

The Barriers to Equitable COVID-19 Vaccinations and How Public Health Strategies can Improve Vaccine Uptake in Low-income Communities

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Abstract. The COVID-19 pandemic is a global public health crisis caused by the SARS-CoV-2 virus, it led to severe health, social, and economic impacts. Significant inequalities in vaccine distribution have been recognized through after and during the pandemic, particularly in low-income communities. This essay explores the barriers to equitable COVID-19 vaccine distribution in low-income countries, focusing on economic constraints, limited healthcare infrastructure and vaccine hesitancy. Addressing these disparities and multilayered challenges involved in increasing vaccination rates, the essay communicates how public health strategies can be optimized and enhanced through making vaccination more easily accessible by the public, such as constructing a larger number of mobile clinics or community-based vaccination sites and building trust through targeted communication and education. Throughout the essay, the significance of ensuring equitable vaccine access is emphasized as it is believed to be a critical component of public health preparedness and resilience. The avertable issues caused by the limited access of vaccine are valuable lessons that are learned from the COVID-19 pandemic, and this can inform future strategies to address broader public health inequities and improve health outcomes for the underserved populations.

Keywords: COVID-19, vaccine, low-income communities.

1. Introduction

The COVID-19 pandemic was an unexpected global public health crisis initiated by the coronavirus SARS-CoV-2. The virus transmits between people when they are in close contact, through their mouth and nose when they cough, sneeze, speak or breathe [1]. Individuals in crowded indoor settings such as nightclubs or restaurants hold substantially higher risks of infecting the virus if infected individuals congregate for extended periods of time with inadequate ventilation. Data and investigations in laboratories suggest that the virus in people is infected appear to be most contagious and infectious just before 2 days before they develop symptoms and early in their illness, and severe cases can be infectious for long periods of time. Immense health, social, and economic burdens were initiated by the COVID-19 pandemic.

The virus disseminating like wildfire, strict measures were implemented by countries across the globe to curb transmission, to curtail its spread and safeguard their citizens. COVID-19 vaccines were launched globally in response and have been proven effectiveness in preventing the spread of the coronavirus. However, inequalities in global health were also revealed through the implemented measures, it brings to light multilayered challenges in ensuring equal access to life-saving interventions. For example, despite the wide availability, its distribution has not been uniform across the globe and across populations, with low-income communities having limited accesses. Issues such as preventable deaths and illnesses and economic recovery processes delaying were examples of numerous issues initiated by low vaccination rates in low-income countries. The significant disparities in vaccine distribution and coverage have been caused by several barriers ranging from economic factors to social and psychological challenges, threatening the broader public health goal of achieving herd immunity [2]. This topic is significant as the disparity has led to severe consequences and it also intersects with broader issues of social justice and equity.

Low-income communities have been disproportionately affected by the COVID-19 pandemic, this essay addresses and explores in depth into the specific challenges that are specifically faced by low-income communities. Moreover, it offers broader insights into how public health systems can be enhanced and better adapted to serve low-income populations or populations that have been helplessly struggling during the COVID-19 pandemic in future health crises. The lessons that have been learned from addressing the barriers to COVID-19 vaccination in low-income communities can be applied to other public health challenges.

2. How Accessible are Vaccines Globally

Equal distribution is achieved when all people have the same, while equitable distribution prioritizes vulnerable individuals who have higher risks of severe illness and death from COVID-19, reinforcing on needs and fairness [3]. Vaccine equity is when vaccines are allocated across all countries based on needs and regardless of their economic status [4].

During the first 18 months of the COVID-19 pandemic, it has been estimated that 1.5 billion vaccine doses were administered worldwide with 75% of this vaccine supply distributed to only 10 countries. In contrast, fewer than 25 million doses of vaccine are distributed to the entire African continent. The continent with a population of 1.36 billion receive less than 25 million vaccine doses [5]. While data has shown that by November 29th, 2023, 78.86% of those living in high income countries have received at least one dose of the COVID-19 vaccine, but only 32.82% of people living in low-income countries have been vaccinated with at least one dose [4].

3. Barriers to Receiving Vaccination in Low-income Communities

3.1. Economic Constraints, Affordability

Income level is defined by GNI per capita and low income is a GNI of \$1 045 or less, middle income is \$1 046 to \$12 745, high income is \$12 745 or more [6]. Economic constraints and instability in low-income countries may be a significant reason to low vaccination uptakes.

