



ON THE MONITORING OF CORONAVIRUS DISEASE 2019 (COVID-19) PANDEMIC OUTBREAK IN NIGERIA

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ABSTRACT: *This study is a monitoring analysis of COVID-19 in Nigeria. The data used for the study is sourced from the Nigeria Centre for disease Control (NCDC) as at 10:00PM on the 11th of April, 2020 which comprises number of laboratory confirmed cases, number of active cases and number of discharged cases. The models used in this study are the linear trend model, fish-bone diagram, Pareto analysis and pie chart. The fish bone diagram depicts the likely symptoms to check out for in a patient infected by COVID-19; the Pareto analysis shows that Lagos, FCT (Abuja) and Osun constitute 80% of all the infected states; the trend analysis shows that the spread of the pandemic is still on an increase rate; from the 3 months forecast carried out using linear trend analysis, in the next three months (90 days) active COVID-19 cases in Nigeria may hit 1000 positive confirmed cases if more measures is not put in place to curb the spread of the pandemic; and lastly, from the performance assessment, it is seen that the pandemic is still under control.*

KEYWORDS: Fish-Bone, Pareto, Time Series, Trend, Pie Chart, Coronavirus Disease, Covid-19, Pandemic, Nigeria

INTRODUCTION

The first laboratory confirmed Coronavirus disease 2019 (COVID-19) case in Nigeria was announced on 27th of February 2020, when an Italian citizen in Lagos tested positive for the virus, caused by SARA-COV-2 ^[1,2]. On 9 March 2020, a second case of the virus was reported in Ewekoro, Ogun State, he was a Nigerian citizen who had contact with the Italian citizen ^[3].

On 28th of January 2020, the Federal government of Nigeria came out to assure the citizens of the country on its readiness to strengthen surveillance at five international airports in the country to prevent the increase of COVID-19. The government announced the airports as Enugu, Lagos, Rivers, Kano and the FCT ^[4]. The Nigeria Centre for Disease Control also announced same day that they had already set up COVID-19 group and was ready to make active its incident system if any case surface in Nigeria ^[5].

On 31st of January 2020, following the increase of COVID-19 pandemic in mainland China and other countries globally, the federal government of Nigeria set up a Coronavirus Preparedness Group to mitigate the country ^[6,7]. On the same day, the World Health Organization listed Nigeria among other 13 African countries identified as high-risk for the spread of the virus ^[8].



On 26th of February 2020, a Chinese citizen presented himself to the Lagos State government on feeling of being infected with COVID-19. He was immediately admitted at Reddington Hospital and was released the following day after testing negative ^[9,10].

With geometric increase in COVID-19 rising to 51 on the 25th of March, 2020, the administration of federal government of Nigeria ordered the immediate closure of shops in the markets and neighborhoods centers, except those selling food items, medicines and other essential commodities in the country. They also ordered the immediate closure of churches, mosques, schools and all social gathering ^[11,12,13,14]. After week, a total lock-down was ordered in some state of the country.

With the increase of confirmed COVID-19 cases in Nigeria, private, corporate and international bodies began to intervene through donation of relieve materials, including funds. With the intervention of government, international and other private bodies, and the stay at home approach, the spread of the disease is still on increasing trend.

The question is how should these relieve materials be distributed and intervention facilities be spread across the country? Secondly, if proper action is not duly taken, what will be the status of the spread of the pandemic in the next three months or future?

MATERIALS AND METHODS

In the course of proffering solution to the above posed questions, quality control tools were adopted to monitor the pandemic. Quality health control can be applied to various aspects of health care. Timeliness in health control relates to obtaining needed care while minimizing delays in intervention on any disease outbreak. Quality health control also looks at consumer point of view of health care needs and intervention by government (health management organizations / ministries).

Appropriate steps must be taken by physician and other health providing activities whenever there is an epidemic or pandemic outbreak so as to maintain quality health standard in any society.

In order to understand the problem posed by the delay in the recent global ravaging outbreak (COVID-19), it may be useful to describe the trend of the outbreak so as to mitigate the impact of the virus spreads in the country.

