

Catalyzing Global Action: Addressing SARS-CoV-2 Vaccine Hesitancy, Knowledge Disparities, and Epidemic Preparedness Challenges in Pakistan

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ABSTRACT

Vaccine hesitancy during COVID-19 pandemic has emerged as major global health concern, typically among countries with poor knowledge and fragile tertiary healthcare setups. Despite of several challenges vaccine hesitancy has remained a major barrier in tackling the global war against SARS-CoV-2. We aimed to analyse the SARS-CoV-2 vaccination knowledge and awareness attributes among medical and allied sciences professionals in Pakistan. Among 1500 study participants, 92% were completely vaccinated against SARS-CoV-2 while, 8% were reluctant to receive the vaccination. 80% of the participants encouraged timely vaccination. 98.5% of the study participants were aware of SARS-CoV-2 related seriousness. Among participants, 50% were using masks single time, 25% have reused masks twice or thrice, 18% have used same mask for weeks, and 7% of the responders have used same mask for several months. 41% of the responders have come across the myths of fertility related issues upon SARS-CoV-2 vaccination, 31% came across the myths of reduction of life expectancy, 13% came across the myths that COVID-19 vaccination is loaded with nano-robots for surveillance and monitoring by foreigners. Of note, SARS-CoV-2 associated myths affected decision of getting vaccination among 20% of the responders. Among the study participants, majority (33%) have received the Sino Vac (in-activated) vaccine against SARS-CoV-2, followed by Pfizer (25%) Sinopharm (18.5%), CanSinoBio (10%), Astra Zeneca (4%), and Moderna (4%). 60% of the participants were satisfied, up to some extents, with the efforts of government in preventing SARS-CoV-2 spread in Pakistan. Global donors can also step forward for the prevention of SARS-CoV-2.

Keywords: SARS-CoV-2; Pakistan; Awareness; Knowledge; Medical Physicians

Introduction

Vaccine resistance, an international trend of being hesitant or unwilling to receive vaccination, is evident in multiple countries, including Pakistan. Misinformation and false rumors can travel fast, particularly on social media, and are a major factor in creating reluctance to

vaccinate [1]. Misleading statements and unverified gossip regarding the effectiveness and safety of vaccines are being spread throughout Pakistan, causing skepticism and worry among its people. In Pakistan, a long-standing lack of faith and suspicion towards government efforts, combined with worries regarding healthcare provisions, have played a part in creating reluctance towards vaccination. There are

some people in Pakistan who have expressed religious reservations regarding the utilization of vaccinations. There may be doubts or anxieties about the acceptability of vaccines due to misunderstandings or worries about their compliance with religious beliefs, such as unfounded claims that vaccines include forbidden components [2]. The role of socioeconomic factors in vaccine reluctance cannot be ignored. Marginalized communities may be hesitant to obtain vaccinations due to their limited access to healthcare services. Moreover, factors like the accessibility and cost-effectiveness of immunization can pose obstacles to individuals receiving vaccines. To combat misinformation, it is crucial for public health officials to communicate transparently and with cultural sensitivity.

The utmost importance lies in dispensing precise details about the effectiveness, safety, and advantages of immunization [3,4]. Community involvement is crucial as it enables the resolution of issues and the development of allegiance by collaborating with local communities, influential figures, and religious leaders. Dispelling misconceptions about vaccines and improving their acceptance can be effectively achieved through community-driven initiatives and awareness campaigns. Enhancing the healthcare infrastructure, especially in secluded and underprivileged regions, could enhance the availability of vaccines and healthcare facilities. Establishing vaccination centers, guaranteeing sufficient vaccine stocks, and teaching healthcare personnel are all part of it [5]. Effective resolution of vaccine hesitancy depends on the cooperation between government agencies, healthcare providers, community organizations, and global allies. Sharing successful methods, tools, and knowledge can aid in the creation of effective approaches to combat reluctance. Ongoing measures are being taken to tackle the reluctance of people in Pakistan towards getting vaccinated. The government is joining forces with global entities and community members to bolster vaccination acceptance, enhance accessibility, and counter falsehoods [6].

