

The Trend of COVID-19 in Nigeria

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Abstract

The World Health Organization (WHO) was notified of a novel coronavirus disease in China in late December 2019 that was later called coronavirus disease 2019 (COVID-19). The outbreak of the COVID-19 was confirmed a pandemic on 11 March 2020. The coronavirus disease 2019 (COVID-19) pandemic emerged in Lagos State since February 27, 2020, and quickly spread to almost all the States in Nigeria. The disease has affected more than five thousand six hundred and twenty-one (5,621) people and more than one hundred and seventy-six (176) deaths have been reported as of May 17, 2020. The research provides a preliminary epidemiological study of the COVID-19 outbreak in Nigeria. In this research, the outbreak of coronavirus disease 2019 pandemic in China, and Nigeria was discussed, and share the daily update of developments in this pandemic. Coronavirus disease 2019 (COVID-19) cases in Nigeria are developing in a similar way to what was witnessed in the early days of the pandemic in China. The disease is presently focused in Southern, and North-Central Nigeria. Early discovery and control of disease outbreaks in the north-east would be very difficult especially the populated areas like Kano, Kaduna, Katsina and Niger. As of 17 May 2020, the evaluations recommended that confirmed cases of COVID-19 in Nigeria have been extraordinarily higher than estimated, and there is utmost need to identify and stop the spread of the pandemic.

Keywords: COVID-19 Pandemic, Epidemiology, Coronavirus in Nigeria, Spread of Coronavirus

INTRODUCTION

Coronavirus belongs to a coronaviridae family a common type of virus that affects mammals, birds, and reptiles. In the human being, it frequently causes mild infections, related to the mutual cold, and accounts for 10-30 percent of upper respiratory tract infections in adults [3]. More considerate infections are exceptional, even though coronaviruses can cause enteric and neurological disease [11]. The increase period of a coronavirus differs but is generally up to fourteen days, i.e. two weeks [16]. The novel coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) happened in China, the city of Wuhan in late December 2019 a developing business center of China experienced an epidemic of coronavirus which killed more than two thousand (2,000) people, and more than 100,000 people were infected for the period of first ten days of the epidemic, and on the 11th of March 2020, it was declared a global pandemic by the World Health Organization (WHO). This coronavirus disease is termed as the 2019 novel coronavirus disease (2019-nCoV) by scientists in China [9]. The global Team on the Taxonomy of Viruses (ICTV) termed the disease as coronavirus disease 2019 (COVID-19), and the virus as SARS-COV-2 [8]. Coronavirus disease is small in size, 65-125 nm in diameter, and 26 to 32 kb in length that covers a single-stranded Ribonucleic acid (RNA) as nucleic acid material size [1] (see figure 1).

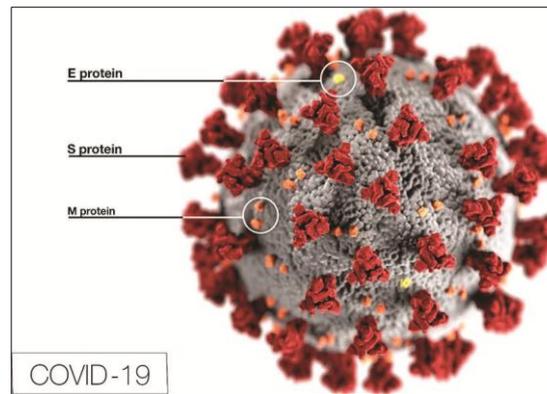


Figure 1. Shows the Arrangement of Respiratory Syndrome Cause by coronavirus disease (COVID-19) [2].

Coronavirus disease 2019 (COVID-19) act similar a usual respiratory coronavirus in the elementary mechanism, contaminations, and replications [10]. Though, approximately transformations permit it to fix close-fitting to host receptors and rise its transmissibility, which is supposed to create it further transferable. Scientists have established that the coronavirus was clear on a copper surface for up to four hours, in aerosols for up to three hours, on a cardboard surface for up to 24 hours, and plastic, and stainless steel for up to two to four days [6]. The outcomes deliver a crucial solidity record about the SARS-CoV-2, which causes coronavirus disease (COVID-19), and recommends that people may obtain the virus through contaminated objects [13]. The epidemic of coronavirus disease (COVID-19) infection is increasing fast globally, imposing us to live with this virus for possibly a long time. Professionals and Researchers have sustained to be educated on COVID-19, and its complex appearance, and pathogenesis [5]. For instance, not all people exposed to the disease are indicative, and not all infected patients develop a severe acute respiratory infection. Thus, the virus can be approximately categorized into three stages: stage I, an asymptomatic development period with or without obvious virus; stage II, non-severe symptomatic period with the existence of virus; and stage III, severe acute respiratory symptomatic phase with high viral dimensions [15]. It has been stated that the severe acute respiratory syndrome (SARS) epidemic was initiated by SARS-CoV-2 in the city of Guangdong, China [17]. The spread rate of SARS-CoV-2 is complex than the SARS-COV the reason could be the S-protein in the RBD region of SARS-CoV-2 may have increased its spread [1].