The control tools used in analyzing COVID-19 data include fish bone diagram, Pareto chart, trend analysis and pie chart.

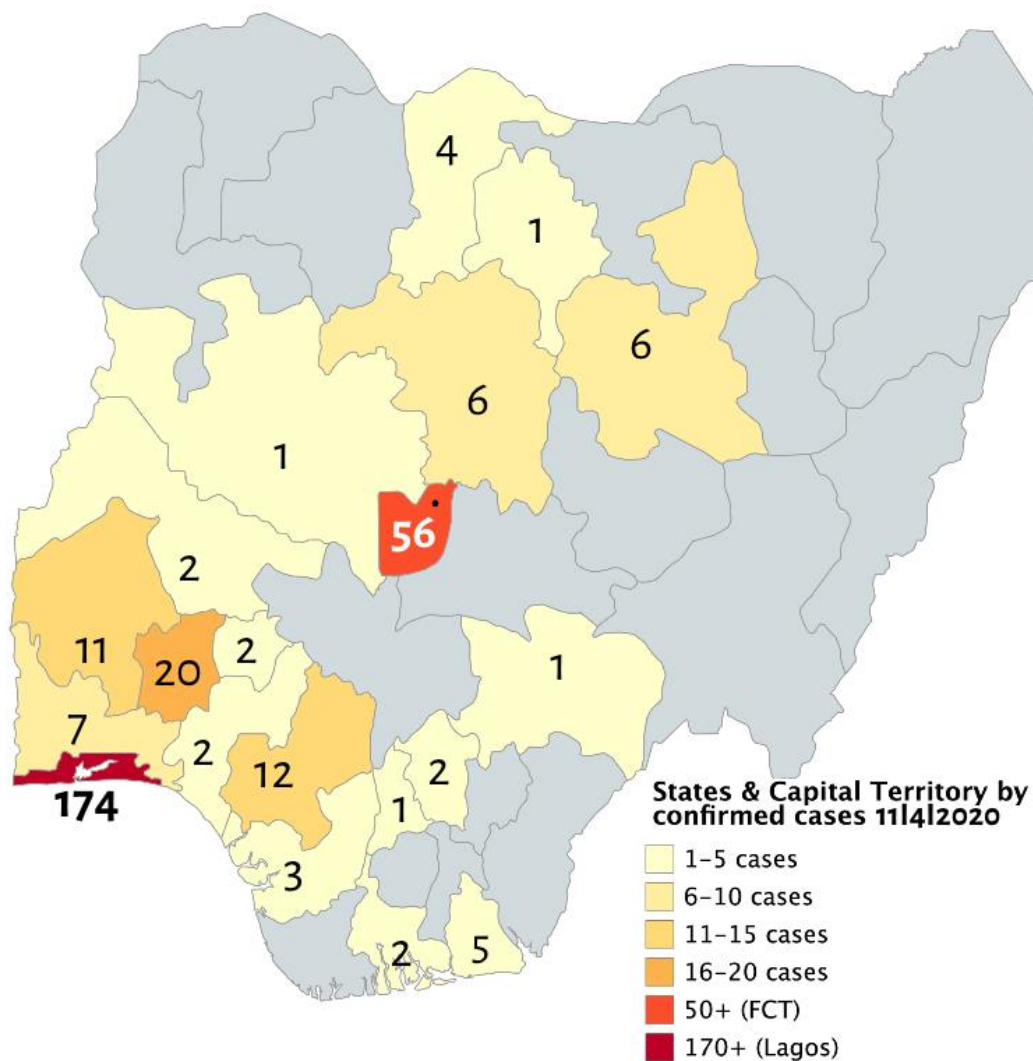


Figure 1: COVID-19 Pandemic in Nigeria as at 14th of April 2020

RESULTS AND ANALYSIS

The data used in this write-up were up to date published data in NCDC official website (<https://covid19.ncdc.gov.ng>) as at 10:00PM on the 11th April, 2020.

