

# Regional Analysis of COVID-19 Incidence and Associated Fatalities in Nigeria: A Validation of Healthcare Delivery Situation

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## Abstract

Ever since the first reported case of COVID-19 on February 27, 2020, Nigeria is yet to effectively contain the spread of the disease. In spite of different measures taken by the Nigerian government to counter the effect of the pandemic, the consequences of COVID-19 are severely felt in the business, health, economic and social spheres of the country. The primary aim of this study was to examine the trends in the growth rates of COVID-19 and related fatalities across the six regions of Nigeria with a view to validating poor condition of healthcare facilities in the country. The cross-sectional times series method was used. COVID-19 data for Nigeria and the world were extracted from the who COVID-19 databank between August, 2020 and February 22, 2021. COVID-19 incidence growth rates and COVID-19 related fatality growth rates were generated at a one-month successful interval for a period of 6 months. Descriptive data analysis was done using Stata version 16. Results across the six regions showed that the highest growth rates for COVID-19 incidence were obtained for North central (80.1%) and Southwest (73.3%) region in January 2021. In addition, results across the regions indicated that the highest growth rates for COVID-19 related fatalities were derived for north central (39.3%) and Southwest (30.9%) region in January 2021. The study concluded that perhaps the rise in COVID-19 incidence and COVID-19 related fatalities could be as a result of the weak state of healthcare deliveries in the country.

**Keywords:** World health organization • COVID-19 fatalities • Healthcare deliveries • Fatality growth

## Introduction

The implications of the novel COVID-19 pandemic are not only felt by the developed but also the poor and developing countries of the world. In fact, the novel COVID-19 pandemic remains one of the few pandemics that the global community has witnessed in the most recent era [1,2]. According to the World Health Organization most recent updates, global fatalities arising from COVID-19 pandemic was put at about 2.5 million out of about 112 million reported cases as at February 22, 2021 (WHO, 2020c). As at February 22, 2021, the United States, India, Brazil, Russia and United Kingdom remain the top five countries with highest figures of the reported cases of COVID-19 in the world, while the total reported number of deaths due to COVID-19 infections was put at 0.495 million and 0.247 million in the USA and Brazil respectively (WHO, 2020c).

Unlike in the developed countries, the number of reported cases of COVID-19 infections and COVID-19 related deaths in the sub-Saharan African region has been relatively low, with an exception of reported cases and deaths for South Africa (WHO, 2020c). At a point in time, the number of reported cases in this region was so low that it

was wrongly assumed that the COVID-19 pandemic was not peculiar to the sub-Saharan region [3,4]. In fact, during this nearly zero-transmission period, many Nigerians were of the view that Nigerians and other black Africans may have developed resistance against the COVID-19 disease (Sahara Reporters). However, this wrong supposition could only last a while, as the cases of COVID-19 were being reported across countries of the region [5]. As noted by Melinda Gate, and due to the upsurge in household poverty in many households across countries of sub-Saharan African region, the cases of COVID-19 could be agreed to a reasonable extent to have either been underreported or not even reported as the case may be (Bankole and Urhere, Sahara Reporters) [6,7].

Since the first reported case of COVID-19 on February 27, 2020, Nigeria is yet to effectively contain the spread of the disease. In spite of different measures taken by the Nigerian government to counter the effect of the pandemic, the consequences of COVID-19 are severely felt in the business, health, economic and social spheres of the country (NCDC, WHO). For instance, the number of reported cases of COVID-19 in Nigeria has increased from less than 1,000 as at May 30, to over 152,000 cases as at February 23, (NCDC, 2021).

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The number of reported fatalities due to COVID-19 infection in Nigeria also grew from 845 on July 25, 2020 to 1,862 fatalities as at February 23, (NCDC, 2021). The growth rates in reported cases of COVID-19 and related fatalities are not only alarming but speak more of the state of healthcare delivery system of the country [8,9]. In fact, as argued by Bankole, Omoyeni, Oyebode, and Oleribe, Momoh Uzochukwu, the present state of healthcare delivery in Nigeria calls for more funding, special and timely interventions, in order to meet up with the basic health demand of the population.

