



A call for strengthened evidence on targeted, non-pharmaceutical interventions against COVID-19 for the protection of vulnerable individuals in sub-Saharan Africa

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ABSTRACT

Following the easing of lockdown measures in many sub-Saharan African countries, coronavirus disease 2019 (COVID-19) cases have been on the rise. As the transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative agent of COVID-19, may be difficult to stop in these settings, we propose that the existing COVID-19 prevention strategies aimed at reducing overall transmission are complemented with more targeted strategies to protect people at risk of severe COVID-19 disease. We suggest investigating the feasibility, acceptability, and efficacy of distributing COVID-19 prevention kits to households with persons at increased risk of severe COVID-19 disease.

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Introduction

A curious imbalance exists between the research and development (R&D) efforts dedicated to pharmaceutical versus non-pharmaceutical interventions in outbreak control. The scientific output as well as the associated R&D investments for pharmaceutical interventions are often a factor higher than those for non-pharmaceutical interventions, even though the latter commonly represent a cornerstone of outbreak control. This seems no different in the case of the coronavirus disease 2019 (COVID-19) pandemic: at the time of writing, a PubMed search indicated that the number of published peer-reviewed articles on COVID-19 and treatment/vaccination was approximately double that of COVID-19 and containment/prevention.

Pharmaceutical interventions such as treatment or vaccination benefit – rightly – from calls for innovation, extensive investigations, rigorous monitoring and evaluation, and the best that evidence-based medicine has to offer. In contrast, while non-pharmaceutical interventions such as physical distancing,

lockdowns, contact-tracing, facemask promotion, and others have been implemented almost ubiquitously as a measure to stem the transmission of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the causative agent of COVID-19, they have tended to be implemented as a blanket approach, with limited monitoring and evaluation, and limited generation of evidence to adapt strategies as they go along. Here, we call for the generation and strengthening of evidence to guide non-pharmaceutical interventions for COVID-19, which we illustrate with a practical proposal for assessing the impact of targeted protection of at-risk individuals in settings in sub-Saharan Africa.

COVID-19 in sub-Saharan Africa

The sub-Saharan Africa region was touched relatively late by COVID-19, with the first case occurring in Nigeria in late February 2020 (Nigeria Centre for Disease Control, 2020). While the implementation of general preventive measures in sub-Saharan Africa may have slowed down the pandemic, it seems it cannot be stopped: by August 14, there were more than one million COVID-19 cases in Africa, with more than 24 000 deaths (Africa CDC, 2020). As COVID-19 diagnostic capacity remains limited in the region, the reported numbers of COVID-19 cases and deaths are likely an underestimation of the true disease burden. Moreover, since many African countries are now easing lockdown measures, the number

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of COVID-19 cases is likely to increase rapidly. A sharp increase has already been observed in South Africa, which now accounts for more than 50% of the continent's total confirmed cases (WHO, 2020).

Despite the increasing community spread of COVID-19 in sub-Saharan Africa, mortality rates have reportedly remained low in most countries. This may be related to the relatively younger demographic in the region: the proportion of persons aged 60 years and over was estimated to be 4.7% in 2005 and is expected to rise to 5.5% in 2030 (Velkoff and Kowal, 2006), compared to approximately 20% in, for example, Western Europe currently. Nevertheless, the region is home to more than 50 million elderly (aged 60 years and over) (United Nations, 2019), who can be considered at elevated risk of severe COVID-19 disease. Additionally, the continent has seen a steady increase in non-communicable diseases (NCD) such as diabetes (Ojuka and Goyaram, 2014) and hypertension (Bigna et al., 2017), which have been linked to COVID-19 severity (Rastad et al., 2020; Zhou et al., 2020). Furthermore, the continent carries a high burden of infectious diseases such as HIV and tuberculosis, which have been speculated to represent particular risk factors for severe COVID-19 disease as well (Davies, 2020).