Fish-Bone Diagram

The figure below depicts the symptoms to check out for in a COVID-19 infected person.

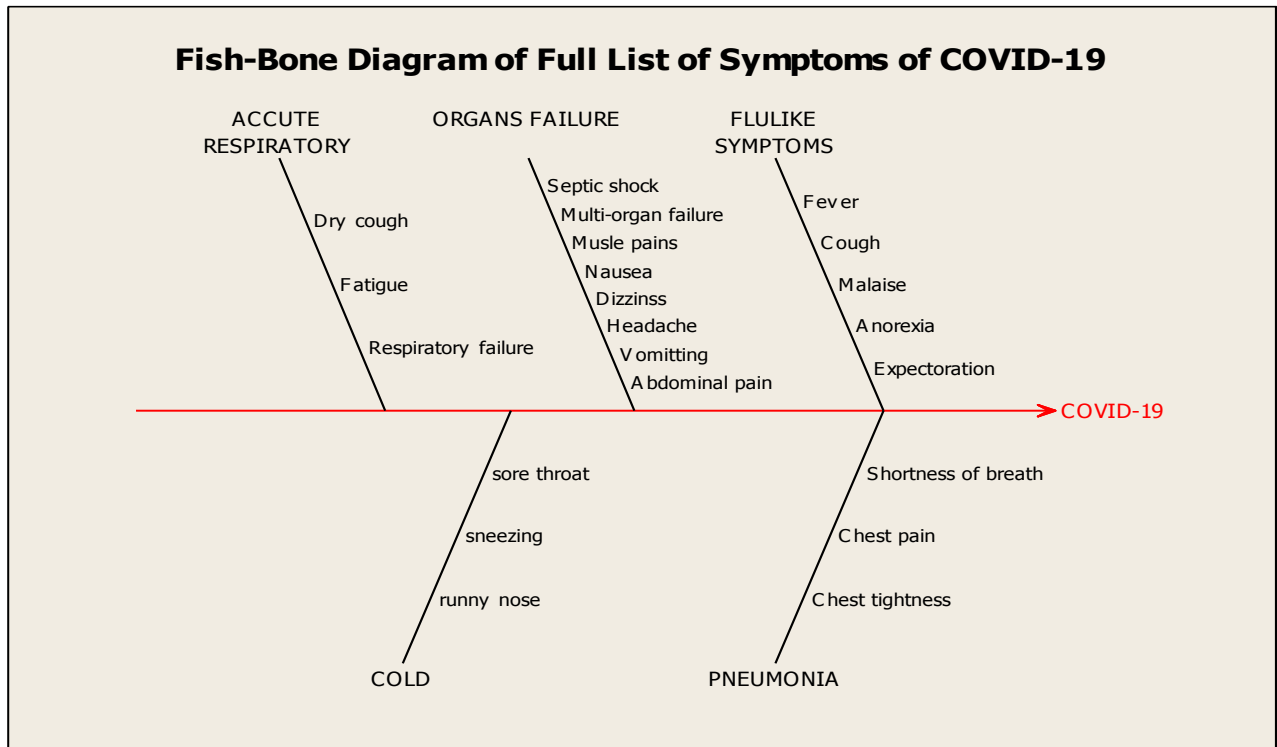


Figure 2: Fish bone Diagram of COVID-19 Symptoms

The figure 2 above depicts the full list of symptoms associated with a COVID-19 infected patient at both the initial and late stage of the disease.

Pareto Chart

To identify the Areas (states) where more intervention would be more needed, we would draw a horizontal line from the 80% mark on the vertical cumulative percentage axis and where it crosses the line graph, a line down to the horizontal axis is also drawn.

