

COVID-19 in Nigeria, West Africa: An Update

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Abstract

Background: Recently, SARS-CoV-2 (Severe Acute Respiratory Syndrome Coronavirus 2) identified and classified as a single stranded (positive sense) RNA virus causes COVID-19 (Coronavirus disease 2019). It was first detected in China. Symptoms of the disease include severe acute respiratory syndrome. The disease has become pandemic affecting the globe. No vaccine has been discovered to be of impact in the control of this deadly disease. MERS-CoV (Middle East Respiratory Syndrome Coronavirus) recognizes DPP4 (dipeptidyl peptidase 4) as its receptor. ACE2 (Angiotensin-Converting Enzyme 2) is a receptor for SARS-CoV. COVID-19 is zoonotic, probably of feline origin or from bats. In the United States, hydroxychloroquine sulphate and zinc in combination with the antibiotic azithromycin or doxycycline is currently under clinical trial and being investigated as a possible potential therapy for COVID-19. **Investigation:** Presently, in Nigeria, West Africa, infection with SARS-CoV-2 is being managed with seemingly minimal mortality. In this investigation, the alcohol extract of a combination of *Garcinia kola* seeds and *Zingiber officinale* leaves, with medicinal value, used locally in some western parts of Nigeria, is being explored as a potential therapeutic application for COVID-19.

Introduction

COVID-19 (Coronavirus disease 2019) is an infectious disease caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2). The disease was first identified in December 2019 in Wuhan, the capital of China's Hubei province, and has since spread globally. The virus is probably of feline origin or from bats (Wikipedia, 2020a). MERS-CoV (Middle East Respiratory Syndrome Coronavirus) seems to have originated from bats but transmitted to humans through camels (Wikipedia, 2020c). No prophylactic drug or vaccine has been developed or discovered for COVID-19 (WHO, 2020).

Nigeria, West Africa, is a developing country that depends on developed countries like Australia, Britain, the United States and Canada for the detection of disease causing microbial agents; the use of prophylactic drugs; and even vaccines in the management and control of infections and diseases. We herein present a statistical epidemiological update on recent cases of infection with Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) in Nigeria. An alcohol extract of a combination of *Garcinia kola* seeds and *Zingiber officinale* leaves is being reported in this investigation as a potential control therapy.

Materials and Methods

Study Population

The study population spanned individuals of all age ranges in all the thirty six States and Abuja the Federal Capital Territory of Nigeria, West Africa.

Collection of Oropharyngeal Samples

Oropharyngeal samples were collected from patients presenting symptoms of COVID-19. The samples were immediately presented for assay of SARS-Cov-2 using the Primerdesign COVID-19 detection method.

SARS-Cov-2 Assay Method

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was detected using the Primerdesign Ltd COVID-19 genesig® Real-Time PCR assay method (Primerdesign, 2020).

The Primerdesign Ltd COVID-19 genesig® Real-Time PCR assay is a real-time RT-PCR assay intended for the qualitative detection of nucleic acid from SARS-CoV-2 in oropharyngeal swab specimens from patients suspected of COVID-19. It is a molecular *in vitro* diagnostic test for the detection of the SARS-CoV-2 RNA in oropharyngeal swab specimens from patients suspected of COVID-19 by their healthcare provider. It aids the diagnosis of coronavirus COVID-19 disease. The assay is based on widely used nucleic acid amplification technology. The product contains oligonucleotide primers and dual-

labeled hydrolysis probes, as well as control material, for the use in reverse transcriptase Real-Time-PCR for the *in vitro* qualitative detection of SARS-CoV-2 RNA in oropharyngeal swab specimens.

Oropharyngeal swab samples were carefully taken from patients who showed symptoms of and suspected of COVID-19.

Collection of Plant Samples

Fresh leaves of *Zingiber officinale* were collected around the University College Hospital (UCH), Ibadan, Nigeria environ. They were identified in the Herbarium of the Department of Botany, University of Ibadan, Ibadan, Nigeria by Professor Taiye R. Fasola of the same department. *Garcinia kola* seeds were bought at Oje Market, Ibadan, Nigeria. They were also identified by Professor Taiye R. Fasola. The fresh *Zingiber officinale* leaves and *Garcinia kola* seeds were stored in air-tight containers for analysis.