With COVID-19 gaining ground in sub-Saharan Africa and given the sizeable population of vulnerable individuals at risk of severe COVID-19, the often already-fragile health systems in many African settings risk being dramatically overwhelmed by the pandemic.

Lockdowns for COVID-19 prevention

At the onset of the COVID-19 pandemic, lockdowns were swiftly recommended as a strategy for COVID-19 prevention. Such interventions were typically modelled on the COVID-19 outbreaks in high-income countries and were subsequently replicated in other settings, such as sub-Saharan Africa (Hodgins and Saad, 2020). However, concerns have been raised that the pandemic follows very different trajectories in different contexts, and that a 'one size fits all' approach for non-pharmaceutical interventions may not be appropriate, as the risk-benefit balance of such interventions may vary across settings (Hodgins and Saad, 2020; Van Damme et al., 2020).

Although the early implementation of lockdown measures for COVID-19 control may have contributed to the (initially) low mortality observed in most sub-Saharan Africa countries, the collateral damage resulting from this strategy is becoming increasingly apparent. Lockdown measures have resulted in major economic losses, loss of jobs (Yaya et al., 2020), increased poverty (Yaya et al., 2020), food shortages (McLinden et al., 2020), mental health problems (Guessoum et al., 2020; Joska et al., 2020), domestic and other forms of violence (Joska et al., 2020), and disruption of health services through drug shortages and an overall negative impact on the quality of non-COVID-19 healthcare. Moreover, it is expected that post-lockdown, there will be an increased burden of malaria, tuberculosis (Nghochuzie et al., 2020), and of neglected tropical diseases, resulting from the suspension of control programmes. In addition to the fact that lockdown measures are more detrimental to those with the least resources, they are unlikely to be sustainable for the stretch of time required to fully curtail SARS-CoV-2 transmission in the long run.

We therefore propose that the existing containment measures in sub-Saharan Africa are complemented with more targeted protection strategies, aimed at protecting people at risk of severe COVID-19 disease.

A targeted strategy to protect people at risk of severe COVID-19 disease

A targeted strategy may be the most efficient to decrease COVID-19-related mortality and to prevent health systems from

being overwhelmed by cases in need of resource-demanding intensive support. If implemented together with the general measures to limit the spread of COVID-19 in the population, including physical distancing, universal facemask use, and frequent handwashing, such a strategy may provide authorities with the means to selectively relax population-wide measures in favour of these more targeted approaches.

Protecting persons at risk of severe COVID-19 disease may, however, be challenging. In high-income countries, where inter-generational mixing within households is less common and where many elderly reside specifically in long-term care facilities, protection has ostensibly been straightforward – however, a few countries failed to safeguard these populations (ECDC Public Health Emergency Team et al., 2020; Miller, 2020). In sub-Saharan Africa, where elderly family members generally live together with the rest of the family or in close contact with them, this challenge may be further compounded. Additionally, one's NCD status may be less well documented in African contexts, prohibiting self-identification as vulnerable. We propose the development and testing of different targeted COVID-19 prevention strategies adapted to the sub-Saharan African context. One strategy could be to distribute COVID-19 prevention kits to households with persons at increased risk of severe COVID-19 disease.

COVID-19 prevention kits

Hygiene kits or prevention kits have been used successfully in other outbreaks, commonly for faecal-orally transmitted diseases such as cholera and Ebola, as a stopgap measure when population-wide interventions are not feasible (Lewnard et al., 2014; Yates et al., 2017; Ali et al., 2020; D'Mello-Guyett et al., 2020). The content of such kits in the context of COVID-19 needs to be developed in collaboration with the affected communities (in particular in terms of acceptability and sustainability), taking into account research updates on COVID-19 prevention tools. We surmise that basic kit items will include fabric facemasks, soap, water storage capacity, alcohol-based hand gel, and health education materials. These materials should ideally cover topics such as respecting at least 1.5 m distance from the person at risk of severe COVID-19 disease, always wearing a facemask when interacting with these persons, having these persons wear a facemask when in the company of others, and limiting human interactions with these persons until COVID-19 is eliminated. Moreover families could be given access to a phone help-line for more personal advice and support.

