Understanding the Covid-19 Vaccine Acceptance and Attitude Among General Population

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ABSTRACT

Objective: The present study aimed to assess the acceptance and attitude the population of the largest metropolis of Pakistan against COVID-19 vaccine.

Methodology: An online cross-sectional study was conducted among 1305 participants using a validated questionnaire. The questionnaire was distributed via snowball sampling technique among the population aged 18 years and above. Study data was analyzed using IBM Statistical Package for Social Sciences Version 20.0. Univariate logistics regression analysis was used to analyze the variables concerning the COVID-19 vaccine acceptance and hesitancy.

Result: Majority of the participants were females (96.6%), age group 18-24 years (87.9%) with more than 50% having 13 years of formal education. A large number of respondents 84.7% (n = 1105) showed willingness to get vaccinated. 62% (n = 808) agreed that COVID19 vaccine will prevent them from the COVID19 virus. The most frequent reasons identified for vaccine hesitancy among the participants were unwanted adverse effects after being vaccinated (42.8 %), rumors that there is a conspiracy behind vaccine (34.6%) and religious reasons (3.4%). Educational background and the occupation were factors associated with COVID-19 vaccine acceptance.

Conclusion: Vaccine acceptance among the participants was remarkably high. However, a large population in Pakistan is still unvaccinated. It is important to address the hesitant individuals by providing adequate information about the vaccine and building their trust in vaccine effectiveness and safety.

Keywords: COVID-19 vaccine, general adult population.

Introduction

Since the end of 2019, the world has been shaken by a series of acute-respiratory infections and is still under its threat. The respiratory infections were caused by the pathogen named "novel corona virus SAR-COV-2". The devastation caused by this novel corona virus pathogen lead to the emergence of one of the mostdeadly outbreaks of the history "the COVID-19 outbreak".[1] Globally, more than 400 million individuals have been infected by this deadly virus which initiated in the Wuhan city of the Hubei province in China.[2] In Pakistan, as of 13 March, 2022there have been 1,518,692 confirmed cases of COVID-19with 30,307 deaths reported.[3] The health care system worldwide had been significantly compromised with the catastrophic social, economic and education consequences of the pandemic. Although a number of potential anti-COVID-19 drugs are under investigation, currently no curative treatment exists against the deadly pathogen. To combat this, vaccines that are safe and effective is the only solution to contain the pandemic. Till date several vaccines have been approved for use in human subjects and a number of vaccines are under trials. [4, 5]

Throughout the history, vaccines are recognized as an effective and safe way for combatting the infectious diseases. However, vaccines hesitancy has been a major concern globally. The WHO has even identified it as a global health threat.[6] Pakistan is a developing country with a diverse population having people belonging to different race, ethnicity, religion and socio-economic groups. Previously, Pakistan had been the subject of polio vaccine hesitancy. As a consequence of it, polio cases are still reported in Pakistan. In the current scenario of the pandemic, vaccines serve as the only resort for providing herd immunity without requiring the community to be infected. Keeping in view the fact, vaccine hesitancy could be a major threat to a country like Pakistan where there is limited budget to advanced point of care treatment and poor health care infrastructure.[7]

As of 13 March 2022, Moderna, Sinopharm, Cansino Bio, Astra Zeneca, Sinovac, Pfizer-Biotech, PakVac and Sputnik V have been approved for use in Pakistan. The vaccine doses administered as of 13 March 2022 are 101,881,176. With a population of 226 million, the vaccine doses administered is far behind.[3]

There is a dire need to address the hesitancy and vaccine literacy among the masses so that majority of the population in Pakistan get vaccinated against COVID-19. The present study sought to evaluate the acceptance of COVID-19 vaccine among the Pakistani population with an aim to identify the underlying population perspectives and their concerns. The population perspectives and their concerns will eventually help the government and health authorities to formulate best approaches to ensure maximum COVID19 vaccine coverage.

Methodology

A cross sectional study was conducted from September 10 to September 30, 2021. The target population was the individuals aged 18 and above of Karachi, Pakistan. OpenEpi was employed to calculate the minimum sample size. With 95% confidence interval the minimum sample size for the population of Karachi i.e. 20 million (as estimated in 2020) was found to be 385. A total of 1305 participants were enrolled in the study.

An online questionnaire using platform of Google Forms was used for data collection. Online questionnaire was disseminated via snowball sampling method using social media (Facebook, WhatsApp). Snowballing sampling was preferred due to pandemic situation. Initially 100 primary participants were recruited and were asked to fill the questionnaire. Upon completion and submission of questionnaire they were asked to share the questionnaire further to their social circle. Incomplete questionnaires were excluded from the study.

