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Table of Contents

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Volume 3, Issue 2, 2020

Special Issue: Coronavirus and Infections

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 1-3)
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REVIEW ARTICLE: GLOBAL PREVENTION METHODS AGAINST THE SPREAD OF CORONAVIRUS DISEASE (COVID-19)

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ABSTRACT: *Coronaviruses are a large family of viruses which may cause illness in animals or humans. In humans, several coronaviruses are known to cause respiratory infections ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). The most recently discovered coronavirus causes coronavirus disease COVID-19. WHO{1}. On March 11, the WHO declared the outbreak a pandemic, a new disease that has spread around the world. Many countries around the world have seen cases of COVID-19 and several have seen outbreaks. Authorities in China and some other countries have succeeded in slowing or stopping their outbreaks. However, the situation is unpredictable so check regularly for the latest news. This research paper presents the most important preventive methods to prevent the spread of the Corona virus, according to the recommendations of the World Health Organization and through your national and local public health authority.*

KEYWORDS: COVID-19, Global Prevention, Coronavirus, Pandemic, MERS, SARS

Basic Protective Measures against the new Coronavirus:

- Wash your hands frequently: Regularly and thoroughly clean your hands with an alcohol-based hand rub or wash them with soap and water. Why? Washing your hands with soap and water or using alcohol-based hand rub kills viruses that may be on your hands. {2,5}

- Maintain social distancing: Maintain at least 1-meter (3 feet) distance between yourself and anyone who is coughing or sneezing. Why? When someone coughs or sneezes, they spray small liquid droplets from their nose or mouth which may contain virus. If you are too close, you can breathe in the droplets, including the COVID-19 virus if the person coughing has the disease. **{2,5}**

- Avoid touching eyes, nose and mouth: Why? Hands touch many surfaces and can pick up viruses. Once contaminated, hands can transfer the virus to your eyes, nose or mouth. From there, the virus can enter your body and can make you sick. {2,5}

- Practice respiratory hygiene: Make sure you, and the people around you, follow good respiratory hygiene. This means covering your mouth and nose with your bent elbow or tissue when you cough or sneeze. Then dispose of the used tissue immediately. Why? Droplets spread virus. By following good respiratory hygiene, you protect the people around you from viruses such as cold, flu and COVID-19. {2,5}

- Keep up to date on the latest COVID-19 hotspots (cities or local areas where COVID-19 is spreading widely). If possible, avoid traveling to places – especially if you are an older person or have diabetes, heart or lung disease. Why? You have a higher chance of catching COVID-19 in one of these areas. {3,5}

- If you have fever, cough and difficulty breathing, seek medical care early: Stay home if you feel unwell. If you have a fever, cough and difficulty breathing, seek medical attention and call in advance. Follow the directions of your local health authority. Why? National and local authorities will have the most up to date information on the situation in your area. Calling in advance will allow your health care provider to quickly direct you to the right health facility. This will also protect you and help prevent spread of viruses and other infections. {2,5}

- Stay informed and follow advice given by your healthcare provider: Stay informed on the latest developments about COVID-19. Follow advice given by your healthcare provider, your national and local public health authority or your employer on how to protect yourself and others from COVID-19. Why? National and local authorities will have the most up to date information on whether COVID-19 is spreading in your area. They are best placed to advise on what people in your area should be doing to protect themselves. {2}

- Stay at Home, Protect the National Health Service (NHS), Save Lives. {1,4} OR Stay at Home. Protect Yourself. Protect Your Family. Protect Your Country. {1,5}

Prevention and Control Measures in Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19).{6}

- Key epidemic indicators that inform evidence-based control strategy decision making and adjustments.
- Effectiveness of infection prevention and control (IPC) measures in various health care settings.
- Effectiveness of entry and exit screening.
- Effectiveness of the public health control measures and their socio-economic impact.
- Restriction of movement
- Social distancing.
- School and workplace closures.
- Wearing mask in general public.
- Mandatory quarantine.
- Voluntary quarantine with active surveillance.

WHO{1} is continuously monitoring and responding to this outbreak. the Questions and answers will be updated as more is known about COVID-19, how it spreads and how it is

affecting people worldwide. Stay aware of the latest information on the COVID-19 outbreak, available on the WHO website and through your national and local public health authority.

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{3} https://www.who.int/news-room/q-a-detail/q-a-coronaviruses.
{4} https://vote.conservatives.com/news/stay-at-home-protect-the-nhs-save-lives.
{5} Ministry of Health and Population (Egypt). http://www.mohp.gov.eg.
{6} https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf.

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COVID-19 PANDEMIC: WHY DOES IT HAPPEN AND WHERE DOES IT TAKE US TO?

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ABSTRACT: *Genome of eukaryotic cells contains up to 69% of the transposable elements and repetitive sequences. To a large extent it is a result of billions of years of evolution through which eukaryotes were encountering gazillions of viruses and storing the footprints of those encounters in its genome. This time Mankind deals with a novel virus belonging to the coronavirus family, which albeit being widely spread in the wildlife is new to humans. Once infected, 80% of humans experience a flu-like symptoms and eventually recover. However, the real menace is posed to those whose vulnerability is determined by old age and underlying medical conditions. Akin to the scenario of alien invasion, this pandemic will leave a notable imprint on social, economic and biological aspects of human existence. How did it happen, or rather, why did we allow this to happen? Let's ponder over the biological, medical and philosophical domains of COVID-19 pandemic.*

KEYWORDS: COVID-19, Coronavirus, Pandemic, Epidemic, Viral Infection, Cytokine Storm, Mortality, Regenerative Medicine, Disease Prevention

INTRODUCTION

Mankind has outlived the test of times and has witnessed several major pandemics causing millions of lives, The Black death being the worst. The Black Death or also known as the Bubonic plague has taken at least 50 million lives across Europe, Asia and Africa lasting the whole 14th century (WHO 2014). In 1917-1918 another epidemic emerged, this time originating from birds and quickly transmitted to pigs and humans, commonly known as the *Spanish flu* and caused by the *H1N1* influenza virus. Causing a massive *cytokine storm* and bacterial superinfections, it targeted young adults in overcrowded camps and hospitals of the post WW1 western world. Malnutrition and weakened immune system allowed pandemic to take lives of some 50 million people within 3 years (Taubenberger JK, Morens DM. 1918 Influenza: the mother of all pandemics, 2006).