Need for better evidence

Experience with such kits exists, but needs to be contextualized to COVID-19 (Lewnard et al., 2014; Yates et al., 2017; Ali et al., 2020; D'Mello-Guyett et al., 2020). Different ways to identify families with persons at risk of severe disease should be explored. Identification could be integrated within a contact-tracing programme, whereby a symptomatic person suspected to have COVID-19 is investigated regarding whether there is a person at risk of severe COVID-19 disease in their household. This approach may be logistically easier to implement, as it would allow the centralized distribution of kits, but risks coming too late, as the person at risk could already be infected. In communities where there is high ongoing SARS-CoV-2 transmission, it may be preferable but more costly to offer prevention kits to all those with a household member at risk, irrespective of any suspicion of active COVID-19 in the family, since it is becoming increasingly clear that asymptomatic infected subjects can also spread the infection. Such an approach could be aided by demographic records that indicate the ages of residents in the different

households and/or medical records from local NCD programmes, and safe and efficient distribution models to realize this approach would need to be tried and tested. Another entry point for the distribution of kits could be clinics attended by persons with comorbidities such as diabetes, hypertension, HIV, and tuberculosis. In rural areas, community health workers could play a key role in identifying vulnerable persons, health education, and the distribution of kits.

Who should be the focus of the targeted intervention needs to be investigated in each setting, taking into account the phase of the COVID-19 epidemic, the commonness and types of vulnerable people, whether they are known in the community, the ability of the local community health workers to recognize vulnerable people, the cultural context, and the financial resources. The easiest way is to consider all persons older than 60 years at risk of severe COVID-19 disease. Recently, a frailty scale was shown to be more predictive of COVID-19 disease outcome than age and co-morbidities (Hewitt et al., 2020). However, it needs to be determined whether community health workers will be able to categorize persons using such a scale, as well as the extent of the resources (time, finances) that this will require.

Formative research will be necessary to explore the composition of the prevention kit; this will depend on local needs and resources. The distribution of the kits will need to be pilot-tested for feasibility and acceptability. To minimize costs, we recommend large-scale local production of fabric face masks. An important component of the intervention would be the counselling of the families by the community health workers. While the exact costs for the production and dissemination of the prevention kits (including the incentives for the community health workers) may be difficult to evaluate, the proposed targeted approach appears to be more cost-beneficial than all-inclusive strategies such as providing face masks to the entire population and enforcing strict contingency measures, with the associated economic backlash.

This model of targeted intervention should be compared with interventions focusing mainly on decreasing overall SARS-CoV-2 transmission. There is thus an urgent need to upscale research capacity, in order to appropriately address these questions.

Conclusions

Currently, a large proportion of the COVID-19 research funding for the prevention of SARS-CoV-2 transmission is being directed towards the development of a vaccine. It is, however, unlikely that an effective vaccine will be available very soon in all SARS-CoV-2 transmission foci in sub-Saharan Africa. Therefore we recommend that well-designed studies, including randomized trials, be planned and conducted in sub-Saharan Africa to identify the most cost-efficient ways to decrease the COVID-19 disease burden, while at the same time mitigating collateral damage of prevention measures. Hygiene kits may be one such measure worthy of investigation.

In collaboration with Somali investigators, we have submitted a research proposal for a cluster randomized trial among camps for internally displaced persons in Somalia, to compare a targeted COVID-19 prevention programme to reduce severe COVID-19-related disease and mortality with a standard COVID-19 prevention programme to reduce overall SARS-CoV-2 transmission. For the moment, such a targeted intervention using prevention kits is only possible in Somalia with external funding. However, we hope that if a significant difference in severe disease and mortality is shown, governments, non-governmental organizations, and funding agencies will try to scale up and sustain similar interventions in other settings.

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Ethical approval

No ethical approval was required.

Conflict of interest

The authors have no conflicts of interest.

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