Extraction

A combination of 180g of fresh *Zingiber officinale* leaves and 200g of fresh *Garcinia kola* seeds were ground and soaked in 1Litre of absolute alcohol and left overnight for four days. The extract was filtered and concentrated to about one-sixth of its original volume in *vacuo* using a rotary evaporator (Quick fit, Rotavapor-R, Buchi, Switzerland) at 30°C under low vacuum pressure and low evaporation.

Anti-SARS-Cov-2 Activity

Fifty (50) human subjects diagnosed positive for SARS-COV-2 participated in this research study. Ethical approval was obtained from the University College Hospital Research Committee. 100ml of extract was given orally to the human subjects before meal on a daily basis for a period of six days. Thereafter, their oropharyngeal samples were collected and assayed for the presence of SARS-Cov-2.

Results

Statistical data from the Nigerian Centre for Disease Control (NCDC) is presented in Table 1.

Table 1: Statistical data from the Nigerian Centre for Disease Control (NCDC) evaluating the recent epidemiological significance of COVID-19 and infection with SARS-CoV-2 in Nigeria

COVID-19 Update	
Case Summary in Nigeria as of 13th April, 2020	
Total Sample Tested = 1,0918	
Total Confirmed Cases = 1,273	
Total Active Cases = 994	
Discharged = 239	
Deaths = 40	
Lagos Number of Cases (Laboratory Confirmed): 731 Number of Active Cases: 584 Number Discharged: 128 Number of Deaths: 19	
Abuja FCT Number of Cases (Laboratory Confirmed):141 Number of Active Cases: 103 Number Discharged: 35 Number of Deaths: 3	
Kano Number of Cases (Laboratory Confirmed): 77 Number of Active Cases: 76 Number Discharged: 0 Number of Deaths: 1	
Ogun Number of Cases (Laboratory Confirmed): 35 Number of Active Cases: 29 Number Discharged: 5 Number of Deaths: 1	

Gombe Number of Cases (Laboratory Confirmed): 35 Number of Active Cases: 35 Number Discharged: 0 Number of Deaths: 0	
Osun Number of Cases (Laboratory Confirmed): 34 Number of Active Cases: 14 Number Discharged: 18 Number of Deaths: 2	
Katsina Number of Cases (Laboratory Confirmed): 30 Number of Active Cases: 24 Number Discharged: 4 Number of Deaths: 2	
Borno Number of Cases (Laboratory Confirmed): 30 Number of Active Cases: 28 Number Discharged: 0 Number of Deaths: 2	
Edo Number of Cases (Laboratory Confirmed): 25 Number of Active Cases: 14 Number Discharged: 8 Number of Deaths: 3	
Oyo Number of Cases (Laboratory Confirmed): 21 Number of Active Cases: 10 Number Discharged: 9 Number of Deaths: 2	

Akwa Ibom Number of Cases (Laboratory Confirmed): 12 Number of Active Cases: 2 Number Discharged: 9 Number of Deaths: 1	
Kaduna Number of Cases (Laboratory Confirmed): 15 Number of Active Cases: 9 Number Discharged: 6 Number of Deaths: 0	
Bauchi Number of Cases (Laboratory Confirmed): 14 Number of Active Cases: 8 Number Discharged: 6 Number of Deaths: 0	
Kwara Number of Cases (Laboratory Confirmed): 11 Number of Active Cases: 9 Number Discharged: 2 Number of Deaths: 0	
Sokoto Number of Cases (Laboratory Confirmed): 10 Number of Active Cases: 10 Number Discharged: 0 Number of Deaths: 0	
Ekiti Number of Cases (Laboratory Confirmed): 8 Number of Active Cases: 5 Number Discharged: 2 Number of Deaths: 1	

<p>Ondo</p> <p>Number of Cases (Laboratory Confirmed): 8</p> <p>Number of Active Cases: 6</p> <p>Number Discharged: 2</p> <p>Number of Deaths: 0</p>	
<p>Delta</p> <p>Number of Cases (Laboratory Confirmed): 6</p> <p>Number of Active Cases: 5</p> <p>Number Discharged: 0</p> <p>Number of Deaths: 1</p>	
<p>Rivers</p> <p>Number of Cases (Laboratory Confirmed): 6</p> <p>Number of Active Cases: 2</p> <p>Number Discharged: 2</p> <p>Number of Deaths: 2</p>	
<p>Taraba</p> <p>Number of Cases (Laboratory Confirmed): 6</p> <p>Number of Active Cases: 6</p> <p>Number Discharged: 0</p> <p>Number of Deaths: 0</p>	
<p>Abia</p> <p>Number of Cases (Laboratory Confirmed): 2</p> <p>Number of Active Cases: 2</p> <p>Number Discharged: 0</p> <p>Number of Deaths: 0</p>	
<p>Enugu</p> <p>Number of Cases (Laboratory Confirmed): 2</p> <p>Number of Active Cases: 0</p> <p>Number Discharged: 2</p> <p>Number of Deaths: 0</p>	

