



Review article

Epidemiology of novel COVID-19 in Nigeria

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ABSTRACT

The first case of COVID-19 from China was reported to the World Health Organization (WHO) on the 31st of December 2019. The infection was observed to spread relatively quickly to several other countries and by the 30th January 2020, the WHO declared COVID-19 a Public Health Emergency of International Concern. The study was conducted to determine the epidemiology of novel COVID-19 in Nigeria. Data obtained were used to determine the distribution of the disease based on gender and age distribution. The case fatality rate (CFR), prevalence rate, recovery rate and mortality of the disease were also determined and compared with Africa and world. The data obtained showed that as of 12th July 2020, out of 32,558 cases recorded, 21,385 (66%) were males while 11,173 (34%) were females. Subjects within 31 – 40 years age category are more susceptible to contracting the disease in Nigeria which accounted for 24%. However, more deaths have been recorded among people of 60 years and above. The CFR, prevalence rate and mortality of the disease were extremely low and stood as 2.26%, 0.015% and 0.00034% respectively. The present recovery rate of the disease in Nigeria was 40.8%. It is concluded that the disease would be contained if relevant measures are put in place accordingly.

Introduction

In late December 2019, there was an outbreak of a new Coronavirus infection in Wuhan, Hubei Province, China, which caused acute respiratory syndrome of unknown aetiology. The World Health Organization (WHO) named the virus Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV2) or COVID-19 and declared the infection a pandemic on the 11th of March 2020. The first case of COVID-19 in Nigeria was reported on the 27th of February 2020 and since then the numbers of confirmed cases has been on the increase, at least in Nigeria [1]. The epidemiological

pattern of COVID-19 suggests an incubation period of five to fourteen days [2,3], with a recent case report suggesting as high as twenty-four days [4]. The mode of transmission of the SARS-CoV-2 is via respiratory droplets; but has also been found in blood and stool. Severe manifestations are more common in males, particularly in the elderly [2,5,6]. Clinical manifestations include fever, dry cough, fatigue, myalgia, headache, sore-throat, abdominal pain and diarrhea [2,5-7]. Nonetheless, COVID-19 preventive measures will prove more effective and are less burdensome on the health system. In Nigeria, strict preventive measures are being taken

to curb the spread of the ubiquitous virus, such as, isolation of infected and suspected cases, social distancing and health educational exercises on hygiene for the general population [8]. The Mainland Hospital in Yaba, Lagos State is the first hospital designated for the management of COVID-19 cases in Lagos and was the hospital that received and treated Nigeria's first cases of the disease.

Transmission and Symptoms of COVID-19

The first case of COVID-19 from China was reported to the WHO on the 31st of December 2019. The infection was observed to spread relatively quickly to several other countries and by the 30th January 2020, the WHO declared COVID-19 a Public Health Emergency of International Concern [9] and announced the new Coronavirus disease as COVID-19 on the 11th February 2020, [10] and thereafter, formally declared it a pandemic on 11th March 2020. The person to person transmission of SARS-CoV-2 is primarily through close contact with an infected person and through respiratory droplets, saliva or discharges from the nose when an infected person coughs or sneezes. The transmission of the virus is quite efficient and as a result, the virus rapidly spreads from person to persons. There is strong evidence that the virus can be transmitted by people who have a mild infection or those who are not showing symptoms of COVID-19. In addition, an indirect transmission has also been documented to occur through touching contaminated objects or surfaces. The incubation period of COVID-19 ranges from two to 14 days but averages about seven days [11,12].

Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Individuals with COVID-19 present mainly with fever, a dry cough, dyspnoea, and bilateral infiltrates on chest imaging [13]. Other less severe symptoms include aches and pains, sore throat, diarrhoea, conjunctivitis, headache, the recent loss of taste or smell, a skin rash, or discolouration of fingers or toes. The COVID-19 virus infects people of all ages, though infection in children has been observed to be less common and less severe than in adults. A systematic review reported that about 1-5% of children were infected with the COVID-19 virus. The children were mostly reported to have mild respiratory symptoms and they rarely died from the disease [14]. However, the risk of severe infection is higher among older people and those with underlying medical problems like cardiovascular diseases, diabetes mellitus,

chronic respiratory diseases and cancers [15]. Some factors have been associated with the transmission of the virus. Emerging evidence suggests that cold and dry conditions appear to increase transmission while warm and humid conditions may reduce the rate of infection [16-18]. In some countries, high latitude has been associated with higher rates of cases and deaths [19].

