Seroprevalence surveys in sub-Saharan Africa: what do they tell us?

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See Articles page e773

Initial estimates of the potential effect of SARS-CoV-2 virus in sub-Saharan Africa were catastrophic:[1] fortunately, these predictions have not been met in terms of number of cases, deaths, and saturation of health systems. On one hand, since ageing is the main risk factor for COVID-19,[2] the young population in sub-Saharan Africa partly explains the low number of cases and deaths registered. On the other hand, the limited testing capacity in many sub-Saharan Africa countries, accompanied by stigmatisation, might result in underestimation of the magnitude of transmission. Underestimation of the true burden of COVID-19 has been indicated by seroprevalence studies in several sub-Saharan Africa countries.[3–5] However, most of these studies were done in specific groups that might not be representative of the general population. In *The Lancet Global Health*, Lloyd Mulenga and colleagues[6] describe the first large population-based seroprevalence survey in the region (covering six districts in Zambia) to determine the extent of SARS-CoV-2 transmission in the country. To complement overall rates of infection, the investigators also collected nasopharyngeal swabs to determine SARS-CoV-2 prevalence by real-time PCR (rtPCR) and thus ongoing infection in the population since the survey was done during the first wave of the epidemic.

Two main findings from the study by Mulenga and colleagues contribute to the growing evidence of under-reporting and the mild symptomatology of SARS-CoV-2 infection in sub-Saharan Africa. First, the study indicates that official data on the number of laboratory-confirmed cases are largely underestimating the extent of community transmission. According to the study, only one laboratory-confirmed case was reported for every 92 SARS-CoV-2 infections that occurred in the community.[6] Only 2·3% of individuals with a positive rtPCR test were aware of their infection and only 8·2% of individuals with SARS-CoV-2 antibodies were aware that they had been infected because they had not been tested. At the time of the survey (July 4–27, 2020), fewer than 5000 cases had been reported in Zambia, whereas the study data indicated that an estimated 454 708 SARS-CoV-2 infections (95% CI 312 705–596 713) had occurred in the six participating districts between March and July, 2020. Absence of systematic surveillance and testing strategies are possible factors that might have contributed to these differences, which have also been observed in other settings.[7] Widespread misinformation in the community and the stigma associated with COVID-19 are also important factors, which result in avoidance of testing and self-medication.[8]

Second, most of the cases identified by the study were asymptomatic or had mild symptoms. Discrepancies between official numbers and infections measured by the survey can also be explained by this high prevalence of asymptomatic infections, since most testing strategies focus on patients who are symptomatic. This finding is consistent with other studies done in Africa,[5] and is aligned with the community belief of unjustified national and international response to the virus. With time, Zambians became less adherent to prevention measures due to the perception of low personal risk.[6]

Mulenga and colleagues should be commended for the timeliness of their survey and swift reporting of results. Seroprevalence surveys done during the peak of the pandemic are likely to underestimate the true magnitude of COVID-19 in the community; therefore, inclusion of PCR testing in this study was beneficial to identify both recent (ie, in the past 2–3 weeks) and past infections. If most of infections in the continent are indeed asymptomatic, seroprevalence studies might underestimate the true extent of transmission, since antibody response is proportional to severity of infection.[9] However, only half of the participants agreed to provide samples for both PCR and ELISA and, therefore, overall infection rate is probably higher than reported in the survey. One limitation of the study design is that it is difficult to estimate the overall transmission at the end of the first wave of COVID-19 infections.

Although the majority of cases of COVID-19 have been mild in sub-Saharan Africa, the overall impact of the pandemic is yet to be quantified. Studies on excess mortality in African countries such as Zambia are necessary to measure the overall direct

and indirect impact on mortality. Additionally, the prompt response of the Zambian Government, which included the closure of borders, curfews, and school closures, could have additional indirect effects, which should be weighed against the direct effects of the pandemic. The overall impact of the pandemic needs to be monitored while accurate information is shared with the public to encourage communities to comply with the restrictions. As noted by the authors, most Zambians remained susceptible to SARS-CoV-2 infection at the time of their survey, thus the higher number of COVID-19 cases reported in the second wave in that country that began towards the end of December, 2020, is not surprising. A follow-up seroprevalence survey will be useful as the epidemic continues and plans for vaccination advance.

For more on the **number of COVID-19 cases in Zambia** see https://www.worldometers.info/coronavirus/country/zambia/

In sub-Saharan African settings with laboratory capacity, we advocate for seroprevalence studies whenever possible. Furthermore, combining these studies with excess mortality studies would provide reliable data to support governments to make decisions on how to manage the pandemic and reduce the health and socioeconomic impact. Ultimately, to understand transmission in Zambia and the sub-Saharan African region, asymptomatic surveillance is warranted.

We declare no competing interests.

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