

The Virology, Re-emergence of COVID-19, and Resurgence of Ebola

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Abstract: Severe Acute Respiratory Syndrome-Corona virus 2 (SARS-COV-2) is a viral agent capable of causing Corona Virus Disease-2019 (COVID-19) infection. The viral strain was first reported in Wuhan city, China, in 2019 hence the suffix '-19', before it's spread into major parts of the world due to its high risk of transmission via air; this has resulted in the death of over 2.4 Million persons globally. The emergence of infectious diseases is no longer news, as the Ebola virus, which caused another saga of the pandemic, has resurged again in the Democratic Republic of Congo and Guinea. This review article aims to summarize the epidemiology, virology and pathogenesis, treatment, and recommendations to contain and prevent any future pandemic. Ninety percent of the articles used for this short review are within the last 3 years (2019-2021) and from the data correlated it is evident that the factors responsible for this emergence and resurgence are mutation of the etiologic agent, geographical locations, resistance to drugs, lack of adequate post surveillance of infectious diseases, and lifestyle of people in a given locality. Finally, there is a need to implement emergency protocols in all parts of the continent as a nation and no arm of government, be it local, State or federal, is insignificant in the event of an outbreak, a joint force is required to curb and arrest future epidemics as the emergence of COVID-19 and resurgence of the Ebola virus as shown that the current protocols put in place is not full proof.

Keywords: COVID-19, Epidemiology, Ebola, Virology

1. Introduction and Aetiology

COVID-19 disease or severe acute respiratory syndrome is caused by an RNA viral agent called Coronavirus or commonly called COVID-19, as declared by the World Health Organization (WHO) on the 11th of February 2020 [1]. The viral pandemic in china was reported in China in 2019 hence the suffix '-19' [2].

COVID-19 or Coronavirus is a positive single-stranded RNA viral agent with a crown-like head (corona) shape because of the glycoprotein spike surrounding its' envelop. The two types of glycoprotein enclosing the envelope are the S-glycoprotein and the trans-membrane M-glycoprotein [3].

This article outlines the virology, resurgence of Ebola and re-emergence of COVID-19. The COVID-19 virus has caused mortality in Thailand, Iran, Italy, the United Kingdom, the

United States of America, Africa and other parts of Europe. Based on WHO reports, more than 2.4 million people globally are dead as of the 17th of February, 2021 [4]. The Nigeria Centre for Disease Control (NCDC) report shows that the number of COVID-19 cases is exponentially increasing compared to February-march, 2020 (figure 1).

2. Epidemiology

The COVID-19 epidemic was reported in Wuhan, China. The deadly virus caused mortality in Thailand, Iran, Italy, the United Kingdom, the United States of America, Africa and other parts of Europe. Based on WHO reports, more than 2.4 million people globally are dead as of the 17th of February, 2021 [4].

The Nigeria Centre for Disease Control (NCDC) report shows that the number of COVID-19 cases is exponentially

increasing compared to February-march, 2020 (figure 1); this is because of cluster communities in Nigeria, especially Federal Capital Territory, Edo and Delta State (figure 2) [5].

Also, the death rate is higher in elderly persons from age 70 and above than adolescents and youth because of their compromised and/or suppressed immune system [5]. Transmission of COVID-19 can occur through the following;

- 1) Direct transmission via oral, nasal, and eye mucous are the primary route of transmission.
- 2) Dental procedures are also a high-risk transmission route due to face-to-face communication.
- 3) Transmission may also happen through objects and personal items in the near environment around the infected person [6, 7].