Global distribution of COVID-19

According to WHO Coronavirus (COVID-19) situation report-173, tally on July 10th, 2020, a total number of 12,322,395 cases of COVID-19 infection has been confirmed worldwide, with a total of 566,335 deaths. In addition, over 213 countries and territories have reported at least a case of COVID-19 infection. The 10 countries with the highest burden of the infection include the United States of America (3,329,821), Brazil (1,810,691), India (850,358), Russia (720, 547), Peru (319,646), Chile (312, 029), Spain (300,988), Mexico (289,174), United Kingdom (288, 953) and Iran (255, 117). All the continents of the world have reported at least a case. The Americas region has the highest number of reported cases while Western Pacific region has the least number of COVID-19 infections. **Table 1** below represents the regional number of confirmed COVID-19 cases as of 10th July 2020. The countries with the highest number of confirmed cases and death according to situation report by WHO as of July 10th, 2020, is presented in **table (2)**.

Table 1. Number of confirmed COVID-19 cases as of 10th July 2020, according to region.

Region	Confirmed cases	Total death
Globally	12,322,395	566,335
Africa	594,955	13,246
Americas	6,397,230	279,857
Eastern Mediterranean	1, 255, 977	30,145
Europe	2,888,850	202,837
South-East Asia	1,097,074	27,990
Western Pacific	239,111	7,563

Table 2. Countries with highest number of confirmed COVID-19 cases as of 10th July 2020.

Country	Confirmed cases	Total death
United States of America	3,329,821	137,174
Brazil	1,810,691	70,623
India	850,358	22,687
Russia	720,547	11,205
Peru	319,646	11,500
Chile	312,029	6,881
Spain	300,988	28,403
Mexico	289,174	34,191
The United Kingdom	288,953	44,798
Iran	255,117	12,635

COVID-19 in Africa

The first confirmed case of COVID-19 infection in Africa was imported from Europe into Egypt on 24th February 2020. Since then, there has been a steady rise in the number of cases in Africa due to the high volume of business and tourism between Europe and Africa [20]. According to the Africa Centers for Disease Control and Prevention (CDC) as of 7 am GMT 13th July 2020, a total of 594,955 COVID-19 infections had been reported with 13,246 deaths has been reported in 54 African countries. The majority of the cases were in Southern Africa with a total of 63, 206 cases (64%), closely followed by North Africa with 14,968 cases (15%), West Africa 11,502 cases (12%), East Africa 5,032 cases (5%). The least number of reported cases was in the Central Africa region with a total of 4,611 cases (5%). The most affected countries in the WHO African Region (**Table 3**) include; South Africa (250,687), Nigeria (31,323), Ghana (23,834), Algeria (18,712) Morocco (15,542), Cameroon (14,916), Cote d'Ivoire (12,502), Sudan (10,250) Kenya (9,726) and Senegal (8,014). These countries account for about 82% of the cases reported in the African region [21].

Table 3. African countries with the highest number of confirmed COVID-19 cases as of 10th July 2020.