Perhaps, number of reported cases, and fatalities arising from COVID-19 diseases in Nigeria would have been minimal if there had not been a large gap between healthcare demand and healthcare supply in the country [10]. This argument is based on the growth rate of the COVID-19 incidence rate despite the fact that there is likelihood of large unreported cases of infection. For instance, the country is finding it extremely difficult to provide the healthcare sectors with enough COVID-19 testing kits, while some COVID-19 patients were allowed to leave for self-treatment at home. On the other hand, the continual rise in the reported cases of COVID-19 in Nigeria could be juxtaposed to the WHO, Cheng, et al., Lin, Ran who argued that with the availability of more testing kits for the conduction of more COVID-19 tests, there is a possibility for a steady rise in the incidence rate of COVID-19 in many countries with low reported cases [11,12].

Nigeria is one of the few countries with the highest figures of reported cases of COVID-19 pandemic in the sub-Saharan African region, and of course the country so far has reported the figures of the pandemic in sub-region of West African. In spite of this confirmed fact, studies have rarely explored the possible disparities in the growth trends of fatalities and reported cases across the six-geopolitical zones that the country is sectionalized into. Also, there are neither empirical studies that have explored the growth in incidence rates and fatalities emanating from COVID-19 complications in the past six months or less nor are there regional based analysis across the regions of the country. In fact, there is a dearth of studies (Bankole and Urhere, Bankole) that had investigated the spread of COVID-19 incidence and COVID-19 related fatalities in retrospective to the poor state of healthcare deliveries in Nigeria. Hence, this prompted the necessity for this study. The primary aim of this study was to examine the trends in the growth rates of COVID-19 and related fatalities across the six regions of Nigeria, with a view to validating poor condition of healthcare facilities in the country (NCDC, WHO) [13].

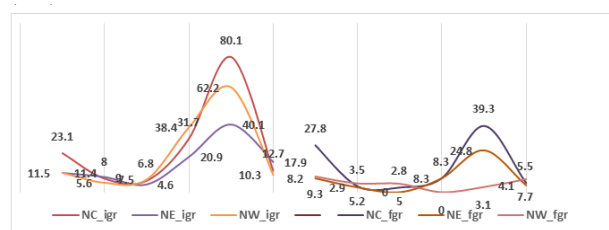
## Materials and Methods

A cross sectional times series method was adopted in this study. Secondary data were extracted the World Health Organization COVID-19 data bank for August 20, to February 22. Data were extracted for reported incidences of COVID-19 and deaths arising COVID-19 related complications among patients in Nigeria [14]. The extracted data were entered into an excel spreadsheet, and subsequently exported into the State version 16 software analysis package. The growth rates for COVID-19 reported cases and deaths attributed to COVID-19 complications were calculated from a-two-month successive intervals for the country's six geopolitical regions (Southwest, Southsouth, Southeast, Northwest, Northeast and Northcentral), and for the globe at large. The growth patterns for the

reported cases of COVID-19 and fatalities attributed to COVID-19 complications in the identified regions descriptively analyzed. The study's unit of analysis was a confirmed case of COVID-19 infection [15].

## Results

Figure 1 presents the trends of percentage growth in the reported cases of COVID-19 and deaths arising from COVID-19 complications in Northern Nigeria. COVID-19 growth rates for north central increased from 6.8% in November 2020 to 31.7% in December 2020, and further increased to 80.1% in February 20, 2021. Similarly, COVID-19 growth rate for the Northeast region increased from 4.6% in November 2020 to 20.9% in December 2020. The growth rate peaked at 40% in January 2021, before dropping to 17.9% in February 2021. Also, a similar growth pattern was observed for the Northwest sub-region. COVID-19 incidence growth rate for the sub-region peaked at 62.2% in January 2021, before declining to 10.3% in the following month. The growth rates for fatalities arising from COVID-19 dropped from 27.8%, 8.2% and 9.3% in September 2020 to 3.5%, 2.9% and 5.2% in October 2020 for Northcentral, Northeast and Northwest regions respectively. COVID-19 related fatality growth rates peaked in January 2021 for Northcentral (39.3%) and Northeast (24.8%), but in September 2020 for Northwest (9.3%).