On the 30th January 2020 the World saw another black dot in human history, the outbreak of new strain of virus from the corona family, instituting a public health emergency by the World Health Organization and many governments. The first ever case of novel corona virus infection was reported in December 2019 in Wuhan, China. (Ronald D. & Steven E., 2020).

The Novel Corona virus, named after its crown like appearance of envelope glycoprotein under electron microscope comes from the subfamily *Orthocoronavirinae* of the *Coronaviridae* family (order *Nidovirales*) (Chan JF et al, 2013). The early outbreak was associated with Huanan Seafood Wholesale Market of Wuhan; hence it was thought to be of animal-to-human

transmission. Later however, human to human transmission was documented. The centre of disease control has established the modes of transmission. Person to person who are in close contact within 6 about feet, via contaminated surfaces and through respiratory droplets have been identified as the modes of transmission (CDC, 2020). Initial data established from Wuhan, China show the incubation period varying between 3 to 7 days and up to 2 weeks while about 12.5 days for patients to exhibit symptoms from the time of infection (Li Q et al, 2020). The epidemiological trend of COVID-19 has been on alarming rate. Wuhan was the early epicentre of the outbreak and later Corona Virus Disease 2019 (COVID-19) was announced as public health emergency and finally a pandemic. Following China, which is the origin of this disaster, epidemic actively emerged spread across the *yellow belt* of the Northern hemisphere creating epicentres in various geographical locations *id est* Iran, Italy and USA (fig. 1). The morbidity and mortality rates rise steadily day by day and these data can be found on The WHO Novel Coronavirus (COVID-19) Situation Board.

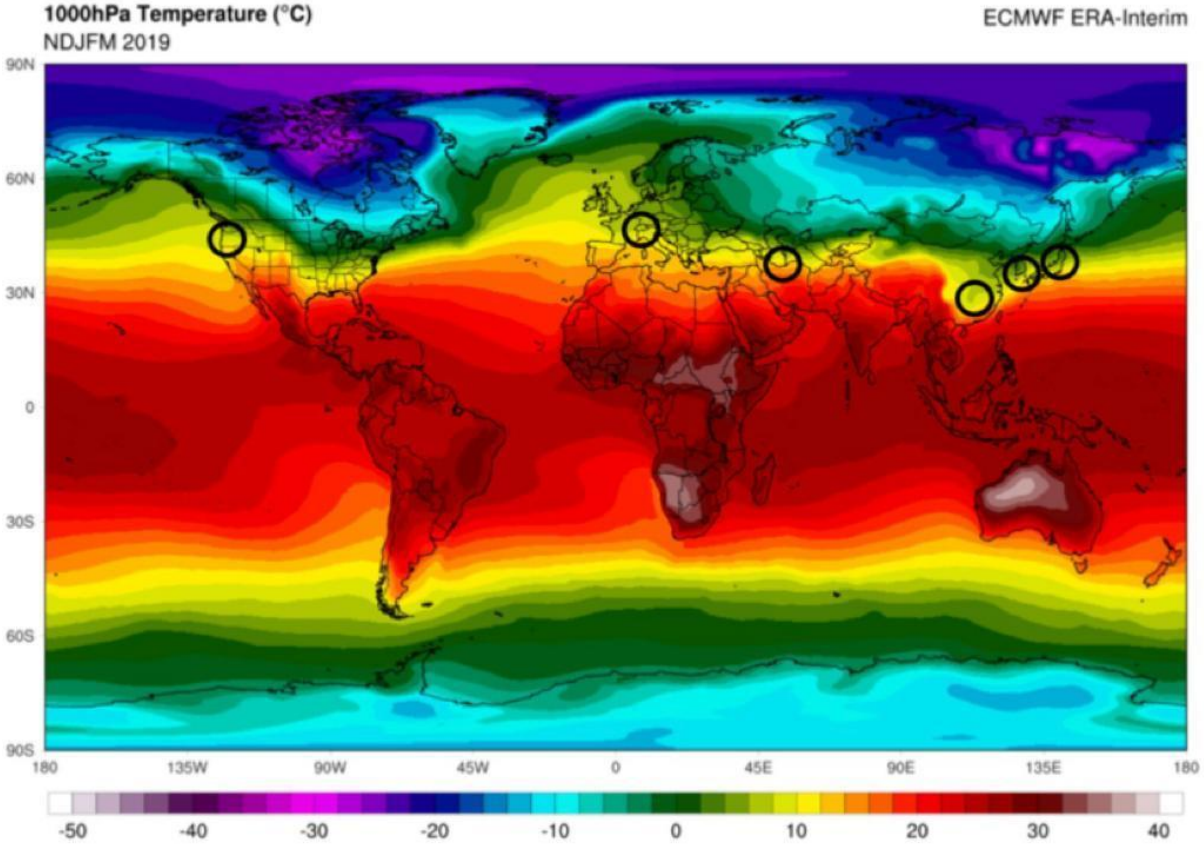

Figure 1. World temperature map November 2018-March 2019. Color gradient indicates temperatures in degrees Celsius. Black circles represent epicentres with significant community transmission (from Climate Reanalyzer: https://ClimateReanalyzer.org), University of Maine, USA.

Etiology

The COVID-19 virus, β genus corona virus is an enveloped, positive-stranded RNA virus with nucleocapsid, the largest known RNA viruses. It shares 85% homology to that of SARS (severe acute respiratory syndrome) like virus and is fragile to ultraviolet rays and heat. Coronaviruses are common viral respiratory pathogens that primarily cause symptoms in the upper respiratory and gastrointestinal tracts and comprise from 15-30% of seasonal flu outbreaks. In 1960s, two CoVs, 229E and OC43, were identified in clinical samples from patients experiencing the common cold (Su et al. 2016). More recently, four additional human CoVs have been successively identified:

- Severe acute respiratory 51 syndrome coronavirus (SARS-CoV) in 2002,
- NL63 in late 2004,
- HKU1 in January 2005,
- Middle East respiratory syndrome coronavirus (MERS-CoV) in 2012.

