



Major considerations in vaccinating children in Africa against COVID-19

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ABSTRACT

Africa has about 41% of its population below the age of 15. The continent also comprises mostly low and middle income countries. As the developed countries worldwide begin to vaccinate children against COVID-19, we highlight the prerequisites, necessities and consequences of vaccinating or failing to vaccinate children in Africa.

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Vaccination of children against COVID-19 has been ongoing or is currently being considered in many developed countries. However, in Africa as at November 2021, only South Africa (with the 6th highest GDP per capita in Africa) had determined to begin child vaccination [1]. The reasons for this inequality are not far-fetched given the fact that Africa comprises mostly low and middle income countries (LMICs). Notwithstanding, the incongruence is especially concerning when we consider that Africa is the youngest continent with a median age of 19.7 years and a demographic of 41% below the age of 14 [2,3]. The aim of this paper is to highlight these concerns and the reasons why vaccination of children in Africa should be seriously urged.

One reason to vaccinate African children is to protect them from the rare but real complications of SARS-CoV-2 infection in children. This is despite the reported lower incidence of infection observed in children and their higher likelihood to be asymptomatic when infected [4]. Children also are less likely to develop severe disease or mortality due to infection [5]. For example, it was found that just 2.4% of deaths due to COVID-19 in Sub-Saharan Africa occur in children [4]. Omicron, however, seems to be infecting children more than the previous variants. But it has a less pneumonic component. Nonetheless, there are children who do develop severe disease, especially those with comorbidities like cancer, asthma and sickle cell disease. Also even in those without these comorbidities, Multisystem Inflammatory Syndrome in Children (MIS-C) might occur [5]. One-third of hospitalized infected children and about 80% of those with MIS-C end up in intensive care [5]. Neurological

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complications like encephalopathy, seizures and Guillain Barre syndrome have been described in children though they are indeed rare except in severe disease [6,7]. Post-acute sequelae of SARS-CoV-2 infection (or 'long COVID') is another concerning complication of COVID-19, the avoidance of which may inform the decision to vaccinate children. This is because of its distressing symptoms such as: insomnia, respiratory symptoms like chest pain and chest tightness, nasal congestion, fatigue, muscle and joint pain, and difficulty with concentration [8]. The long term consequences of COVID in children are not yet fully known though.

In addition to preventing severe disease in individual children, vaccinating children may be necessary to end this pandemic in Africa. It is true that we do not fully understand the dynamics of SARS-CoV-2 transmission in children and its contribution to the disease burden of the entire population. However, given that children comprise more than 41% of the African population [3], the sheer size of this proportion seems to indicate that the role played by children in transmission of the virus is, to put it modestly, not insignificant. Therefore, if the COVID-19 vaccines reduce transmissibility, as some recent studies indicate [9], it seems that children must be vaccinated to stop transmission and halt this pandemic. Moreover, considering the suggested herd immunity thresholds for COVID-19 (67% to 90%) [10] in conjunction with the large proportion of children in the African population, it seems that Africa cannot reach herd immunity without vaccinating children.

Moreover, the peculiar disease landscape of Africa may necessitate urgent vaccination of children against COVID-19. It has been pointed out, for example, that children in Africa have a higher prevalence of comorbidities such as sickle cell anaemia, HIV/AIDS and malnutrition. For example, 9 out every 10 children living with HIV are in Sub-Saharan Africa [11]. The prevalence of stunting in West and Central Africa was 30% compared to most developed countries in which prevalence ranged from 2.8% to 8.7% in 2020 [12]. 75% of the burden of haemoglobin disorders arises from Sub-Saharan Africa [13]. These immunocompromising conditions place children at higher risks of morbidity and mortality [14,15]. While it is not certain to what extent morbidity due to COVID-19 is increased in HIV-infected children, we may extrapolate from the knowledge that risk of death is increased twofold in HIV-infected adults above 19 years in South Africa [14]. It is also pertinent to note that the pandemic has caused disruptions in the national economies and in routine vaccination coverage. These disruptions roll back progress in vaccine preventable disease prevention while at the same time increasing poverty and malnutrition in the land as well as disrupting schooling. If vaccines are our quickest bet at ending the pandemic and children compose so much of the population, then we have to vaccinate the many quickly to forestall serious added morbidity from secondary COVID-19 infection as well as to allay the wider socioeconomic consequences of the pandemic.

