

Perspective

The Precious Commodity of Time and Sub-Saharan Africa's Success in Keeping COVID-19 at Bay

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ABSTRACT

Most sub-Saharan African countries acted early and aggressively in response to the WHO COVID-19 warning by closing schools, international borders, limiting domestic travel and restricting large gatherings. The six most populous sub-Saharan African countries, at the beginning of July 2020 with the exception of Republic of South Africa, all had relatively modest COVID-19 case counts compared with European, North and South American and some Asian countries in spite of access to more limited medical resources and technologies. Shutdowns or shelter-in-places were put in place for 5 out of 6 countries surveyed well before the first reported COVID-19 death. Timely action to enact comprehensive public health measures are irreplaceable and cannot be substituted by later use of medical resources or technologies. In the case of Republic of South Africa, earlier and multiple instances of virus introduction may have made infection control much more difficult compared with other sub-Saharan African countries.

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1. EMERGENCE OF COVID-19 PANDEMIC

Health authorities in China reported the emergence of a cluster of viral pneumonia cases of unknown background on December 31, 2019 earmarking the beginning the global coronavirus or COVID19 pandemic [1]. When Dr. Tedros Adhanom Ghebreyesus, the WHO Director-General, declared COVID-19 a public health emergency on January 30, 2020, he expressed grave concern for countries including those in sub-Saharan Africa with more limited health resources and weaker public health systems [2]. Furthermore, many African populations already have a high burden of infectious disease including malaria, HIV/AIDS and tuberculosis and as such, the onslaught of an additional respiratory pathogen was projected to be catastrophic. More recently, the World Bank, the World Health Organization and other international organizations have expressed concern about the pending disaster to sub-Saharan Africa and other countries with limited health infrastructures [3].

While there continues to be ongoing concern about the possibility of more widespread infection and devastation due to limited health care infrastructures [4], sub-Saharan Africa with the exception of the Republic of South Africa, has largely managed to avert the tsunami of cases that have befallen on European nations, United States, Brazil, Russia and parts of Asia. Looking at the six largest sub-Saharan African countries by population size, as of June 30, 2020, three of these countries have less than 10,000 cases (Democratic Republic of Congo, Ethiopia, Kenya), Nigeria has 27,110 and Tanzania has less than 1000 cases and the Republic of South Africa has 168,061 [5]. Of the other sub-Saharan African countries that have tabulated metrics, two other West African countries have between

10 and 20,000 case counts, five between 5 and 10,000 and 18 between 1 and 5000 with the remaining 21 under 1000 [5].

2. EXPLANATION(S) OF LOW INFECTION RATE IN SUB-SAHARAN AFRICA

In part, the demographic age structure of sub-Saharan African countries may explain, differences in infectious disease patterns between Africa and other, hard-hit parts of the world. COVID-19 disproportionately impacts older adults, particularly those over 65 years of age [6], and the median age for sub-Saharan Africa countries is the lowest in the world at 18 years [7]. Others have argued that poorer surveillance for COVID-19 may explain the lower numbers in sub-Saharan Africa as well as less extensive transport and distribution routes may have resulted in limited infection patterns [8]. Other theories include the widespread coverage of potential protection from the Bacille-Calmette-Guérin vaccine, cross immunity due to higher prevalence of other infectious diseases and warm temperatures which could impact viability of the virus [9–11]. Difference in infection rates in sub-Saharan Africa could also potentially be explained by differential access to polymerase chain reaction-based testing in different countries as well as varied, public-based infrastructure that have different contact tracing capacities. Republic of South Africa, has the most cases as well as the most comprehensive testing infrastructure [12]. Republic of South Africa is actually within the top 20 countries internationally in case count.