However, only two beta-coronaviruses (beta-CoVs), SARS-CoV and MERS-CoV, are able to cause severe and fatal infections (Zhou et al, 2020). Much biochemical properties of this virus are derived from the previous SARS-CoV and MERS Co-V. The non-structural and structural proteins play pivotal roles in exhibiting the virulence. Some research outlined that these non-structural proteins can block the host cell's innate immune response (Lei J et al, 2018). The viral envelope coordinates the viral assembly and release. The virus has characteristic spike like surface glycoprotein with two subunits S1 and S2, which are important in binding to the host cell receptors (Song W et al, 2018). In SARS-CoV, the S2 has a fusion peptide spanning from transmembrane to the cytoplasm which has been a target for potential site of anti-viral therapy. However, the spike receptor binding protein only resembles 40% of the amino acid sequence that of SARS-CoV. Many of these structural proteins and its roles in virulence are yet to be described. These include ORF3b that has no resemblance with that of SARS-CoV and also a secreted protein encoded by ORF8, a structurally different protein compared to SARS-CoV. A recent research outlined that the current pandemic is attributed to a spike mutation that could have occurred in late November 2019 due to selective pressure on the virus. The positive selective pressure could be accounted for the clinical features of this virus compared to that of SARS and bat SARS-like CoV. Angeletti et al proved a change in amino acid sequences in position 723 and 1010 in the ORF1ab encoded 2 structural proteins (nsp2) and nsp3 a part of the transmembrane helical protein (Angeletti et al, 2019).

Pathogenesis

The virus binds to the Angiotensin Converting Enzyme 2 receptors (ACE-2) which are abundantly found in the type II alveolar cells of the lungs, enters the host cell and exhibit the response (Letko M. & Munster V., 2020). For this reason, it is suggested that patients who use ACE-2 inhibitors for hypertension could be more protected from the virus. However, detailed studies are needed to prove this (Zhang et al, 2020; Zu H. et al, 2020). On the contrary, there is more data suggesting that angiotensin-converting enzyme inhibitors and angiotensin receptor blockers may increase the risk of severe COVID-19 (Diaz JH., 2020; Louisiana State University Health Sciences Center, 2020).

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Volume 3, Issue 2, 2020 (pp. 4-14)
www.abjournals.org

COVID-19 virus primarily has an affinity towards the respiratory system, the lungs leading to severe pneumonia, anaemia, combined with the incidence of ground-glass opacities, and acute cardiac injury. Raised levels of cytokines and chemokines such as IL1-β, IL1RA, IL7, IL8, IL9, IL10, basic FGF2, GCSF, GMCSF, IFNγ, IP10, MCP1, MIP1α, MIP1β, PDGFB, TNFα, and VEGFA has been identified and in severe cases pro-inflammatory cytokines including IL2, IL7, IL10, GCSF, IP10, MCP1, MIP1α, and TNFα were found to be raised significantly. These have been attributed to the disease severity (Huang C. et al, 2019). Similar to SARS-CoV severe cases of COVID-19 are strongly associated with cytokine storm. All patients with severe COVID-19 should be screened for hyperinflammation using laboratory trends (eg, increasing ferritin, decreasing platelet counts, or erythrocyte sedimentation rate) and the HScore (fig. 2) to identify the subgroup of patients for whom immunosuppression could improve mortality (Mehta P. et al, 2020).

Variable	Points
Known underlying immunosuppression	0 (no) or 18 (yes)
Temperature (°C)	0 (<38.4), 33 (38.4–39.4), or 49 (>39.4)
Organomegaly	0 (no), 23 (hepatomegaly or splenomegaly), or 38 (hepatomegaly and splenomegaly)
Number of cytopenias	0 (1 lineage), 24 (2 lineages), or 34 (3 lineages)
Ferritin (ng/ml)	0 (<2,000), 35 (2,000–6,000), or 50 (>6,000)
Triglyceride (mmoles/l)	0 (<1.5), 44 (1.5–4), or 64 (>4)
Fibrinogen (g/l)	0 (>2.5) or 30 (≤2.5)
Serum aspartate aminotransferase (U/l)	0 (<30) or 19 (≥30)
Hemophagocytosis features on bone marrow aspirate	0 (no) or 35 (yes)

Figure 2. HScore.

Clinical findings

The mean incubation period stands at 14 days from the time of exposure, with a median incubation period of 4 days. The spectrum of disease ranges from asymptomatic, mild to severe, fortunately most infections are not severe. Most patients present with respiratory symptoms including fever, cough, dyspnoea, and bilateral infiltrates on chest imaging. In a particular study, acute respiratory distress develops in approximately 20% patients with 12.3% requiring ventilator support (Wang D.et al, 2020). It has been hard to differentiate COVID-19 from other common viral respiratory infections and patient history has been relied much on. Other uncommon symptoms reported include headache, sore throat, and rhinorrhoea and gastrointestinal symptoms such as nausea and diarrhoea (Chan et al, 2020; Bajema KL. et al, 2020; Huang C. et al, 2019; Chen N. et al, 2020; Liu K. et al, 2020; Yang X, 2020). The World Health Organization devised that the recovery time appears to be around two weeks for mild infections and three to six weeks for severe disease (WHO, 2020).

Diagnosis

Clinical suspicion and diagnostic criteria have been devised before suspected patients are subjected to diagnostic laboratory testing. WHO devised a standard guideline of case definition. Patients presenting with fever, with or without recorded temperature; radiographic evidence of pneumonia, low or normal white-cell count or low lymphocyte count; and no reduction in symptoms after antimicrobial treatment for 3 days, following standard clinical guidelines or fulfilled the abovementioned first three criteria and had an epidemiologic link to the Huanan Seafood Wholesale Market or contact with other patients with similar symptoms. However, this was later devised on 18th January 2020 to fit the epidemiological criteria of case definition. This includes a travel history to Wuhan or direct contact with patients from Wuhan who had fever or respiratory symptoms, within 14 days before the onset of the illness. Later other affected countries were added into the criteria.

All patients complying with the case definition should be subjected to either laboratory tests that would confirm the infection. This includes isolation of 2019-nCoV or at least two positive results by real-time reverse-transcription–polymerase-chain-reaction (RT-PCR) assay for 2019-nCoV or a genetic sequence that matches 2019-nCoV (Qun Li et al, 2020).

Treatment Strategies

The current treatment option devised by The World Health Organization (WHO) includes Remdesivir a broad-spectrum intravenous antiviral that inhibits the replication through premature termination of RNA transcription and has in-vitro activity against SARS-CoV-2 and in-vitro and in-vivo activity against related betacoronaviruses. This drug is however, in trial stage (Wang M. et al, 2020; Sheahan TP. et al, 2017; Sheahan. TP et al, 2020). Antimalarial drugs Hydroxychloroquine and chloroquine have been proven to have in-vitro activity against SARS-CoV, SARS-CoV-2 and other coronaviruses, hydroxychloroquine being more potent against SARS-CoV-2 (Wang M. et al, 2020; Sheahan TP. et al, 2017; Colson et al, 2020). In a recent trial in China, antiviral Lopinavir-ritonavir did not show efficacy in treating COVID-19 patients with pneumonia. This is being studied by WHO (Cao B. et al, 2020).