We should also consider that dangerous variants of SARS-CoV-2 may arise in the unvaccinated child population. If the children are left unvaccinated, infection and transmission would continue to occur within that population. The large numbers of immunocompromised children may allow for unusually prolonged infection with resultant mutation and emergence of variants. Also, given that children usually have mild and asymptomatic COVID-19 infections, it is possible that less cases would be diagnosed and treated than are actually present. So, the unmonitored SARS-CoV-2 virus would have chance to mutate in these children. More pathogenic variants may then arise with enhanced transmissibility, more morbidity or vaccine resistance. Consequently, these variants are capable of spreading to high income countries and undermining their current vaccination efforts.

Another special consideration in Africa is the large number of young refugees and internally displaced persons (IDPs) on the con-

tinental. There were about 22 million IDPs in Sub-Saharan Africa in 2020 [16]. In fact it is estimated that about 7 million children in Africa are internally displaced [17]. Armed conflict, natural disasters and poverty are responsible for these large numbers. There were at least 15 countries with active armed conflicts in Africa in 2019 [18]. Sub-Saharan Africa particularly had more armed conflicts than any other region of the world in the period 1990–2015 [19]. These wars have disrupted existing health systems, ousted health workers and created many IDPs and refugees of whom many are children [14]. The wars also create and aggravate poverty which predispose children to malnutrition and other diseases which, as indicated earlier, increase the risk of morbidity and mortality following COVID-19 infection. In addition, the IDPs live in IDP camps that are overcrowded and so hygiene, hand washing, social distancing and other non-pharmaceutical methods of infection control cannot be easily maintained. It seems then that the surest way to prevent infection in this population is by vaccination [17]. If these camps and the children therein are neglected in vaccination against COVID-19, it would have the unhappy effect of making these camps a focus of constant transmission, possible viral mutation and severe/complicated COVID-19 infections. It is therefore pertinent to advocate for more vaccine equity for African children in conflict-ridden areas.

We have attempted to show the issues that should be taken into consideration in the decision to vaccinate children in Africa against COVID-19. Let us note that LMICs in other continents all over the world face similar issues as those faced by Africa: a generally young population, a high proportion of immunocompromised children, and children displaced by wars and conflicts. We acknowledge the dilemma faced by African countries torn between vaccinating adults at risk (the elderly and the immunocompromised) and their children despite prevailing vaccine scarcity. We suggest that at least the children at most risk of severe disease or of fomenting variants should be identified and vaccinated. We also note talk abroad of COVID-19 phasing into endemicity and the promise of a pancoronavirus vaccine which may even be included into the EPI schedule. The pancoronavirus vaccine should protect from variants of SARS-CoV-2 and other coronaviruses like those that cause the common cold. That would be a most welcome inclusion.

All the foregoing discussion highlights the importance of vaccine equity for Africa and poor regions of the world. We acknowledge the efforts of donor associations like the COVAX Facility and Gavi which have ensured the administration of about 400 million doses as at February 2022 [20]. Still we require more aid as only 13% of the African population is vaccinated with barely any children at all included, but our paper suggests that at least certain groups of children must be vaccinated. Lastly, if the COVID-19 immunization program is indeed extended to children, we urge AEFI surveillance to prevent vaccine hesitancy in addition to protecting the children.

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Declaration of Competing Interest

