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IN THIS ISSUE

- Beta Lactamase-Producing Bacteria
- Insulin Resistance
- Cardiac Diseases in Pregnancy
- Antibiotic Prescription
- Antenatal Care Services
- Epithelial Ovarian Tumours
- Low Back Pain
- Regional Anaesthesia in Children
- Somatisation
- Nigella sativa and Essential Tremor
- Neonatal Conjunctivitis
- Long Term Non-Progressive HIV Infection

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EXPERT OPINION

Epidemiology of Coronavirus Disease (COVID-19) in Nigeria

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Summary

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. With no vaccine or cure in sight, only public health measures that include personal protective measures, physical distancing, environmental and travel-related measures have been recommended to mitigate and contain the spread of the disease. There is a need to make testing for COVID-19 widely available so that the true burden of the infection will be described. This step should assist policy makers in making evidence-based decisions in the prevention and control of the disease.

Introduction

Human Coronaviruses, discovered in the 1960s, were responsible for mostly respiratory or gastrointestinal infections in the human population. The class, Coronavirus, was so named because the virions have a characteristic “crown-like” appearance under the electron microscope. [1] These viruses primarily affect the epithelial cells of the respiratory and gastrointestinal tracts and cause various respiratory infections including pneumonia. [2]

Two strains of the Coronavirus family, namely Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV) and the Middle East Respiratory Syndrome Coronavirus (MERS-

CoV), were responsible for previous outbreaks. In the years 2002 and 2003, SARS-CoV was responsible for a global outbreak that started off in Guangdong Province, China. The disease affected over eight thousand people causing severe pulmonary infections in different countries. [3] Also, an outbreak of MERS-CoV infection was first observed in Saudi Arabia in 2012 and was responsible for severe respiratory illnesses in several countries in the Middle East. [4]

In late December 2019, there was an outbreak of a new Coronavirus infection which caused acute respiratory syndrome of unknown aetiology was reported from China. Most of the initial cases were linked to a seafood market (wet market) in Wuhan, Hubei Province. [5] The

initial outbreak seemed to be a zoonotic transmission from bat to man and as the outbreak continued, it was evident that human to human transmission of the virus via close contact was also possible, especially infections among health care workers. [6] The Severe Acute Respiratory Syndrome Coronavirus-2 (SARS-CoV2) was identified to be responsible for severe cases of pneumonia in Wuhan. The full genome sequencing and phylogenetic analysis showed that the SARS-CoV-2 is a beta (β) Coronavirus in the same subgenus as the SARS virus but in a different clad. It was similar to a bat Coronavirus thereby suggesting that the primary source may be from bats. [7, 8]

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 [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, a high latitude has been associated with higher rates of cases and deaths. [19] However, there is a need for further studies to ascertain the validity of these findings.

Global Picture

According to the John Hopkins University Coronavirus Resource Centre, tally on May 5th 2020 at 1530 Hours local time in Nigeria, a total number of 3, 603, 217 cases of COVID-19 infection has been confirmed worldwide, with a total of 252,102 deaths. In addition, over 187 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 (1,180, 634), Spain (218, 011), Italy (211, 938), United Kingdom (191,

832), France (169, 538), Germany (166, 199), Russia (155, 370), Turkey (127, 659), Brazil (108, 620) and Iran (99, 970). All the continents of the world have reported at least a case. The European region has the highest number of reported cases while Africa has the least number of COVID-19 infections (Figure 1). [20]

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 disease in Africa due to the high volume of business and tourism between Europe and Africa. [21] According to the

Africa CDC on 5th May 2020 at 1530 Hours Nigerian time, a total of 47, 118 COVID-19 infections had been reported with 1, 843 deaths. The majority of the cases were in North Africa with a total of 17, 700, closely followed by West Africa with 13, 000 cases. The least number of reported cases was in the Central Africa region with a total of 4, 100. The most affected countries in the WHO African Region include South Africa (7, 572), Algeria (4, 838), Nigeria (2, 950), Ghana (2, 718), Cameroon (2, 265), Guinea (1, 811) Cote d'Ivoire (1, 464), and Senegal (1, 329). These countries account for about 40% of the cases reported in the African region. [22]

Figure 1: Map showing the global distribution of COVID-19 confirmed cases.