Objective: The purpose of this study was to provide sufficient results on coronavirus disease 2019 (COVID-19), and the daily responses (update) of coronavirus disease 2019 (COVID-19) in Nigeria.

1.1 Coronavirus disease 2019 (COVID-19) Outbreak in China

Chinese government informed the World Health Organization (WHO) about the several cases of pneumonia with unaware aetiology. The epidemic was originated from a market in Wuhan city known as Hunan seafood, and rapidly infected more than Seventy (70) people. The Hunan seafood market was the trade point of live animals such as birds, rabbits, frogs, bats, and marmots [14]. The National Health Commission of China recommended it was viral pneumonia on the 10th of January, 2020, but further this virus was known as novel coronavirus. Originally, it was presumed that the seafood market had infected animals, so people were infected from this virus if they visited the market.

Further research displayed that some persons were infected with the virus with no record of visiting the market. Therefore, advanced clarifications showed the human-to-human aptitudes of the virus. Dispersal of the virus happens due to the near interactions with an infected person, exposure to virus-containing aerosols during, coughing, sneezing, respiration. These aerosols can enter the lungs through breath via the nose or through the mouth [7].

1.2 COVID-19 Outbreak in Nigeria

The first case of the deadly coronavirus in Nigeria was noticed on the 27th of February 2020, the case is an Italian citizen who works in Nigeria, and returned from Milan, Italy to Lagos, Nigeria on the 25th of February 2020, this did not tip to an instant epidemic. The widespread path has been sluggish, in a measure, outstanding to the public health contributions applied in Nigeria, which condensed both local spread, and importation [4,12].

An immediate intervention was put in place by the Nigeria government in reaction to the Novel Coronavirus disease 2019 (COVID-19). Nigeria government issued a ban on all international flights active from the 23rd of March 2020, except for essential, and emergency flights, and all schools (Primary, Secondary, and Universities) both private and government were closed in order to curtail mass congregations. In this research, an epidemiological study of the coronavirus outbreak in Nigeria is provided. With the cumulative overview of coronavirus disease 2019 (COVID-19) into Nigeria, an enormous disease eruption is imminent, as constant with experimental cases in countries that are epicentres.

The Federal Ministry of Health through the Nigeria Centre for Disease Control (NCDC) has moved an Emergency Operations at the maximum level through the National Emergency Operations Centre (EOC), and is leading the national public health response on the outbreak in Nigeria with state EOC's prominent determinations at the state level. All affected states are working hard through the Nigeria Centre for Disease Control (NCDC) for the deployment of national Rapid Response Teams (RRTs) to support the contact tracing response thoroughly. Enough measures have been taken by the presidential Task Force on coronavirus disease 2019 (COVID-19), to curtail the spread of the disease together with the Federal Ministry of Health and protect the health of Nigerians as soon as possible [12]. The Federal Government on the 30th of March 2020, imposed a lockdown in Lagos state, the FCT, and Ogun State of non-essential activities. On the 27th of April 2020, President Muhammadu Buhari proclaimed that there would be a gradual easing of the lockdown in these places. However, the following further precautionary measures will be forced;

- i. The compulsory usage of non-medical face mask/covering for all individuals while in public places.
- ii. The usage of rubber hand gloves is banned
- iii. The ban on interstate travel excluding the vital travels, and services
- iv. Ban of congregations of more than twenty (20) persons outside of a workplace, Worshipers, and offices.
- v. Ban of meetings of more than twenty (20) persons at a funeral; all contamination avoidance, control measures, and physical distancing of two (2) meters must be observed.
- vi. Restrained contact to markets, and places of economic activities
- vii. Social isolation of two (2) meters among people in workplaces, and other public places

The Presidential Task Force on COVID-19 remains to study national response events, and more protective measures may be recognized or compact as the condition demands. The laboratory testing of the affected state of COVID-19 continues to increase by the Nigeria Centre for Disease Control (NCDC). Presently, there are twenty-five (25) Nigeria Centre for Disease Control's (NCDC's) molecular laboratory centers with the capacity to test the confirmed cases in Nigeria. These laboratories are adequately prepared with mechanisms and materials for testing.

