COVID-19 and Sub-Saharan African Children: Epidemiology, Direct and Indirect Impacts

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Abstract

The COVID-19 pandemic affected the lives of many people worldwide. While studies on the effects of COVID-19 on adults are well-outlined, the effects of COVID-19 on children appear to have largely been invisible and minimised. African leaders have largely ignored the effects of COVID-19 on children in favour of more pressing issues, which include food security, adult COVID-19, economic turmoil and internal political wars. However, for Africa, where half of the population is under the age of 18, the effects of COVID-19 on children need to be carefully examined. Children represent the present and future of Africa's youthful population. This study seeks to highlight COVID-19's epidemiology and the effects of the pandemic on children on three fronts, namely, the economic, education and health sectors. South Africa has been the hardest hit country with COVID-19 and consequently most studies on African children are from South Africa.

Keywords: COVID-19; sub-Saharan African children; epidemiology; impacts

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Introduction

Coronavirus disease 2019 (COVID-19) was first reported in Wuhan, China in the late months of 2019 (Huang et al. 2020; Zhou et al. 2020; Zhu et al. 2020). The global pandemic is now entering its third year and is still ravaging the lives of millions of people. The COVID-19 outbreak is impacting societies around the world in an unprecedented manner. As of 17 March 2022, the world has recorded more than 463 million COVID-19 cases and approximately six million deaths. Africa as a continent recorded 11, 648 071 cases and 251 863 deaths (Worldometer 2022). More than 29 million COVID-19 cases and 22 000 deaths have been recorded among children and adolescents aged 0 to 19 years. Data on children have mostly been obtained from European countries. Data from China, Italy, the United Kingdom (UK) and the United States (US) have shown that the prevalence of COVID-19 in children and adolescents ranges from 1% to 5% of all COVID-19 cases (Nachega et al. 2021). Deaths have been recorded in less than 1% of the population of children (Nachega et al. 2021; WHO 2021b). However, the proportion of cases varied by country, with a high of 23% recorded in Paraguay, 11% in the US, 15% in Brazil and lower prevalence in Africa (Kufa et al. 2022). In Africa the proportion of cases varied and has been estimated to be 2% in South Africa (Africa CDC 2021).

Reports from China and other Western countries demonstrated that the severity of the effects of COVID-19 on children and adolescents is substantially lower compared to adults. Children are largely unaffected, and even for those diagnosed COVID-19 positive, severe disease or death is very unusual (Jensen and McKerrow 2021; Kufa et al. 2022; Zheng, Wang, and Yu 2020). COVID-19 infections have been found to be asymptomatic or cause milder symptoms in 80% of children as compared to adult populations; this confirms the global finding that COVID-19 may be less severe in children compared to adults (40–60%), and children may be less likely to receive medical care or be tested (Jensen and McKerrow 2021; Zheng, Wang, and Yu 2020).

Several factors have been proposed to explain the lower incidence of COVID-19 in children. Children are likely to be asymptomatic or have milder symptoms. In addition, children are less likely to receive medical care or be tested, therefore laboratory testing in children may be substantially lower than in adults (Kufa et al. 2022; Viner et al. 2021). Africa is less likely to consider the impact of COVID-19 on children early in the course of the response, as has been noted in earlier outbreaks (Viner et al. 2021). This is because Africa tends to have fewer resources, in general, which most likely cater for the needs of the adult population before those of children. In addition, African leaders are currently overwhelmed with more pressing needs, which include food insecurity, poor performing economies and unending internal political wars.

Underestimating the impact of COVID-19 on children is a huge error because, compared to other continents, Africa has a largely youthful population compromising more than 50%, which is far higher than other continents like Europe where the youth comprise 32% of the population (Nachega et al. 2021; UNICEF 2021). The African

population is also affected by endemic diseases, which include high rates of tuberculosis, HIV, and malaria. The African population is also afflicted by under-resourced health systems, which cannot adequately support its population. The diseases are not only found in adults but also occur in children. Little is known about COVID-19 outcomes among children and adolescents in sub-Saharan Africa, where pre-existing comorbidities are prevalent. Thus, the aim of this narrative is to highlight the likely impact of COVID-19 in Africa on children (Kufa et al. 2022; UNICEF 2021).