The fact that ACE-2 receptors are the binding site for the virus has opened an avenue of possible therapeutic approach. Developing a vaccine that is based on spike 1 (S1) protein that binds on ACE-2 paratope using the cell lines that express ACE-2 receptors is a promising pedestal (Zhang H. et al, 2020). It has been identified that the spike protein has to be primed by transmembrane protease serine 2 (TMPRSS) prior to interaction with ACE-2 receptors (Hoffman M, 2020). Serine protease inhibitor camostat mesylate has been used in Japan to treat unrelated diseases, has proven to block TMPRSS2 activity and is an excellent target point of therapy (Kawase M et al, 2012; Zhou Y et al, 2015). Another rather direct approach would be blocking the ACE-2 receptors to inhibit the binding of the virus (Zhang H, 2020).

Researches have demonstrated that in lab animals, the SARS-CoV down regulates ACE2 expression but not ACE, by binding its spike protein, contributing to severe lung injury (Kuba et al, 2005). It has been proven that over expression of ACE-2 receptors induces the binding of these receptors to the viral epitope not only to neutralise them but also to regulate the renin-angiotensin system (RAS) to protect the lung from injury. Soluble form of ACE-2 will not only halt the rate of viral binding and entry but also will protect from lung injury (Kuba K et al, 2005; Zhang R, 2015; Wosten A et al, 2011).

DISCUSSION AND FURTHER COGITATIONS

So, here it is, the novel strain of coronavirus that humans have not encountered before. Irrelevant of its exact origins, speculations on which shall we leave to conspiracy theorists, the genome of the SARS-CoV-2 is relatively new to humans. The acquisition of genes encoding proteins capable of interfering with heme in the red blood cells (RBCs) by dissociating iron from it and ability to interact with ACE2 receptors on the surface of the epithelial cells in lungs and digestive tract to be further internalized by those cells define the main hallmarks of the pathogenicity of SARS-CoV-2. Unlike the *Spanish flu* COVID-19's preferences go to those who are senior and elder by age and are burdened by chronic age-related diseases. The ORF protein family, enabling virus to cause abnormal functioning of RBCs, hence reducing the oxygen transport capacity, has another detrimental feature – it prefers the increased amount of glycated haemoglobin. This fact puts individuals with increased level of HbA1c into the group of risk for COVID-19. Increased expression of ACE2 receptors also facilitates COVID-19 infection, adding individuals with hypertension and perhaps specifically those taking ACE inhibitors and ARBs (angiotensin receptors blockers) to the group of risk. However, this topic needs further exploration and scrutiny. Needless to say, that people with underlying COPD by default become candidates for ARDS in its severe and critical forms of manifestation. The gruesome statistics from Italy shows that 99% of the deaths are individuals with underlying chronic medical conditions with hypertension, diabetes, COPD, metabolic syndrome and obesity topping the list.

Aren't these illnesses representing the most frequent and widespread maladies of the past century? The chronic diseases of slow accumulation. And that too it is all happening in times when our Civilization has a longest average lifespan in its history and amount of people who are 85 years old and above was predicted to triple between 2015 and 2050!

By any stretch of imagination, the insufficient (on the general scale) levels of vitamins D and C, impaired immunity, overall frailty and weakened resilience of the twenty-first century Homo sapiens nourished by atrocious products of the modern food industry are not capable of redeeming this macabre state of affairs.

We may be approaching the *evolutional bottleneck,* when elders of our society, those who for past two hundred millennia passed over to the younger generations the skills and experience necessary for survival of our species, turn out to be in jeopardy.

Well, where do we stand now?

The pandemic is already happening anyways and as any infectious disease it has its biological trends and epidemiologic laws to abide to. Those who were infected and survived the infection will develop natural immunity to this virus. At least until the moment when virus will mutate to that extent that existing immunity will not be able to recognize the pathogen anymore. When percentage of people with immunity reaches 60%, we develop the *herd immunity* - the resistance to the spread of a contagious disease within a population that results if a sufficiently high proportion of individuals are immune to the disease. In case with coronaviruses the likely hurdle on the way to achieving the *herd, immunity* is the possibility that vaccination may not work well as a tool to speed it up. The data from animal studies with previous strains of coronaviruses indicates that vaccines have serious safety issues - the production of effective and safe vaccines for animal coronavirus previously reported has not been satisfactory

(Cavanagh, 2003; Enjuanes et al, 1995; Saif, 2004), the production of inactivated, subunit, or vaccines based on DNA, recombinant vectors, or by reverse genetics using SARS-CoV genomes may be more promising (Enjuanes L et al, 2008). Another promising solution could be development of antibodies to coronavirus (Wang C et al, 2020).

Albeit majority of infected individuals developing a flu-like symptoms and eventually recover, those who develop severe and critical illness should benefit from a number of treatment modalities. Clinical trials, although small to medium scale, show efficacy of *favipiravir* and *remdesivir* in COVID-19. These antiviral medications promote reduction of fever and disappearance of virus from the organism within 4 days (on the average) as well as faster clearance of the inflammatory foci in the lungs.

The old and well-known drug against malaria hydroxychloroquine has demonstrated high efficacy against coronaviruses. In 2003 medical journal *The Lancet Infectious diseases* published an article describing effects of *chloroquine* on viral infections, including SARS-CoV virus, through various mechanisms of actions, including an anti-inflammatory and immunomodulatory pathway (Savarino A et al, 2003). However, most likely the mechanism of action of *chloroquine* against coronavirus is through the increased intracellular concentration of $Zinc^{2+}$ that prevents virus from replicating by blocking the RNA synthesis inside virus (te Velthuis AJW et al, 2010). Addition of azithromycin in severe cases speeds up the recovery.

Severe and critical cases associated with ARDS, multi-organ failure and cytokine storm can be treated with stem cell therapy. As it was established in a controlled human clinical trial the *Stem cell therapy* can inhibit the overactivation of the immune system and promote endogenous repair by improving the microenvironment. After entering the human body through intravenous infusion, large part of the MSCs accumulate in the lung, which could improve the pulmonary microenvironment, protect alveolar epithelial cells, prevent pulmonary fibrosis and improve lung function (Leng Z et al, 2020). This data gives a clear indication that topic of *cell therapy* in prevention and treatment of severe ARDS and multi-organ failure in SARS-CoV-2 deserves further profound exploration. Fascinating is the fact that none of the patients receiving *stem cells* in the mentioned clinical trial have died or had further deteriorated after stem cell administration. On the contrary, **all subjects in the stem cell group had a speedy recovery**!