Country	Confirmed cases	Total death
South Africa	250,687	3,860
Nigeria	31,323	709
Ghana	23,834	135
Algeria	18,712	1,004
Morocco	15,542	245
Cameroon	14,916	359
Cote d' Ivore	12,502	81
Sudan	10,250	650
Kenya	9,726	184
Senegal	8,014	145

COVID-19 in Nigeria

The coronavirus entered Nigeria through an infected Italian citizen who came in contact with a Nigerian citizen who was subsequently infected with the coronavirus. The coronavirus then spread to other citizens in Lagos and to other parts of the country. As of 10th July 2020, Nigeria reported 31,323 confirmed cases of COVID-19 and 709 related deaths [8]. The first COVID-19 case was announced on 27 February in Lagos. Since then, over 178,265 samples have been tested [8]. Most cases have been registered in Lagos, Federal Capital Territory (FCT), Edo, Oyo, Delta, Rivers and Kano states (**Table 4**). Currently, all the 36 states have reported COVID-19 cases. Lower cases were reported in Kogi, Cross-Rivers and Taraba States. World Health Organization stated on 18 March that the number of cases in Africa was likely higher than reported, due to limited testing and deficiencies in emergency preparedness. The Nigerian Centre for Disease Control is the government agency in charge of COVID-19 preparedness and response activities. A Coronavirus Preparedness Group was established at the end of January by the Nigerian government following the development of the epidemic in China. National NGOs, civil society organizations, international NGOs and UN agencies are also engaged in responding to the pandemic and the effects of COVID-19 containment measures.

Table 4. Number of confirmed COVID-19 cases confirmed by states as of 10th July 2020.

State	Confirmed cases	Active cases	Discharged cases	No. of death
Lagos	12,051	10,140	1,764	147
FCT	2,433	1,665	733	35
Oyo	1,689	745	925	19
Edo	1,593	607	929	57
Delta	1,348	863	454	31
Rivers	1,343	450	847	46
Kano	1,303	221	1,030	52
Ogun	1,063	336	705	22
Kaduna	946	312	622	12
Katsina	655	191	441	23
Ondo	606	462	124	20
Borno	586	96	455	35
Gombe	527	119	387	21
Bauchi	519	8	489	13
Ebonyi	508	5	497	6
Plateau	499	241	242	16
Enugu	469	192	263	14
Abia	402	134	265	3
Imo	359	290	61	8
Jigawa	321	2	308	11
Kwara	311	131	168	12
Bayelsa	299	128	153	18
Nassarawa	238	117	113	8
Osun	212	121	84	7
Sokoto	153	2	135	16
Niger	135	20	108	7
Akwa-Ibom	134	60	71	3
Benue	121	80	35	6
Adamawa	100	22	71	7
Anambra	93	19	65	9
Kebbi	86	16	63	7
Zamfara	76	0	71	5
Yobe	62	3	51	8
Ekiti	46	4	40	2
Taraba	27	16	11	0
Cross Rivers	5	1	3	1
Kogi	5	0	3	2
Total	31,323	17,819	12,795	709

Epidemiology of COVID-19 in Nigeria

According to Nigeria Centre for Disease Control (NCDC), as of 12th July 2020, out of 32,558 cases recorded, 21,385 (66%) were males while 11,173 (34%) were females (**Table 5**). The percentage of male cases in Nigeria was higher than that of Hubei Province (China) who recorded 51.1%. Similar study conducted by Frontier in Public Health Study in China showed that more men than women were susceptible to suffering severe COVID-19 complication. According to them, higher incidence in men for most of the diseases could correlate with general demographic fact of a shorter life expectancy in men when compared to women in China and world in general. A Professor of Molecular Microbiology and Immunology at John Hopkins Bloomberg School of Public Health (Sabra Klein) stated that there is greater immune response in females as compared to males and this greater immunity can be a blessing in many cases for women [22]. In addition, in Nigeria, higher incidence among men may be attributed to the high exposure of men as most of the women are housewives and always at home. Therefore, the women are less exposed to the environment in Nigeria. According to medical experts, COVID-19 mainly affects the immune system, and there is ongoing research in Nigeria in understanding the cause of the increased rate of infections in Men.

According to NCDC, subjects within 31–40 years age category were more susceptible to contracting the disease in Nigeria which accounted for 24%. It however, said more deaths have been recorded among people of 60 years and above. The result of COVID-19 cases and morbidity in Nigeria was in conformity with that of China. According to report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19) mortality increases with age, with the highest mortality among people over 80 years of age (CFR 21.9%) while patients who reported no co-morbid conditions had a CFR of 1.4%, patients with co-morbid conditions had much higher rates: 13.2% for those with cardiovascular disease, 9.2% for diabetes, 8.4% for hypertension, 8.0% for chronic respiratory disease, and 7.6% for cancer. Higher mortality among older people in Nigeria is due to co-morbidity from diseases such as diabetes, hypertension, asthma and cardiovascular diseases [8].