2. Data Collection

An organized data collection was acquired from the Nigeria Centre for Disease Control (NCDC) on the coronavirus disease 2019 (COVID-19) database as of the present dated the 17th of May 2020. The data collected included thorough studies associated to dispersal cases of coronavirus disease 2019 (COVID-19) by states, (except Kogi and Cross River States those doesn't have any confirmed case(s) respectively), epidemiological curves and maps showing the pattern of Geographical distribution and a collective number of reported cases across the country. This data also stated the exact region, the places of reported cases, number of deaths and the number of the person infected with this deadly nCov-19.

Multi-sectoral Emergency Operations Centre (EOC) was activated at Level 3 on the 28th of February 2020, the highest emergency level in Nigeria –led by Nigeria Centre for Disease Control (NCDC) in close coordination with the State Public Health EOCs (PHEOC). Meanwhile, the validation of the first coronavirus disease 2019 (COVID-19) case was on the 27th of February 2020, the Nigeria Centre for Disease Control (NCDC) has released advisories, and affected groups and statements to help Nigerians, in particular, respond to the pandemic.

3. Epidemiological Curves

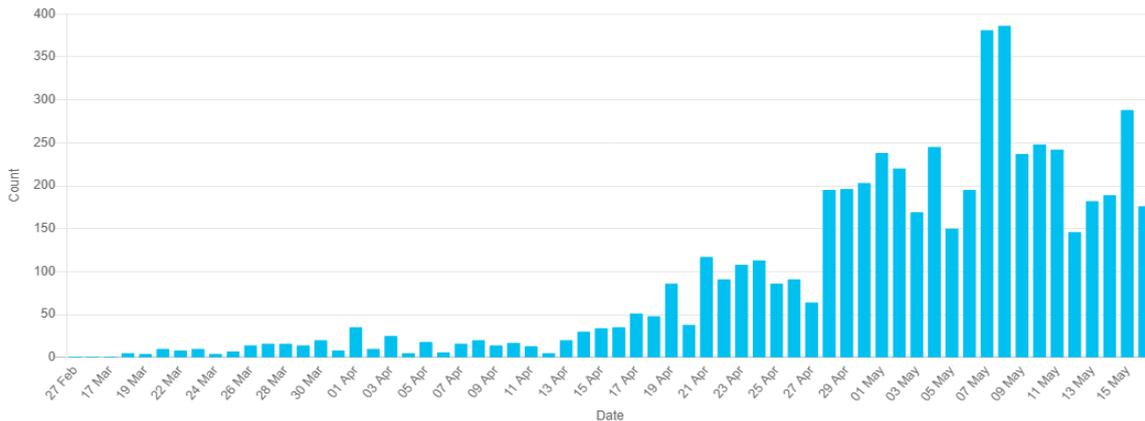


Figure 2. Distribution of Confirmed cases of COVID-19 by states (according to the related case description and testing policies in the affected states) as of the 15th of May 2020 [12].

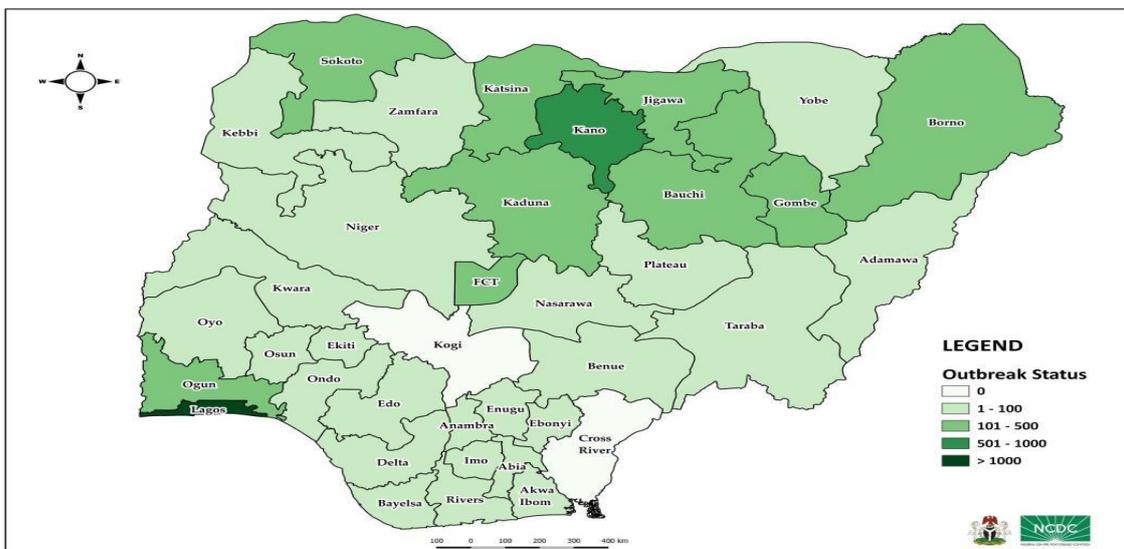


Figure 3. Map of Nigeria showing FCT, and 34 states affected by COVID-19 as of the 15th of May 2020 [12].