Materials and Methods

Data was obtained by carrying out a comprehensive and non-systematic search in PubMed, Scopus, SciELO, and Google Scholars databases. Search strategies emphasised recent articles, consensus statements, guidelines, and prospective cohort studies, critically reviewed and selected by the author. Research has also been done in an informative official website public domain and references contained in the previous data collected. The choice of a non-systematic review was associated with the circumstances of fewer original data addressing paediatric mental health during the COVID-19 pandemic available in Africa. Case numbers, mortality, number of tests performed, and demographic data were summarised and compared by continent, country, regions and countries within the continent of Africa. Due to the nature of the study, the question of ethics was not deemed necessary considering this was a desktop research study that heavily relied on pre-existing data.

Age and Gender

An epidemiological study conducted in South Africa from various provinces across all age groups reported increased percentages of positive COVID-19 cases according to age as well as slightly more females than males in all age groups (see Figure 1). Of South African COVID-19 cases, children aged less than one year old accounted for 7.8% and those aged 17 years old accounted for 19.1% (Kufa et al. 2022).

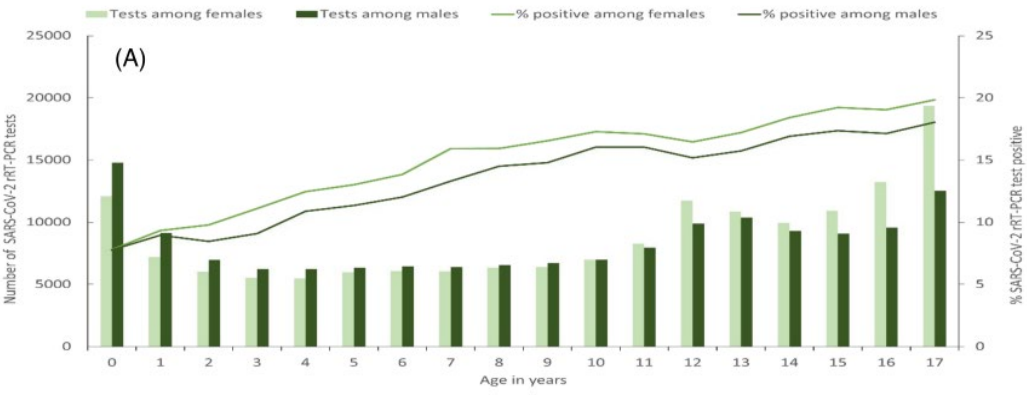

Figure 1: South African COVID-19 cases by age and gender (Kufa et al. 2022)

The number of deaths of children under the age of five years in sub-Saharan Africa has been increased by the presence of COVID-19, which tends to have grave effects on immune-compromised patients (Jensen and McKerrow 2021). A tender age tends to have serious effects on weak immune systems in children under the age of five in sub-Saharan Africa. This subregion continues to have the highest rates of mortality in the world, at 74 deaths per 1000 live births. These deaths can be attributed to infectious diseases including HIV, tuberculosis, asthma, pneumonia, diarrhoea, malaria, and also from pre-term birth complications, birth asphyxia, trauma as well as congenital anomalies (WHO 2020a).

In South Africa approximately 14% of children have underlying conditions, with respiratory conditions being the most frequent followed by HIV infection and diabetes mellitus (see Figure 2).