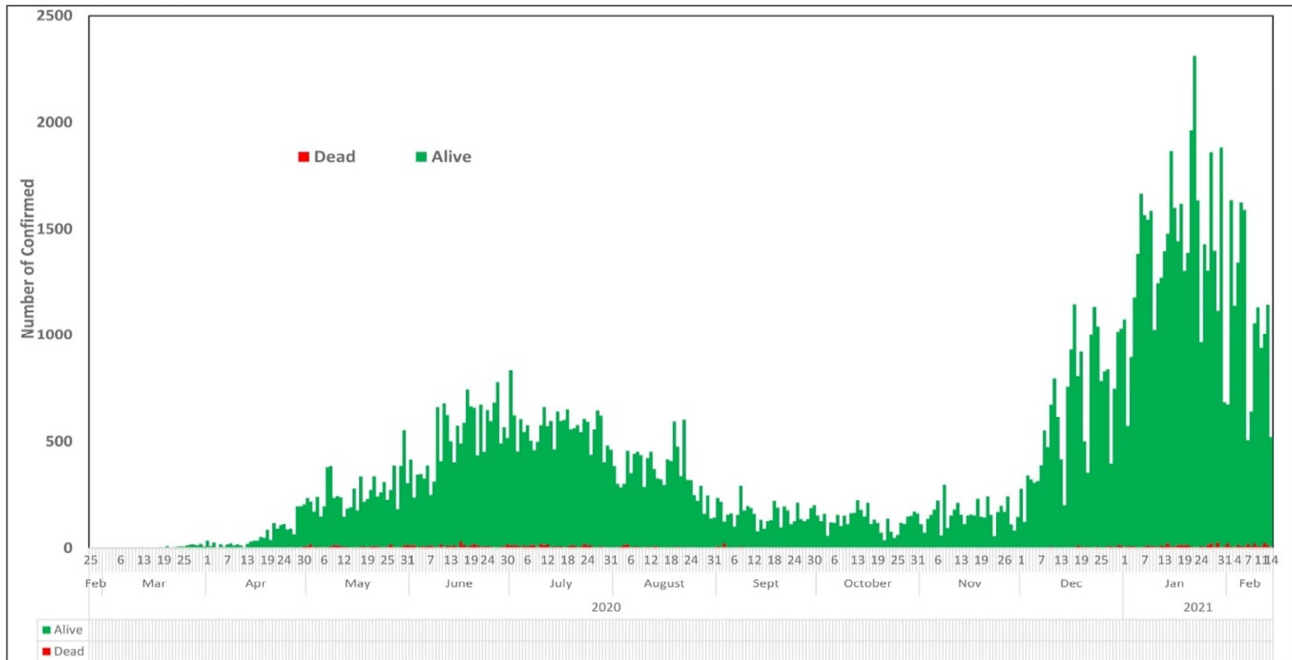


Figure 1. A daily epicurve of confirmed cases as of 14th of February, 2021 (NCDC, 2020).

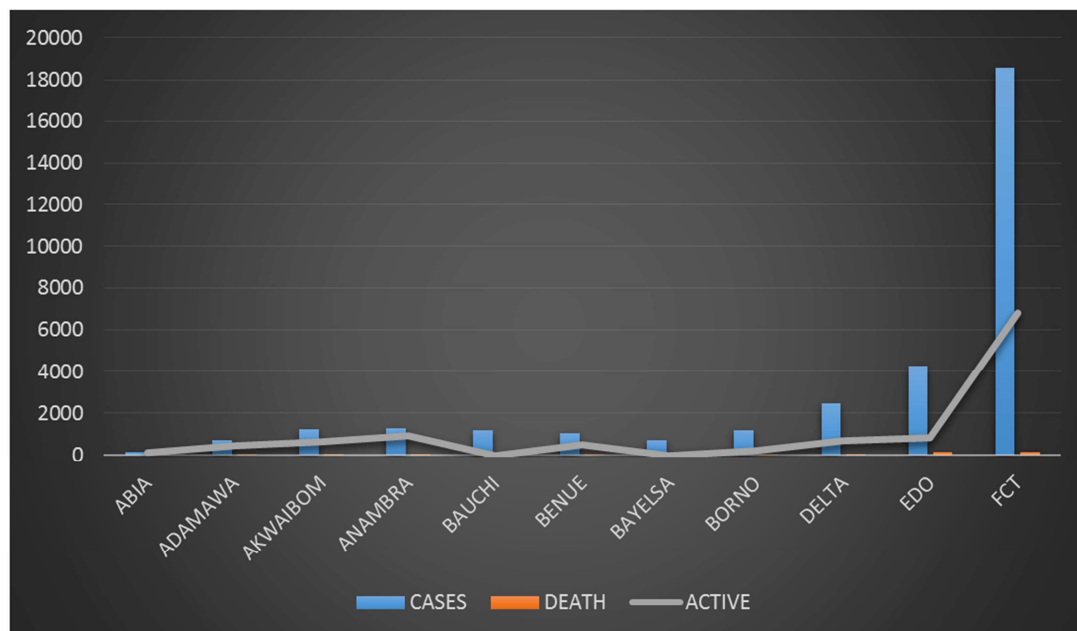


Figure 2. Graph showing high incidence of COVID-19 in Federal Capital Territory (FCT), Edo and Delta State of Nigeria (NCDC, 2020).