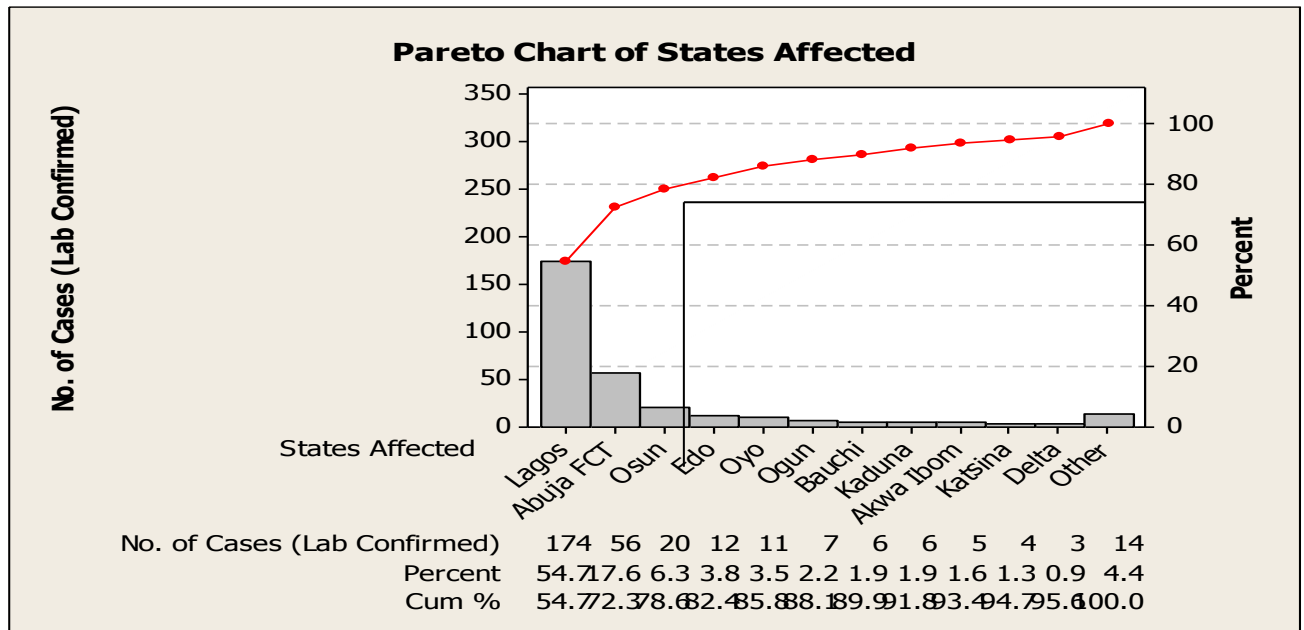


Figure 3: Pareto Plot of COVID-19 Infected State

From the Pareto chart above, intervention efforts should be more focused on the states to the left of this line (Lagos, FCT and Osun), which are referred the ‘vital few’. Therefore, the government and other intervention bodies should intervene more in these three states since they contribute 80% of the total out in the entire country.

Trend Analysis

Figure 3 below shows trend plot for the pattern of outbreak of COVID-19 in Nigeria.