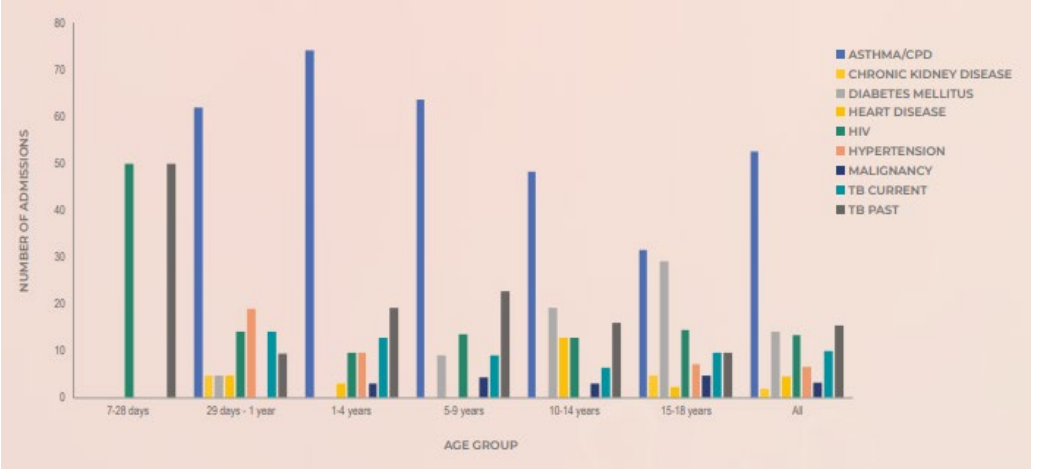

Figure 2: Distribution of underlying conditions among children and adolescents by age group in South Africa, 3 March – 25 March 2020 (NICD 2020)

Several African countries have initiated dusk-to-dawn curfews and local travel restrictions as part of social distancing measures. These measures further reduce access to healthcare, especially among young children and pregnant women. Downscaling or closure of regular child and maternal health preventive and other services may compromise immunisation, antenatal and nutritional programmes, and result in higher morbidity and mortality from other diseases such as tuberculosis (TB) (Jensen and McKerrow 2021; Viner et al. 2021).

Race and Gender

South Africa, unlike other African countries, is characterised by heterogeneities in socioeconomic status exposure risk, poverty levels and healthcare access, among others. These heterogeneities may result in differential impacts of COVID-19 across groups. The demography of South Africa is distributed as 81% black Africans, 9% coloured,

7.9% whites and 2.6% Indian/Asian. Apartheid segregation practices are one of the fundamental hallmarks of inequality in South Africa (Shifa, David, and Leibbrandt 2021). Apartheid segregated people along racial lines. Black South Africans tend to live in crowded and impoverished communities compared to their white counterparts. Despite significant progress in improving access to basic services since 1994, spatial discrepancies continue to persist (Leibbrandt et al. 2010). A South African study conducted between 6 March 2020 and 24 January 2021 showed that more black South Africans children contracted COVID-19 than other race groups (Table 1).

Table 1: Proportion (%) of COVID-19 hospital admissions by race and sex in South Africa, 6 March 2020 to 2021 (NICD 2020)

Table 1. Proportion (%) of COVID-19 hospital admissions by race and sex in South Africa, 6 March 2020 - 24 January 2021*

Age group	Black African		Coloured		Indian		White		Other		Unknown		
(years)	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Total
0 - 9	1.5	2.7	2.2	3.3	0.9	1.0	0.7	0.7	1.7	0.4	1.4	1.8	1.8
10 - 19	2.6	2.3	1.7	1.5	0.8	0.8	1.1	0.7	4.2	1.2	1.5	1.2	1.9
20 - 29	8.7	5.6	6.7	4.6	6.3	2.9	4.0	1.8	10.0	9.5	7.2	4.0	6.3
30 - 39	16.1	14.3	12.9	9.9	12.0	10.5	7.7	5.2	23.3	23.6	14.3	10.8	13.6
40 - 49	17.3	19.9	17.0	18.7	18.5	20.8	12.0	13.0	20.0	24.0	15.8	17.8	17.5
50 - 59	21.9	23.2	23.6	26.7	23.8	26.3	19.1	21.7	12.5	18.6	21.0	23.9	22.5
60 - 69	17.4	18.9	19.5	21.3	19.4	21.1	19.1	23.1	9.2	13.2	18.5	20.4	18.9
70 - 79	9.8	9.5	11.3	9.9	12.5	12.9	18.5	21.5	15.8	7.0	11.7	12.7	11.3
≥80	4.7	3.5	5.0	3.9	5.8	3.6	17.8	12.2	3.3	2.5	6.8	5.7	5.6
Unknown	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	1.8	1.6	0.6
Total, %	100	100	100	100	100	100	100	100	100	100	100	100	99.9
Total, *n*	64 501	43 652	5 394	4 956	3 629	4 780	5 878	6 847	120	242	39 871	34 983	215 028

Table 2: Cumulative number of deaths from COVID-19 by race, age and mortality rates due to COVID-19 in South Africa, 6 March 2020 to 24 January 2021 (NICD 2020)

Table 2. Cumulative number of deaths (n) from COVID-19 by race, sex and age and mortality rates due to COVID-19 in South Africa, 6 March 2020 - 24 January 2021

