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PUBLIC ATTITUDES TOWARD THE COVID-19 VACCINE IN DISTRICT PESHAWAR, PAKISTAN

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Abstract

The study reveals a basic understanding of the attitudes and knowledge of the District Peshawar population about the COVID-19 vaccine. Mixed vaccination responses according to the results emerged with a significant gender distribution showing that the female population (55.3%) constituted a majority with males making up 44.7% during the survey. Among the respondents, most of the subjects are single and mostly students 86.0%. General vaccination practice was reported as follows: 59.0% of the respondents reported that they were vaccinated, whereas 28.7% reported not being vaccinated, and 12.3% of the respondents were not sure. That reflects a rather large proportion of the population as either vaccine-hesitant or uninformed of the importance of vaccines. Still, knowledge about the COVID-19 vaccine was good at 79.3%, and 57.0% of the respondents were of an opinion on whether such a vaccine is effective. This may indicate a knowledge gap related to vaccine benefits. Social media was the most important influence at 74.3% and markedly greater than the influence of mass media and family/friends. While an important factor, social media influence can lead to misinformation, as evidenced by 49.0% who believed that it was possible to overdose on vaccines and 39.0% who believed that vaccines could cause an allergic reaction. Regarding vaccine safety, 42.7% agreed that it is safe but 44.7% are unsure-probably due to the reason for hesitance, whereas 55.3% showed reluctance to vaccinate. However, the need to vaccinate was felt by 66.0%, which is similar to the encouragement to vaccinate (63.7%). A vast majority of participants, that is 73.3%, agreed that they were waiting for

more information before deciding on vaccination, which reflects an uncertainty regarding vaccine rollout and long-term effects. In addition, 30.7 percent of the respondents viewed vaccination as population control, and therefore, a public awareness campaign is needed to eradicate the misconceptions surrounding it. The findings revealed concerns about unequal vaccine distribution, but a large majority of the respondents believed that "the distribution should be fair," 68.0 percent, which could be an expression of perceptions about the unequal availability of vaccines in urban and rural settings.

Keywords: COVID-19, Attitudes towards Vaccine, Vaccine Knowledge, Peshawar, KP, Pakistan, Vaccination Hesitancy, Social media influence, Public Health, Safety of Vaccine, Fair distribution.

Introduction

Coronavirus obtains its name from the crown-like shape it has when placed under a microscope. Latin "corona" means "crown," denoting a setting of spherical protrusions with their peplomers spike proteins crowning the particle. This is a way for the virus to recognize potential hosts. The first reported case of human infection arose in Wuhan, China, late in 2019. By January 2020, significant human-to-human transmission was confirmed as the primary mode of spread of this disease (Ahandani & Sheydaei, 2020). Coronaviruses belong to family Coronaviridae. There are four groups. However, only α-CoVs and β-CoVs infect mammals. SARS-CoV and SARS-CoV-2 fall under the β-CoVs, lineage B, whereas MERS-CoV falls under lineage C (Yesudhas et al., 2020). The virus attaches to the receptor on the host cell, angiotensin-converting enzyme 2 (ACE2), by using the spike protein, S protein, and helps gain entry into the cell by S1 and S2 subunits (Sternberg & Naujokat, 2020). Reports of a series of cases of severe respiratory illness caused by a novel coronavirus (SARS-CoV-2) were reported in Hubei, China, in December 2019. The World Health Organization officially named the disease COVID-19. Despite containment efforts, by March 2020, the disease had spread globally, and the WHO declared it a pandemic on March 11, 2020 (R, 2020).

It was confirmed in Pakistan that the first two positive cases were detected by Polymerase Chain Reaction (PCR) testing on February 26, 2020, in Karachi and Islamabad. Positive cases have been raised to 20 for the second week. Within the past two weeks, all laboratory-confirmed cases had a travel history to different countries abroad. A higher proportion of males than females was infected, with male and female proportions of 6.7% and 3.6%, respectively (Waris et al., 2020).

