

Policy Brief

Emerging COVID-19 virus variants and low vaccination coverage in Ethiopia: The need for tailored vaccination strategy

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Abstract

The world has faced multiple waves of COVID-19 outbreaks, with more than 300 million cases and 5.5 million deaths officially reported globally as of Jan 8, 2022. Within the first year of the pandemic, there was hope that it would soon be under control, yet the pandemic sustains to be the world's priority health agenda. This brief communication provides emerging time-sensitive perspectives on the need for a tailored COVID-19 vaccination strategy in Ethiopia by reviewing studies and expert opinions. As of Jan 8, 2022, Ethiopia has reported 443,339 cases and 7,020 COVID-19-related deaths. Only 9,361,640 people (8%) of the Ethiopian population received at least one dose of the COVID-19 vaccine. While the short supply of vaccines is mentioned as a major bottleneck, the role of vaccine skepticism is largely overlooked, though the vaccine is the primary means to combat the emergence of new variants. Therefore, we recommend vaccine advocacy and awareness creation, planning for vaccine mandate for certain groups of the society, and targeted vaccination and economical use of the vaccines.

Keywords: Emerging, Variant, COVID-19, Strategy, Ethiopia

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Introduction

It has been two years since COVID-19 was officially reported to the World Health Organization as a cluster of cases of pneumonia with an unknown etiology (1). Over this period, our world has faced multiple waves of COVID-19 outbreaks, with more than 300 million cases and 5.5 million deaths officially reported globally as of Jan 8, 2022(2). The authorization of the first COVID-19 within a year of the first reported case gave the hope that the pandemic would soon be under control(3). However, this hope was dashed by inequitable distribution of the vaccines(4)(5), vaccine hesitancy(6)(7)(8)(9), and the arrival of immune escape variants of the virus(10). Currently, although more than 60% of populations in rich countries have been fully vaccinated(11), and despite high rates of Sero-prevalence of SARS-CoV-2 in poorer nations(12), the virus is causing more infection than ever(2).

Ethiopia is currently in the fourth wave of the COVID-19 outbreak with a recorded-high number of daily new cases and RT-PCR test positivity rates than ever.

As of Jan 8, 2022, Ethiopia has reported 443,339 cases and 7,020 COVID-19-related deaths(13). Oromia, the most populous and largest region, in Ethiopia, has reported 56,338 cases and 1,096 deaths, accounting for 12.7% of the cases and 15.6% of the deaths reported nationally; the second-highest number of cases and death after Addis Ababa(14). However, the real burden of the pandemic remains unknown and likely to be underestimated due to the country's limited testing and surveillance capacity(15).

Large-scale SARS-CoV-2 serosurveys conducted in Oromia and Addis Ababa among healthcare workers (HCWs), urban and rural communities, school children, and patients visiting hospitals indicated a dramatic increment of Seroprevalence between August 2020 and September 2021 (Figure 1). For instance, the Seroprevalence among HCWs increased from around 11% in August 2020 to over 70% in September 2021. In late 2020 to nearly 60% in August 2021(16).

Among community participants, the seroprevalence increased from <30%

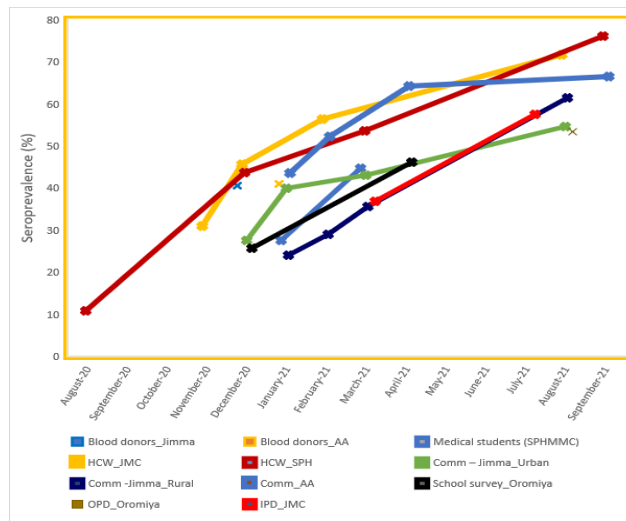


Figure 1: Dramatic increment in SARS-CoV-2 seroprevalence in Ethiopia between August 2020 and September 2021