	Black African		Coloured		Indian		White		Unknown		
Age group (years)	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Total
0 - 9	53	42	0	6	1	1	1	0	8	7	119
10 - 19	41	40	2	3	0	0	4	1	14	13	118
20 - 29	241	136	12	7	10	7	8	4	86	79	590
30 - 39	725	571	47	47	39	36	17	17	324	275	2 098
40 - 49	1 370	1 197	99	128	83	135	60	98	632	751	4 553
50 - 59	2 794	2 209	208	272	129	220	118	211	1 235	1 531	8 927
60 - 69	3 498	2 990	317	330	167	278	200	356	1 718	1 936	11 790
70 - 79	2 464	1 785	194	189	146	220	233	452	1 356	1 604	8 643
≥80	1 361	714	117	76	85	74	291	338	922	828	4 806
Unknown	3	2	0	2	0	1	0	0	107	115	230
Total	12 550	9 686	996	1 060	660	972	932	1 477	6 402	7 139	41 874
Rate/100 000	50.9	41.2	37	41.5	87.6	123.9	38.6	65.1	22	23.4	70.2

The Indirect Effects of COVID-19 on Child Health in Low to Medium Income Countries (LMICs)

The recognition of the COVID-19 outbreak has both direct and indirect effects on the well-being and health of children and adolescents worldwide (Mofenson et al. 2020). Whether or not COVID-19 has ultimately affected the children of Africa directly, African children appear to face burdens from infectious diseases not seen anywhere else globally (Ludvigsson 2020). While COVID-19 does not appear to affect many children in low to medium income countries (LMICs) directly or severely, the indirect effects of the pandemic are of great concern (Zar et al. 2020). Children's well-being is the most important indicator of a country's vitality today and its prospects for tomorrow.

Impact on the Economy

Children may not openly represent the face of COVID-19, as it does not appear to severely affect many of them. However, children risk being among the biggest victims economically. All children of all ages and in all countries are gravely affected by the economic impacts of COVID-19. The pandemic has been of great concern considering children's well-being is the most important indicator of a country's vitality today and its prospects for tomorrow. The harmful effects of this pandemic have been most damaging for children in the poorest countries.

Over the last 28 months, Africa, and the entire world, experienced socioeconomic challenges of alarming proportions as Africa has been hard hit by the COVID-19 pandemic. The African Development Bank estimates that economic growth in the continent shrank by 2.1% in 2020 (AfDB 2021). Ethiopia, Kenya, Tanzania, the Democratic Republic of Congo and Nigeria have the largest populations experiencing both multidimensional and monetary poverty (AfDB 2021). A recent analysis by Save the Children and UNICEF predicted that the economic impact of the pandemic would push up to 24 million additional children living in sub- Saharan Africa into poverty by the end of 2020. This would be an increase from 250 million children living in poor households to around 274 million children (UNICEF 2020a). COVID-19 has spun into action a vicious cycle of poverty, hunger and malnutrition in these already vulnerable, at-risk children (Jensen and McKerrow 2021). With the continuation of the COVID-19 pandemic the economic downturn in some African countries is likely to worsen at the expense of children's well-being.

Child Poverty

Sub-Saharan Africa has the largest share of the world's extremely poor children, at over 50% (Children International 2022). A traditional household survey suggests that millions of children experience either monetary or multidimensional poverty. Nearly half of Africa's population are children (49 %) aged 0–17 and have been classified as

monetary poor. By definition, monetary poor children are defined as children living in a household where the standard of living is below the poverty line, which in Africa is pegged at $2 per day during the COVID-19 pandemic (UNICEF 2020a). Close to 80% of children (440 out of 550 million) living in sub-Saharan Africa could be experiencing multidimensional poverty due to COVID-19 (UNICEF 2020c). Multidimensional poverty is described as being deprived in at least 17 selected indicators under the umbrellas of family, nutrition, health, education, labour, water, sanitation, and hygiene (World Bank 2021).

