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Commentary

An overview of procurement, pricing, and uptake of COVID-19 vaccines in Pakistan

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1. Introduction

The coronavirus disease 2019 (COVID-19) vaccination drive in Pakistan began in February 2021 after half a million doses of Sino-pharm vaccine (BBIBP-CorV vaccine) was supplied to the country by the People's Liberation Army of China [1]. The National Command and Control Center (NCOC) managed the vaccination program in the country; the frontline healthcare workers were the first group to be vaccinated when the mass vaccination campaign began on February 3, 2021 [2]. Later, on February 22, 2021, the government initiated the vaccination campaign for other healthcare workers. On March 16, April 3, April 25, April 28, May 12, May 29, and June 3, 2021, a mass vaccination campaign was introduced for populations above the age of 70, 65, 60, 50, 40, 30, and 18, respectively [3].

While leading the national COVID-19 vaccination efforts in Pakistan, NCOC also drafted policies related to vaccines distribution to the provinces [3]. NCOC works closely with the provincial health departments and National Coordination Committee (NCC), headed by the Prime Minister of Pakistan. As of the last week of July 2021, the number of fully and partially vaccinated people in Pakistan has reached more than 6 million and 20 million, respectively (a total population of approximately 220 million). The total daily doses administered at designated COVID vaccination centers have increased to somewhere between 600,000 and 900,000 doses (as of the last week of July 2021), [3]. In this paper, we aimed to shed light on the dynamics of COVID-19 vaccination in Pakistan and discussed the potential solutions to the recognized problems.

2. Procurement and pricing issues of COVID-19 vaccines

The procurement process of COVID-19 vaccine in the country has been slow; as a low and middle-income country, the supply of COVID-19 vaccines in Pakistan has been mainly depending on donations from the Chinese government and through the COVID-19 Vaccines Global Access (COVAX). COVAX is a global initiative that aims at equitable access to COVID-19 vaccines led by Gavi, the Vaccine Alliance, the Coalition for Epidemic Preparedness Innovations, and the World Health Organization [4,5]. The government of Pakistan has planned to procure enough supply of COVID-19 vaccines for 70 million eligible people in Pakistan through loans which shall be attained from the World Bank and the Asian Development Bank [5]. Indeed, the government has allocated PKR 1.1
The government has granted permission to the private parties to procure Chinese (AD5-nCoV) and Russian (Sputnik V) developed vaccines, of which the sale price has been capped at USD28, and USD56, respectively, for full vaccination [5]. Nevertheless, with a minimum wage of USD 115, one would require about a quarter of one week’s earnings to afford the Chinese developed vaccine and about half a week’s earnings to afford the Russian developed vaccine [7]. Furthermore, unlike the pricing procedure of other medicines, the Drug Regularity Authority of Pakistan (DRAP) was not involved in the pricing mechanisms of the COVID-19 vaccines; instead, the federal cabinet was involved in finalizing and approving their capped price [5].

The pricing issue of the privately procured vaccine started with Sputnik V, a Russian-developed COVID-19 vaccine, which had a global price of USD 20 but was being sold for a higher price by the importers and distributors in Pakistan (Table 1) [8]. The landing cost of Sputnik V vaccines in Pakistan was USD 45 (for two doses), which included the cost of the supply chain and shares of agents involved as middlemen between manufacturer and importer. With a 40% margin being distributed among facilities, taxes, logistics, hospitals, and importers, the Sputnik V vaccines were privately priced at USD 80 for two doses [8]. According to the distributors, Sputnik V vaccines must be stored and maintained at −18°C throughout the supply chain, incurring the additional cost. The capped price set by the government for Sputnik V vaccines (USD56 for two doses) had been overruled by the court, which allowed the private sales at the price of USD80 for two doses. Therefore, if the COVID-19 vaccines are not provided free of cost by the government, they are likely to be out of reach of the pockets of the eligible population.

Our recommendation is that the government should manage the procurement of COVID-19 vaccines itself to avoid excessive mark-up due to distributions of profits among various parties. The government can procure vaccines in bulk, if possible, and redistribute them cost-effectively and at subsidized rates to improve accessibility. The procurement of COVID-19 vaccines by the private parties could eventually lead to the unequal distribution of vaccines to only the social elites; the government should be the only party in the country to provide the vaccines to the eligible population, including the vulnerable sectors of society and the elderly population [9]. To provide a sustainable vaccination drive to the masses, the government should also promote inland co-manufacturing of approved COVID-19 vaccines. The facilities for this purpose are already available at the National Institute of Health, where recently the government has started manufacturing antivenom for snake bites [10].

### 3. Sourcing of more COVID-19 vaccines supply

Earlier this year, Pakistan signed an agreement with the manufacturer CanSinoBio, allowing Pakistan to import the vaccine concentrate of a Chinese-developed vaccine, Ad5-nCoV, in bulk. Accordingly, the government has started the co-production of the single-dose Ad5-nCoV vaccine and repackaged the vaccine as PakVac for the masses [11]. Such procurement practice represents another method for sourcing vaccine supply. It could allow the government to provide the vaccine at a lower cost than the global price of the given vaccine. In addition, locally manufactured vaccines could help the country achieve sustainable development goals and, in the long run, to be able to export low-cost vaccines to other underdeveloped countries.