The disease spreads through discharging minute particles of fluid into the air when infected individuals cough, sneeze, or even speak. The primary person-to-person transmission is through proximity, that is, within 1 meter, but it also remains in poorly ventilated spaces, whereby it can spread over large distances through the air. Further, the virus lingers on surfaces and poses a risk to human health when people touch the infected surface and the eyes, nose, and mouth (WHO, 2020). The symptoms of COVID-19 include asymptomatic conditions to severe respiratory distress. Common symptoms include fever, cough, headache, and shortness of breath. Other reported symptoms include diarrhea, production of sputum, and loss of taste and smell (Dawson et al., 2020). Recent studies have identified some patients diagnosed with skin rashes and severe itching (Gupta et al., 2020). With COVID-19 arising, it caused mass apprehension where people ran amok looking for PPE, and the lack of resources resulted in panic among health workers. The WHO declared the outbreak a global health emergency and called for vaccination as a sustainable solution. By October 2020, more than 212 COVID-19 vaccine candidates were under development and 50 in clinical evaluation (Zhao et al., 2020).

Despite the need for a vaccine, the hesitancy to accept it is one of the greatest challenges. Issues related to information, mistrust, and religious or cultural beliefs contribute to vaccine refusal. Some people perceive vaccines as risky or unnecessary altogether and back this up with conspiracy

theories currently being perpetuated: for instance, regarding the virus as a bioweapon or 5G technology as causing COVID-19 (Ullah et al., 2021).
Vaccination hesitancy is being approached with strategic communication, including education towards the people, myths debunking, and increasing trust in health authorities. Policymakers need to involve local communities and healthcare providers for the big acceptability of the vaccine when it hits the market. Boosting vaccine confidence will be a critical means of attaining high rates of immunization. The policies in most vaccination hesitancy have involved informed consent, freedom, and right information (Tan and Earle, 2012).

Objectives

To contain the spread of COVID-19, the WHO advises: Avoiding close contact with the affected persons Maintaining physical distance Wear masks in crowded places Wash hands frequently with soap or sanitizer Clean and disinfect high-contact surfaces regularly (Singh et al., 2020). Public perception and withstanding vaccine hesitancy is an important component to successful COVID-19 immunization campaigns. On-time interventions along with clear communication and community engagement will help to overlook scepticism and thus herd immunity.

Methode and Materials

This cross-sectional study was conducted in the Peshawar District of Khyber Pakhtunkhwa, Pakistan, from May 2021 to July 2021. The study aimed to explore the attitudes and knowledge of people regarding COVID-19 vaccines. A structured survey was used to collect data from 300 participants, focusing on gender, age, marital status, area of residence, and educational background. The study setting included a mix of rural and urban populations to ensure diverse representation.
A simple random sampling method was adopted to select participants from different regions within the district. The sample included individuals from various demographic backgrounds to capture a comprehensive view of public perceptions. The inclusion criteria were individuals aged 18 and above, residing in Peshawar District, and willing to participate voluntarily. Exclusion criteria included participants under 18 and those with medical conditions preventing participation.
Data was gathered using a structured questionnaire that was designed based on validated tools from previous studies on vaccine perception. The questionnaire comprised both closed and open-ended questions. It covered areas such as demographic details, knowledge about COVID-19 vaccines, sources of information, and personal beliefs regarding vaccination safety and effectiveness. The questionnaire was distributed both online and in printed format to accommodate participants from various backgrounds.
Ethical approval was obtained from the relevant institutional review board before commencing the study. Informed consent was acquired from each participant, ensuring they were fully aware of the study's purpose, the confidentiality of their responses, and their right to withdraw at any stage without any consequences. Data was anonymized, and no identifying information was collected to protect participants' privacy.
The collected data was entered into SPSS software for statistical analysis. Descriptive statistics such as frequencies and percentages were calculated to summarize the demographic characteristics of participants and their responses. Chi-square tests were conducted to identify associations between demographic variables and vaccine perceptions. Graphs and charts were generated to visually represent the findings.