Due to rising prices of food and medicine, disruption of the supply chain and job losses, millions of families who currently earn an income just above the poverty line will likely fall into a prolonged spell of poverty, from which they may not recover. Monetary poverty will have a direct impact on food security and nutrition as well as on the uptake of health services, affecting the well-being of children and mothers (UNICEF 2020a; World Bank 2021). The impact of COVID-19 is severe for adolescent girls, children in care homes and disabled children. Another group of children who will be greatly impacted is children whose parents or guardians depend on daily income for survival, which has been abruptly halted due to the ongoing lockdown in parts of the country (Abiodun, Onafowora, and Ayo-Adeyekun 2019; Briggs and Numbere 2020). The continuation of the COVID-19 pandemic will shift more children from extreme poverty to destitution, which means children will try to survive without essentials such as food, water or shelter (Children International 2022; UNICEF 2020a). Therefore, it is important to note that without any urgent interventions, the situation could worsen because the pandemic risks undermining all the earlier efforts to reverse the trend of rising hunger in the country.

Impact on Education

Education is a top priority for children and adolescents because it is the foundation for peaceful coexistence and appropriate development. Education, according to UNESCO, is “critical to escaping chronic poverty and preventing the transmission of poverty between generations” (UNESCO, UNICEF, and the World Bank 2021). School closures have ranged from none in a few countries to more than a full school year in others. According to UNICEF, approximately 1.6 billion (91%) of the world’s enrolled children and young people are unable to physically attend school due to temporary school closures (UNESCO, UNICEF, and the World Bank 2021). The partial or complete closure of schools has thrown millions of children into a vicious cycle.

Alternative methods and approaches to teaching children and young people must be devised, which largely include online learning, in order to prevent students from falling behind academically (Berman 2020; Parker, Morris, and Hofmeyr 2020; UNICEF 2020b). However, conducting online education in Africa is a huge task because only 24% of the population has internet access (Figure 2). There is poor connectivity even when internet access is available. Other challenges arise from exorbitant costs, power

outages, and frequent network outages (Berman 2020; Dreesen et al. 2020; Parker, Morris, and Hofmeyr 2020).

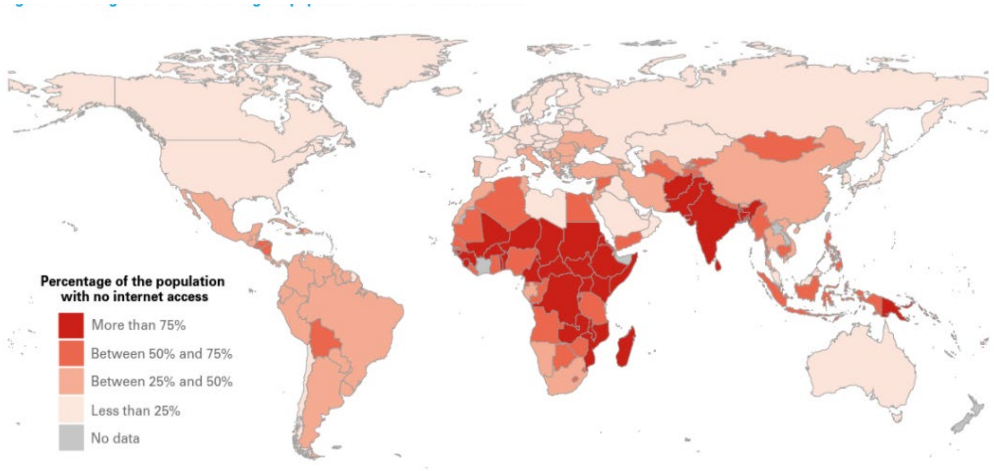

Figure 2: Representation showing the digital divide and percentage of population with no internet access (Dreesen et al. 2020)

Providing sufficient internet access necessitates significant assistance not only from governments, but also from national service providers, regional and international entities, and the private sector in order to provide internet at low or no cost (Berman 2020; Dreesen et al. 2020; UNICEF 2020b). Governments in Rwanda, South Africa and Tunisia are increasing access to specific educational websites by working together with telecommunication companies to provide internet at reduced or no cost (Dreesen et al. 2020; UNICEF 2020c). In order to circumvent the need for live lectures, countries such as Burundi have distributed digital cards for mobile phones preloaded with educational content (Briggs and Numbere 2020).

Children from wealthy families make up the small number of those attending private schools, which either offered education online or in person due to smaller class sizes. However, most teenagers dropped out of school due to lack of online classes, computers and inability to access the internet. Sub-Saharan African countries were forced to opt for daily live teaching sessions on radio and television at predetermined time intervals throughout the country. The problem is that live teaching sessions are also unavailable to many Southern African countries. Many children from poor communities rely on school feeding schemes for daily sustenance. Therefore, not attending school has a direct impact on child learning and nutrition. At the beginning of COVID-19, South Africa's Department of Basic Education took a decision to stop the National School Nutrition Programme (NSNP). As a result, the 9.6 million children who were dependent on this programme had to go hungry as their usual food supply was limited.