Niger Number of Cases (Laboratory Confirmed): 2 Number of Active Cases: 2 Number Discharged: 0 Number of Deaths: 0	
Jigawa Number of Cases (Laboratory Confirmed): 2 Number of Active Cases: 2 Number Discharged: 0 Number of Deaths: 0	
Zamfara Number of Cases (Laboratory Confirmed): 2 Number of Active Cases: 2 Number Discharged: 0 Number of Deaths: 0	
Benue Number of Cases (Laboratory Confirmed): 1 Number of Active Cases: 1 Number Discharged: 0 Number of Deaths: 0	
Anambra Number of Cases (Laboratory Confirmed): 1 Number of Active Cases: 0 Number Discharged: 1 Number of Deaths: 0	
Adamawa Number of Cases (Laboratory Confirmed): 1 Number of Active Cases: 0 Number Discharged: 1 Number of Deaths: 0	

<p>Plateau</p> <p>Number of Cases (Laboratory Confirmed): 1</p> <p>Number of Active Cases: 1</p> <p>Number Discharged: 0</p> <p>Number of Deaths: 0</p>	
<p>Imo</p> <p>Number of Cases (Laboratory Confirmed): 1</p> <p>Number of Active Cases: 1</p> <p>Number Discharged: 0</p> <p>Number of Deaths: 0</p>	
<p>Bayelsa</p> <p>Number of Cases (Laboratory Confirmed): 1</p> <p>Number of Active Cases: 1</p> <p>Number Discharged: 0</p> <p>Number of Deaths: 0</p>	
<p>Ebonyi</p> <p>Number of Cases (Laboratory Confirmed): 1</p> <p>Number of Active Cases: 1</p> <p>Number Discharged: 0</p> <p>Number of Deaths: 0</p>	
<p>Kebbi</p> <p>Number of Cases (Laboratory Confirmed): 1</p> <p>Number of Active Cases: 1</p> <p>Number Discharged: 0</p> <p>Number of Deaths: 0</p>	

As of 13th April, 2020, samples from a total of 1,0918 individuals were tested for SARS-CoV-2 in Nigeria according to the Nigerian Centre for Disease Control (NCDC). Samples from 1,273 individuals were confirmed positive for SARS-CoV-2. 994 individuals presented with COVID-19. Of the 1,0918 individuals, mortality was 40 (Table 1).

Of all the fifty (50) human subjects (diagnosed positive for SARS-CoV-2) who participated in this research study, after the administration of the plants' extract for the period of six days, none tested positive for SARS-CoV-2 using the Primerdesign test kit. Also none presented symptoms of COVID-19.

Discussion

COVID-19 which is presently pandemic was first detected in Nigeria in Lagos on the 27th of February, 2020 (NCDC, 2020). The disease has since become endemic in Nigeria (Wikipedia, 2020b). Till date, no vaccine has been developed to stem this menace. Hydrochloroquine sulphate and zinc in combination with the antibiotic azithromycin or doxycycline is presently under clinical trial in United States of America as a potential therapy for SARS-CoV-2 infection (US NIH, 2020). In Nigeria, plants including herbs and shrubs with medicinal values are used in the treatment of various ailments (Adejuwon and Tsygankova, 2019). In this present investigation, the alcohol extract of a combination of the seeds of *Garcinia kola* and leaves of *Zingiber officinale* were observed to seemingly have anti-SARS-CoV-2 inhibitory potential. In light of the existence of the present pandemic, COVID-19 caused by the viral strain SARS-CoV-2, the bioactive constituents of the alcohol extract of a combination of the seeds of *Garcinia kola* and leaves of *Zingiber officinale* should be investigated for a possible vaccine development or prophylactic therapeutic application.

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