

COVID 19 Vaccine Uptake in Pakistan

Hena Arif

Background

Pakistan is an Asian country occupying part of the Gihir-Euphrates and Indus basin and is the seventh most populated country in the world, comprising approximately of 135 million people. The key population characteristics in Pakistan are high maternal and child mortality, high level of infectious and communicable diseases, and low life expectancy and high fertility. Common disease burdens in Pakistan include tuberculosis, malaria, and acute respiratory tract infections.

Pakistan's healthcare system is nothing different from what a typical LMIC's healthcare system consists of, fragmented, underdeveloped, and a weak structure. The responsibility of healthcare primarily falls under the provincial governments. The federal government does however formulate the health policies while the provincial government more so implements them. The health care system includes the private and public sectors as do most systems with 70% of the population using the private sector which uses a fee-for-service model. The public sector is mainly funded by the government including foreign aid from bilateral and multilateral organizations. The primary health care (PHC) in Pakistan is vastly underutilized due to lack of health care professionals, lack of women staff, absenteeism, poor quality of care, and inconvenient locations. There are inherent weaknesses in the system which causes corruption to occur in the health care system.

With the health care system Pakistan has, it is not equipped to face a public health emergency, especially a pandemic. The hospitals are not equipped to deal with such a high disease burden. The necessary supplies such as PPE are not readily available or accessible. They

also do not have many quarantine wards and diagnostic wards. In Pakistan, typically only around 3.29% of its GDP is spent on health care. This percentage is very low especially compared to smaller countries and the COVID pandemic has put the health care system in a lot of stress.

Vaccine Availability and Delivery Plan

Pakistan has approved 7 different COVID-19 vaccines for emergency use. These are Pfizer, Moderna, Vaxzevria, Sputnik V, Sinopharm, Sinovac, and Cansino-Bio. The efficacy of Pfizer and Moderna vaccines is 95%. Vaxzevria, Sputnik V, Sinopharm, and Cansino have 70%, 91.6%, 79.34%, and 90% efficacy, respectively. Sinovac's efficacy rate lies around 50% which is pretty low compared to the others, but it does have a 100% efficacy rate against severe infection and hospitalization 14 days after the second dose.

Pfizer and Moderna were the first vaccines to get approved and this was done as early as December 2020. They both employ the novel mRNA technology and are very potent. They have a low cost of production and can be produced rather rapidly. They also have a better safety profile since they don't use actual pathogen in the manufacturing of the vaccines. The main issue with the use of these vaccines in Pakistan are that they require extreme cold temperatures because of the unstable mRNA they contain. Pfizer requires -60 to -80°C and Moderna requires -15 to -25°C refrigeration temperature. These extreme temperature requirements are hard to manage in Pakistan which is why the uptake of these vaccines are limited even though they are the most effective.

Vaxzevria employs the use of SARS-Cov-2 proteins to induce an immune response. The temperature requirement for storage is between 2 to 8°C which is much more feasible than the mRNA vaccines. It is more readily accessible although it does carry the risk of thrombosis. Sputnik V uses an adenovirus vector and has great efficacy. It requires to be refrigerated at -18°C

and Pakistan orders quite a bit of supply from Russia. The Sinopharm vaccine is inactivated and made from vero cells. Cansino-Bio employs the common cold virus as a vector and boosts T cell response with no serious adverse effects. Both the Cansino-Bio and Sinopharm have no major accessibility issues.

Early on during the pandemic, Pakistan did survive well but during the Delta surge in July 2021, hospitals suffered quite a bit and out-patient clinics were shut down. A majority of unvaccinated individuals live in rural villages and as a result, those areas were heavily affected. Pakistan has secured many Sinopharm doses as they have ties with China. They have been gifted these doses and have bought about a million doses as well. The US government did give Pakistan about 9.6 million doses. Majority of the vaccine supply is sourced from other countries but to become more independent, Pakistan did create a facility in late 2021 called PakVac to produce about 3 million doses of the Chinese Cansino-Bio COVID-19 vaccines monthly. This initiative is set to decrease vaccine costs and improve vaccine availability.

Vaccine Implementation and Uptake

Pakistan's population includes 25% of people being under the poverty line and a lot of the population has poor hygiene practices. The population is very susceptible to COVID-19 and requires immense support to tackle it. Although vaccines may be available in Pakistan, access is limited to them especially for the lower- and middle-class individuals. Majority of the lower income individuals live in tightly packed areas and have very limited access to medications and hospitals. Hospital facilities and health care is miles away and wait times are also very long.

