

# Epidemiology of COVID-19 in Africa: daily cumulative index and mortality rate

**Kenneth Bitrus David<sup>1</sup>,  
Naomi Thomas<sup>2</sup>, Joan Kuyet Solomon<sup>1</sup>**

<sup>1</sup>Faculty of Pharmaceutical Sciences,  
Kaduna State University, Nigeria

<sup>2</sup>Faculty of Pharmaceutical Sciences,  
Ahmadu Bello University Zaria, Nigeria

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## **Abstract**

The COVID-19 outbreak which originated from Wuhan, a city in China, has spread to over 180 countries in the world, disrupting several sectors of human life, and causing deaths. This unprecedented event has affected 55 countries in Africa. This study aims to outline the current epidemiological data of COVID-19 in Africa. The number of confirmed cases and deaths in Africa was obtained from the COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) at Johns Hopkins University. Mortality rate and daily cumulative index were calculated for each country. The results indicated that the mortality rate in Africa was low compared to other continents regardless of the high Daily Cumulative Index recorded.

**Keywords:** COVID-19, epidemiology, mortality, Africa

## **Corresponding Author**

Kenneth Bitrus David

Faculty of Pharmaceutical Sciences, Kaduna State University, Nigeria

E-mail: kennethdavidb@gmail.com

Coronaviruses are a group of RNA viruses so named because of their outer fringe of envelope proteins resembling a crown (known as 'corona' in Latin).<sup>1</sup> They are zoonotic and often cause mild to severe upper respiratory tract infections in humans. In 2003 and 2012, there were outbreaks of infection causing severe acute respiratory syndrome (SARS) and Middle-East respiratory syndrome (MERS) respectively.<sup>2</sup> The novel coronavirus disease also known as COVID-19, caused by a virus known as SARS-Cov-2, started at Wuhan in China, crossed to many other countries in the world, and was declared an epidemic by the World Health Organization (WHO) on 11<sup>th</sup> March 2020.<sup>3,4</sup> The burden caused by this pandemic is devastating.

The countries with the greatest number of COVID-19 cases and related deaths include: United States of America, Spain, Italy, France, Germany, United Kingdom, Turkey, China, Iran and Russia.<sup>5</sup> Thus, it is speculated that warmer temperatures tend to limit the spread of the infection. This has led to the assumption that European countries and other temperate regions will experience higher morbidity and mortality rates than African countries. However, there has not been any strong evidence to either confirm or debunk this speculation.<sup>6</sup>

The aim of this article is to provide some epidemiological parameters that will guide future research on COVID-19 in Africa as there has not been any published article containing the epidemiological parameters of COVID-19 pandemic cases in all African countries, hence the need for this letter. This is imperative as simple counts on individual confirmed cases can be misleading indicators of the pandemic's trajectory if these counts are limited by problems in access to care or bottlenecks in laboratory testing, or if only patients with severe symptoms are tested.<sup>7</sup>

As of 18<sup>th</sup> May 2020 11:44pm GMT, Africa recorded a total of 87,925 confirmed COVID-19 cases in 55 countries with highest number of cases found in South Africa - 16433 (18.7%), Morocco - 6952 (7.9%), Ghana - 5735 (6.5%), Egypt - 12229 (13.9%), Algeria - 7019 (8.0%), and Nigeria - 5959 (6.8%)<sup>8</sup> (Table I). In a bid to reduce the rate of transmission, 23 countries including China and USA imposed a ban on international flights

by 31<sup>st</sup> January, 2020. South Africa, on 18<sup>th</sup> March was the first African country to impose a ban on foreigners who had visited high-risk countries such as China. Other countries followed suit. Since there is a ban on international flights, the tendency of having further imported cases of COVID-19 is unlikely, implying that new cases recorded are due to local transmission. However, due to the asymptomatic nature of the disease and diagnostic insufficiency, local transmission and underreporting are expected to increase, consequently posing a threat to the global health.<sup>9</sup>