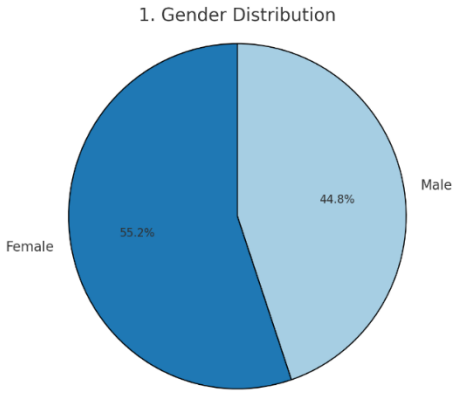
Table 1: Summary of Participant Responses on COVID-19 Vaccine Attitudes and Knowledge During COVID. Pandemic at District Peshawar Kp Pakistan 2021-22.

Category	Response	Frequency	Percent
Gender	Male	134	44.7
	Female	165	55.3
Marital Status	Married	27	9.0
	Single	273	91.0
Occupation	Student	258	86.0
	Self-employed	13	4.0
	Unemployed	18	6.0
	Other	11	3.0
Age	Less than 20 yrs.	86	28.7
	20 to 29 yrs.	196	65.3
	30 to 39 yrs.	12	4.0
	40 to 49 yrs.	6	2.0
Area	Urban	157	52.3
	Rural	143	47.7
Vaccination Practice	Yes	177	59.0
	No	86	28.7
	Don’t know	37	12.3
Knowledge of COVID-19 Vaccine	Yes	238	79.3
	No	50	16.7
	Don’t know	10	3.3
Source of Information	Mass media	28	9.3
	Social media	223	74.3
	Newspaper	7	2.3
	Family	26	8.7
	Friends	16	5.3
Knowledge of Vaccine Effectiveness	Yes	171	57.0
	No	72	24.0
	Don’t know	57	19.0
Vaccine Overdose	Yes	147	49.0
	No	39	13.0
	Don’t know	114	38.0
Vaccination and Allergic Reaction	Yes	117	39.0
	No	40	13.0
	Don’t know	143	47.7
Safety of COVID-19 Vaccine	Yes	128	42.7
	No	38	12.7
	Don’t know	134	44.7
Necessity of COVID-19 Vaccine	Yes	198	66.0
	No	38	12.7
	Don’t know	64	31.3
Belief in Vaccine Effectiveness	Yes	168	56.0
	No	38	12.7
	Don’t know	94	31.3
Hesitation to Vaccinate	Agree	166	55.3
	Disagree	84	28.0
	Don’t know	50	16.7
Encouragement to Vaccinate	Agree	191	63.7

	Disagree	63	21.0
	Don't know	46	15.3
Wait for More Information	Agree	220	73.3
	Disagree	36	12.0
	Don't know	44	14.7
Vaccine as Population Control	Agree	92	30.7
	Disagree	112	37.3
	Don't know	96	32.0
Vaccination to Reduce COVID-19 Incidence	Agree	125	41.7
	Disagree	74	24.7
	Don't know	101	33.7
Fair Distribution of Vaccines	Agree	204	68.0
	Disagree	46	15.3
	Don't know	50	16.7

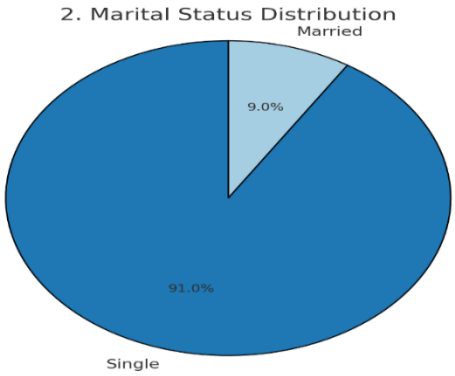
Gender Distribution:

The pie chart shows a relatively balanced gender distribution with a slight predominance of females (55.2%) over males (44.8%). This may reflect general population trends or the composition of the sample used for the survey. Gender balance is important in studies to avoid biases in findings, especially in public health research.