The questionnaire was developed in English proceeding extensive literature review.[8, 9]. The questionnaire comprised of the following aspects: (a) Socio-demographic factors including gender, age, education and occupation etc., (b) acceptance of COVID-19 vaccine, (c) attitude regarding COVID-19 vaccine and (d) concerns regarding COVID-19 vaccine. A pilot study was conducted enrolling 77 participants (20% of the estimated sample size) to assure that the questions were easy to understand and clearly written.

Data analysis was performed using IBM Statistical Package for Social Sciences Version 20.0. Descriptive statistics was performed for continuous and categorical variables. Univariate logistic regression analysis was employed for the variables concerning the COVID-19 vaccine acceptance and hesitancy. Results were considered to be significant with p-value less than 0.05.

Results

A total of 1,305 participants responded of which 3.4 % (n = 45) were male and 96.6% (n = 1260) were female. Out of 45 male respondents, 51.1 % (n = 23) were from the age group 25-54 years and 62.2% (n = 32) had more than 13 years of formal education. On the contrary to the male respondents, majority of the female respondents 89.5% (n = 1,128) were from age group 18 – 24 years and more than 50% of them had more than 13 years of formal education. Collectively, 58.2 % (n = 760) had medical sciences background and the majority of the respondents were students 88.2 % (n = 1,151) (Table I).

Table I: Sociodemographic characteristics of participants. (n=1305)		
Sociodemographic characteristics	n	%
Gender		
Male	45	3.4
Female	1260	96.6
Age		
18 – 24 years	1147	87.9
25 – 54 years	152	11.6
> 55 years	4	0.3
Education		
Below secondary	9	0.7
Secondary	335	25.7
Bachelors	594	45.5
Masters	89	6.8
Doctorate	278	21.3
Education domain		
Health Sciences	760	58.2
Social Sciences	127	9.7
Business	62	4.8
Information Technology	102	7.8
Media Studies	9	0.7
Others	245	18.8
Occupation		
Employed	39	3.0
Housewife	38	2.9
Professional	77	5.9
Student	1151	88.2

More than 50% of the participants had not suffered from COVID19. Of the 25.2 % respondents that had suffered from COVID19, 2% (n = 26) had

been severely ill. The data from the respondents also revealed that approximately 40% (n = 518) had some immediate family members that had been the victim of this deadly virus of which more than 50% couldn't survive the virus.

A large number of respondents 84.7% (n = 1105) showed willingness to get vaccinated. Additionally, 66.4% (n = 865) were only willing to get vaccinated because of the mandatory requirement from their employer, work organization and/or university/college. 40% of the respondents were of the view that if there is no mandatory requirement, they won't get vaccinated. 62% (n = 808) agreed that COVID19 vaccine will prevent them from the COVID19 virus while, 30.2 % (n = 394) showed neutral response. Similarly, 59.6% were in agreement with the belief that the vaccine for COVID19 is safe whereas, 7.8% (n = 102) doesn't considered the vaccine to be safe for them. More than one-third of the participants expressed their concerns regarding the adverse effects of the COVID19 vaccine and believed that the current COVID19 vaccines available in the market have not fulfilled the preliminary and prior clinical testing required. According to more than 60% of the study respondents, COVID19 vaccines will be effective to curb the spread of the disease in the community and may also be beneficial in reducing the severe form of

When asked about the most effective COVID19 vaccine, respondents showed a mixed response. Majority of the participants 26.1% (n = 340) considered Sinopharm to be most effective followed by Pfizer BioNTech 20.9%, SinoVac 20.2%, Moderna 18.5%, Astra Zeneca 6.9% and CanSino 6.8% (Figure 1).
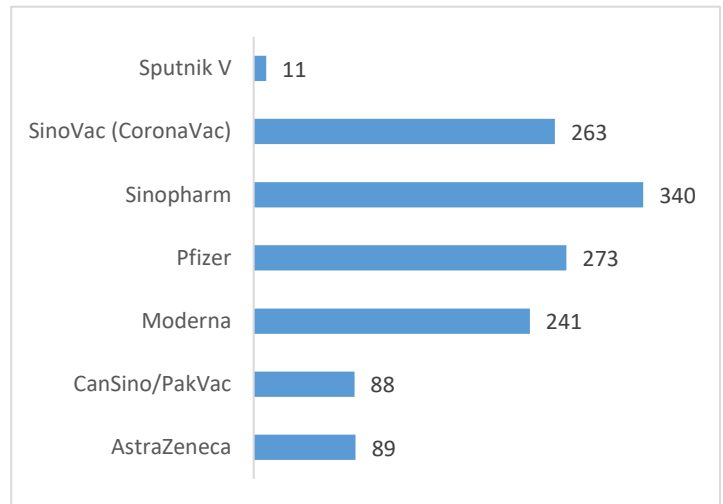

Figure 1. Most effective COVID-19 Vaccine among participants (n = 1305)

The most frequent reasons identified for vaccine hesitancy among the participants were unwanted adverse effects after being vaccinated (42.8 %), rumors that there is a conspiracy behind vaccine (34.6%) and religious reasons (3.4%).

