

Vaccine hesitancy in COVID-19: a major matter of concern

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ABSTRACT

Introduction: Coronaviruses live in but do not infect animals. They may mutate as they transfer to other species. Eventually the virus can jump from animal species and infect humans. Although researchers are not aware how people were infected at the start of COVID-19 pandemic, but subsequent evidence indicated that close contact between people led to spread of the virus.

Objective: To assess the hesitancy of a diverse group from the general public regarding Covid-19 vaccination.

Materials & Methods: The cross sectional descriptive study was carried out in Peshawar, Khyber Pakhtunkhwa, Pakistan, from June 07, 2021, to July 11, 2021, on a diverse sample of the general public through purposive and snowball sampling by utilizing social media platforms. Informed consent was obtained prior to enrolment of participants in the survey. Questionnaires contained demographic data, and 5 items related to vaccine hesitancy; they were distributed electronically via WhatsApp, Facebook, telegram and other media platform via investigators contact. Data were analyzed for descriptive statistics by MS Excel and SPSS 26.

Results: A total of 410 responses were received, of which 190(46.3%) were females and 220(53.66%) were males. Most of the responders, 316(77.07%) were in the 20-30 years age group, and 220(53.66%) were healthcare workers. The majority, 247(60.24%) of responders had not received the Covid vaccine at the time of completion of the survey. An overall vaccine hesitancy rate of 16.7% (range 5.4%-38%) was documented for the five questions, the maximum being due to apprehensions about vaccine side effects.

Conclusion: Vaccine hesitancy is an important factor hindering immunization against COVID-19, even in healthcare workers. Targeting the hesitant population about vaccine safety and efficacy should be an effective way to overcome the issue.

Keywords: Covid-19; Vaccine; Vaccination Hesitancy; Immunization; Immunity.

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INTRODUCTION

In Wuhan, Hubei Province of China, a number of people were diagnosed with pneumonia of an uncertain causative organism towards the end of December 2019. The health authorities were associating it's origin with a nearby exotic animal wholesale market.¹ This unknown pathogen was later on called as SARS-CoV-2. The health authorities were able to know about SARS-CoV-2 by an identification system for "pneumonia of unknown etiology" which was put in place after the 2003 SARS outbreak, for the prompt recognition of new infectants. Towards the end of January 2020, SARS-CoV-2 was termed as a "public-health emergency of international concern by the World Health Organization (WHO).² SARS-CoV-2 was responsible for a significant epidemic of COVID-19 in China, however, it was all over the world in no time and was categorized as a pandemic in March, 2020.³

The spike (S) protein of SARS-CoV-2 was recognized as the immune-dominant antigen; furthermore, the investigation of SARS-CoV-2 patients made us realize that antibodies were chiefly aiming for the receptor-binding domain of the S1 subunit. This S1 subunit is the main target of all vaccines against COVID-19. So far, vaccines have been developed from virus grown in culture and then chemically inactivated, injecting of the S protein as a recombinant protein subunit within one of the several cell-based systems that support protein expression, viral vector vaccines, and the latest technology of using mRNA for vaccine manufacturing.⁴ In the US, the prompt legalization of the two mRNA vaccines, the Pfizer-BioNTech (BNT162b2) vaccine and Moderna (mRNA-1273) vaccine by the FDA, proved to be a pertinent turning point in the fight against the COVID-19 pandemic. These steps were in light of very encouraging clinical trials of these vaccines.⁵ Two doses of the BNT162b2 (Pfizer-BioNTech) vaccine, administered three weeks apart, proved to be safe and 95% effective against SARS-CoV-2. The BNT162b2 has primary efficacy end points with greater than 99.99% probability of a true vaccine efficacy greater than 30%.⁶

Though vaccines are proving to be game changers against COVID-19, the luxury of having vaccines

does not ensure vaccinating everyone because of vaccine hesitancy. ‘Vaccine hesitancy’ is the disinclination or indecision to receive a vaccine oneself or prevent one’s family from getting inoculated against that specific disease, even if it has been proven secure and valid. We have known from research that compliance and confidence in the COVID-19 vaccine remains fluctuating and unpredictable. Moreover, improving this variance will require educating our populations about the safety and efficacy of the SARS-CoV-2 vaccine.⁷ Vaccine hesitancy and anti-vaccine campaigning is a common problem with outbreaks of diseases that were once not so common. Vaccine hesitancy is threatening and unhealthy not only to the person himself, but also to their families and communities because such people can very easily spread the disease to those around them.⁸

MATERIALS & METHODS

A cross sectional descriptive study was carried out from June 07, 2021, to July 11, 2021, in Peshawar, Khyber Pakhtunkhwa, Pakistan, on a diversified sample of the general public through the use of electronic and social media platforms. Ethical approval for the observational web-based study was obtained from the Research Ethics Committee of Rehman Medical Institute, Peshawar, before initiating the study. Informed consent was obtained on the web page of Google docs prior to the enrollment of participants in the survey. Confidentiality of all the information was assured. Participants were allowed to withdraw from the study at any time. Questionnaires were distributed electronically via WhatsApp, Facebook, Telegram and other

media platform via investigators contact. Purposive sampling was used, supplemented by snowball sampling as subjects were requested to forward the forms to further acquaintances and friends.