Marital Status Distribution:

The majority of the respondents (91%) are single, with only a small proportion (9%) being married. This could indicate that the survey was predominantly answered by younger individuals or students, where single status is more common. Marital status may influence attitudes toward health policies and vaccination behavior.



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Most respondents are students (86%), with only a small percentage of self-employed (4.3%), unemployed (6%), and others (3.7%). This highlights the younger demographic of the survey participants, which aligns with the high number of single individuals. Occupation plays a role in access to information and exposure to COVID-19.

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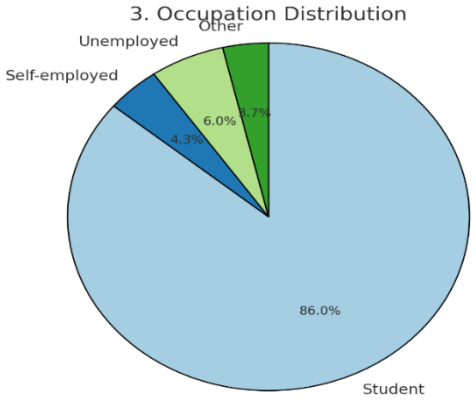
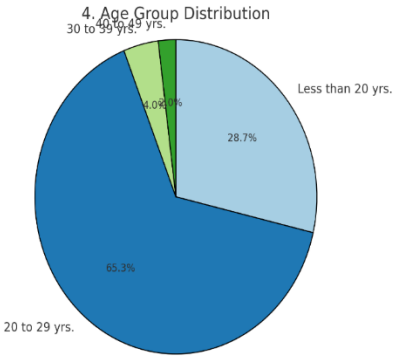


Age Group Distribution:

The largest group of respondents falls within the 20 to 29 years age range (65.3%), followed by those younger than 20 years (28.7%). Only a small fraction is in the 30 to 49 years range (6%). This distribution further supports that the survey sample was mainly composed of younger individuals, possibly students.

Area (Urban/Rural) Distribution: Respondents are fairly evenly distributed between urban (52.3%) and rural areas (47.7%). This balance is crucial for understanding how geographic location impacts access to healthcare, vaccination rates, and perceptions of vaccine safety and effectiveness, which may vary between urban and rural settings.



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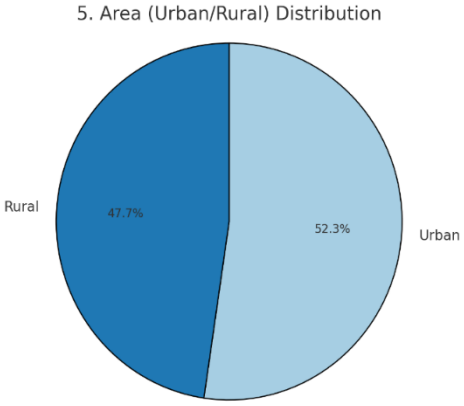
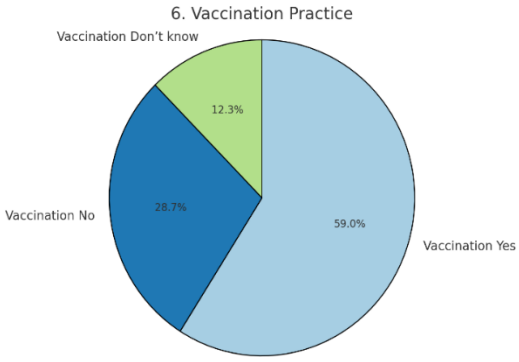
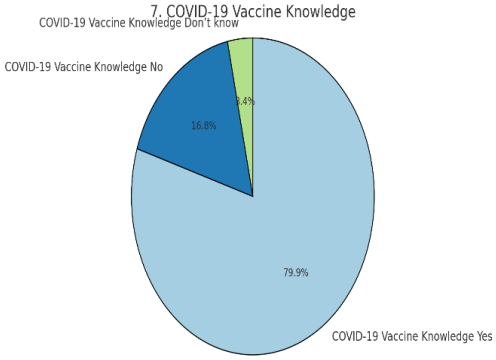