Table II: Attitude of participants against COVID-19 vaccine. (n = 1305)					
	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
COVID-19 vaccine will be helpful in preventing from COVID-19 virus	27 (2.1)	76 (5.8)	394 (30.2)	601 (46.1)	207 (15.9)
COVID-19 vaccine is safe to be administered	25	77	424	580	199
Getting the appropriate vaccines for COVID-19 is important to stay healthy1	19	54	279	575	378
I do not trust any COVID-19 vaccine	207 (15.9)	561 (40.3)	332 (25.4)	124 (9.5)	81 (15.9)
COVID-19 vaccine can reduce the spread of the disease in the community	32 (2.5)	80 (6.1)	352 (27)	576 (44.1)	265 (20.3)
COVID-19 vaccine can help reduce severe COVID-19 disease.	29 (2.2)	74 (5.7)	318 (24.4)	593 (45.4)	291 (22.3)
I am concerned that the present COVID-19 vaccines may not be effective enough	43 (3.3)	353 (27)	528 (40.5)	297 (22.8)	84 (6.4)
I am concerned about the serious adverse events from the currently available COVID-19 vaccine	26 (2)	157 (12)	540 (41.4)	443 (33.9)	139 (10.7)
I am concerned about the present COVID-19 vaccines might not have been tested rigorously prior to launch	26 (2.5)	157 (21.1)	540 (40.2)	443 (25.2)	139 (11)
I trust the information I am receiving about the COVID-19 vaccine from the government or public health experts	35 (2.7)	109 (8.4)	396 (30.3)	605 (46.4)	160 (12.3)
COVID-19 vaccines made in Europe or America are safer than those made in China	49 (3.8)	289 (22.1)	606 (46.4)	280 (21.5)	81 (6.2)
If not made mandatory, I will not use COVID vaccine at all	114 (8.7)	355 (27.2)	295 (22.6)	307 (23.5)	234 (17.9)

the disease (Table II).

As shown in table III, the factors associated with COVID-19 vaccine acceptance were educational background and occupation (p < 0.05). An educational background of health sciences is a significant factor of likeliness to get vaccinated (p-value 0.003) followed by an educational background of information technology. Employment was a significant predictor for vaccine acceptance among the participants (p-value = 0.023). Employed individuals displayed significant association to acceptance of COVID19 vaccine.

Table III: Univariate Analysis (n = 1305)						
Factors	n	%	p-value	Odds ratio	95% CI Lower	Upper
Gender						
Male	45	88.8		Reference		
Female	1260	84.5	.137	.461	.166	1.280
Age						
18 – 24 years	1147	84.6	.296	Reference		
25 – 54 years	152	85.5	.630	1.165	.626	2.167
> 55 years	4	50	.155	.212	.025	1.802
Education						
Below secondary	9	77.7	.224	Reference		
Secondary	335	80.6	.933	.928	.163	5.295
Bachelors	594	85.5	.705	1.398	.247	7.924
Masters	89	83.1	.938	1.076	.170	6.806
Doctorate	278	88.5	.729	1.365	.235	7.948
Education domain						
Health Sciences	760	88.2	.003	Reference		
Social Sciences	127	84.3	.260	.732	.425	1.260
Business	62	79	.046	.500	.253	.986
Information Technology	102	76.5	.001	.419	.246	.714
Media Studies	9	88.8	.952	1.067	.130	8.768
Others	245	78.7	.000	.496	.334	.736
Occupation						
Employed	39	79.5	.023	Reference		
Housewife	38	73.6	.548	.723	.250	2.087
Professional	77	94.8	.017	4.710	1.320	16.798
Student	1151	84.5	.395	1.411	.638	3.119

Discussion

Vaccination serves as a last effective resort for the curtailment of the contagious COVID19 disease. Vaccination against COVID19 has become extremely vital in presence of lack of definite and effective treatment of the disease. Additionally, nations with fragile economies cannot bear the burden of extensive lockdowns and therefore, there is a dire need of individuals vaccinated against the viral disease for the economical sustainability.[10-13]

Vaccine hesitancy has been a major issue worldwide especially in the South Asian region. Globally, a number of studies have been conducted to assess the response of the public against the COVID19 vaccine. Resistance to vaccination in Pakistan is not new. For years Pakistan has been the subject for the polio vaccine hesitancy and is still struggling to completely eradicate the disease.[14-16] There could be long term and devastating consequences of the current pandemic disease if a similar attitude is observed for the COVID19 vaccination. Hence, it is the need of the hour to evaluate the acceptance of COVID19 vaccine among the general Pakistani public.