Questions about demographic data included age, gender, area of specialty, whether they have been administered COVID-19 vaccine, and if they were planning to get vaccinated or not. The remaining 5 items included specific questions regarding the reasons for vaccine hesitancy. Data were entered into MS Excel and SPSS 26 for descriptive analysis.

RESULTS

A total of 410 responses were received for the survey; of these, 220 (53.7%) were males and 190 (46.3%) females, as shown in Table 1.

Majority (220, 53.7%) of subjects were health care workers, followed by students (102, 24.9%). Most of the respondents (316, 77.1%) were in the 20-30 years age group, followed by the 30-40 years age group 50(12.2%); the least responses were from the 51-60 years age group and the 61-70 years age group (07 each, 1.7%).

Regarding COVID-19 vaccination status, 247 (60.24%) subjects had not been vaccinated, while 163 (39.76%) had received the vaccine. Of the 247 people who had not received the vaccine, 190 (76.92%) planned on getting the jab in the future while 57(23.08%) did not plan on getting the vaccine.

Table 1: Demographic data of respondents (n=410).

#	Demographic Variables	Frequency	Percentage
1.	Gender		
	Males	220	53.66
	Females	190	46.34
2.	Employment status		
	Healthcare workers	220	53.66
	Students	102	24.87
	Engineer	27	6.60
	Government Service	21	5.12
	Unemployed	16	3.90
	Lawyer	08	1.95
	Businessman	06	1.46
	Doctor	02	0.49
	Teacher	02	0.49
Others	06	1.46	
3.	Age Group (Years)		
	20 - 30	316	77.07
	31 - 40	50	12.19
	41 - 50	30	07.32
	51 - 60	07	01.71
61 - 70		07	01.71
4.	COVID-19 Vaccination Status		
	Vaccinated	163	39.76
	Not Vaccinated	247	60.24
5.	If not vaccinated, do you plan to get vaccinated in future? (n=247)		
	Yes	190	76.92
	No	57	23.08

Table 2 shows the responses of subjects to the questions regarding COVID-19 vaccinations. In general, responses were

distributed among the different scales rather than concentrating around one response scale.

Regarding safety of COVID-19 vaccines, 94(22.9%) strongly agreed that Covid vaccines are completely safe, 112(27.3%) moderately agreed about the vaccines being safe, and 24(5.9%) strongly disagreed with the safety of vaccines.

276(67.3%) strongly disagreed with the notion that vaccine is unnecessary because Covid is not common anymore. While only 6(1.5%) strongly agreed with this idea.

We got a wide range of responses on the question; uncertainty of side effects prevents me from receiving the Covid vaccine.

103(25.1%) strongly disagreed with the idea while 73(17.8%) slightly agreed with it. However, 85(20.7%) remained neutral.

126(30.7%) people strongly agreed that they weigh the benefits and risks of the Covid vaccine before receiving it. 102(24.9%) remained neutral on the matter.

229(55.9%) strongly disagreed with the notion that if everyone is vaccinated with the covid vaccine, they don't have to be vaccinated while 56(13.7%) moderately disagreed with this statement.

Table 2: Responses of subjects to questions about COVID-19 vaccination on a 7-point Likert scale (n=410).

Questions	Response categories on 7-point Likert scale f (%)						
	Strongly disagree	Moderately disagree	Slightly disagree	Neutral	Slightly agree	Moderately agree	Strongly agree
I am completely confident that COVID-19 vaccines are safe.	24 (5.9)	26 (6.3)	25 (6.1)	87 (21.2)	42 (10.2)	112 (27.3)	94 (22.9)
Vaccination is unnecessary because COVID-19 is not common anymore.	276 (67.3)	59 (14.4)	17 (4.1)	36 (8.8)	09 (2.2)	07 (1.7)	06 (1.5)
Uncertainty of side effects prevents me from being vaccinated with the COVID-19 vaccine.	103 (25.1)	35 (8.5)	31 (7.6)	85 (20.7)	73 (17.8)	47 (11.5)	36 (8.8)
When I think about being vaccinated with the COVID-19 vaccine, I weigh its benefits and risks to make the best decision possible.	20 (4.9)	16 (3.9)	08 (2.0)	102 (24.9)	58 (14.1)	80 (19.5)	126 (30.7)
When everyone else is vaccinated with the COVID-19 vaccine, I don't have to be vaccinated.	229 (55.9)	56 (13.7)	45 (11)	35 (8.5)	18 (4.4)	07 (1.7)	20 (4.9)

Table 3 lists the final data distribution to obtain the vaccine hesitancy percentage in the sampled subjects. The calculation is based on categorizing the percentages of responses for each question, indicating hesitancy or otherwise, while not including the neutral responses. The final hesitancy rate was estimated at 16.7% (5.4% – 38%); the highest hesitancy was for question three where respondents showed their uncertainty regarding side effects of vaccination to be the main reason for hesitancy. The lowest hesitancy rate was for question two, where respondents negated the concept that vaccination was no longer necessary because COVID was no longer common.