Performance of clinical trials of COVID-19 vaccines in Pakistan can also be a source for their supply. In August 2020, the Drug Regulatory Authority of Pakistan approved the clinical trial of Ad5-nCoV vaccines, developed by China's CanSino Biologics and the Beijing Institute of Biotechnology [12]. Over 17,500 people from different walks of life and country areas volunteered to participate in the trials underway at five different sites in Islamabad, Lahore, and Karachi [12]. However, recently, the National Bioethics Committee of Pakistan has refused to give clearance of at least five double-blind, placebo-controlled Phase-III clinical trials of COVID-19 vaccines on ethical grounds, citing that the use of a placebo cannot be allowed during these trials at a time when different types of conventional COVID-19 vaccines are available in the country, though this had not been accepted by the investigators and manufacturers [13]. This issue, if solved, could lead to hundreds of thousands of individuals in Pakistan, to be vaccinated.

### 4. Vaccine uptake and hesitancy

In Pakistan, 8 in 10 physicians are willing to receive the COVID-19 vaccine offered, but among the general public, only 60% of Pakistanis are committed to receiving the COVID-19 vaccine [15,16]. The recent increase in vaccine uptake [3] was due to the roll-out of a mass vaccination campaign for the younger population (30 years old and below), who are better informed of the benefits of the COVID-19 vaccine. This included those who get their shot of vaccines to fulfill the requirement for the approval of visa...
application of few countries, which mainly applied to the labour class who wish to pursue work outside of Pakistan [17]. Nevertheless, the vaccine hesitancy, fuelled by numerous conspiracy theories, has remained a significant challenge in eradicating endemic vaccine-preventable diseases like polio and measles [18]. Thus, it is imperative to take concrete measures to target and reduce such misconceptions surrounding COVID-19 vaccination.

Consequently, the government should prioritize measures such as providing the masses with information regarding the safety and importance of COVID-19 vaccination to return to normality, besides other preventive measures. Additionally, the prime responsibility lies with Pakistani media to avoid publicizing exaggerated falsehoods about COVID-19 vaccines during the current pandemic crisis. Furthermore, as the majority population in Pakistan follow religious conservatism, the government can work with the religious clerics to promote and educate COVID-19 vaccination in sermons and even extend the vaccination program to religious places. These actions will give confidence to the conservatives about the safety and efficacy of the COVID-19 vaccines. Another issue is about the conspiracy beliefs related to infertility from the COVID 19 vaccines. This issue should be challenged with fact-checking and dissemination of evidence-based scientific information. Furthermore, as a long-term plan to counter vaccine hesitancy, in low- and middle-income countries like Pakistan, the district government can arrange community gatherings where vaccinees can share their stories of successful vaccination after six months of their first shot of vaccine. As the vaccination campaign started in February 2021 with frontline workers, these gatherings can be initiated by July 2021, incorporating the frontline workers at the community and primary care level to motivate the undecided population about vaccination and challenge vaccine hesitancy through sharing of their stories of successful vaccination. Nonetheless, whichever measures are taken, they must follow the spirit of ethics, and vaccination must not be forced against the will of those who are being vaccinated.

5. Adverse drug reactions (ADRs) monitoring

There is a lack of a centralized electronic medical record system in Pakistan. Therefore, most of the reported ADRs related to the COVID-19 vaccine was performed voluntarily through the Medsafety app. The app allows the online reporting of suspected ADRs from any allopathic, biological, herbal, and homeopathic products. This application aims to provide an easy way of ADR reporting and encouraging the active participation of all healthcare professionals and patients to promote safe use of medicines. Its use is limited to the technology and health literacy of the population. As of May 18, 2021, out of over 3.8 million doses of COVID-19 vaccines administered, 4329 reports of adverse events following immunization have been reported so far. Hence, only 0.1% managed to report an adverse event following vaccination [19]. Nearly all reported adverse events were mild in severity, and 90% of these reports involved pain at the site of injection or fever. The pharmacovigilance system in Pakistan needs revamping, professional management, and funding to improve its functioning. The public, a key source of reporting, should be educated to report ADRs through online platforms, telemedicine follow-ups, or easy-to-use app.

6. Conclusion

In conclusion, despite being a developing country with limited resources, Pakistan is exploring all the avenues available to increase the vaccination rate to terminate the COVID-19 pandemic from procurement of COVID-19 vaccines to a centralized policy of mass vaccination. The government of Pakistan should facilitate and support more technology transfer deals for local co-manufacturing of vaccines, which could be cost-effective in the long run. The roll-out of COVID-19 vaccines in developing countries is critical to building human capital and stimulating economic recovery; the World Health Organization should develop more policy actions to support equitable vaccine access in a developing country like Pakistan.

Funding

None.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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