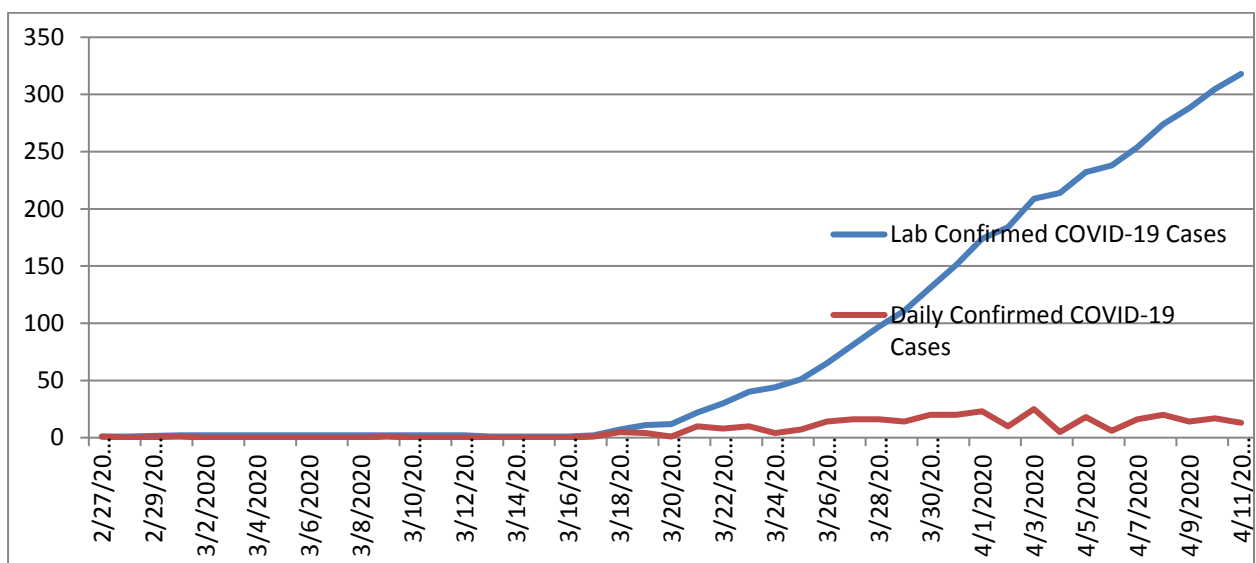


Figure 4: Trend Plot of Both Active and Daily Confirmed Cases are on Increasing Trend Since 11th March till date.

The figure 4 above shows an increasing trend of laboratory confirmed cases and an upward and downward trend of the daily confirmed cases since 7th of March, 2020. The increase in the rate of spread indicate that more effort needs to be put in place to curb this pandemic spread both government and intervening bodies.

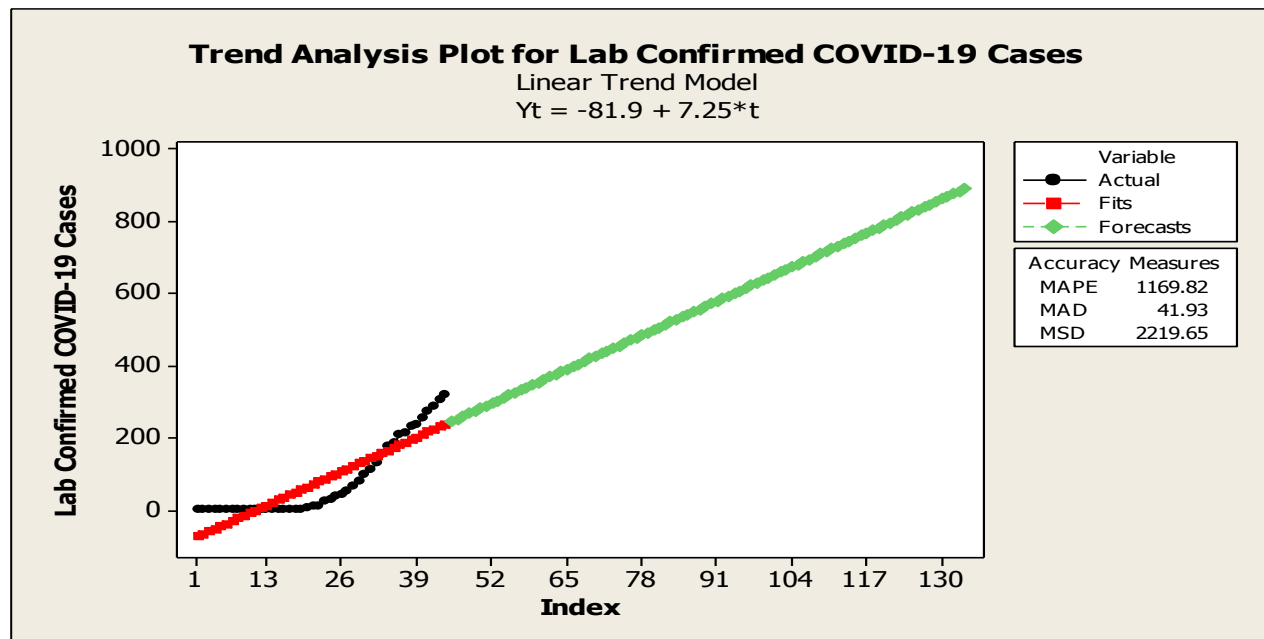


Figure 5: Linear Trend plot for COVID-19 Outbreak in Nigeria

The trend line shows the uptrend in the in COVID-19 confirmed positive case in laboratory from 17th March till 11th April, 2020 and can be thought of as a geometric increase in the outbreak. If more intervention is not put in place to curb the spread, it is forecasted using linear trend model