The daily cumulative index (DCI) for each country was obtained by dividing the cumulative cases by the number of days between the first reported case and 18<sup>th</sup> May, 2020. South Africa has the greatest DCI (216.2), followed by Egypt (134.4), Morocco (90.3), Algeria (85.7), Ghana (83.1), and Nigeria (72.7). More than 50% of African countries have a DCI value less than 5.00. Recent research outlined South Africa, Algeria, and Egypt as countries with the highest importation risk from China hence the high incidence rate in these countries.<sup>9</sup>

The mortality rates due to COVID-19 in Africa vary from country to country but have been relatively low compared to those recorded by European countries and other regions. It is noteworthy that the mortality rate recorded by countries may not be the actual death rates as the estimation is based on the number of deaths in relation to confirmed cases. The full denominator is not usually obtained accurately as patients with very mild symptoms might not be tested and hence remain unidentified. It is assumed that the maximum incubation period of COVID-19 is up to 14 days, whereas the average number of days from onset of symptoms presentation to becoming critically ill is around 10 days. It was reported by the WHO recently that it takes from about 2 to 8 weeks between onset of symptoms and death.<sup>10</sup>

## Conclusion

African countries recorded a high daily number of confirmed cases but have a relatively low mortality rate. This is an indication that adequate measures are being put in place in order to curb the impact of this pandemic. The research community has responded

Table 1. Epidemiology of COVID-19 in Africa

Country	CSN <sup>a</sup>	CSN <sup>b</sup>	Number of deaths	Mortality rate (%)	New cases <sup>c</sup>	Local transmission	Date of First case (DOFC)	Number of Days between DOFC and 18 <sup>th</sup> May, 2020	DCI
Algeria	7019	7201	555	7.7	182	Yes	25/02/2020	84	85.7
Angola	48	50	3	6.0	2	Yes	21/03/2020	59	0.8
Benin	339	339	2	0.6	0	Yes	16/03/2020	65	5.2
Botswana	25	25	1	4.0	0	Yes	30/03/2020	50	0.5
Burkina Faso	796	796	51	6.4	0	Yes	09/03/2020	72	11.1
Burundi	42	42	1	2.4	0	Yes	31/03/2020	49	0.9
Cameroon	3478	3529	140	4.0	51	Yes	06/03/2020	75	47.1
Cape Verde	328	328	3	0.9	0	Yes	20/03/2020	60	5.5
Central African Republic	327	327	0	0.0	0	Yes	14/03/2020	67	4.9
Chad	503	519	53	10.2	16	Yes	19/03/2020	61	8.5
Comoros	11	11	1	9.1	0	Yes	30/04/2020	18	0.6
Congo, Republic	412	412	15	3.6	0	Yes	10/03/2020	71	5.8
Congo, Democratic Republic	1455	1538	61	4.0	83	Yes	14/03/2020	67	23.0
Cote d'Ivoire	2109	2119	28	1.3	10	Yes	15/03/2020	66	32.1
Djibouti	1401	1518	7	0.5	117	Yes	18/03/2020	62	24.5
Egypt	12229	12764	645	5.1	535	Yes	14/02/2020	95	134.4
Equatorial Guinea	594	719	7	1.0	125	Yes	14/03/2020	67	10.7
Eritrea	39	39	0	0.00	0	Yes	20/03/2020	60	0.7
Eswatini	203	205	2	1.0	2	Yes	14/03/2020	67	3.1
Ethiopia	317	352	5	1.4	35	Yes	13/03/2020	68	5.2
Gabon	1320	1320	11	0.8	0	Yes	12/03/2020	69	19.1
Gambia	23	24	1	4.2	1	Yes	17/03/2020	64	0.4
Ghana	5735	5735	29	0.5	0	Yes	12/03/2020	69	83.1
Guinea	2658	2796	16	0.6	138	Yes	13/03/2020	68	41.1
Guinea-Bissau	990	1032	4	0.4	42	Yes	25/03/2002	65	15.9
Kenya	887	912	50	5.5	25	Yes	12/03/2020	69	13.2
Lesotho	1	1	0	0.0	0	Yes	13/05/2020	6	0.2
Liberia	226	229	22	9.6	3	Yes	16/03/2020	65	3.5
Libya	65	65	3	4.6	0	Yes	17/03/2020	64	1.0