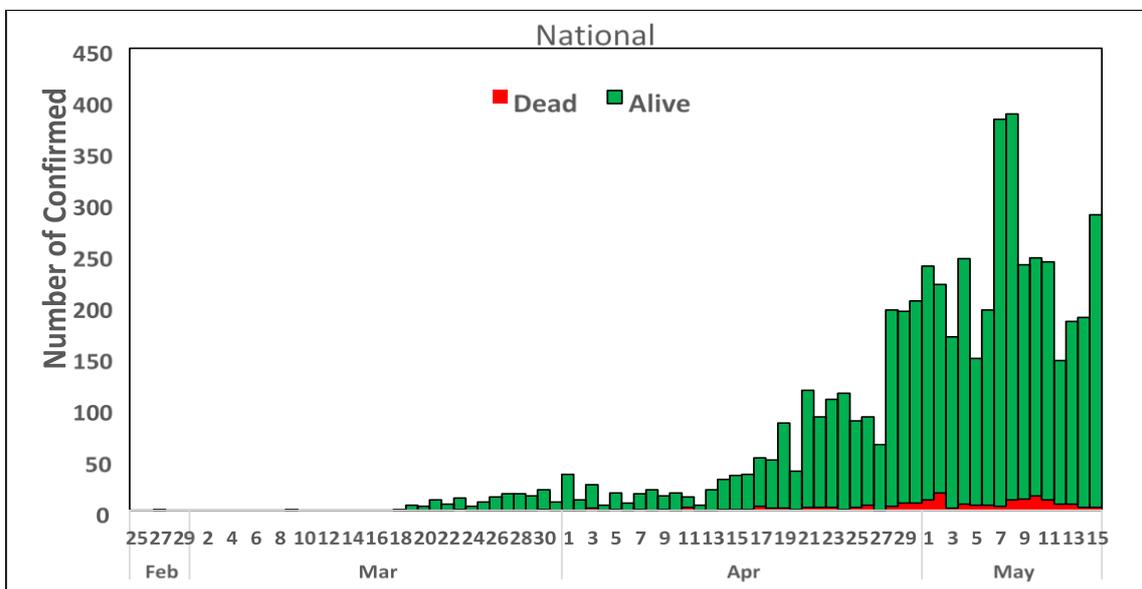


Figure 4. Daily Epidemic Curve of Confirmed Cases (Week 9 – Week 20) as of the 15th of May 2020 [12].

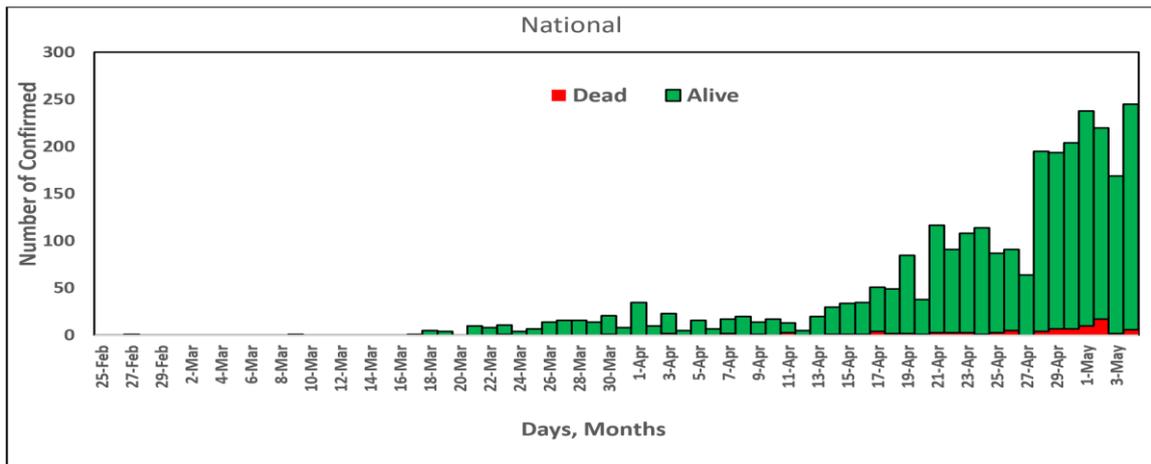


Figure 5. Daily Epidemic Curve of Confirmed Cases (Week 9 – Week 19) as of the 4th of May 2020 [12].