School Going Age

Secondary schools, which serve as feeders for students pursuing higher education, have also been closed (Spaull 2020). The quality of students entering higher education institutions has deteriorated. Richer households are better positioned to sustain learning through online learning strategies, though this takes significant effort and presents challenges for teachers and parents (García Docampo 2021). Many low-income children do not have a desk, books, internet access, or a computer. Some children have parents who can take on the role of home-schooling. The rich and poor have varying degrees of access to digital devices and connectivity. From the beginning of the spread of COVID-19 in Africa, young and adolescent girls were twice as likely as boys to be absent from school. When girls were absent from the protective sanctuary of the school, the girls were vulnerable to rape, forced marriages and sexual assault (Anifowoshe et al. 2020).

University Students

In Africa, there are approximately 1650 higher institutes of learning, with 5% enrolment for the appropriate age group (Anifowoshe et al. 2020). Africa is said to have the world's lowest number of enrolled students, accounting for roughly one-fifth of the global average of about 25%. Sub-Saharan African countries were forced to close their higher education institutions as part of their lockdown measures to limit the spread of the virus. As a result, higher education institutions were forced to rely on information and communication technology (ICT) to deliver their programmes to enrolled students online and through distance learning (Anifowoshe et al. 2020; Parker, Morris, and Hofmeyr 2020). Many potential university students lost out because of lack of knowledge to register online.

Funding for Research

Before the COVID-19 pandemic the focus had been on increasing postgraduate training, especially at doctoral level, and facilitating research projects in higher education institutions with an emphasis on areas which are of priority to the expansion of sub-Saharan Africa. And all indicators at one point showed that the initiatives were bearing fruit (Anifowoshe et al. 2020). However, the achievements gained appear to have been reversed by COVID-19. In sub-Saharan Africa, there are very few national agencies funding research and hardly any regional or continental ones. The bulk of the research initiatives are funded by European countries and by agencies and foundations in the United States, and lately by China (Anifowoshe et al. 2020). Furthermore, almost all of the research is carried out in collaboration with higher education institutions in these foreign countries. However, with COVID-19 ravaging the whole world and Europe, the US and China emerging as being the hardest hit, access to research funds was limited.

Impact on Mental Health

The COVID-19 pandemic caused unexpected disruption to the social fabric and community support, affecting children's behavioural and mental health. The pandemic

created a sense of insecurity and anxiety, as well as a high level of stress among children and adolescents, owing to the closure of their schools (Albuquerque and Santos 2021; Golberstein, Wen, and Miller 2020; Lee 2020). This stress may have had an unfavourable impact on learning. Many children were at a higher risk of mental health effects from COVID-19 due to their limited ability to comprehend their rapidly changing environment and cope with triggers and stressors in their changing environments.

Bereavement

COVID-19 has claimed more than six million lives, with adults constituting 90% of these deaths. The deceased adults have left behind a large number of grieving children and grandchildren, with rates of 2.2 children and 4.1 grandchildren bereaved for each person who passed on (Albuquerque and Santos 2021; Verdery et al. 2020). Bereavement was not properly addressed during the COVD-19 pandemic due to the need for isolation. People draw on internal and external support systems to adjust to life after the loss of loved ones. Some COVID-19 measures created "new" traditions that included corpses coming for burial wrapped in plastic straight from the funeral parlour. This tended to not afford relatives the customary time to view the deceased's body and bid their final goodbyes. The burial service was limited to one hour only and the casket was kept in a hearse, a distance from the mourning family. The casket was not kept in the house overnight, an age-old traditional observance. All these improvised practices of COVID-19 dealt a serious blow to the mandate that African ways of grieving are meant to achieve. Grieving for Africans is meant to protect the bereaved from extreme suffering as a result of their loss, and for them to understand and accept that grief has a definite beginning and ending (Kgadima et al. 2022; Nwoye 2013, 2017). It has been shown that failure to adequately address the mental needs of bereaved children results in poor mental and physical health. Ordinarily, bereavement has been shown to affect 5 to 10% of children and adolescents who develop clinically significant psychiatric difficulties. The number of children experiencing childhood trauma and loss may significantly increase during the COVID-19 pandemic (Albuquerque and Santos 2021; Verdery et al. 2020).