Lastly, in case of survival, how long may immunity last if there is any? Non-human primates infected with SARS-CoV-2 virus and recovered were reinfected after 28 days. Observed animals had a spike of temperature for one day and subsequently did not develop any symptoms neither were tested positive for the presence of virus in the body. Instead, they had IgM present in their blood that signified presence of acquired immunity against SARS-CoV-2 virus (Bao LL et al, 2020).

As a conclusion to all being said let us face the reality and embrace the fact that our Life will never be the same hereafter: neither from the biological and medical point of view, nor from economic, social or even philosophical aspects. And that's how *evolution of Life* on this planet *was*, *is* and *will be.* After the natural selection has done its job, We, the Mankind, should learn the lessons, adapt to the new reality and strive forward towards new achievements and better greatness.

***Ad astra per aspera* and into the Future!**

Conflict of Interest

Authors declare no conflict of interests.

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REVIEW ARTICLE: CORRELATION BETWEEN UNIVERSAL BCG VACCINATION POLICY AND REDUCED MORBIDITY AND MORTALITY FOR COVID-19: AN EPIDEMIOLOGICAL STUDY[1]

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ABSTRACT: *Genome of eukaryotic cells contains up to 69% of the transposable elements and repetitive sequences. To a large extent it is a result of billions of years of evolution through which eukaryotes were encountering gazillions of viruses and storing the footprints of those encounters in its genome. This time Mankind deals with a novel virus belonging to the coronavirus family, which albeit being widely spread in the wildlife is new to humans. Once infected, 80% of humans experience a flu-like symptoms and eventually recover. However, the real menace is posed to those whose vulnerability is determined by old age and underlying medical conditions. Akin to the scenario of alien invasion, this pandemic will leave a notable imprint on social, economic and biological aspects of human existence. How did it happen, or rather, why did we allow this to happen? Let's ponder over the biological, medical and philosophical domains of COVID-19 pandemic.*

KEYWORDS: COVID-19, Coronavirus, Pandemic, Epidemic, Viral Infection, Mortality, Cytokine Storm, Regenerative Medicine, Disease Prevention

INTRODUCTION

The authors of the article deserve appreciation for their scientific work because of - firstly, addressing the global COVID-19 pandemic, a kind of one-sided world war against an unseen enemy; secondly, opening up an opportunity of critically criticising the topic relating to diverse behaviours and patterns of either the COVOD-19 itself or global to local societal culture / structure or both, and thirdly, many established scientific theories today were started with implicit philosophical thoughts rather than with scientific evidence; the authors have handled with scientific methods to initiate future researches. However, I have my observations and reservations regarding the findings.

[1] Correlation between universal BCG vaccination policy and reduced morbidity and mortality for COVID-19: an epidemiological study
Aaron Miller, Mac Josh Reandelar, Kimberly Fasciglione, Violeta Roumenova, Yan Li, Gonzalo H Otazu
medRxiv 2020.03.24.20042937; doi: https://doi.org/10.1101/2020.03.24.20042937

The authors have conducted a kind of 'ecological study design' which is appropriate in this particular context. However, no potential confounding factors (e.g., socio-cultural, biological) have been taken into account. Although investigating such confounders in this design often challenging, any remarks on such factors can be addressed.

The authors' analysis on country-specific BCG vaccination policy with year of coverage does not clearly explain the 'age and sex' distribution of infection and deaths. Italy has never implemented BCG vaccination, so the question of BCG-related immunity in general population of Italy is irrelevant. It means that Italians irrespective of age and sex has no BCG-related non-specific protection against any virus (if there is any; this point is addressed later); thus, all are equally at risk. However, a recent study shows that in Italy, by 17 March 2020, there was no single case in age group 0 – 29 years and both cases and deaths were increasing with increase of age (of total deaths - 0.3% in 29-39 years versus 52% in ≥80 years age group with case fatality rates of - 0.3% and 20.2% respectively. Death rate is markedly higher in males (70%) than in females. These patterns are visibly comparable to the case of China (Onder, Rezza and Brusaferro, 2020). On the other hand, the case of Thailand clearly contradicts the age distribution in Italy and China. According to the report of WHO, majority cases are also male but in age group 20 - 49 years. Notably, Thailand has been implementing BCG vaccination policy since 1967[2]. Thus, the authors' BCG vaccination hypothesis does not explain why this population group is not protected from COVID-19.

The possible confounders which may explain this contrast: in Thailand, there is a clear link between the epidemic outbreak in those relatively young population group and large-scale gatherings in boxing stadiums and Dakwah pilgrimage[3]. How it can be explained in case of Italy and surrounding western European countries?

In Italy (and western European countries; e.g., France, Germany, Belgium, Netherlands), the outbreak follows the same pattern with a steep rise started from 6 March. This fits well with the Carnival, a Catholic Christian festival[4], that was celebrated with huge gatherings from 21 – 23 February, exactly coincides with the Corona incubation period of two weeks (Figure 1).

[2] https://www.ncbi.nlm.nih.gov/pubmed/8160047.
[3] https://reliefweb.int/sites/reliefweb.int/files/resources/2020_03_28_THA%20Sitrep%2035%20COVID19%20FINAL-2.pdf.
[4] This analysis is nothing about religion but to logically explain the possible links between Corona pandemic and broader socio-cultural factors.