Implementing these measures must take into account the cultural, religious, and socioeconomic factors intrinsic to Pakistan. The ideal strategy to tackle vaccine hesitancy among expectant mothers and children in Pakistan would be a customized approach that takes into account their individual concerns and requirements [7]. Pakistan is currently administering multiple types of vaccines to combat COVID-19, which include Sinovac, Sinopharm, CanSinoBio, Covishield (AstraZeneca), and Pfizer-BioNTech. The government has been acquiring vaccines by means of bilateral agreements as well as through the worldwide COVAX initiative. The COVID-19 vaccination drive in Pakistan was launched in February 2021, prioritizing vaccination for frontline healthcare professionals and later extending it to other high-priority groups, such as the elderly and those with underlying medical conditions. The objective of the campaign was to immunize a noteworthy percentage of the populace in order to control the transmission of the virus. The government has provided an efficient means for citizens to sign up for COVID-19 vaccination via an online

registration portal and helpline [8]. By registering, individuals can receive alerts regarding their vaccination timetable. In order to streamline the process of administering vaccines, centers for vaccination were established throughout the nation. These vaccination centers, comprising both government-owned and privately-owned establishments, had the task of dispensing injections and keeping watch on those who received them for any unwanted reactions. It is crucial to consult reliable sources, such as the Ministry of National Health Services, Regulations, and Coordination and the National Command and Operation Centre (NCOC), in order to obtain the latest and most precise updates regarding the ongoing COVID-19 vaccination progress in Pakistan. Consistently, updates on the advancement of the vaccination campaign, the accessibility of vaccines, and the qualification requirements for distinct population segments are communicated to the general public.

International contributors have a critical function in bolstering vaccination-based efforts to prevent the worldwide impact of illnesses. Various entities such as governments, foundations, and organizations from across the globe extend monetary assistance towards the development and research of vaccines geared towards tackling a variety of ailments. This financing aids in facilitating the exploration, experimentation, and creation of vaccines, particularly those directed towards illnesses that have a significant impact on the world. Global benefactors frequently provide support to secure and distribute vaccines to nations that require them. International benefactors support fair distribution of vaccines to economically challenged and middle-income nations through measures such as the COVAX initiative, which may otherwise face financial and logistical difficulties in obtaining vaccines [9].

The ongoing global pandemic of coronavirus disease 2019 has already infected 257 million population and of them, 5.1 million already died. Both therapeutic and non-therapeutic measures were taken to decrease the numbers of COVID-19 confirmed cases and reduce the deaths. However, the non-pharmaceutical interventions taken worldwide to handle the pandemic have become flacid with time. Therefore, it has become necessary to achieve herd immunity or to implement effective vaccination. Achieving herd immunity for COVID-19 by natural means or allowing a large number of people to become infected will cause a strain on healthcare resources and will also result in up to 30 million deaths worldwide. Thus, mass vaccination has become the only way to manage COVID-19 transmission. Vaccines are effective and reliable public health interventions against viral outbreaks and pandemics. It is the only way to acquire mass immunity amongst a population through a safe and reliable route. However, hesitancy regarding the Coronavirus disease (COVID-19) vaccine is evident worldwide. Therefore, understanding vaccination-related behavior is critical in expanding the vaccine coverage to flatten the infection curve. Conducting a study that explores the different reasons which make people hesitant towards vaccinating themselves against the

COVID-19 virus provide us with a clear and transparent platform to go over all the ways in which we could educate people about the benefits of the vaccine, the severity of a COVID-19 infection, and to clear their misconceptions that they might have either due to falling prey to many of the inaccurate conspiracy theories that often accompany the vaccine everywhere or due to a lack of exposure to knowledge about the vaccine [10-12].

Material and Methods

A descriptive cross-sectional study was conducted by International Center of Medical Sciences Research (ICMSR) Islamabad Pakistan, on 1500 participants from pre-medical background or associated with medical professional in Pakistan aged 18 years or above during January 2023 to June 2023. For data collection, a snowball sampling survey strategy was devised for getting insight into the pre-existing knowledge and perceptions of the participant about the COVID-19 vaccine.

Results

Among 1500 participants of the study, 58% were males and 42% were females. Among participants, 56% were from the profession of Bachelor of Medicine & Bachelor of Surgery, 18% were from the profession of Bachelor in Dental Surgery, while 26% participants were nurses and other para-medical staff. Overall, among 1500 participants, 92% were completely vaccinated against SARS-CoV-2 while, 8% were reluctant to receive the vaccination. Among the completely vaccinated participants, 74% participant's family members were vaccinated against SARS-CoV-2; while 17% participant's family members were not vaccinated against SARS-CoV-2; while 7% were not sure about the vaccination status of their family members due to absence for long time from their homes. Among the study participants, 92% responded that all female members were given equal preference for vaccination status as of men family members. 80% participants of the study personally encouraged other people to get timely vaccination against SARS-CoV-2. 98.5% of the study participants were aware of the basic knowledge regarding COVID-19 and its seriousness. 71% of the participants responded that SARS-CoV-2 is lethal, while 21% were not sure about the seriousness of the SARS-CoV-2; and 8% did not consider SARS-CoV-2 as lethal viral infection. Among the participants, only 39% were fully aware of SARS-CoV-2 transmission via Airborne, Fomites mediated transmission, Close contact, Human-to-Human transmission and others. 82% of the participants responded that SARS-CoV-2 can be transmitted below than 6 feet at close proximity with the infected individual. Among responders, 94% were aware of the infection as respiratory infection.