Vaccine implementation is also difficult due to lack of proper training of local health centers and shortage of staff. These local health centers are what low-income individuals can often access but the staff in the centers themselves lack expertise and cannot provide the best

care. There is also a lack of education that leads to healthcare ignorance and low awareness of public health concerns. This ignorance feeds into vaccine hesitancy and makes it even harder to implement vaccines.

Pakistan also has a shortage of health care professionals that are injection-certified and can be very useful in increasing the vaccination rates. Only about 1 physician is available for every 963 people. In term of pharmacists which are known to play an integral part in vaccination, there are only 1.6 pharmacists available to serve every 10,000 individuals whereas the goal set by the WHO is 5 pharmacists per every 10,000 individuals. This deprives patients of accessible front-line consultations about communicable disease prevention along with vaccine administration.

Vaccine hesitancy has definitely been a major hurdle in the uptake of vaccines in Pakistan. Although there are supply issues, Pakistan has successfully been able to procure around 40 million doses of the COVID-19 vaccines through many sources. Even with all these vaccines, the vaccination rate is not as high as it should ideally be due to vaccine hesitancy caused by religious and cultural beliefs as well as rumours and conspiracy theories. Despite all these hurdles, uptake has generally been decent even though it is low (18.2% by September 2021) and initiatives such as vaccine drives have helped. These drives are geared towards healthcare workers and the elderly as do most other countries.

A recent cross-sectional study performed in Pakistan indicated that the majority of the individuals in the study which is about 70.8% of respondents will accept the vaccine if available and 66.8% of respondents had a positive attitude towards the vaccine. This is a very good indication, but that sadly has not been reflected nationwide with the vaccination rate still being low either from administration/availability issues or hesitancy/access. The study also revealed

that 48% of the respondents said that they would refuse to vaccinate themselves if the government made it necessary to do so. There is still some hesitancy and distrust seen there but there are also some positive indicators as explained prior even though not reflected by the public. This study does however foster the hope that with right guidance, the covid 19 vaccine implementation and uptake can increase resulting in higher and more ideal vaccination rates.

Along with this, Pakistan has also promoted many virus preventing strategies. Pakistan put restrictions on inbound and outbound flights. They have also promoted self-hygiene. They came up with the concept of “smart lockdowns” where only areas heavily affected were locked down. They also set quarantine requirements for certain affected people and of course, they have also promoted COVID-19 vaccines to a great extent.

Facilitators and Barriers

In terms of barriers in derailing the success and spread of COVID-19 vaccines, there are quite a few. The government can be a barrier, although also a facilitator. It can be a barrier because many individuals may have distrust in the government and any political leaders. Therefore, anything they promote or try to publicize may not be taken in a positive way and they public may think that there is an ulterior and selfish motive of the government involved. There is also a high level of corruption that is present in Pakistan which further supports the anti-government sentiment and causes distrust in vaccines as well. Another barrier is hesitancy that often the public has, especially when introducing a novel invention such as a vaccine. The public of Pakistan has low healthcare knowledge and awareness surrounding the vaccine and certain beliefs against the vaccine have circulated throughout the country. Even in a high literacy rate country such as the USA or Canada, misinformation and negative sentiments towards the COVID-19 vaccines have paved way so there is no doubt that this can happen in Pakistan and to

a higher extent. Other barriers also include access and storage restrictions. Vaccine facilities are often far away from the public, especially the poor who need it the most. Storage restriction is also a problem. For example, Moderna and Pfizer are one of the most effective vaccines, but they are seldom used and less available due to their extreme temperature requirements. They are available, but not as common as they could and should be.

In terms of facilitators in aiding the uptake of COVID-19 vaccines, there are also quite a few to take note of. Government for one is also a facilitator. This is because although there is distrust and corruption present, the government also has many initiatives set in place to promote vaccine uptake. First, they have started the PakVac initiative which helps increase access and availability of vaccines by producing them inhouse. Second, they have promoted vaccine uptake by distributing cash and non-cash benefits to people who take the vaccine. There are also cell phone messages the government sends out to promote vaccine usage to the public as well as powerful leaders that spread awareness. The government has approved multiple vaccines which makes it easier to have vaccines available since so many are approved. Other facilitators of vaccine uptake in Pakistan are the WHO and donor countries such as China and the USA. They have helped by donating a lot of vaccines. Pakistan is a third world country that has limited resources and depends on vaccine donations by the WHO and donor countries, so these donations have greatly facilitated vaccine usage in the country.