Vaccination Practice:

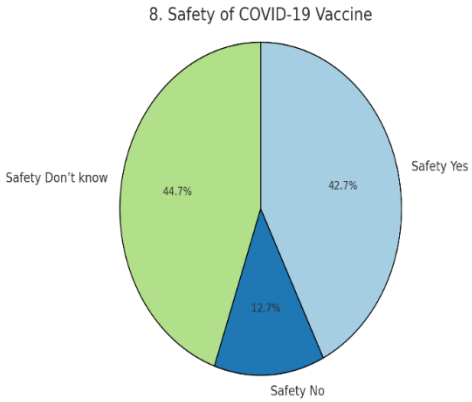
A significant proportion of respondents (59%) reported being vaccinated, while 28.7% have not been vaccinated, and 12.3% are unsure. These results provide insight into the reach and acceptance of COVID-19 vaccination programs. The level of uncertainty or lack of vaccination may indicate barriers such as misinformation or limited access.



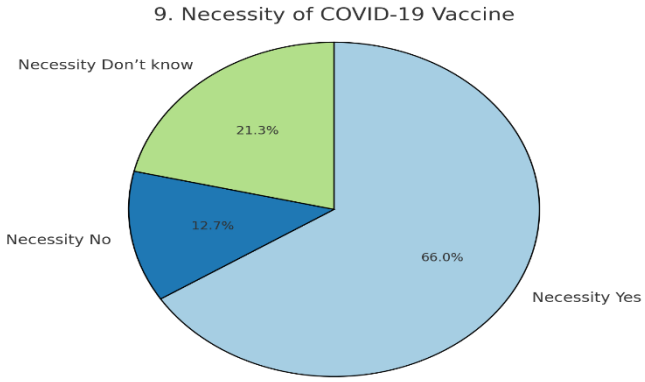
COVID-19 Vaccine Knowledge: The vast majority of respondents (79.9%) reported having knowledge about the COVID-19 vaccine, while 16.8% have no knowledge, and 3.3% are unsure. This suggests that awareness campaigns have been largely successful, though a small but notable group remains uninformed or uncertain about the vaccine.



Safety of COVID-19 Vaccine: Respondents are divided on the safety of the COVID-19 vaccine, with 42.7% believing it is safe, 12.7% considering it unsafe, and a large proportion (44.7%) unsure. This uncertainty about vaccine safety may contribute to vaccine hesitancy and highlights the need for clear communication and education efforts.

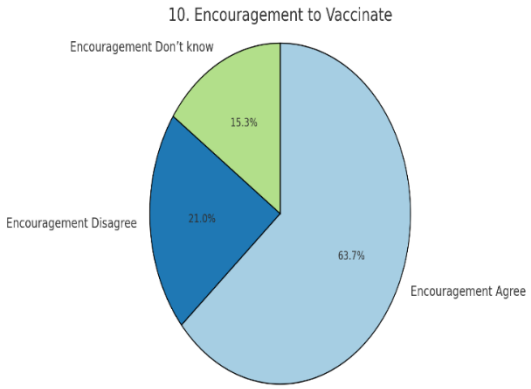


Necessity of COVID-19 Vaccine: A majority of respondents (66%) believe the COVID-19 vaccine is necessary, while 12.7% disagree, and 21.3% are unsure. These findings underscore the importance of public health messaging that conveys the necessity of vaccination to prevent disease spread and protect public health.



Encouragement to Vaccinate:

Most respondents (63.7%) agree that vaccination should be encouraged, 21% disagree, and 15.3% are unsure. This distribution reflects overall support for vaccination efforts but also indicates a portion of the population that is resistant or ambivalent about promoting vaccination. Effective strategies are needed to address these concerns.