These findings indicate a high level of virus transmission among HCWs and the community. Putting these results into perspective, nearly three-fourths of the HCWs and about 60% of the general population in Ethiopia have been exposed to the virus. However, the role of detectable antibodies and herd immunity due to natural infection remains not fully understood. Hence, vaccination remains the best means to contain the outbreak risks effectively(17).

Why tailored- vaccination strategy?

Only 9,361,640 people (8%) of the Ethiopian population received at least one dose of the COVID-19 vaccine. While the short supply of vaccines is mentioned as a major bottleneck, the role of vaccine skepticism is largely overlooked(18)(19). Ethiopia rolled out COVID-19 vaccination in March 2021 with initial priority for HCWs. In our survey among 1,314 HCWs in five teaching hospitals just before the arrival of vaccines in Ethiopia, we found that 25.5% (n=332) of the HCWs were hesitant toward the COVID-19 vaccine, and 20.2% hesitated to recommend the COVID-19 vaccination to others (20). After five months of vaccine arrival (August and September 2021), though the Ministry of Health of Ethiopia (MoH-Ethiopia) and the hospitals reported to have enough vaccine doses, we found that only 42.1% took one dose of AstraZeneca Covishield vaccine, while the rate for two doses was only 29.2% among 662 HCWs at Jimma Medical Center and St. Paul Hospital. This indicates profound vaccine skepticism among HCWs. Usually, few deviants among even well-informed individuals may always exist. However, most health workers refuse vaccination against a deadly

disease, which is a double burden to any country. First, HCWs are the high-risk group of getting infected and spreading the infection to patients, family members, and the community at large. Secondly, though HCWs are expected to advocate for vaccination, they could spread misinformation to the community, leading to profound vaccine hesitancy. Thus, Ethiopia has to deal with this matter as a priority agenda to avoid further setbacks due to the pandemic.

Low vaccination rates contribute to immune escape variants such as Delta and Omicron(21). With the arrival of such variants and the low vaccination rate in Ethiopia, the outbreak's next wave, or even waves, is inevitable. Ethiopia thus needs to take a proactive approach to mitigate the impact of the outbreak's next wave(s). Vaccination helps reduce the spread of SARS-CoV-2, including the Delta and Omicron variants, albeit with reduced efficacy (22)(23). More importantly, vaccines have proven efficacy in preventing severe disease and death (24). Hence, accelerating vaccination and increasing vaccination coverage remains a critical and urgent matter. It is the most effective strategy to end the pandemic. Besides non-pharmacological interventions, MoH-Ethiopia should improve vaccine coverage by enhancing public awareness and economic and contextualized use of the vaccines.

There are vital pieces of evidence that a single dose of COVID-19 vaccine of a conventionally two-dose regimen may sufficiently protect previously SARS-CoV-2 infected individuals(25) (26). With the existing evidence of high SARS-CoV-2 Seroprevalence(16) (27), Ethiopia benefits from a single vaccination strategy to facilitate and expedite immunization campaigns for most of the population. However, the country should follow the conventional approach of two regimen vaccines for the segment of the people at risk for severe disease (those with comorbidities and older individuals). Furthermore, booster dose vaccination – the third dose for conventionally two regimens and the second dose for one dose vaccines, is vital to prevent future surges in selected populations(28). Thus, Ethiopia should design a proactive and contextualized strategy to effectively and economically use available scarce vaccines. The country can save enough vaccine doses for the most at risk by providing a single dose for most of the population and following the conventional strategy for high-risk groups and booster doses for selected groups.