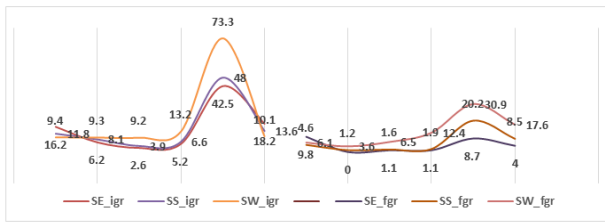


**Figure 1:** Incidence and related fatality growth rates of COVID-19 for northern regions of Nigeria.

Figure 2 presents the trends of percentage growth in the reported cases of COVID-19 and deaths arising from COVID-19 complications in Southern Nigeria. COVID-19 incidence growth rates for Southeast dropped from 16.2% in September 2020 to 6.2% in October 2020, and further dropped to 2.6% in November 2020 before rising to 5.2% in December 2020 and eventually peaked at 42.6% in January 2021. COVID-19 incidence growth rates followed the same pattern for the Southsouth and Southwest regions.

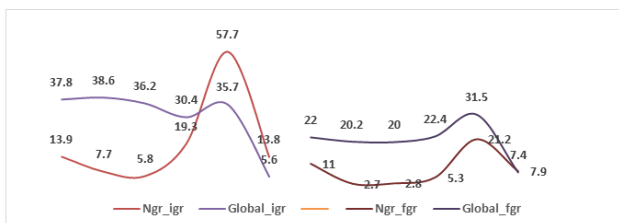
Unlike in the Southsouth region where COVID-19 incidence growth rate peaked at 48% in January 2021, the rate was higher for the Southwest region in the same period (73.3%). The results showed a slight difference in the patterns of COVID-19 fatalities across regions of Southern Nigeria.

For instance, while no increase in COVID-19 fatality growth rate was not observed in the Southeast region till December 2020, increase in fatality growth rates were observed in November 2020 and October 2020 in the Southsouth and Southwest respectively.



**Figure 2:** Incidence and related fatality growth rates of COVID-19 for southern regions of Nigeria.

Figure 3 presents the trends of percentage growth in the reported cases of COVID-19 and fatalities arising from COVID-19 complications in Nigeria and the world at large. An up-and-down growth rate pattern was observed for incidence of COVID-19 in Nigeria. For instance, COVID-19 incidence growth rate for the country dropped from 13.9% in September 2020 to 7.7% in October 2020, with a further drop to 5.8% in November 2020; the growth rate increased from 19.3% in December 2020 to 57.7% in January 2021, and afterward dropped to 13.8% in February 2021. The Global COVID-19 incidence growth rate increased from 37.8% in September 2020 to 38.6% in October 2020, dropped to 36.2% in November 2020, and peaked at 56% in February 2021. A similar pattern was observed for COVID-19 fatality growth rates in Nigeria and the world at large. The COVID-19 fatality growth rate for Nigeria peaked at 21.1% in January 2021 while a lowest rate of 11% was recorded in September 2020. Unlike for Nigeria, the highest COVID-19 fatality growth rate of 31.5% was reported for the Globe in January 2021, while its lowest rate of 7.4% was observed in February 2021.