Country	CSN <sup>a</sup>	CSN <sup>b</sup>	Number of deaths	Mortality rate (%)	New cases <sup>c</sup>	Local transmission	Date of First case (DOFC)	Number of Days between DOFC and 18 <sup>th</sup> May, 2020	DCI
Madagascar	304	322	1	0.3	18	Yes	20/03/2020	60	5.4
Malawi	70	70	3	4.3	0	Yes	02/04/2020	47	1.5
Mali	860	874	52	5.9	14	Yes	25/03/2020	55	15.9
Mauritania	62	81	4	4.9	19	Yes	13/03/2020	68	1.2
Mauritius	332	332	10	3.0	0	Yes	19/03/2020	61	5.4
Morocco	6870	6952	192	2.8	82	Yes	02/03/2020	77	90.3
Mozambique	137	145	0	0.0	8	Yes	22/03/2020	57	2.5
Namibia	16	16	0	0.0	0	Yes	14/03/2020	67	0.2
Niger	904	904	54	6.0	0	Yes	19/03/2020	61	14.8
Nigeria	5621	5959	182	3.1	338	Yes	27/02/2020	82	72.7
Rwanda	292	297	0	0.0	5	Yes	14/03/2020	67	4.4
Sao Tome and Principe	240	246	7	2.8	6	Yes	06/04/2020	43	5.7
Senegal	2480	2544	26	1.0	64	Yes	02/03/2020	78	32.6
Seychelles	11	11	0	0.0	0	Yes	14/03/2020	67	0.2
Sierra Leone	505	519	33	6.4	14	Yes	16/03/2020	65	8.0
Somalia	1421	1455	57	3.9	34	Yes	16/03/2020	65	22.4
South Africa	15515	16433	286	1.7	918	Yes	05/03/2020	76	216.2
South Sudan	236	290	4	1.4	54	Yes	05/04/2020	45	6.4
Sudan	2289	2591	105	4.1	302	Yes	13/03/2020	68	38.1
Tanzania	509	509	21	4.1	0	Yes	16/03/2020	65	7.8
Togo	301	330	12	3.6	29	Yes	06/03/2020	75	4.4
Tunisia	1037	1037	45	4.3	0	Yes	02/03/2020	78	13.3
Uganda	227	248	0	0.0	21	Yes	20/03/2020	60	4.1
Zambia	753	761	7	0.9	8	Yes	18/03/2020	63	12.1
Zimbabwe	44	46	4	8.7	2	Yes	15/03/2020	66	0.7
West Sahara	6	6	0	0.0	0	Yes	04/03/2020	77	0.1

CSN<sup>a</sup>: Cumulative Case Number as at 17<sup>th</sup> May, 2020

CSN<sup>b</sup>: Cumulative Case Number as at 18<sup>th</sup> May, 2020

New cases<sup>c</sup>: CSN<sup>b</sup> - CSN<sup>a</sup>

DCI (Daily Cumulative Index) = CSN<sup>b</sup>/no. of days between the first reported case and 18<sup>th</sup> May, 2020

to the COVID-19 pandemic in the world by carrying out studies to help understand the virus and provide ways of fighting it. However, not much attention has been given to the epidemiological studies of the virus in most regions. The impact of an epidemic is directly related to the number of people affected. Thus, further studies should be conducted on epidemiological patterns of COVID-19 in other regions so as to fully forecast the potential impact of the pandemic on life and the society. Evidence generated will help governments and health professionals to put measures in place to further flatten the curve of the disease.

### Competing interests

The authors declare no competing interests.

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