Implications

The implication of the COVID-19 current vaccine delivery and uptake situation in Pakistan is quite clear, a low vaccination rate. This makes individuals and the nation as a whole more susceptible to the virus and its complications. Pakistan needs to aim for a higher vaccination rate so they can help prevent the spread of COVID-19 even more. Figure 1 below

shows the situation of the COVID-19 pandemic in a chart format. People are not understanding that not getting the vaccine can put others at risk, not just themselves. They need to be more aware about the virus and how it can spread, and they should learn to value the vaccine and the benefits it can provide. Many people are victims of misinformation. Even though there might be people that do appreciate the vaccine, their uptake may be low due to problems in access. Another issue is that many people are taking vaccines that do not have the best efficacy rate. The vaccines with the best efficacy rate such as Moderna and Pfizer have limited use due to availability and storage issues.

The government needs to deconstruct its issues surrounding the reason for the low vaccination rate. The vaccination rate is 18.2% as of September 2021. It is a decent vaccination rate, but it needs to be much higher in order to fight against COVID-19 to the best ability they can. Figure 2 depicts a graph of vaccine doses given per 100 people. They need to highlight areas for improvement such as access. They must make sure that the staff is trained well and that health centers are located in convenient locations and a convenient distance for many different neighborhoods, especially for low income and congested communities who have a higher risk of disease contraction.

When vaccines were becoming available in Pakistan, many people had reluctance and distrust in authority. This attitude spread quite a bit and brought a lot of vaccine hesitancy along with it. A recent study conducted by the John Hopkins University stated that the COVID-19 vaccine acceptance rate in Pakistan was 67% which was about 2/3 of the population. A good thing is that this is the majority of the population accepts it but there is still work that needs to be done. The Vaccine Confidence Project stated that there is a growth of anti-vaccine feeling in Pakistan. It used to be 2% but later grew to 4% due to the promotion of anti-vaccine leadership

and statements. A research article also assessed the COVID-19 vaccination situation present in Pakistan. This was done by analyzing policy reports, news, and announcements. The dominant themes found by the study was hesitancy and inequality, as spoken about earlier in the paper. This indicates that inequality, meaning the unfair distribution is one of the main problems. This further boils down to policies and accessibility. The other dominant theme was hesitancy, meaning spread of vaccine mistrust. This is done by spreading conspiracy theories. They often ridicule the vaccine saying its forbidden by religion or saying that its Western-made so it should be avoided.

The COVID-19 vaccine situation in Pakistan is decent, but it has a lot of potential for improvement. Pakistan is headed in the right direction and with some guidance and understanding of their strengths and weaknesses, they can make great improvement.

Appendix

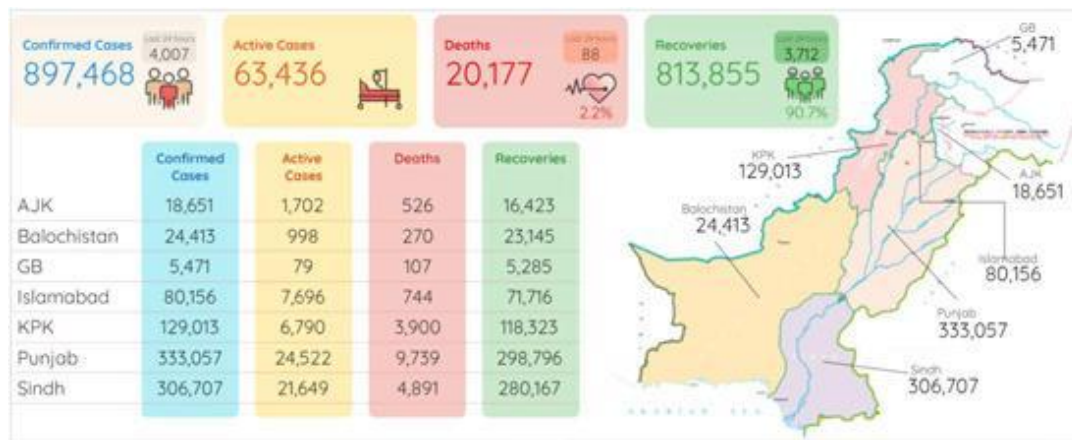


Figure 1: Summary of the COVID-19 situation in Pakistan (May 22, 2021)



Figure 2: COVID-19 vaccine doses given per 100 people in Pakistan (May 22, 2021)

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