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References

- [1] Morland S, Cherfan O, Portala J, Davis C, Marchioro L, Nadeem D, et al. Factbox: countries vaccinating children against COVID-19. Reuters. Published November 3, 2021. <<https://www.reuters.com/business/healthcare-pharmaceuticals/countries-vaccinating-children-against-covid-19-2021-06-29/>> [accessed 9 November, 2021].
- [2] UN. Median age of population. [accessed 29 May, 2021].
- [3] World Bank. Population ages (0-14) % of total population – Sub-Saharan Africa. <https://data.worldbank.org/indicator/SP.POP.0014.TO.ZS?locations=ZG&name_desc=false> [accessed 9 November, 2021].
- [4] Rodriguez Velásquez S, Jacques L, Dalal J, Sestito P, Habibi Z, Venkatasubramanian A, et al. The toll of COVID-19 on African children: A descriptive analysis on COVID-19-related morbidity and mortality among the pediatric population in Sub-Saharan Africa. *Int J Infect Disease* 2021;110:457–65.
- [5] Anderson EJ, Campbell JD, Creech CB, Frenck R, Kamidani S, Flor M, et al. Warp speed for COVID-19 vaccines: why are children stuck in neutral? *Clin Infect Dis* 2020. <https://doi.org/10.1093/cid/ciaa1425>.
- [6] Panda PK, Sharawat IK, Panda P, Natarajan V, Bhakat R, Dawman L. Neurological complications of SARS-CoV-2 infection in children: a systematic review and meta-analysis. *J Trop Pediatr* 2021; 67(3). <<https://doi.org/10.1093/tropej/fmaa070>>.
- [7] Manji HK, George U, Mkopi NP, Manji KP. Guillain-Barré syndrome associated with COVID-19 infection. *Pan African Med J* 2020;35 (Suppl 2):118. <https://doi.org/10.11604/pamj.supp.2020.35.2.25003>.
- [8] Buonsenso D, Munblit D, De Rose C, Sinatti D, Ricchiuto A, Carfi A, et al. Preliminary evidence on long COVID in children. *Acta Paediatr* 2021;110(7):2208–11.
- [9] Lipstitch M, Kahn R. Interpreting vaccine efficacy trial results for infection and transmission. medRxiv (Preprint); 2021. <<https://doi.org/10.1101/2021.02.25.21252415>> [accessed 14 June, 2021].
- [10] McDermott A. Herd immunity is an important - and often misunderstood - public health phenomenon. *PNAS* 2021; 118(21): e2107692118. <<https://doi.org/10.1073/pnas.2107692118>>.
- [11] UNICEF. Children, HIV and AIDS global and regional snapshots. <Children, HIV and AIDS 2019 - UNICEF DATA> [accessed May 4, 2022].
- [12] UNICEF. Malnutrition. <https://e.infogram.com/1ppl23g0rvylnur1kvjxrwwventzrj6ymyz?live?parent_url=https%3A%2F%2Fdata.unicef.org%2Fresources%2Fchildren-hiv-and-aids-global-and-regional-snapshots-2019%2F&src=embed#asyn_embed> [Accessed February 25, 2022].
- [13] Alabi M, Adebowale N. World SCD 2021: Nigeria, global epicentre of sickle cell, not doing enough to tackle disease. *Premium Times*. Published June 19, 2021. <<https://www.premiumtimesng.com/news/headlines/468767-world-scd-2021-nigeria-global-epicentre-of-sickle-cell-not-doing-enough-to-tackle-disease.html>> [accessed February 25, 2022].
- [14] Coker M, Folayan MO, Michelow IC, Oladokun RE, Torbunde N, Sam-Agudu NA. Things must not fall apart: the ripple effects of the COVID-19 pandemic on children in sub-Saharan Africa. *Pediatr Res* 2021;89:1078–86. <https://doi.org/10.1038/s41390-020-01174-y>.
- [15] Mertens E, Penvalo JE. The burden of malnutrition and fatal COVID-19: a global burden of disease analysis. *Front Nutr* 2021;7:619850. <https://doi.org/10.3389/fnut.2020.619850>. PMID: PMC7858665.
- [16] World Bank. Internally displaced persons, total displaced by conflict and violence (number of people) – Sub-Saharan Africa. <<https://data.worldbank.org/indicator/VC.IDP.TOCV?locations=ZG>> [accessed 9 November, 2021].
- [17] Ibrahim AD, Akpus AI, Aborode AT, Babatunde AO. Will refugees also get vaccinated against COVID-19 in Africa? *Public Health in Practice* 2021;2:100118.
- [18] SIPRI Yearbook 2020. Armed conflict and peace processes in sub-Saharan Africa. Stockholm International Peace Research Institute. Published by Oxford University Press. <<https://www.sipri.org/yearbook/2020/07>> [accessed October 30, 2021].
- [19] Chol C, Negin J, Garcia-Basteiro A, Gebrehiwot TG, Debru B, Chimpolo M, et al. Health system reforms in five sub-Saharan African countries that experienced major armed conflicts (wars) during 1990–2015: a literature review. *Global Health in Action* 2018;11(1):1517931.
- [20] WHO. New push to drive up Africa's COVID-19 vaccination. Published February 24, 2022. <<https://www.afro.who.int/news/new-push-drive-africas-covid-19-vaccination>> [accessed May 1, 2022].