However, the quick and far-reaching public health interventions enacted early in the course of the epidemic in sub-Saharan countries can not be overlooked or minimized as the majority may have succeeded to thwart the worst-case scenarios. As public health

professionals and epidemiologists have noted, time not financial wealth may be the most important resource to prevent infectious disease spread [13]. Indeed, looking at the six most populous countries, all shut down their airports, banned domestic travel and closed schools very early respectively in the pandemic relative to the first reported COVID-19 death and number of cases (Table 1). These were non-pharmacologic interventions that required no advanced medical technologies or infrastructure; rather, these swift actions were the result of strong political leadership and the belief in the efficacy of low-tech public health interventions.

The extent of the travel restrictions that limited all movement from the capital cities in African nations (e.g. Kinshasa or Nairobi)

to the provinces cannot be minimized and were not similarly enacted in North American countries or throughout European ones. European countries closed schools and non-essential shops and borders between 3 and 13 days after the third death, much later than sub-Saharan African countries [14]. Additionally, in the United States, the first death from COVID-19 was reported at the end of February in Washington state but the stay at home mandate was only enacted three weeks later at the end of March [15]. By contrast, as indicated in Table 1, five out of the six most populous sub-Saharan African countries began lockdowns well before the first death as described more in detail below. Some of these lockdowns have been enforced by military and police, signifying the overall serious political response to the pandemic, but resulting

Table 1 | Timing of lockdown and border closures for six most populous African countries in relation to COVID-19 cases

Country (by population size)	Population Size (millions)	Per capita income (in US \$)	Number of confirmed infections as per 7/2/20	Date lockdown when into effect	Borders and airports closed (dates)	Specifics of lockdown	Case count when lockdown began; date of first death
Nigeria [25]	206.1	\$5680	27,100	March 30 (Lagos, FCT, Ogun)	Airports (3/21)-no international flights	No movement between states. Businesses closed. Individuals shelter in place	22 cases (when airports shut on 3/21); 3/23 (first death - 2 days after lockdown)
Ethiopia [26]	114.9	\$1066	5846	3/16 (school closures) 3/12 (land borders and bars) 3/24 (work from home for Govt employees)	Land borders closed 3/20 Ethiopian flights stopped to 30 countries	3/16 – school closures, no large gatherings including sporting events-religious institutions to limit gathering 3/20 – closure of nightclubs and bars. 3/24 – Govt employees work from home; Lockdowns enforced by security/Defense	9 cases-3/20 (shutdown of schools, land borders) (first deaths, 4/5 which was 16 days after the land border closures)
Democratic Republic of Congo [27]	89.6	\$561.8	7189	3/24	Borders closed from 3/24. No domestic travel including road and river travel from Kinshasa to provinces	3/24 – schools closed, restaurants, bars, nightclubs, cafes, gatherings of 20 or more people; security forces to ensure compliance	45 cases on 3/24 on date of lockdown (1st death 3/21- 3 days before first lockdown)
Tanzania [28]	59.7	\$1159	509	3/17 closure of schools, sporting events and public gatherings 3/23 quarantine of travelers			1st case (3/16) 1st death 3/31 which was 14 days after the closure of schools and public gatherings
Republic of South Africa [17]	59.3	\$6374	124,590	3/16 citizens from certain countries denied admission 3/18 (schools closed) 3/26 closure of all borders-shelter in place	3/26 closure of all borders	3/26 shelter in place/ lockdown with only essential workers allowed to move about	927 cases (3/26); 1st death 3/27, 1 day after the shelter in place
Kenya [29]	53.7	\$1710	6941		3/15 Only Kenyan allowed back into country 3/22 Restaurants and bars closed 3/25 international flights suspended	3/13 Schools will be closed (Kenya Ministry of Health)	3/13(1st case). 3/20 (six cases). 3/26 (1st death, 13 days after schools are closed and 4 days after restaurants and bars are closed).

in unnecessary violence and intimidation [16]. Additionally, select sub-Saharan African countries (e.g. South Africa) enforced additional public strategies including alcohol and cigarettes bans as a means to prevent excess hospital visits and social gatherings [17].