The findings of our present study indicated that a large number of the participants 84.7% were willing to get vaccinated. The acceptance rate was very much similar to the studies conducted in Malaysia, Saudi Arabia, China, Indonesia, Ecuador and Europe.[17-21]

Contrary to the studies conducted in Saudi Arabia and China where marital status and gender and in Malaysia where, age, monthly income, race, marital status, occupation and medical condition influenced vaccine acceptance, in present study only field of education and occupation showed significant association with vaccine acceptance. [1, 18, 20] A study by Hildreth and Alcendor has reported that the COVID19 vaccine acceptance increased with education in minority population of the USA.[22] Education is a bigger factor than all other factors for COVID19 vaccine. Our findings reported that having an educational background of health sciences is a significant factor of likeliness to get vaccinated (p-value 0.003) followed by an educational background of information technology.

The results in the present investigation are also supported by a study conducted in Ethiopia which showed the positive association of health sciences educational background to COVID19 vaccine acceptance.[23] The clinical exposure of the health sciences students to COVID19 might be a significant reason behind the perception of vaccine importance and its acceptance. However, our results were in contradiction with a cross sectional study in India which reported that the vaccine acceptancy was

highest among participants having non-health sciences educational background.[24]

Joshi et al., has reported that unemployment is significantly associated with lower vaccine acceptance rate.[25] Similar results were observed in our present study. Employment was a significant predictor for vaccine acceptance among the participants (p-value = 0.023). Employed individuals displayed significant association to acceptance of COVID19 vaccine.

A number of studies that were conducted before COVID-19 vaccines were readily available in Pakistan have reported positive attitude and good acceptance by the Pakistani population. In a study reported by Qamar et.al where a nationwide survey was conducted to assess the acceptance of COVID-19 vaccine among the masses, vaccine acceptance rate was found to be 70.1%. [7]   Prior to this study, Khan et.al has also reported that more than 70% of the population was willing to get vaccinated once the COVID-19 vaccine was made available.[26] Tahir et.al has also reported similar vaccine acceptance rates and a high positive attitude against COVID-19 vaccine.[27]

In line with the previously reported findings, knowledge and the availability of the COVID-19 vaccines in Pakistan, acceptance rate was much higher i.e. 84.7% in the current study. Previous statistics showed that 40% of the Pakistani population was hesitant to get vaccinated against COVID-19.[28] In the current study, the vaccine acceptance rate has remarkably increased. Better understanding of the virus and the consequences of the COVID-19 disease has led to the increase acceptance rates. [29]

Public confidence in vaccination is the key to curtail any infectious disease pandemic. However, perceived risks and rumors associated with vaccination dominantly affects the public confidence.[30] Vaccine hesitancy is a global threat and is evident from the past that it has caused reduction in global immunizations against numerous infectious diseases and eventually led to numerous outbreaks. The only affective measure to control the COVID-19 disease is by means of achieving herd immunity. For achieving herd immunity, a substantial population needs to be immunized. Though, the exact proportion of the population to be immunized is unknown.[31] The larger the population is vaccination, better are the chances of achieving herd immunity. Hence, there is a dire need to address vaccine hesitancy. In the present study, the COVID-19 vaccine hesitance was found to be 15.3%.

The most frequent reasons identified for vaccine hesitancy among the participants were unwanted adverse effects after being vaccinated (42.8 %), rumors that there is a conspiracy behind vaccine (34.6%) and religious reasons (3.4%). A number of studies in different countries have identified similar vaccine concerns.[32-35]

Understanding of the people's behavior and perception towards vaccine is necessary to achieve maximum vaccination rates. With the development and availability of various COVID-19 vaccines, there is a light at the end of a long tunnel that the pandemic may come to an end or become endemic. However, to achieve this, at least 70% of the global population needs to be vaccinated according to the WHO. The emergence and global spread of the various COVID-19 variants identified till date pose a daunting challenge to curtail the COVID-19.

Maximum vaccine coverage is the only solution to this public health problem. Although the vaccine acceptance rate in the present study was found to be relatively high, till date more than 45% of the Pakistani population is still beyond the vaccine coverage. Interventions are needed to speed up the vaccination coverage. Mass awareness to reduce negative perceptions can serve as a critical component to boost the vaccine coverage and ensure successful vaccination.

Conclusion

With the passage of time, COVID-19 has come much to a halt but yet still exists. Immunization against the virus significantly lowers the risk of getting infected and ultimately ensures mass wellness in the times of pandemic. In the present study, vaccine acceptance among the participants was remarkably high. However, a large population in Pakistan is still unvaccinated. The Pakistani government and other health related agencies must address the population concerns and investigate the vaccine hesitancy. Population must be educated about the benefits of the COVID-19 vaccine as vaccination is a successful resort to mitigate future coronavirus pandemics.

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