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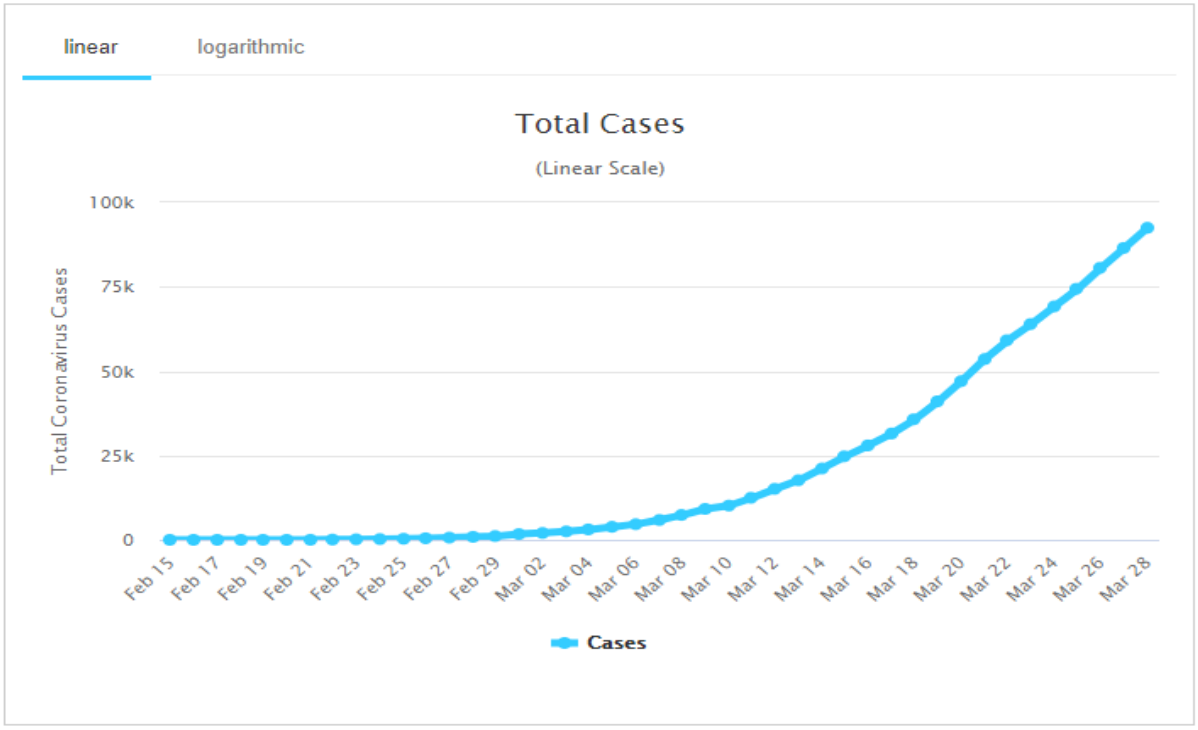

Figure 1: The Daily Trends of Corona Cases in Italy (source: Worldometer[5]).

Notably, in the Netherlands, most of the cases are in the south-eastern Catholic dominant provinces (Noord-Brabant; Limburg). The well-known Bible-belt with majority protestant Christians adjacent to north-west of the affected region have comparatively few cases (Figure 2 and Figure 3 show the geographic comparison between the Bible-belt and COVID-19 distribution in the Netherlands). The protestant inhabitants in the Bible-belt abstain from any vaccination including BCG because of their faith and also do not celebrate carnival. This explains the link of the measles outbreak in 2013 in this population (Bier and Brak, 2015). However, why absence of BCG immunization has not caused COVID-19 outbreak in them is not understandable, taking into account the authors' claim. On the other hand, of the total Christian population in Denmark, the majority nearly 63% are protestant and only 1.3% is Catholic; hence, carnival gathering was limited which may explain the low cases and death rate in Denmark rather than BCG linkage.

I quote the authors: "our data suggests that BCG vaccination seem to significantly reduce mortality associated with COVID-19" – it is a quite strong interpretation since an ecological study design of this type is nearly at the bottom of the validity hierarchy among all designs and mostly generates hypothesis for future research. Scientists have to wait for such a comment after documenting empirical evidence from systematic review of multicentric RCTs in future.

[5] https://www.worldometers.info/coronavirus/country/italy/

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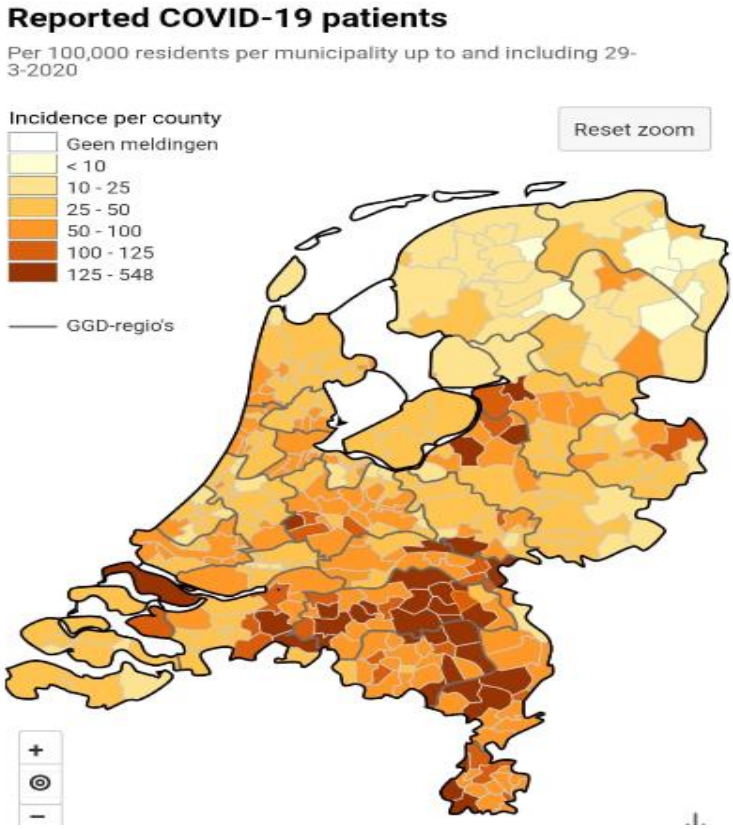