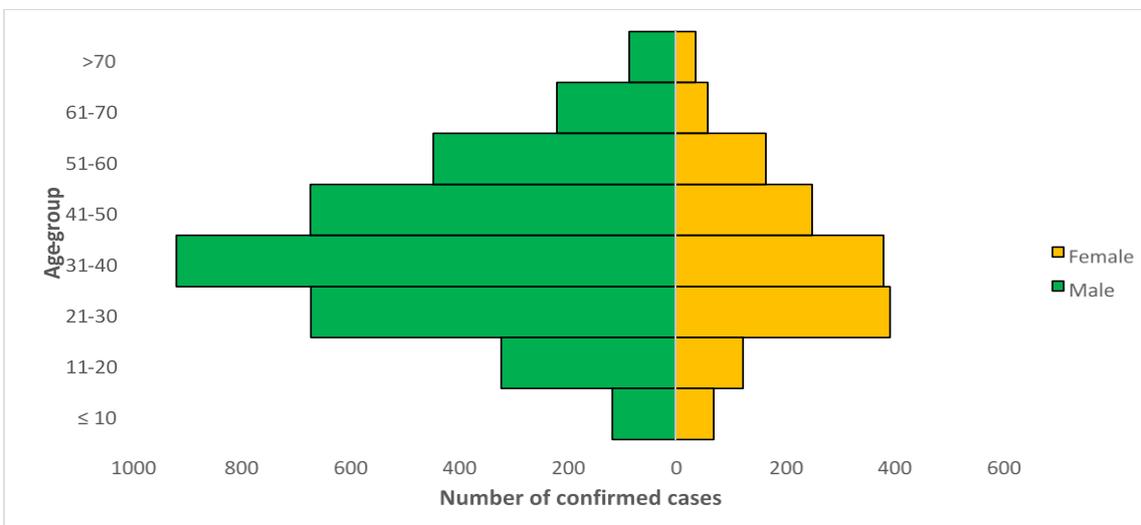


Figure 6. Age-Sex Distribution of Confirmed Cases (Week 9 – Week 20) as of the 15th of May 2020 [12].

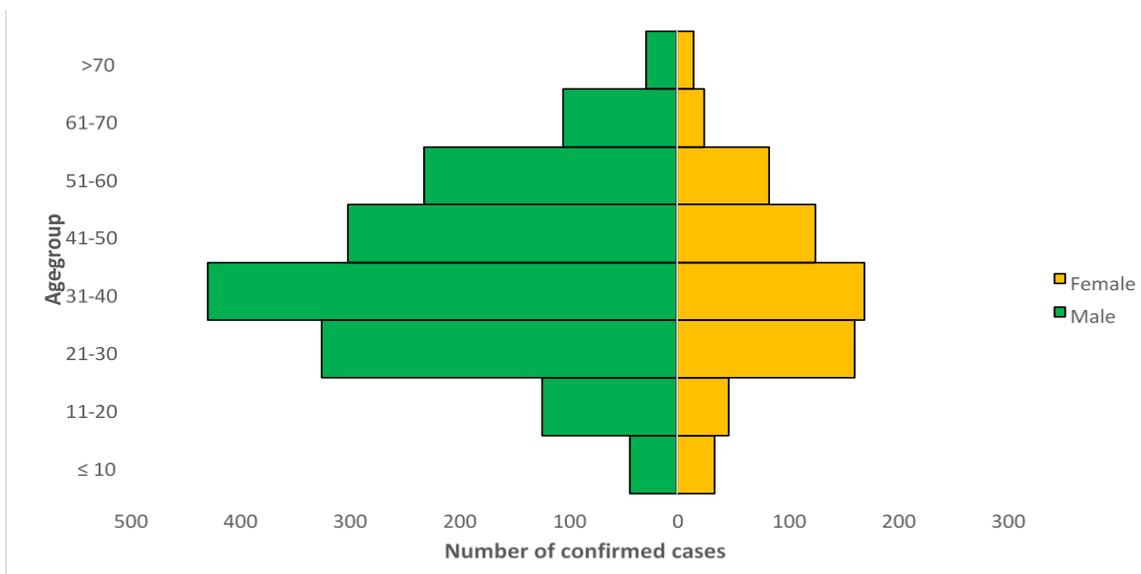


Figure 7. Age-Sex Distribution of Confirmed Cases (Week 9 – Week 18) as of the 3rd of May 2020 [12].

Table 1: Confirmed Cases by States as of the 17th of May, 2020 [12].