While 6% were not aware about the type of infection. 92% of the responders knew the standard operation procedures to prevent SARS-CoV-2 including sanitary masks usage, hand sanitizers, and maintaining social distancing and others. 50% of the responders were practicing single time use of masks, 25% have reused masks twice

or thrice, 18% have used same mask for weeks. 7% of the responders have used same mask for several months. 8% of the participants were highly satisfied to the efforts of government of Pakistan against SARS-CoV-2 pandemic, 60% were satisfied to some extents. However, 32% were not satisfied with the government efforts in preventing the spread of COVID-19 in Pakistan. 88% of the responders have heard myths against COVID-19 vaccination. 41% of the responders have come across the myths of fertility related issues, 31% have come across the myths of reduction of life expectancy, 13% came across the myths that COVID-19 vaccine includes tracking Nano-robots that can cause damage anytime, 15% have come across other myths. The COVID-19 associated myths affected decision of getting vaccination among 20% of the responders, while 68% were not affected with these myths. Among the study participants, 33% have received the Sino Vac (in-activated) vaccine against SARS-CoV-2, 25% responders were vaccinated with Pfizer vaccine (based on mRNA vaccine technologies) against SARS-CoV-2, 18.5% were vaccinated with Sinopharm, 10 % have received the CanSinoBio/ PakVac SARS-CoV-2 vaccine, 4% have received Astra Zeneca vaccine against SARS-CoV-2, 4% received Moderna vaccine against SARS-CoV-2, while 5.5% vaccinated responders were not sure about the type of vaccine.

Discussion

Vaccines are one of the most effective and reliable public health interventions that could be implemented to prevent millions of deaths from viral infections every year. Although anti-vaccination attitudes and misconceptions are present worldwide, vaccination programs have been developed and progressed in the global health era. Currently, the vaccine from the Pfizer/BioNTech, the SII/Covishield and AstraZeneca developed by AstraZeneca/Oxford, the Janssen/Ad26.COV 2.S developed by Johnson & Johnson, the Moderna COVID-19 vaccine, the Sinopharm COVID-19 vaccine from China National Biotec Group, and the Sinovac-CoronaVac are listed for WHO Emergency Use Listing. All the vaccines have some kind of mild to moderate side effects, but all of them are safe and effective (60–95%). COVID-19 vaccines save from not only infection but also severe illness and death. Though mass vaccination programs have already been started globally, the effectiveness of vaccination programs has been affected by a hesitancy to receive the vaccines [13].

The hesitancy regarding COVID-19 vaccines is present worldwide. Studies have shown many factors related to the COVID-19 vaccine hesitancy in different categories of the population. The factors included various socioeconomic and demographic characteristics (e.g., age, sex, residence, income, occupation, and marital status) build-up of the health belief model, vaccines-related knowledge, attitude towards COVID-19 vaccination, conspiracy beliefs, trust and confidence, COVID-19 preventive practices, and the notions of safety and side effects of the vaccines. Despite vaccine hesitancy, the demand for vaccines has increased with time, and differences in vaccine access within and across the countries are remarkable. Even though

the main drivers of vaccine hesitancy are often accompanied with its own context, there are some agreed upon factors that make us believe that confidence and trust in the COVID-19 vaccine play a vital role in increasing vaccine acceptance [14,15]. This study explores the public perception regarding COVID-19 vaccination and isolates factors related to vaccine hesitancy amongst the general population. The funding and resources provided by donors assist in carrying out immunization programs and campaigns, which include delivering vaccines, establishing a cold chain infrastructure, training healthcare workers, and promoting public awareness. These endeavors have the objective of enhancing global vaccination rates and lessening the impact of illnesses that can be prevented by vaccines. International aid organizations offer technical support and help enhance the capacity of nations and institutions engaged in vaccine-driven prevention efforts.

Possible Paraphrase

This could involve providing education and support for healthcare personnel, enhancing monitoring and tracking mechanisms, optimizing the distribution of vaccines, and bolstering the effectiveness of immunization programs as a whole. International donors oftentimes work hand in hand with private corporations, such as those in the pharmaceutical industry, to cultivate alliances known as public-private partnerships. Intelligent rewording: By joining forces, these collaborations can exploit resources, know-how, and technology to expedite the creation, manufacturing, and dissemination of vaccines that target worldwide health concerns [16,17]. Receiving financial assistance from donors, research and monitoring efforts are conducted to evaluate the efficiency, safety, and influence of vaccines on the prevalence of diseases. These investigations offer valuable insights for shaping policy choices, enhancing vaccination plans, and guaranteeing ongoing surveillance of vaccine-preventable illnesses and their consequences. International donors play a vital role in promoting the allocation of more resources and policy encouragement towards immunization-based prevention through their advocacy and policy influence [18]. They conduct discussions with governments, global organizations, and related parties to highlight vaccination as a significant aspect of global health strategies. In order to address the issue of reluctance towards vaccines amongst pregnant women and children in Pakistan, it is necessary to implement focused tactics and a thorough plan of action. There are several actions that can be implemented to tackle the issue of reluctance towards vaccination within these particular groups.