($Y_t = -81.9 + 7.25time$) that Nigeria might record close to 1000 cases in the next 90 day from 11th April 2020.

Pie Chart

In order to assess the performance of strategies put in place to monitor and curb the outbreak of this pandemic, number of laboratory confirmed cases, number of active cases, number of discharged patients on testing negative after treatment and number of death were plotted in a pie chart using their percentages.

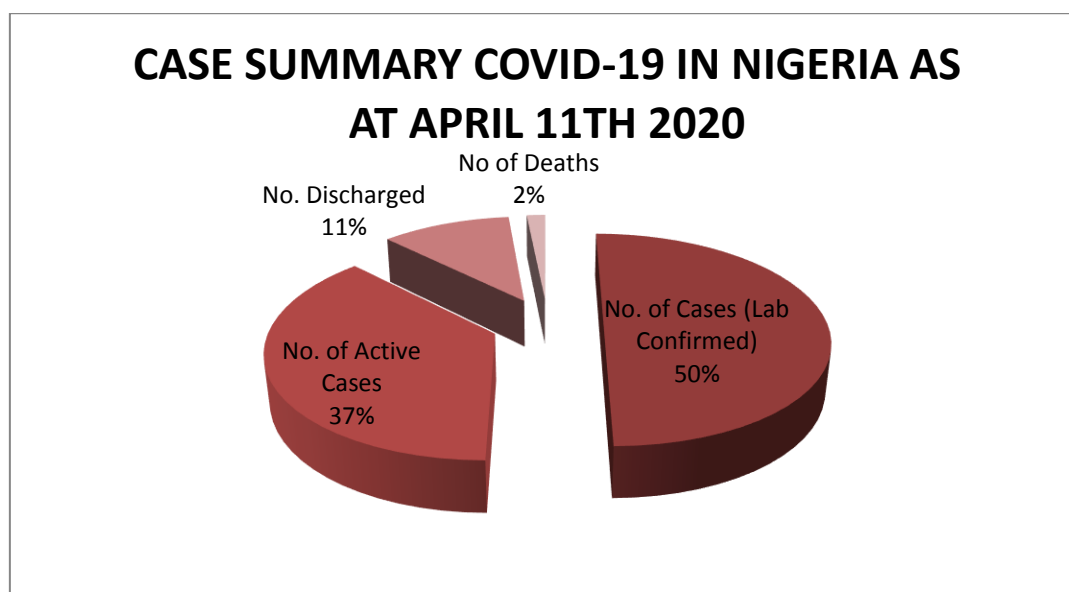


Figure 6: Pie chart of summary of COVID-19 cases in Nigeria.

The number of active cases is 37%, number of discharged is 11% and number of deaths is 2%. This shows that the pandemic still under control since the level of significance of death from COVID-19 is 0.02 which is less than 0.05 (standardized level of significance).

CONCLUSION

This study was aimed at monitoring the outbreak of COVID-19 in Nigeria and to make out the effect of palliative measure put in place to curb the spread of the virus. The study reveals that Lagos state was more vulnerable comprising of about 58% of the total outbreak in Nigeria, followed by FCT(Abuja) with about 18% and Osun with about 16%. These three states constitute the vital few (80%) of the entire outbreak in Nigeria. The pandemic is also on an increasing trend, of which if more measures is not put in place to curb the outspread, Nigeria may record about 1000 positive cases in the next 90 days from 11th of April, 2020. Lastly, the outbreak is still under control since the significant level of the death rate of COVID-19 is about 0.02.

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