States Affected	No. of Cases (Lab Confirmed)	No. of Cases (on admission)	No. Cleared	No. of Deaths
Lagos	2,373	1,796	541	36
Kano	761	633	93	35
FCT	397	282	108	7
Katsina	239	198	29	12
Bauchi	212	140	69	3
Borno	212	144	46	22
Jigawa	197	135	59	3
Ogun	145	73	67	5
Kaduna	138	80	55	3
Gombe	124	32	90	2
Sokoto	112	46	53	13
Oyo	107	77	28	2
Edo	95	55	35	5
Zamfara	74	35	34	5
Kwara	58	45	12	1
Osun	42	7	31	4
Rivers	35	11	21	3
Yobe	32	28	3	1
Nasarawa	31	25	5	1
Kebbi	31	10	17	4
Delta	25	12	9	4
Niger	22	19	2	1
Plateau	21	17	4	0
Adamawa	21	10	11	0
Ekiti	19	5	13	1
Ondo	19	5	13	1
Taraba	17	16	1	0
Akwa Ibom	16	2	12	2
Enugu	12	10	2	0
Ebonyi	9	8	1	0
Imo	7	5	2	0
Bayelsa	6	1	5	0
Benue	5	5	0	0
Anambra	5	4	1	0
Abia	2	1	1	0

Source: Nigeria Centre for Disease Control (NCDC)

4. Coronavirus disease 2019 (COVID-19) Outbreak in Nigeria

Table 2 contributes the COVID-19 outbreak report on daily basis in Nigeria from the 1st of May 2020 till the 15th of May 2020.

Table 2: COVID-19 Daily update in Nigeria (Last updated: the 17th of May, 2020).

The 1st of May, 2020: The using of COBAS 8800 analysis trials commenced in the National Reference Laboratory (NRL). Distribution of Quick reaction and high-level technical surge teams to support the organization in the intervention in Kano State. The increased to 2,500 per day to testing Laboratory capability has now been helpful. Added new testing center, CAMRET- Sokoto, ABU- Zaria, and 54 genes (Lagos and the Ogun States). An addition of risk communications in the scheduled training Engaged with government agencies for the Primary Healthcare workers in the country. All states with confirmed case(s) have a deployment Rapid Response Team (RRT) to support in reply with the Currently 35 RRTs deployed.

The 2nd of May, 2020: Recognized and dispersed case definition for community active case search. The deployment of high-level procedural and Rapid reaction surge teams to support response events in Kano State.

The 3rd of May, 2020: Dispersed Community Case Description to States, and associates. Planned real-time coordination with all State response teams. Stimulated three new mobile laboratories to increase testing ability in three States Delta, Kano, and Ogun. Showed virtual training and provided for sample collection, handling, packaging, and transport in 30 States. Established jingles on the proper use of face masks in seven local languages. Involved healthcare professionals on the ease of lockdown.

The 4th of May, 2020: Organization of operational funding support for States. Involved the focal persons from Faith Based Health Services facilities on scaling up IPC programs. Dispersed Community Case. Description to States, and partners. Planned real-time coordination with all State response teams. Stimulated three new mobile laboratories to increase testing capability in three States Kano, Ogun, and Delta. Directed virtual training and provided for samples assembly, handling, packaging, and transport in 30 States. Established jingles on the proper use of face masks in seven local languages. Involved healthcare professionals on the ease of lockdown.

The 5th of May, 2020: Endorsed hand hygiene in places of duty of IPC teams for Global Hand Hygiene day. Qualified Kaduna and the Delta States on sample collection, packaging and transport. Involved with government agencies to settle risk communication activities for Kano State. Organization of operational funding support for States. Involved the focal persons from Faith Based Health Services facilities on scaling up IPC programs. Distributed Community Case Definition to States and associates. Planned real-time coordination with all State response teams. Stimulated three new mobile laboratories to expand testing capacity in three States Kano, Ogun, and Delta.

The 6th of May, 2020: Deployed RRT team to strengthen COVID-19 preparedness in Cross Rivers and Kogi states. Informed security forces on infection prevention and control of COVID-19 in the Federal Capital Territory. Dispersed Infection Prevention and Control materials with funding from partners to Internally Displaced People camps. Risk communication training for all states in Nigeria Started in partnership with government agencies. Encouraged Hand hygiene in places of task of IPC teams for Global Hand Hygiene day. Trained Delta, and the Kaduna States on sample collection, packaging, and transport. Engaged with government agencies to confirm risk communication activities for Kano State. Dispersed Case Definition to States and partners in the Community. Three new mobile laboratories Stimulated to increase testing capacity in three States Delta, Kano, and Ogun.

The 7th of May, 2020: Completion of the plan response for operational funding support for COVID-19 in all 36 states plus the FCT. Conducted a case meeting with all managers on the psychosocial impact of COVID-19 on healthcare providers, coping strategies, and promotion of emotional wellbeing.