Discussion

The vaccine against COVID-19 has been framed as the ideal solution. While hitherto there were just a few candidates for the vaccine, recently several clinical trials were released with good results, which has caused several countries to approve specific vaccines for implementation into vaccination programs. In Peshawar, the government already rolled out the COVID-19 vaccinations, which brought hope along with a pandemic solution. Although the vaccination services in Peshawar are numerous, the novelty of the roll-out of the COVID-19 vaccination injects several questions related to vaccine distribution and acceptance in this city. Questions also surface regarding the general population's knowledge and attitude toward the COVID-19 vaccine and vaccination rollout. Findings of a newly designed study for assessing the knowledge and attitudes towards COVID-19 vaccinations in Peshawar are presented in this paper. Several socio-demographic factors that influenced knowledge and attitudes regarding COVID-19 vaccinations were observed. In this study, knowledge had a significant association with education and previous experience with vaccine uptake. However, attitudes had a significant association with earlier experiences with the administration of vaccines and other myths related to the COVID-19 vaccine. More importantly, most of the respondents portrayed a positive attitude towards the COVID-19 vaccine at 55%. Further, the possible underreporting or misrepresentation of information on the severity of incidence and mortality of COVID-19 could lessen fears regarding vaccine safety or indeed could prevent residents of Peshawar from seeking. Accordingly, community members need to be empowered with having access to credible, evidence-based information on vaccines.

At present, social media seems to be the source of information among respondents 74.3%. Massive group among the UK adult population about 33% indicated that they would be using social media (Chadwick et al., 2021). For the people belonging to the region of the current study, there was a noteworthy usage of social media. As far as the vaccination practice is concerned, it was shown whether the participants had all of the vaccines or not, based on this matter, the current study revealed that 59% of the respondents have received them. Similarly, in the same study carried out in Australia in September 2020, a total of 52.9% of the respondents were vaccinated.

This study results reflected that 55.3% of the respondents agreed that one should get COVID-19 Vaccine without any hesitation. Similarly, another study conducted in Bangladesh from December 2020 to February 2021, showed that 52% of the participants thought everyone should get the COVID-19 vaccine (Islam et al., 2021). The results of the present study are higher than the one conducted in Bangladesh. This increase may result from social media. As for vaccine refusal in the discussion of the study, it is ascertained that 28% of the respondents were not willing to receive COVID-19 vaccines. On the other hand, in the study conducted in America in February 2021, it was found that 20% of the respondents had stated a level of unpreparedness for vaccines (Chu and Liu., 2021). In the same study in Nigeria in October 2020, about 25% of the respondents opposed

taking the COVID-19 Vaccine when it is available. The unwillingness to take the COVID-19 vaccine was higher in Russia (47%) (Adebisi et al., 2020). Vaccination refusal often correlates with philosophical beliefs and moral faiths associated with health and immunity making "natural" above "artificial" medicine. In some areas, people do not believe in the presence of COVID-19, the virus is intangible and not very concrete, and for some individuals, it is really hard to accept that a "flu-like illness" could be life-threatening.28Some believe that COVID-19 is a business for HCWs and doctors are diagnosing every fever as COVID-19 for their benefits. These would relate to various other myths about the origin of the virus. Other people believe that the government has been providing false reports of COVID-19 cases because a large number of cases are usually those that will get more profit and donations. Many believe also that it is from God as a punishment, the 5G technology directly transmits the virus and weakens the human immunity and some consider that the virus is a bio-warfare weapon (Ullah et al., 2021).

However, regarding the safety of the COVID-19 Vaccine, this study showed that 12.7% of respondents believe that it has side effects and 44.7% had no idea about the side effects. It is also documented that 48% of respondents in China postponed vaccination before confirmation of the safety of the vaccine; this reflects their skepticism about vaccine safety (Wang et al., 2020). This variation could be because of a lack of information about the COVID-19 Vaccine.