One can achieve this goal via a range of channels, such as medical institutions, communal hubs, extensive communication networks, and online social platforms. The involvement of healthcare providers is essential in combating vaccine hesitancy [19]. Healthcare professionals must possess current knowledge of vaccines, including their efficiency and safety, in order to address inquiries and counsel expectant mothers and caregivers. Providing healthcare professionals with training on effective communication strategies can improve their

capabilities in addressing vaccination skepticism. To promote vaccination and tackle concerns, seek the cooperation and involvement of prominent community members, religious leaders, and influential people. The backing and approval from them can have a significant influence on the willingness of pregnant women and parents to accept vaccines. Create communication and resources that are personalized to the culture and mindful of the distinct worries and values of expectant mothers and caregivers in Pakistan. One way to increase vaccine acceptance and reduce concerns is by clarifying misunderstandings, dispelling myths and addressing religious beliefs. Make sure that pregnant women and children can easily access vaccination services. Efforts entail establishing vaccination hubs at easily accessible sites, expanding business hours, and minimizing logistical hurdles. Mobile vaccination units can additionally be dispatched to reach isolated and inadequately served regions [20].

To alleviate worries regarding the safety of vaccines, it is advisable to furnish factual information and disclose the thorough scrutiny and monitoring procedures that vaccines go through. Emphasize the advantages of immunization in averting grave illnesses and shielding the mother and child. Building effective strategies in collaboration with global institutions, healthcare providers in the vicinity, community groups, and other important entities. Pooling knowledge, resources, and successful tactics can enhance endeavors towards addressing vaccine reluctance [17]. The EPI has been actively engaged in educating healthcare workers on diverse facets of COVID-19 vaccination, encompassing the proper handling and administration of vaccines as well as vigilance in monitoring any adverse events. This training program guarantees that healthcare practitioners possess the essential proficiency and expertise to administer vaccines with utmost safety and efficacy. The EPI has effectively leveraged its vaccination centers and outreach programs to ensure the efficient distribution of COVID-19 vaccines. These facilities and solutions have been enlarged and tailored to cater to the escalated need for immunization amidst the COVID-19 crisis. The EPI has played a crucial role in overseeing and keeping track of the COVID-19 vaccination situation in Pakistan through surveillance and monitoring efforts.

The organization has been actively engaged in gathering and examining information related to the extent of vaccination, potential negative effects that may result from immunization, and the safety of vaccines [21]. This information contributes to the monitoring of the vaccination campaign's advancement and the identification of possible problems. The EPI has been instrumental in increasing public knowledge about the COVID-19 vaccinations and tackling any doubts surrounding their efficacy. It has worked together with additional participants to create educational resources, carry out campaigns to increase public awareness, and spread precise knowledge regarding the advantages of the vaccinations. The utilization of EPI's expertise and resources has aided in the successful execution of the COVID-19 vaccination drive in Pakistan. Its effective management of coordination, cold chain protocols, training initiatives, transportation, monitoring,

and communication strategies have played a pivotal role in successfully inoculating a considerable segment of the populace [22,23].

In general, global governments offer financial, technical, and logistical aid to promote the use of vaccines to prevent the impact of global diseases. Their inputs help improve the availability of vaccines, reinforce immunization initiatives, and alleviate the repercussions of illnesses that can be prevented by vaccines all across the globe. The COVID-19 vaccination drive has greatly benefited from the Expanded Programme on Immunization (EPI) in Pakistan, reflecting its significance in execution. The EPI has played significant roles and contributed towards COVID-19 vaccination efforts in Pakistan [24-26]. The coordination and planning of the COVID-19 vaccination campaign in Pakistan has been aided greatly by the EPI, a key entity in charge of immunization efforts in the country. A comprehensive plan for the deployment and implementation of vaccines has been collaboratively developed with the Ministry of National Health Services, Regulations, and Coordination. Cold chain management is a crucial aspect of vaccine storage and distribution and the EPI possesses significant expertise in this area. This system has been utilized to securely store and transport COVID-19 vaccinations, guaranteeing their effectiveness at every stage of distribution [27,28].

Conclusion

This study provides us with a crucial understanding of the populations' perception, their misconceptions and their lack of awareness about the COVID-19 vaccines that can be used to design effective COVID-19 vaccination programs for a population of a specific region or country. We can use the studies' findings to form context specified vaccination programs and information-sharing events, ultimately resulting in increased confidence in and usage of the vaccine.

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