Table 3: Categorization of responses for calculating vaccine hesitancy (n=410; responses out of total 2050).

Q. #	Hesitant f (%)	Not Hesitant f (%)
1.	75 (18.3)	248 (60.5)
2.	22 (5.4)	352 (85.9)
3.	156 (38.0)	169 (41.2)
4.	44 (10.8)	264 (64.4)
5.	45 (11.0)	330 (80.5)
Total	342 (16.7)	1363 (66.5)

DISCUSSION

A major milestone of the advancements in public health has been vaccination.⁹ Vaccination has proved to be miraculous in improving the living standards of people and decreasing the number of deaths caused by preventable diseases.¹⁰ Even though

a greater proportion of people worldwide are happy to be vaccinated, a minority of the population declines to be vaccinated.¹¹ Vaccination is generally perceived to be unsafe by some people, due to this lack of confidence in vaccination there is a perceived threat that currently running programs might not be successful.¹² Vaccine hesitancy is said to be the reason for reduced vaccine coverage which might then lead to vaccine-preventable diseases and outbreaks in future.

Globally the government has been making efforts to battle the COVID-19 pandemic; authorities have included different measures including intermittent lock downs of high-risk areas in the country. Lockdowns have forced people to alter their lifestyles overnight, further leading to a change in their habits and thinking.¹³ Countries with the most advanced and developed healthcare infrastructures have found battling the pandemic difficult; however, the developing countries have found their healthcare systems helpless in front of COVID-19.¹⁴ The given data demonstrates various predictors for COVID-19 vaccination. Our data reports a certain level of vaccine hesitancy among the participants estimated at about 17%.

Similarly, results of hesitancy towards COVID-19 vaccine were reported in Ireland (35%) and the United Kingdom (31%) respectively;¹⁵ the findings are twice as much as the current results. Similarly results from some other European countries reported that 26% of the adult population showed hesitancy towards vaccine and similarly the hesitancy ratio in the United

States was reported to be 33% of the population.¹⁶ Studies indicate that the rate of resistance and hesitancy towards COVID-19 vaccine were similar to some other vaccines. In the present study, 5.9% respondents said that they “strongly disagree” with the statement “Vaccines are safe”; 13.9% of subjects appeared opposed to vaccinations. The current study findings might be different from those of Europe, US or other non-Western countries because of cultural differences and beliefs.¹¹

Low vaccination acceptance rate among the population can have a negative impact on future vaccination as well as compliance of people who come in touch with vaccine hesitant individuals. Our study assumes that catastrophic economic upshots of the pandemic-related restrictions may lead to more compliance rates. This may happen due to preventive measures, such as disastrous layoffs, increased underemployment, and educational closures.

The study responses were high in male gender during the survey and there was a positive association in acceptance of COVID-19 vaccination. This might be attributed to the fact that there is a high risk for COVID-19 related complications, infections, and mortality among males, which may bias the male gender to accept vaccination.¹⁶

It is very important for the high disease risk communities to achieve “herd immunity” and for this a good compliance rate is required towards vaccination. Governments should conduct awareness programs to educate the vulnerable population towards accepting COVID-19 vaccination, with resultant expected reductions in morbidity and mortality.

More than 50% of our study population (if neutral responses are included) were uncertain of side effects of the vaccine which prevented them from being vaccinated. Worry within the respondents regarding COVID-19 vaccine provides a platform for the health policy makers to target such population and provide them with interventional educational sessions to increase the vaccination rates. As scientists we must act accordingly to educate and intervene awareness to boost up the COVID-19 vaccination rates.

There is still limited evidence on vaccine hesitancy and owing to the limited data available on how to address the situation, proper tailored strategies shall have to be carefully planned according to the population we are dealing with.¹⁷ Various factors of hesitancy shall be addressed accordingly.

CONCLUSION

Vaccine hesitancy rates among the selected sample were lower than international studies, and could be attributed to the majority of respondents being healthcare personnel and/or other educated and employed online participants.

RECOMMENDATIONS

Steps can be taken by policy makers to increase vaccination rates, especially among resistant individuals. Targeting the population which is hesitant towards vaccination seems to be an effective way to convince communities about the safety and efficacy of the vaccine. Campaigns focusing on social benefits of vaccine might enhance inclination towards vaccination.

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