Although the price of the vaccines offered in low-income countries tend to be substantially less than high-income countries, affordability is remaining as a major and realistic constraint to increasing vaccination in low-income countries. In low-income countries, vaccination was donated by developed countries, they relied heavily on support provided by COVAX (COVID-19 Vaccines Global Access), Gavi the Vaccine Alliance, and the World Health Organization (WHO) [4]. By July 2023, 1.9 billion doses of the vaccine has been delivered to 146 countries across the globe by COVAX [7].

Due to the fact that numerous low-income countries do not having the capacity to manufacture the vaccines themselves at the beginning of the pandemic, the cost of receiving vaccination also included the cost of delivering the COVID-19 vaccines which was around US\$3.70 per vaccinated person [8]. The WHO estimated that, a dose of vaccine ranges from US\$2 to US\$40, the price includes the cost of planning, cold chain equipment, transportation and also taking in to account possible wastage during the process [8, 9]. The WHO has also estimated that receiving vaccination would call for on average between 10% and 25% of people's health budgets per year, which a large proportion of the residents in low-income countries might be struggling to afford [10].

The implementation of vaccination in low and middle-income country was delayed in comparison with high-income countries which made them susceptible to COVID-19 variants and leaving them unprotected. Vaccination begins on average two months in advance in high-income countries than low-income countries with vaccination coverage in low-income countries remaining alarmingly low [4].

Herd immunity is the indirect protection from an infectious disease [11]. This can be achieved when a large proportion of the population is vaccinated against COVID-19, as it limits the transmission of the disease and protects vulnerable groups who are not vaccinated. In contrary to receiving vaccination, reaching herd immunity through exposing people to the virus and allowing

them to be infected challenges ethics and may lead to unnecessary deaths and severe cases [11]. In high income countries such as the U.K., a large proportion of over 6 million people has received both doses of the COVID-19 vaccination. With an estimated 73.4% of the population having forming immunity, the country may achieve herd immunity quickly.

3.2. Limited Access to Healthcare Infrastructure

Limited access to healthcare and healthcare infrastructure creates various barriers to equitable COVID-19 vaccination in low-income countries as the number of vaccination sites and healthcare facilities such as hospitals and clinics is limited. Many healthcare facilities are also inadequately equipped when handling with large-scale vaccination efforts, including the lack of vaccine storage space and equipment, the space to manage patients and people are receiving vaccination and the technology to keep records of the patients.

Furthermore, shortage of healthcare professionals in these communities is another significant issue. This limits efficiency of administering vaccines and the lack of healthcare workers also means that individuals will be receiving sufficient attention in necessary follow-up care or support and for managing side effects or addressing vaccine-related concerns.

The fact that for those who are willing and those vulnerable groups of people who are urgently needing the vaccine having no or limited access to these vaccines indicates the necessity to invest in and expand healthcare infrastructure especially in low-income areas, ensuring that vaccines are accessible, safe, and administered in a timely manner for all populations. In order to reach the goal of having equitable access to COVID-19 vaccines, this is essential that these issues regarding to infrastructure limitations is addressed to effectively combat the pandemic.

3.3. Distance and Transportation Barriers

Due to the limited resources not meeting the high demand, the amount of attention received, and quality of health care may become low. Citizens may have to travel a long distance to receive vaccination, this is disadvantageous towards them as transportation costs, mobility challenges and the time-consuming journey may discourage them. Scarcity of resources may result in the need to prioritize urgent care over preventive measures like vaccination, further limiting vaccination rates.

In addition, transportations in many low-income countries are not well-developed and transportation options are limited. Many rural areas in low-income countries may be geographically isolated, with few or no healthcare facilities nearby or within their reach, this isolation can significantly reduce vaccination rates in low-income countries. Distance and lack of public transportation facilities is especially burdensome for those individuals with low daily wages, as taking time off work to travel long distances for vaccination might mean losing crucial income. The issue is also more significant for those with mobility issues such as the elderly or illnesses that limits the person's ability to move, as they may find it even more difficult to travel to distant vaccination sites.

These factors have the ability to discourage people from receiving vaccination, leading to lower vaccination rates in low-income communities and vulnerability to COVID-19 outbreaks.

3.4. Vaccine Hesitancy – Mistrust, Misinformation

Vaccine hesitancy is a significant barrier to increasing vaccination rates, not only in low-income countries but across the world. Vaccine hesitancy is the delay in acceptance or refusal of vaccines despite availability and this has become a significant issue for many countries who are attempting to close the immunization gap [12]. Despite its effectiveness in preventing the disease and despite its pervasive use, vaccines continue to face skepticism. Many people still remain concerned about their safety and efficacy, due to various reasons including, negative experiences in health care, misinformation, rumors spreading on social media platforms or other contextual factors such as religious influences, this has led to large groups of individuals delaying or refusing vaccines [13].