3. Symptoms

The viral infection from a carrier can be transmitted by

respiratory droplets called aerosols through person to person contact. Upon catching the virus, the prevalent symptoms of COVID-19 are fever, cough, headache, sore throat, rhinorrhea, dyspnea, shortness of breath [8]. The symptoms

of Malaria and COVID-19 have few similarities, such as fever, difficulty in breathing, fatigue, headache of acute onset. Therefore, malaria could be misinterpreted as COVID-19 if symptoms alone are used to define a case during this emergency period [9]. However, the differences are shown if the disease is severe (pneumonia, coughing of blood, leucopenia). Laboratory PCR test confirms the result [10].

4. Treatment and Prevention

COVID-19 can be treated with antiviral drugs such Dexamethasone and other corticosteroid drugs that possess high anti-inflammatory agents with high potency that can be used to arrest cytotoxic cascade in severe cases Baricitinib with Remdesivir. Hydroxychloroquine is also effective in the treatment of COVID-19. Hydroxychloroquine is mainly used in Nigeria, Africa in both hospitalized and non-hospitalized patients. It is also used in the treatment of malaria.

There are quite several preventive measures to curb the further spread of the virus. These measures have been effective and efficient, and the pandemic will be halted with the proper distribution of COVAC (COVID-19 vaccine) [11].

- 1) Use face masks: The use of face mask has dual function. To protect non-carrier of COVID-19 from contacting the virus via aerosol from a carrier and to stop a carrier (symptomatic/asymptomatic) from spreading the virus.
- 2) Cover coughing and sneezing: cover coughing and sneezing with the elbow to halt the projection of aerosols in the atmosphere.
- 3) Regular hand wash: Hand should be washed with soap and water because of its' contact with the eyes and nose and inanimate materials. Mobile sanitizers with more than 70% alcohol should be carried at all times.
- 4) Avoid touching of eyes, nose and mouth when symptoms persist and maintain appropriate distance from people.
- 5) Avoid over crowded places: Essential service and nonessential service providers should always disinfect their environment.
- 6) COVAC

In the fight of COVID-19, the Edo State Government has done the following;

- a) Upon the first wave of COVID-19, there was curfew to immediately halt the pandemic in the state; this prevented social gathering.
- b) Empowered committee and task force in the state to enforce stay at home order.
- c) Built mobile COVID-19 facilities across the state. Equipped Laboratories in the state so they can easily perform RT-PCR on isolates in different Local government areas.
- d) Inspected hospitals and isolation centers such as Edo Specialist Hospital, University of Benin Teaching Hospital, Irrua specialist Hospital, Lily Hospital amongst others.
- e) Provided monitoring vehicles.

- f) Edo emergency operation centers.
- g) Edo government intensified surveillance on adherence to safety protocol in the State.
- h) Teachers were trained On COVID-19 prevention ahead of school resumption.

5. Reemergence of COVID-19 and Resurgence of Ebola

The first recorded case of COVID-19 was noticed in 1965 [12] from, then 2004 to 2006 [13-16], and now 2019 till date. The ongoing pandemic of coronavirus disease from 2019 has claimed millions of lives, and the mortality still counts. Though numerous patients have recovered, several countries have reported re-positive cases [17-20]. According to [21], the more attention should be given to surveillance of post-discharge patients, asymptomatic cases, monitoring of genomic mutation of SARS-COV2.

Also, the Ebola virus (EV) was first recorded in 1965, then 1976 in the Democratic Republic of Congo (formerly Zaire) in a village near the Ebola River. EV has been a serious public health concern till now [22-24]. There has also been a reported resurged of the Ebola virus in two African countries; the Democratic Republic of Congo and Guinea [25, 26]. The factors responsible for this emergence and resurgence are a mutation of the etiologic agent, geographical locations, resistance to drugs, lack of adequate post surveillance of infectious diseases, and lifestyle of people in a given locality.

6. Conclusion and Recommendation: Future Outbreaks

- 1) Government should build, equip and empower more men in research facilities, especially in developing countries, to be more abreast in arresting any further pandemic because there is a constant war between man's survival and pathogenic microbe. Man needs to be more equipped to win this war against pathogenic microbe.
- 2) There should be adequate monitoring of post-pandemic incidence.
- 3) Research facility should be adequately funded for research purposes only.
- 4) More research in robotics and artificial intelligence to prepare us for the worst that could happen in any severe stay at home pandemic.
- 5) The re-emergence of diseases indifferent time loop should be considered an aftermath necessity by the WHO and other national bodies for disease control after any disease outbreak reoccurs.

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