In Nigeria, international flights were banned on 3/21 prior to the first death on 3/23 and similarly in the Republic of South Africa, border closures and shelter in place was enacted on 3/26 with the first death occurring the day after on 3/27 (Table 1). For Ethiopia and Kenya, the border and school closures were weeks before the first death. For Ethiopia, the first death was on 4/5 while the school and border closures happened weeks earlier (3/16 for school and 3/20 for land borders with limits on size of gatherings) (Table 1). Similarly, for Kenya, the first death happened 3/26 well after school closures on 3/13 and restaurants and bars closed on 3/22 (Table 1). DRC was the only African country that reported a death before the enactment of public health measures (3/24 was border, school and other public place closures while first death was 3/21).

3. FORECAST FOR SUB-SAHARAN AFRICA

While there is ongoing concern about the economic health of African countries with the World Bank forecasting a recession with the region's economies shrinking by 5.1% [18], at this point in time, African lives have been saved by these swift and comprehensive public health measures. The majority of sub-Saharan African countries have shown by quick and on-target responses, that they have learned from previous infectious disease outbreaks. Perhaps more than any other area of the world, in response to COVID-19, there was a concerted effort by African nations not to squander the advance warning that the WHO gave at the end of January [2] and visual display of pain and suffering that the entire world witnessed of the lockdown in Wuhan and Hubei province [19]. Let us not forget the precious commodity of time as we move forward to prevent further COVID-19 spread in sub-Saharan Africa and elsewhere [13].

Not all African countries have enacted comprehensively beneficial public health policies, with the President of Tanzania refusing to close or limit church gatherings [20] and the Defense Minister of Zimbabwe calling COVID-19 divine retribution on European and Western countries for their treatment of Zimbabwe [21]. Andy Rajoelina, the current president of Madagascar, has widely promoted a medicinal "cure" and prevention for COVID-19 containing the herb *artemisia*, which has not been comprehensively scientifically tested [22]. The World Health Organization forecasts as of the middle of May that without ongoing testing and containment efforts, sub-Saharan African countries could have longer, more smoldering epidemics compared to other parts of the world, eventually resulting in larger number of infections and deaths [23].

4. CASE OF REPUBLIC OF SOUTH AFRICA

Although South Africa enacted an early lockdown relative to first deaths and was comprehensive in border control, the Republic of South Africa has been unable to control the growth and extent of the epidemic and has had almost 168,061 cases (or 2834/1 million population similar to the amount of cases experienced by France and Germany). In part, due to the historically high frequency of

travel between Europe and Republic of South Africa, particularly Cape Town and Johannesburg, it is possible that there were more introductions of the virus in February and March compared with other sub-Saharan African countries. These introductions likely occurred before the enactment of any lockdown, and subsequently the virus became impossible to control internally.

Initially the majority of testing that was occurring was in the private sector as public sector clinics had stricter criteria [24]. Furthermore, given the poverty that many South Africans face, social distancing and handwashing in informal settlements and other low-income areas was difficult to put into practice creating a situation that resulted in further spread [24]. As Abdul Karim notes, the South African response is in the context of limited resources as 80% of the population does not have access to health insurance and there is large burden of HIV and TB. The Republic of South Africa, similar to other African countries, acted aggressively and proactively, but they may have had a more difficult situation to contend with than their neighbors in February and March, due to the potentially more widespread and multiple introductions of the virus. For Republic of South Africa, the middle of March may have been too late, and they had less time than other African countries.

5. PUBLIC HEALTH CONCLUSION

The most populous sub-Saharan African countries responded aggressively and quickly to the COVID-19 threat, in many cases well before the first death from COVID-19, an important metric for evaluating spread of disease. These important steps resulted in a relatively low case count of virus over three months into the pandemic and post lockdown. In the case of Republic of South Africa, however, the amount of virus in the country at the time of lockdown may have been too much and the control efforts somewhat late. Nonetheless, these swift public health actions, averted a much more serious epidemic for Republic of South Africa and have allowed the rest of sub-Saharan Africa to remain relatively unscathed.

CONFLICTS OF INTEREST

The authors declare they have no conflicts of interest.

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