66% of respondents in the present study had a positive attitude towards COVID-19 Vaccine. This is an association that goes along with an earlier study on attitudes toward dengue vaccination conducted in Indonesia (Harapan et al., 2016) and attitudes toward COVID-19 carried out in Bangladesh (Ferdous et al., 2020). the safety of the COVID-19 Vaccine, 73.3% of respondents agreed. In a qualitative study about public attitude toward the COVID-19 Vaccine conducted between 15 March to 22 April 2020 in the UK, 41% of respondents agreed to the Vaccine delay to wait for more information about the COVID-19 Vaccine. (Williams and Dienes., 2021). This difference is due to different myths about COVID-19 vaccines circulating among the people.

Recommendations

The COVID-19 pandemic has resulted in a significant amount of morbidity and mortality, as well as social and economic disruption, worldwide.

Authorized COVID-19 vaccines should be recommended as safe and effective in preventing symptomatic laboratory-confirmed COVID-19 disease, and prevention of severe disease, hospitalization, and death due to COVID-19.

There should be efforts to make access to immunization services not enhance health inequity further by stigmatizing or discriminating against people and ensure systemically marginalized populations and racialized populations are included in the design of immunization programs.

Efforts should be made to increase awareness of the general benefits of vaccines and the specific benefits of COVID-19 vaccines when available, dispel misinformation, and discuss transparently COVID-19 vaccine allocation decisions.

Currently available and authorized COVID-19 vaccines are administered intramuscularly in a two-dose schedule, as follows: Pfizer-BioNTech; Moderna; AstraZeneca. Others are given in a one-dose schedule, as follows: Janssen.

When the initial dose in any COVID-19 vaccine series is an mRNA vaccine product, the same mRNA vaccine product should be offered for subsequent doses if available. When the same mRNA vaccine product is not readily available or the product is unknown, a different mRNA COVID-19 vaccine product used routinely in the appropriate age group can be considered interchangeable and should be offered to complete the vaccine series.

COVID-19 vaccines should not be administered concomitantly with other live or inactivated vaccines unless other vaccines are needed for post-exposure prophylaxis.

COVID-19 vaccines should not be administered concomitantly with monoclonal antibodies or convalescent plasma.

Conclusion

Some challenges were encountered during the research, including the time spent accessing some rural areas with limited access to digital equipment and infrastructures. Second, responses may be biased due to participants' beliefs related to their personal beliefs about vaccination. Despite the challenges, the study produced rich information on how people in the Peshawar District perceive COVID-19 vaccines, which will be a launch pad for more focused health communication strategies that will manifest in the future. The COVID-19 pandemic continues to wreak havoc globally in terms of human lives and livers, and perhaps all that can brighten their future are the COVID-19 vaccines. The results of the current study reflect low knowledge but higher positive attitudes toward COVID-19 vaccinations in Peshawar. The results suggest that immediate health education programs and more accurate information should be disseminated and publicized by relevant health authorities. Policymakers should attempt to ensure adequate knowledge, positive attitudes, and perceptions toward COVID-19 vaccinations to decrease the vaccine hesitancy promoted and fostered by misinformation in the media.

Author Contributions:

Sana Shahid and Fawad Khan led the conceptualization and methodology of the study. Muhammad Nisar and Nisar Ahmad contributed to data collection and analysis. Asad Ullah assisted in the formal analysis and visualization of results. Inayat Ul Haq and Muhammad Waqar Farooqi were responsible for resources and software validation. Saeed Ullah provided funding acquisition and overall project administration. All authors reviewed and approved the final manuscript.

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Conflict of Interest Certificate

We, all authors of the manuscript titled *"Public Attitudes Toward the COVID-19 Vaccine in District Peshawar, Pakistan,"* hereby certify that there are no conflicts of interest related to the publication of this paper. All authors have contributed significantly to the research, analysis, and writing of this manuscript, and none of the authors have any financial or personal relationships that could inappropriately influence or bias the content of this work.

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