The 8th of May, 2020: Completion of the active funding support for the plan on COVID-19 response in all 36 states plus the FCT.

The 9th of May, 2020: The NCDC CARE kit and the compulsory official quarantine guideline was published for the returnees from other countries. The Kebbi Medical Centre Isolation Assessment Facility Commenced.

The 10th of May, 2020: Home care provisional guidelines for COVID-19 patients were established, and the valuation of the Kebbi Medical Centre Quarantine Facility Commenced.

The 11th of May, 2020: Training was conducted on the use of the Surveillance Outbreak Response Management Analysis System (SORMAS) for case managers. Disseminated discharge criteria for COVID-19 patients were Studied. Extra supplies and materials to all teaching hospitals, Federal Medical Centers, Orthopedic, and Psychiatric hospitals in the South-East, South-South, and North Central were distributed.

<p>The 12th of May, 2020: Form were restructured for self-reporting for returnees/Persons of Interest (POIs). Established Evaluation Matrix (M&E) and Data Quality Implementation Plan Monitoring (DQIP). Practical training was Initialized and ongoing at the University of Maiduguri Teaching Hospital (UMTH), Borno, and Katsina State treatment centers. Distribution to different labs products was finalized across the states: DNA LAB Kaduna, Ahmadu Bello University Lab Zaria, Delta Mobile Lab, African Centre of Excellence for Genomics of Infectious Diseases (ACEGID) Osun, University College Hospital (UCH) Lab Ibadan, University of Maiduguri Teaching Hospital (UMTH) Lab Borno, and Usman Danfodio Teaching Hospital Lab Sokoto.</p>
<p>The 13th of May, 2020: Case supervision Technical Working Group teleconference with participants within and outside the country was Shown. Initiated tracking record for Healthcare Workers (HCWs) infection all over Nigeria. Traditional religious leaders were involved in Kano and Nigeria Interfaith Action Association (NIFAA) on appropriate COVID-19 advisories.</p>
<p>The 14th of May 2020: Established the Non Communicable Disease (NCD) and COVID-19 tool kit. Enhanced and initiated two (2) new laboratories in Everight Laboratory- Imo and Federal Medical Centre (FMC), Adamawa. Initiated record for tracking of Healthcare Workers (HCWs) infected by Coronavirus throughout Nigeria.</p>
<p>The 15th of May 2020: Conducted high level technical meeting on the outputs of the National COVID-19 Response Mid-Action Evaluation. Started the Infection Prevention and Control (IPC) training for the Almajirai specifically in Kano state. Helpful supervision provided across several mobile transmission centers in Edo and Lagos states.</p>

Source: Nigeria Centre for Disease Control (NCDC)

5. DISCUSSION

From epidemiological curves in figure 2 and figure 4, an increase of confirmed cases (COVID-19) from the 7th of May, 2020, till the 9th of May, 2020, and also from the 29th of April, 2020, till the 3rd of May, 2020 was because of the rapid testing conducted in Nigeria. In figure 6, and figure 7 the mortality percent defers in dates the 3rd of May, 2020, and the 15th of May, 2020 that the male counterpart has 80 percent confirmed cases compared to the 20 percent female counterpart confirmed cases in (week 9 – week 18), and (week 9 – week 20) respectively. Table 2 shows the daily updates of coronavirus disease from 1st may till 15 may 2020 across Nigeria. From table 1, Lagos state records more confirmed cases since the outbreak of the resulted deadly coronavirus (COVID-19), followed by Kano and federal capital territory (FCT), Kogi, and cross river states have no confirmed cases at the time of submitting this research. The epidemic curve increase in the number of infected persons in Nigeria is also a source of worry with a rapid increase of coronavirus disease 2019 (COVID-19) in Lagos, Kano, and some parts of the country. Nigeria numbers jumped at a shocking rate of May 4th 2020, continuing to rise to reach 5,621 confirmed cases, 3,973 active cases (i.e. 70.7%), sample cases 1,472 (i.e. 26.2%), sample tested 32,942, deaths 176 (i.e. 3.1%), and globally we have 4,710,614 confirmed cases, 1,732,344 recovered cases, and 315,023 deaths as of 17th May 2020. Nigeria has experienced very little deaths, confirmed cases in recent weeks compared with the United States of America, South Africa, the United Kingdom, Spain, and Italy.