The WHO has decided to list vaccine hesitancy as one of the top threats to global health especially among children and pregnant women [13]. The two groups of people are perceived as vulnerable populations, and concerns regarding risks around safety, potential side effects, and long-term impacts has led to hesitancy of vaccination and delayed decisions due to heightened caution. Vaccine hesitancy of children is mainly driven by parental fears about the relative risks and the new nature of COVID-19 vaccines, the spread of misinformation across social media platforms and between individuals, and a perceived lower risk of severe disease in younger age groups. After balancing the perceived risks of vaccination against the risks of the disease itself, many might be made the decision to delay reject the uptake of the vaccine. According to WHO, 20% of children still do not receive routine life-saving immunizations resulting in an estimated of 1.5 million children dying each year suffering from diseases that could be prevented by available vaccines [12]. Vaccine hesitancy in pregnant women is often fueled by concerns regarding the vaccine's negative effects on fetal development. Despite health authorities and professionals emphasizing on the safety and benefits of COVID-19 vaccination, including providing crucial protection against severe illness caused by the contagious virus for both the mother and the fetus, many pregnant women still remain cautious and skeptical.

4. How Can Vaccine Uptake in Low-income Communities be Improved

4.1. Enhancing Access to Vaccination

Vaccination rates may also be improved through addressing key factors that often hinder immunization efforts. By locating clinics near areas with shops or other facilities and by opening them for long hours, and through setting up mobile clinics, pop-up vaccination sites, or home visits, healthcare providers etc, travel burdens of residents living in rural areas or far from hospitals or clinics may be reduced significantly, making it more convenient for individuals to get vaccinated [14].

By investing in the development of healthcare facilities and the logistics needed to deliver vaccines, these countries can ensure that vaccines are available and accessible even in the most remote areas. This infrastructural development not only improves vaccine availability but also builds trust in the healthcare system, which is crucial for encouraging vaccine uptake.

Public health systems and policies also need to make adjustments to ensure that vaccine access continues to be equitable, especially for underserved and vulnerable populations [15]. Financial barriers having the potential of declining vaccination rates which can affect the attainment of herd immunity. It is likely that low-income countries or low-middle-income countries, will need international support and financial assistance for vaccine supplies and technical resources for their vaccination strategies [15]. By providing targeted financial support to underserved communities, financial barriers that contribute to low vaccination rates can be minimized, alleviating disparities in vaccination rates among different socioeconomic groups.

4.2. Building Trust Through Communication, health education and reducing Vaccine Hesitancy

A way to improve vaccine uptake in low-income areas is by building trust through communicating, engaging and educating the community and residents who are hesitant to addresses or eliminate any mistrust that often exists.

In low-income communities, especially those with large populations of racial and ethnic minorities, have experienced medical exploitation and neglect, leading to a pervasive sense of distrust. Targeting at rumors and concerns, health-care professionals could engage with residents, responding to their concerns to prevent deterioration of vaccine trust, especially in regions with religious backgrounds or contextual factors that are building vaccine hesitancy among communities.

Moreover, two-way communication may also be beneficial as questions, fears, and concerns of local people can be addressed and discussed. This approach is able to build a strong sense of

partnership, empowerment and trust, it can also help to diminish fears and misinformations that might otherwise discourage people from receiving vaccination.

5. Conclusion

In a word, barriers to disproportionate COVID-19 vaccination distribution should be addressed, as it is crucial for public health resilience and equity. The disparities in vaccine access are initiated by economic constraints in low-income countries, which often make vaccination unaffordable; inadequate healthcare infrastructure and transportation challenges, which prevent easy access to vaccination; and vaccine hesitancy, which is fueled by mistrust, misinformation, and cultural factors, which also further hinder distribution efforts.

To optimize public health strategies to improve vaccination rates, several measures could be implemented, such as developing accessibility to mobile clinics, vaccination sites, and extended clinic hours to reduce travel burdens. To minimize vaccine hesitancy, trust could be built through education, addressing concerns and misinformation of the locals. In addition, direct and targeted communication is also essential. Furthermore, providing financial support to those who are struggling with their limited income can bridge the gap in vaccine distribution, increasing vaccination rates, protecting those vulnerable individuals, and ensuring that all populations have access to this life-saving and crucial intervention.

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