Qatar report greater hesitancy among the female gender.^{27,28} The study reveals that married individuals have more odds of being hesitant than unmarried individuals, whereas a Saudi national survey depicts a higher acceptance of COVID-19 vaccination among married people.²⁹ Likewise, a US national study reinforces this contradiction.³⁰ In our study, housewives, businessmen, and private employees were more likely to be hesitant in comparison to the reference group of students, while the government employees, laborers, and unemployed candidates had fewer odds of being hesitant than the reference group. A study in Bangladesh stated more vaccine hesitancy among students and public service employees.³¹ In contrast, a considerably low level of vaccine hesitancy (13.9%) was found among University students in Italy.³²

In the present study, candidates from rural areas (22 out of 34 individuals) had more odds of being hesitant than individuals living in urban areas (157 out of 369). Similar results were stated by Urban Institute, Washington, DC ³³ as they found a high level of COVID vaccine hesitancy among rural residents (22%) than urban residents (15%). However, according to another study in Bangladesh, rural respondents were more interested regarding receiving the COVID-19 vaccine.³⁴ Individuals with intermediate, graduate and post-graduate levels of education had fewer odds of being hesitant than the reference group (uneducated participants). Similarly, higher educational status was associated with a greater willingness to receive vaccination in the US.³⁵ A study shows that 68% of the college degree holders and 61% of the individuals with no college degree in US accepted the vaccine.³⁶

To our knowledge, this is the first study conducted to measure vaccine hesitancy in the general population

in Pakistan. It will contribute greatly to the public health strategies that need to be undertaken in order to enhance vaccine compliance. The study was not biased in the selection of the study population as diverse people from the general population of twin cities were included. People from both genders belonging to all age groups and different economic, social, and educational backgrounds were part of the study. The study can be used as a pilot study which can be used to design and conduct similar studies and surveys to assess vaccine hesitancy in populations of other cities. Since our study also shows the general public opinion regarding vaccine administration to pregnant and lactating mothers, results can be used to devise strategies to improve vaccine compliance in this population.

However, our study has a few limitations. The study was conducted on the population of twin cities. Since the demographic characteristics and availability of vaccines vary in different areas and cities of Pakistan, the results of this study cannot be generalized to the entire population of the country. Another possible limitation of our study is that the intention to get the vaccine is not always translated into a real act. Thus, the results may not correspond to actual facts and figures. Furthermore, as this is a cross-sectional study, the results can not be used to anticipate the long-term vaccine hesitancy rates among the population as the vaccine hesitancy may vary greatly with the changing COVID-19 situation.

Conclusion

Our results indicate that majority of the population did not believe in myths circulating regarding vaccine side effects. However, in those who were hesitant, the major factors contributing to vaccine hesitancy were lack of sufficient information about vaccine.

Multidisciplinary education, pro-vaccination awareness campaigns, and health seminars must be introduced by government authorities to promote a positive attitude towards vaccines.

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