Summary and recommendations

The threat posed by COVID-19 remains dire despite great success with the vaccine. Inequitable distributions of vaccines, vaccine hesitancy, and the emergence of new variants have put more strain on global and national endeavors. Putting the existing shreds of evidence and the local contexts into perspective, we recommend the country to take the following actions as priority areas for interventions:

1. **Vaccine awareness creation and advocacy.** As stated above, there is a high rate of vaccine hesitancy among HCWs working in tertiary hospitals and the community in Ethiopia (18)(19)(29) in Ethiopia. A community study also revealed that around half of the participants' knowledge regarding COVID-19 was not good, and they also had a negative attitude towards the vaccine. This urges the need to increase community awareness of COVID-19 through health education. Besides, Ethiopia should enhance the effort in COVID-19 vaccine advocacy by promoting the best scientific knowledge, moral attitudes, and public health practice to respond to vaccine concerns of HCWs and communities and reduce vaccine hesitancy.
2. **Vaccine mandate for certain groups of the society.** Vaccine mandates for other diseases exist in some settings like schools and HCWS. Such a vaccine mandate improved the vaccination rate in high-income countries(30). Concerning COVID-19 vaccination, some countries have mandated either full country vaccination to achieve herd immunity or for certain professions or settings like schools(31). Besides, mandatory proof of vaccination requirement for travel has also been implemented globally to control COVID-19 (31). It is thus important if Ethiopia plans to implement a workplace vaccination mandate for all frontline healthcare workers, schools, and universities. MoH-Ethiopia should also identify other high-risk frontline workers in this category.
3. **Targeted vaccination and economical use of the vaccines.** Over a year since it became available worldwide, the COVID-19 vaccine is still in short supply throughout Africa(11). On the other hand, as a recent serosurvey has indicated, nearly two-thirds of the population has already been exposed to SARS0CoV-2 and have detectable antibodies against the virus(16). Thus, countries with high SARS-CoV-2 Seroprevalence and limited vaccine supply benefit from prioritizing vaccines for the high-risk groups (e.g., healthcare workers) and the most vulnerable to severe disease (older people and those with comorbidities) (Targeted vaccination and the speed of SARS-

COV2 adaptation). Such a targeted vaccination approach is more economical in its implementation and saving lives than blanket immunization which is not realistic in the current Ethiopian context and is not a priority due to the reasons explained above. Based on these facts, we recommend the country to use one dose vaccine (for conventionally two regimen vaccines such as Pfizer/Biontech and AstraZeneca/Covishield) to increase vaccination coverage (**Table 1**). However, high-risk groups (frontline workers) should follow internationally recommended vaccination strategies, including frontline healthcare workers and other high-risk professionals. Furthermore, people who are at high risk for severe diseases, such as those with debilitating comorbidities (DM, HIV, cancer, cardiorespiratory diseases, CKD/ CLD), and older people (≥ 65 -year) should also follow the conventional approach of vaccination. Booster vaccination for such groups of society should also be considered.

Table 1: Targeted Covid-19 vaccination strategy for Ethiopia

| Category | Vaccination strategy | Indications* |
|----------|----------------------|--|
| A | One dose | 12-50 years of age PLUS No known comorbidity PLUS Apparently healthy |
| B | Two doses | ≥ 50 years ≥ 12 years PLUS comorbidity |
| C | Booster dose† | ≥ 65 years ≥ 50 years PLUS comorbidity |

*In individuals with confirmed prior SARS-CoV-2 infection as evidenced by positive RT-PCR or detection of SARS-CoV-2 antibody, one dose of the vaccine is enough for category A and B indications. Booster dose vaccination may also be exempted for such groups in category C.

† Booster (third dose) should be given six months after the second dose (the first dose of the Johnson & Johnson vaccine)

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