**Figure 3:** COVID-19 incidence and related fatality growth rates for Nigeria and the globe.

Note: NC:Northcentral; NE:Northeast; NW: Northwest; SE: Southeast; SS: Southsouth; SW: Southwest; Ngr: Nigeria; fgr: fatality growth rate; igr: incidence growth rate

## Discussion

The focus of this study is to investigate the trends in the growth rates of reported COVID-19 incidence and deaths arising from its complications in Nigeria. While the underlying motivating factors for this study is to establish the differentials in the growth rate of COVID-19 across the six geopolitical regions of Nigeria, the author considered it appropriate to relate the inability of the country to contain the spread to the state of healthcare services in the country. Nigeria, a developing country is known to be faced with healthcare challenge. The rise in incidence growth for COVID-19 is a sign of the inability to timely response to the laid down regulations that would have led to minimal level of contraction of the disease.

Evidence emanating from the study revealed that the growth rate for COVID-19 incidence was slightly higher in the Southern than in the Northern region. Region of the country. Similarly, the fatality growth rate for the Southern Nigeria was found to be somewhat higher compared to the growth rate for the Northern region of Nigeria. So, it could be arguably perceived that the approach to containing the spread of COVID-19 pandemic was timelier and more proactive in the Southern region than in the Northern part of the country. Perhaps, the differential in the growth rate could be attributed to disparities in the population access to qualitative healthcare facilities across the country. This assertion is a confirmation of Kiri (2020) and Doctor, Nkhana-salimu and Abdulsalam, who consistently argued that the state of healthcare deliveries in Nigeria was not only inadequate but also poor and largely inaccessible to the vulnerable population. On the other hand, evidence from the study revealed the fatality growth rate arising from COVID-19 complications was moderately higher in the Southern region than in Northern region of the country. Perhaps, the higher percentage growth rate for COVID-19 incidence in the Southern region of the country is responsible for this.

Despite the fact that the spread of the COVID-19 pandemic took a relatively longer time before it was reported in Nigeria, the trend in its incidence and fatality growth rate called for a serious attention, especially when these rates are compared to the global rates. It is not very unlikely that the weak state of the country's healthcare system is a "primary factor" that prevents the timely and proper containment of the pandemic, thereby allowing it to get to the present nearly critical state. This argument therefore could be used to justify WHO (2020a) and Bankole et al., who noted that the poor state of many of the healthcare facilities, and the partial or non-adherence of Nigerians to the World Health Organisation COVID-19 preventive measures aids the spread of COVID-19 in the country. Another possible line of argument for the rise for the COVID-19 incidence and fatality growth rate for Nigeria is the shortage of specially trained healthcare workers who are needed to support the effort of the available overworked and poorly remunerated medical doctors, nurses and medical laboratory professionals. Hence, the line of argument is in collaboration of Lawumi, Azevedo and Gautier and Ridde (2017) who consistently claimed that the poor state of healthcare deliveries in sub-Saharan Africa was not only peculiar to poor financing of the healthcare sector but also due to absence of good remuneration benefits for healthcare professionals in the sub-region of Africa.

## Conclusion

The rise in the growth rates of COVID-19 incidence and related deaths arising from COVID-19 complications in Nigeria, perhaps, might be a possible reflection of the weak state of the country's healthcare system. Although, the state of healthcare facilities is generally poor in the country, a relatively higher incidence growth rate experienced in the Northern region of Nigeria compared to the Southern region's rate could be as a result of the slower approach and severe shortage of well-trained healthcare personnel in the Northern region. The comparatively higher growth rate of COVID-19 related deaths in the Southern region could possibly be as a result of the significantly higher volume of spread reported in the region. Imperatively, the COVID-19 pandemic should be accepted by the government of Nigeria as an uncalled-for event which should drive the proper financing and management of the nation's healthcare

sector, while adequate measures must be taken to retain and bring out the best in the available, and future healthcare workers in Nigeria.

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## Conflict of Interests

The author of this work declares no competing interests.

## Ethical Consideration

The ethical subject of this work has already been met based on the fact that the regenerated dataset used in this study were pulled from the World Health Organisation 2021 COVID-19 data bank.

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