Lack of Contact with Friends

The COVID-19 pandemic has reshaped relations between children and adolescents in ways that have never been seen before. Due to the COVID-19 requirement of social distancing, children were separated from their friends. Many children felt alone, isolated, and bored due to the strictly enforced quarantine requirements. The most difficult challenge was that many children's social lives were abruptly disrupted, and normalcy as they knew it had completely changed. Children use their network of friends to develop relationships, learn new skills, solve problems, and communicate (Hossain, Sultana, and Purohit 2020). When children's routines are disrupted and they are cut off from friends they are more vulnerable than adults (Loades et al. 2020).

Impact on Health

The COVID-19 pandemic has presented the health sector with unprecedented challenges, with major concerns about disrupted healthcare provision and access (Ratner et al. 2020). Prior to the onset of the COVID-19 pandemic, most countries in sub-Saharan Africa had an endemic "weak healthcare system," with substandard personnel, infrastructure, and funding. The magnitude of the COVID-19 pandemic created unprecedented pandemonium and severe consequences for children and young people. The healthcare delivery system was severely harmed. However, the impact of these disruptions has not been thoroughly studied, particularly in terms of children and adolescents. It is critical to understand the indirect effects of COVID-19 in order to effectively advocate for children's rights to access healthcare and prevent irreversible harm to future adults (COVIDSurg Collaborative 2020).

Effects on Paediatric Medical Care Services

Typically, long delays in seeking healthcare and within the referral chain characterise paediatric health services in Africa. The COVID-19 pandemic put an unprecedented strain on already overburdened health services, including paediatric medical care (Al-Omar and Bakkar 2021; COVIDSurg Collaborative 2020). So far, responses from surgical societies around the world have concentrated on maintaining emergency and urgent elective services while protecting healthcare workers (Zimmermann 2020). Almost all hospitals in Southern Africa postponed elective paediatric healthcare. The purpose of the postponement was to increase the capacity of hospitals and clinics to treat COVID-19 patients during a surge of infection (COVIDSurg Collaborative 2020). During the initial stage, a South African study found that elective surgery was reduced by 75% and total general surgery operations were reduced by more than 40% during the initial stage of the COVID-19 pandemic (Chu et al. 2021).

Impact on Medical Training

The onset of the COVID-19 pandemic has had a negative impact on medical, nursing, and allied health schools across Africa. The schools are facing difficulties as a result of partial or total disruptions to their academic calendars (Ossai and Ogbuoji 2021). While some schools closed completely, others made adjustments, such as implementing remote learning methods (Ossai and Ogbuoji 2021). The ongoing COVID-19 pandemic is causing harm to medical education in Africa, which could have long-term consequences. If these effects on medical education are not addressed, African communities will suffer long-term health consequences. The prolonged closure of medical training facilities will increase dropout and produce phony doctors. This can perpetuate and exacerbate the continent's poor-quality care and avoidable deaths.

Policymakers have concentrated their efforts on mitigating the impact of COVID-19 on the more visible aspects of the health system, such as service delivery and health finance. There has been little, if any, attention paid to the less visible but equally

important function of medical education. Africa bears 27% of the global burden of COVID-19 cases while having only 3.5% of the global health workforce and 1.7% of the world's physicians. Currently, 24 countries in sub-Saharan Africa have only one medical school, while 11 have none (Kruk et al. 2018; Mills et al. 2011; Ossai and Ogbuoji 2021).

Brain Drain as an Effect of COVID-19

Africa has lost and continues to lose a significant number of medical doctors, nurses, and allied health workers to wealthier destination countries (Ossai and Ogbuoji 2021). This trend will worsen as a result of the pandemic if stakeholders do not implement effective mitigating measures. This is primarily due to the fact that Western and richer countries have a comparatively higher COVID-19 transmission rate than African countries (Kruk et al. 2018; Mills et al. 2011; Ossai and Ogbuoji 2021). The reallocation of funds from governments to combat COVID-19 was massive and encouraged internal brain drain because medical professionals shifted their focus from other diseases to COVID-19 (Kruk et al. 2018; Mills et al. 2011; Ossai and Ogbuoji 2021).