Figure 2: Geographic Distribution of COVID-19 in the Netherlands

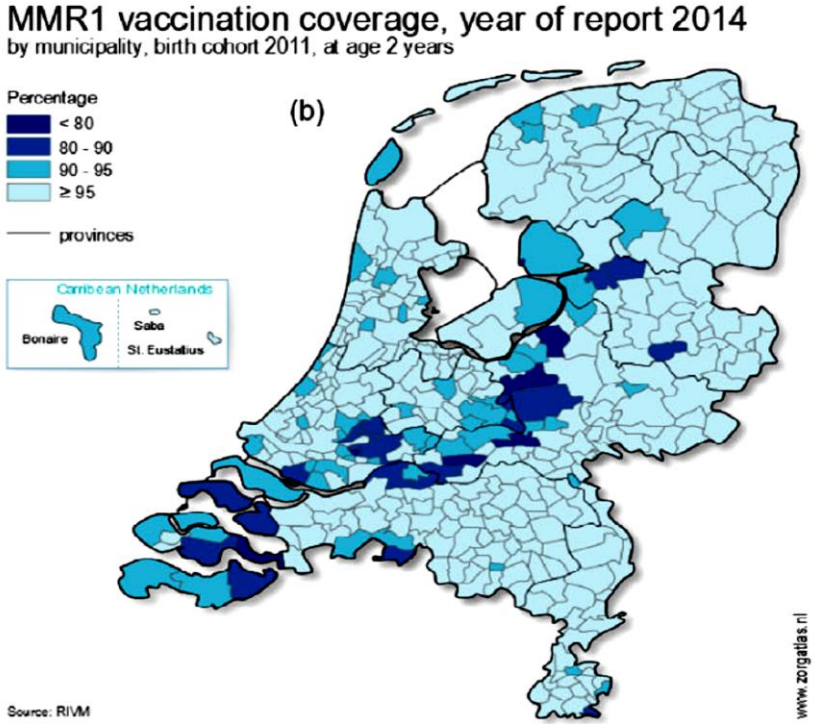

Figure 3: The Protestant Christian Dominant Bible-belt in the Netherlands

I quote the authors again – "BCG vaccination has been shown to produce broad protection against viral infections and sepsis" [6]- this finding is based on animal model and the authors of the source are quite restrictive on this point and suggested for future research to conclude.

A number of developing countries (such as Bangladesh) have global rewarding success on under-5 immunization covering BCG, measles, polio, tetanus, rubella, HBV, diphtheria vaccinations. However, respiratory infections, most often viral, are still the commonest cause of under-5 mortality in those countries; so, the concrete conclusion on the effects of BCG on viral infections including COVID-19 still deserves lot of efforts.

Spread of COVID-19 and mortality: it has been reported that Corona viral load in body fluids (specifically in saliva) at the onset of the disease is much higher than SARS affected cases. The salivary viral load in COVID-19 infected subjects throughout incubation period can be enough to infect. The underlying modes of transmission, in this context, could be risky behaviours (e.g., sharing wine/beer glasses, bottles, canes etc.) might have influenced by the socio-cultural event (i.e., carnival). A subgroup analysis in Italy shows that case fatality rate increases with increase in the number of comorbidities (e.g., diabetes, ischemic heart disease, cancer, atrial fibrillation, stroke, dementia). Of course, outcome of COVID-19 infection ultimately depends on immunological response; however, how BCG plays role/s is too early or conclude.

Overall, the authors' observation is interesting, although not such convincing. It is because in a study on this topic, socio-structural and cultural confounders play crucial roles, which become more complicated with additional biological and biomolecular confounders since a novel virus is behind the scene.

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[2] Onder, G., Rezza, G. and Brusaferro, S. (2020) 'Case-Fatality Rate and Characteristics of Patients Dying in Relation to COVID-19 in Italy', *Jama*, 2019, pp. 2019–2020. doi: 10.1001/jama.2020.4683.

[6] Source reference 11 of the article - (Moorlag, S. J. C. F. M., Arts, R. J. W., van Crevel, R. & Netea, M. G. Non-specific effects of BCG vaccine on viral infections. Clinical Microbiology and Infection 25, 1473–1478 (2019)).

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PSYCHOLOGICAL EFFECTS OF COVID-19 AND ITS IMPACT ON BODY SYSTEMS

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ABSTRACT: *During pandemic outbreaks like COVID-19, global attention is focused on curbing the spread of infection while giving minimal or no care to pandemic impact on mental health and psychological well-being of individuals. In this short article attempts have been made to discuss how pandemic infectious outbreaks such as COVID-19 affect the psychological well-being which in turn have great impact on other body systems, the author also draws some recommendations to positively address the issue.*

KEYWORDS: Pandemic, COVID-19, Mental, Psychological, Psychosocial, Well-Being, Health

INTRODUCTION

Right from the global outbreak of SARS-CoV-2 that causes COVID-19 in early January to date; scientific researches have not yet provided an evidence of direct effects of COVID-19 on mental health and psychological well-being. However, it's well known that during infectious disease outbreaks there are always increase level of destructive emotional conditions amongst the population, which ranges from fear, worry, distress and anxiety among others. This is due to fear of infection, restriction of movements, scarcity of food or water et cetera. The global pandemic outbreak of COVID-19 which cannot be excluded is of no doubt resulting same effect. Nevertheless, it should also be noted that severity of any infection can affect thinking and behavior.

The Impact on Body Systems

As noted above, pandemic outbreaks such as COVID-19 tends to cause some negative psychological changes in human beings. Furthermore, according to Bhikha and Dockrat (2015) emotions have powerful effects on the nervous system, which in turn regulates a host of bodily functions. From a scientific perspective, emotions trigger the release the of the steroidal response hormones, mainly *cortisol* from *adrenal cortex*. In her explanation, Ayad (2008) elucidated that high level of cortisol have a devastating suppressing effect on immune system; they reduce the number of white blood cells, interfere with the production of lymphocytes, and suppress the production of some immune system regulators, *hyperglycemia*. In addition, some studies have found that excess cortisol damages brain by its destructive effect on the neuro-connectors or dendrites. Ultimate effect is that a person becomes more susceptible to the development and progress of malignant growths and more vulnerable to infections by pathogenic micro-organisms, cellular malfunctions and tumors.

Subsequently, fear, worry and anxiety caused by the spread of infectious disease like COVID-19 can lead to constant stimulation of sympathetic nervous system, which in turn results to permanent rise in blood sugar level (BSL), increase breakdown and mobilization of stored fat, coronary heart problems, decrease the activity of digestive tract, just to start with.

CONCLUSION

As discussed earlier, pandemic outbreak of infectious disease like COVID-19 affects mental and psychosocial well-being, which in turn can lead to a great damage to some body systems, interventions are required to better address the issue. This includes actions from both public and personal/individual.

Public responsibilities include emergency planning and response measures to support mental and psychosocial well-being, facilitate access to basic life needs like food, water and electricity as reliable and possible, communicating broad massages that are positive to the whole of society, promote easy communication between families and mental health support groups, and emergency psychological first aid training should be given to the health workers, community leaders, religious leaders, youth leaders and volunteers (Eaton, 2020).

Individual responsibilities are many per se, to mention but few are; being calm and optimistic that all will be well, practicing passive meditation, finding time for oneself to relax, regular and appropriate intake of immune boosters, moderate exercise as well. Classical studies show that spiritual injunctions on contentment and steadfastness also have a great effect (Ayad, 2008).