6. CONCLUSION

In this paper, the evidence shows that the rate of spread of coronavirus disease 2019 (COVID-19) in Nigeria appears to be lesser if we relate with other countries. The livelihood, and lives of Nigeria citizens, as well as that of the world, is at risk due to virus. There are still many doubts about how the pandemic would be measured and controlled in Nigeria. It is clear that the government's support devices may not be sufficiently equipped to completely duplicate with the assault. Furthermore, such tools tend to be temperately fragile in rural areas of the country because of the dispersed nature of the population in rural communities. Thus far, the interference in Nigeria has been opportune, but, the battle against the viral disease needs to be intensified. Coronavirus disease 2019 (COVID-19) cases in Nigeria are developing in a similar way to what was witnessed in the early days of the pandemic in China. The disease is presently focused in Southern, and North-Central Nigeria. Early discovery, and control of disease epidemics in the north-east would be very difficult especially the populated areas like Kano, Kaduna, Katsina, and Niger. We hope that states in Nigeria will overwhelm the spread of this pandemic as rapidly as possible.

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Authors

COMPETING INTEREST

The authors declare no competing interest

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7. REFERENCES

- [1] Adnan Shereen M, Khan S, Kazmi A, Bashir N, Siddique R (2020). COVID-19 infection: origin, transmission, and characteristics of human coronaviruses. *J Adv Res.*; 24:91-98. doi: <https://doi.org/10.1016/j.jare.2020.03.005>.
- [2] Centers for Disease Control and Prevention. (2020). Available at <https://www.cdc.gov/coronavirus/2019ncov/about/symptoms.html>.
- [3] COVID-19 Dashboard by the Center for Systems Science and Engineering (CSSE) (2020) at Johns Hopkins University (JHU). <https://coronavirus.jhu.edu/map.html>.
- [4] Ebenso, B (2020). Out, A. Can Nigeria Contain the COVID-19 outbreak using lessons from recent epidemics? *Lancet Glob. Health*.
- [5] Guan W-J, Ni Z-Y, Hu Y, et al (2020). Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med.* 1-13. doi:10.1056/NEJMoa2002032.
- [6] Lanese N (2020). New coronavirus may spread as an airborne aerosol, like SARS. <https://www.livescience.com/coronavirus-can-spread-as-an-aerosol.html>.
- [7] Li Q, Guan X, Wu P, et al (2020). Early Transmission Dynamics in Wuhan, China, of Novel Coronavirus–Infected Pneumonia. *N Engl J Med.* 1199-1207. doi:10.1056/nejmoa2001316.
- [8] Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR (2020). Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease-2019 (COVID-19): The epidemic and the challenges. *Int J Antimicrob Agents.* 55(3):105924. doi:10.1016/j.ijantimicag.2020.105924.
- [9] Mbagwu, JP.C., Obidike, B., Anyiam, I. V., & Omeje, F. I. (2020). A Review: Global Pattern of Distribution of Novel Coronavirus (COVID-19). *International Journal of Research and Innovation in Applied Science (IJRIAS), V(IV)*, pp. 89-95. Retrieved from <http://www.rsisinternational.org>.
- [10] Mbagwu, JP.C., & Dike, K.S. (2020). COVID-19 Epidemic and Pattern of Global Distribution. *Journal of Science and Technology, 5(3)*, 125-137. doi.org/10.46243/jst.2020.v5.i3.pp125-137.
- [11] Miller A, Reandelar MJ, Fasciglione K, Roumenova V, Li Y, Otazu GH. (2020). Correlation between universal BCG vaccination policy and reduced morbidity and mortality for COVID-19: an epidemiological study. *MEDRXIV.* doi: <https://doi.org/10.1101/2020.03.24.20042937>
- [12] Nigeria Centre for Disease Control (2020). *COVID-19* Outbreak in Nigeria Situation Report.
- [13] Patients L, Taylor D, Lindsay AC, Halcox JP. (2020). Aerosol and Surface Stability of SARS-COV-2 as Compared with SARS-COV-1. *N Engl J Med.*:0-2. doi:10.1056/NEJMc2004973.
- [14] Wang C, Horby PW, Hayden FG, Gao GF. (2020). A novel coronavirus outbreak of global health concern. *Lancet.* 395(10223):470-473. doi:10.1016/S0140-6736(20)30185-9.
- [15] Wang D, Hu B, Hu C, et al. (2020) Clinical Characteristics of 138 Hospitalized Patients with 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. *JAMA - J Am Med Assoc.* 1-9. doi:10.1001/jama.2020.1585.
- [16] Wilder-Smith, A., & Freedman, D. O. (2020). Isolation, quarantine, social distancing and community containment: pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. *Journal of travel medicine, 27(2)*, taaa020.
- [17] Zhong NS, Zheng BJ, Li YM, et al. (2003) Epidemiology and cause of severe acute respiratory syndrome (SARS) in Guangdong, People's Republic of China, in February, 2003. *Lancet.* 362(9393):1353-1358. doi:10.1016/S0140-6736(03)14630-2.