Epidemiology of COVID-19 in Nigeria

John Last, defined epidemiology as “the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems.” [23] The distribution of diseases is described in terms of person, place and time or the who, where and when. The first case of COVID-19 in Nigeria was identified on

27th February 2020 in a visiting Italian. Since then the numbers of confirmed cases of the disease have been on the increase with a total of 2, 805 as at 4th May 2020. [24] The distribution of COVID-19 cases in Nigeria will be described herein in terms of the person, place and time.

The Person

Though the data for COVID-19 are rapidly changing, the infection affects all ages and

equally affects both the healthy and the immunocompromised people. Most affected adult patients are between the ages of 25 and 89 years with few cases occurring among children and infants. [25] A study done on the early transmission dynamics of the novel Coronavirus reported the majority of affected patients (51%) were males. [25] The majority of confirmed cases in Nigeria are in the age group 31-40 years (23%) with a preponderance of males (69%) compared to females (31%) (Figure 2). A total of 8% had a travel history (to high-risk countries), 29% were in contact with someone with a travel history and 56% had no epidemiological link with someone with travel history. The overall case

fatality rate so far is 3%. These data of the Nigeria Centre for Disease Control have not been disaggregated by age and sex, however, reports from the US suggest that majority of deaths were in blacks and in those with co-morbidities. Several factors have been identified to be associated with poor outcomes in COVID-19 patients in China and Europe. These include older age, hypertension, diabetes mellitus, obesity, concomitant cardiovascular diseases (including coronary heart disease and heart failure) and myocardial injury. [26] Significant risk factors for death have been described to include older age and the male gender. [27]

Figure 2: Age and sex distribution of confirmed cases of COVID-19 in Nigeria.

The Place

The first case of COVID-19 in Nigeria was identified in Ogun State, south-west Nigeria. The spread of the disease progressively covered more states of the federation. Presently, 34 out of the 36 states of the federation and the Federal Capital Territory (FCT) have at least one

confirmed case of the virus. [24] Only two states, namely Kogi and Cross River State, have not reported any case of COVID-19 and this may be attributed to the extent of access to or availability of testing in these states. The COVID-19 cases in Nigeria are not uniformly distributed among the 36 states and FCT in the country. Lagos State has the highest number of

COVID-19 cases of 1,183 reported to the Nigeria Centre for Disease Control. This is closely followed by Kano (365) and FCT (297). Figure 3

shows the distribution of COVID-19 by states in Nigeria.

Figure 3: Map of Nigeria showing the distribution of confirmed cases of COVID-19 by states.

Time

The analysis of the outbreak of disease by time is done using the epidemic curve. Since the identification of the first case in the country, the number of cases of the disease has been growing steadily. The pattern of the epidemic curve suggests on-going transmission of infection in the community as shown in Figure 4.

Prevention of COVID-19

Primary Prevention: These are actions taken to prevent the host from getting infected. At this time, there are no specific vaccines or prophylactic treatments for COVID-19. Primary prevention includes some public health measures that include personal protective

measures (hand hygiene, respiratory etiquette), environmental measures, physical distancing measures, and travel-related measures. There has been a major challenge of how to implement physical distancing and lockdowns in the face of reality in many African countries where overcrowding, poverty, and weak healthcare systems persist. Physical distancing has been shown to slow down transmission and reduce the over-stretching of the health system. However, the advantage of physical distancing needs to be balanced with the economic toll, especially on the informal sector of the economy. This is a delicate decision that has to be weighed by policymakers in balancing the health of the people against their livelihoods.

Figure 4: Epidemic curve of confirmed cases of COVID-19 epidemic in Nigeria

Secondary Prevention: These are strategies employed for early detection of the disease and prompt treatment. The widespread availability of testing facilities for COVID-19 is essential for the prompt identification of infected persons, whether they are symptomatic or not, and the subsequent isolation and care for all cases. All identified contacts of confirmed COVID-19 patients should be traced and quarantined. There is currently no known accepted treatment for the disease. However, supportive care is the mainstay of management.

Tertiary Prevention: This involves the limitation of disability and rehabilitation of patients. COVID-19 patients have been observed to encounter common complications which include acute respiratory distress syndrome, acute respiratory failure and cardiovascular disorders. The aim of tertiary prevention is limiting the development of these complications through medical and non-medical measures and ameliorating the effect of the complications when they arise.

Conclusion

The COVID19 epidemic in Nigeria appears to be escalating with very many unknowns. Hopefully, as the epidemic progresses and testing facilities become widely available, the true burden of the infection will be known and can be better described. This will assist policymakers to make evidence-based decisions in the prevention and control of the disease in the country.

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