Effect of COVID-19 on Childcare Treatments

Another negative impact induced by COVID-19 is possible shortages of drugs/ supplies and challenges with diagnosing high-risk/immunosuppressed children for HIV and tuberculosis (Adepoju 2020). With the ongoing restriction of movement, children on antiretroviral and anti-tuberculosis medications may face the challenges of stock-outs and adherence issues due to the inability of the healthcare facilitates to prescribe medications for longer periods to cover the likely duration of the pandemic to avoid the risk of exposure to the virus (Adepoju 2020).

Downscaling or closure of regular child and maternal health preventive and other services may compromise immunisation, antenatal and nutritional programmes, and result in higher morbidity and mortality from other diseases such as tuberculosis (TB) (Zar et al. 2020). Several African countries tended to initiate dusk-to-dawn curfews and local travel restrictions as part of social distancing measures. These measures further reduced access to healthcare, especially among low-income groups, leading to potential increases in morbidity or mortality among vulnerable groups. These groups of people, including young children and pregnant women, are most in need of healthcare (Stein, Ward, and Cantelmo 2020). Reduced access to care, poverty and fear of being infected with COVID-19 at healthcare facilities may have led to delays in seeking care for sick children. This results in the presentation of more severe illnesses and lower uptake of effective preventive interventions such as childhood vaccination (Menendez et al. 2020). Diversion of resources to adult services further compromised the ability to care for children. Healthcare workers are increasingly being seconded to adult services from health budgets that are already inadequate for child health needs (Menendez et al. 2020).

Immunisation Delays

The COVID-19 pandemic has brought unprecedented challenges to the health sector with major concerns around disrupted healthcare provision and access. During the Ebola virus outbreak in West Africa, healthcare services led to restrictions in the coverage of health services, both directly and indirectly (Quaglio et al. 2019). Disruptions in healthcare provision have led to a low demand for healthcare. This situation can erode trust in providers. As a result, patients may continue to avoid providers for fear of infection even when services resume (Quaglio et al. 2022). The same trend has been seen in the COVID-19 era.

Routine immunisation has emerged as one of the most disrupted health services since the beginning of COVID-19 pandemic. A number of reasons can explain the low demand for this healthcare service in Africa, including reduced capacity of healthcare services, staff redeployment, reduced attendance by patients and, in some cases, temporary suspension of routine or mass immunisation campaigns (Schwartz et al. 2019).

In May 2020, an estimated 80 million children were thought to be affected by interrupted vaccination services and campaigns, and over 60% of 105 countries reported at least partial routine disruptions to the World Health Organization. Global coverage dropped from 86% in 2019 to 83% in 2020. An estimated 23 million children under the age of one year did not receive basic vaccines, which is the highest number since 2009 (WHO 2021a). These disruptions are poised to halt or even reverse decades of global progress achieved in vaccine delivery and child health (WHO 2021a).

The COVID-19 pandemic has caused limitations in terms of ability to travel and access to healthcare facilities. This has led to lower numbers of children accessing primary routine immunisation, which has led to a worrisome issue of incomplete immunisation. Incomplete immunisation could place communities at risk of an outbreak of a vaccine-preventable disease (WHO 2021a).

Conclusion

The COVID-19 pandemic is threatening to destroy the gains in controlling the major causes of child morbidity and mortality which have been made over the past decades in Southern Africa. The ripple effects of this pandemic and its aftermath will impact children economically, in terms of health and education and whether or not they are ever infected by COVID-19. The continent's scanty institutional and national capacities, frail healthcare systems and mobile ways of life may crumble should the virus persist. The impact of such a catastrophic situation in sub-Saharan Africa is simple to picture and alarming to forecast. Once COVID-19 subsides, economies will have been seriously affected, if they indeed survive crumbling completely. Universities, particularly public universities, will suddenly become unmoving and not useful for obtaining quality

trained workers and most will face downsizing or even closure, as they receive little or no support from governments.

Ironically, COVID-19 may be the catalyst for long-lasting changes in sub-Saharan African higher education. Higher education may have to imagine and introduce diversified methods of educational delivery. Understanding the direct and indirect effects of COVID-19 will not only add to the crucial scientific body of knowledge, it will also assist in identifying and suggesting solutions to both indirect and direct negative effects. This knowledge is crucial particularly for Southern Africa, where half of the population is under the under the age of 18 years.

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