Table 5. Prevalence of COVID-19 in Nigeria on the basis of Gender of the patients as of 12th July 2020.

Sex	No. of cases (n)	Prevalence (%)
Male	21,385	66
Female	11,173	34
Total	32,558	100

The prevalence of COVID-19 in Nigeria stands at 0.015% which implies that 1 in every 6,667 persons is infected. This rate is lower than that of Africa and World whose prevalence rates are 0.044% and 0.158% respectively (**Table 6**). Case fatality rate is the proportion of death from a certain disease compared to total number of people diagnosed with the disease for a particular period. Based on the COVID-19 data available in Nigeria, the CFR was 2.26%. This value is slightly lower than that of Africa (2.23%) but lower than that of the world (4.59%). Lower prevalence and CFR in Nigeria may be attributed to the tight measures taken by Nigerian authorities since before the emergence of first case on 27th February 2020. The CFR correlate with mortality rate, the mortality rate of COVID-19 in Nigeria as of 10th July was 0.00034% meaning that 1 in 294,176 persons in Nigeria die of COVID-19. This rate is lower than that of Africa (0.00098%) and world (0.0072%). The recovery rate for the infection in Nigeria was 40.8%. However, this rate is lower than that of Arica and the World whose recovery rates were 49.6% and 60.4% respectively. Lower recovery rate in Nigeria may be attributed to lack of proper medication in the isolation centers across the country.

Table 6. Comparison of some epidemiological parameters between Nigeria, Africa and the World.

Parameter	Nigeria	Africa	World
Total population	206,139,589*	1,340,598,147*	7,794,798,739*
Confirmed cases	31,323	594,955	12,322,395
Active cases	17,819	286,467	4,313,889
Discharged cases	12,795	295,242	7,442,141
No. of deaths	709	13,246	566,335
CRF	0.023 = 2.26%	0.022 = 2.23%	0.045 = 4.59%
Prevalence rate	0.015% (1 in 6,667 persons)	0.044% (1 in 2,272 person)	0.158% (1 in 632 persons)
Recovery rate	40.8% (1 in 2.5 persons)	49.6% (1 in 2 person)	60.4% (1 in 1.6 persons)
Mortality rate	0.00034% (1 in 294,176 persons)	0.00098% (1 in 102,040 person)	0.0072% (1 in 13,888 persons)

CFR = Case fatality ratio, * = <https://www.worldometers.info/world-population>, 2020

Conclusion

The first case of COVID-19 in Nigeria was reported on the 27th of February 2020 and since then the numbers of confirmed cases has been on the increase, at least in Nigeria. According to NCDC, as of 12th July 2020, out of 32,558 cases recorded, 21,385 (66%) were males while 11,173 (34%) were females. Subjects within 31– 40 years age category were more susceptible to contracting the disease in Nigeria. It however, said more deaths have been recorded among people of 60 years and above. The infection is characterized by low prevalence rate, case fatality rate and mortality rate but the recovery rate is relatively high. Based on the findings from this study, the following recommendations were made;

- i. The awareness campaigns on the danger of the infection should be relentlessly conducted by the government, private organizations and the media.
- ii. Adequate diagnosis and isolation/quarantine should be implemented.
- iii. Samples can be collected by setting up Coronavirus test booths so that samples can be collected quickly anywhere in the country.
- iv. All those who have entered Nigeria recently from abroad through airports, land ports, seaports, railways and their families,

or all those returning home should be tested for coronavirus and to be monitored accordingly.

- v. Government should spend additional resources directly on government doctors, drugs, hospitals and health centers and also increase the allocation in education to ensure quality by recruiting qualified teachers, retaining them by providing incentives and ensuring better infrastructural facilities and resources.

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None declared

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