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COVID-19: PSYCHOLOGICAL IMPLICATIONS AND RESPONSE

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ABSTRACT: *The coronavirus or COVID-19 has emerged as the serious threat for all the nations around the globe. The disease has been declared as Pandemic by World Health Organization (WHO) and has paralysed the cycle of global village with stress and anxiety. Covid-19, started from the Hubei province of China, has now reached to more than 200 countries on the planet. Rapid spread and limitations of healthcare facilities are causing extensive panic and anxiety among individuals in every part of the world. The outbreak of this virus has triggered the equal level of crisis in countries of developed, developing, and underdeveloped world.*

KEYWORDS: Coronavirus, Pandemic, Psychological Issues, Global Challenge

INTRODUCTION

The coronavirus or COVID-19 pandemic has emerged as a serious threat that has unveiled unprecedented challenges for the nations around the globe. It has turned out to be the most severe stress for the comity of nations and the international organizations. World Health Organization (WHO) and other relevant sources suggest that the virus has infected hundreds of thousands and the number of resulting deaths is increasing with every passing day since December 2019[1], which is an alarming situation for nations around the globe. Analysts, journalists and politicians are trying to evaluate and comprehend the emerging situation that will unleash new health, economic, political, and social challenges in this globalized world. However, the psychological implications of this pandemic are very critical as they will have a long-lasting impact on the individuals and collective behaviour of every nation. The growing number of infected populations in every corner of the world has posed serious challenges for the psychological state of masses.

Started from China in December 2019, COVID-19 has now penetrated into more than 200 countries and territories,[2] raising issues of extensive panic and growing anxiety in individuals. It has already brought a pause into the lives of the people drawing a line of 'before' and 'after' Corona. Some people have given up their recreational activities such as traveling and socializing for some the ground from under their feet and they may not stand again, and some have lost their jobs. The social and economic impact of this crisis has become ubiquitous in every walk of life. The forced lockdowns and other restrictions of mobility by the authority have sacked a large number of populations particularly daily-wage earners from their means.

[1] "World Health Organisation" Available at: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020

[2] "Coronavirus disease 2019 (COVID-19) Situation Report – 78", *World Health Organization* (7 April 2020) Available at: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200407-sitrep-78-covid-19.pdf?sfvrsn=bc43e1b_2

The micro-entrepreneurs are undergoing a mental agony hence no certainty of running their businesses is looming in the nearer future. The current Coronavirus pandemic is leading towards a global pandemic of unemployment.

It is fascinating to know that the developed regions particularly Europe and the US are more vulnerable as compared to the rest of the world in the face of COVID-19.[3] It has appeared as a dual edged -sword threatening their personal health and their economic prosperity. We observed a staggering and baffling behaviour from the so-called the most civilized part of the world when they were asked to confined to homes trimming their proclaimed freedom and liberty of movements. They remained reluctant to follow the order by the authorities, eventually they are facing serious situation is the dell toll is ringing aloud every passing day. Today this disease strongly fixed its lethal jaws in countries like Italy, the US, and Spain, and they have now become the epicentres of new coronavirus cases.[4] Fighting against, COVID-19, may soon get over with the invention of vaccines, but provision of appropriate earning sources for millions of people around the globe who have consequently lost their jobs will be the next gigantic task for the world. In addition to this serious financial challenge, a numerous population will be suffering from severe psychological ailments.

CORONAVIRUS: THE PSYCHOLOGICAL IMPACT

Coronavirus disease is affecting everyone in the world in one way or another, with no exceptions of religion, language, occupation, age, sex as well as social and financial background. At various epochs of history several past events such as epidemics, World Wars and revolutions have affected the course of history in different ways. These events to result in redefining and restructuring future trends. This pandemic COVID -19 is not only affecting the political and financial structure but also the social structure.

Relationships and social connections are an important factor in our lives. People who often complained about having no time for simple joys of life are now blessed with an abundance of time. It could be blessings in disguise for those who were berated by their loved ones for sparing no time, they have a chance to win their hearts now. The children, who used to protest against their parents for not giving them time and importance, are now overwhelmed with their company. People must be finding innovative ways to love their beloveds.

Since long we have been neglecting our health, our family and our home. In the time of self-quarantine, it is an opportunity for us to take care of ourselves and our loved ones and rebuild the house into a home and to nurture relationships at home. By eating junk food, taking soft drinks and drinking contaminated water, we put our health in danger. Now is the time to take healthy food, exercise and rest for your physical as well as mental health because a healthy mind resides in a healthy body.

[3] Joe Penney, "U.S. Got More Confirmed "Index Cases" Of Coronavirus From Europe Than From China", *The Intercept* (13 April 2020) https://theintercept.com/2020/04/12/u-s-got-more-confirmed-index-cases-of-coronavirus-from-europe-than-from-china/

[4] Alison Rourke, "Europe's coronavirus numbers offer hope as US enters 'peak of terrible pandemic'", *The Guardian* (6 April 2020) https://www.theguardian.com/world/2020/apr/06/europes-coronavirus-numbers-offer-hope-as-us-enters-peak-of-terrible-pandemic

The COVID-19 pandemic is perceived as a global hazard that needs to be dealt with prudent and cost-effective measures. In addition to the precautionary and preventive measure there is a desperate need of positivity for undoing the long-lasting damage of coronavirus. Now, it's time to remain optimistic in this creepy environment while having a constructive perspective for the future of humanity. In order to control the spread of the virus and protect more vulnerable members of the community, it's a crucial time to frame coronavirus as a collective rather than an individual threat, and for that a collective action could be desired help. The virus has brought the world to a standstill. We need to understand that this type of situation is not new, the world has experienced these kinds of crises before in history as well. All those crises and epidemics ultimately ended one way or another. Eventually, this coronavirus pandemic will also get over. After every difficulty, there is always ease. In the hustle and bustle of everyday life, we forget the real purpose of mankind. The most important for us is to help each other in these difficult times. We do not need to be panic or afraid of Coronavirus, but we should fight against it.

Since the end of February 2020, Pakistan is fighting an outbreak of the coronavirus that has infected around 6000 people so far.[5] The COVID-19 disease is not merely a public health issue but a crisis that will touch every sector. The fear of Coronavirus has stopped public life in much of the world so as in Pakistan. The authorities in Pakistan have also imposed partial and complete lockdowns at the provincial level to control the spread of the virus. Across the country public gatherings are banned, schools, colleges, and universities are closed and all shops except groceries or medicines have been shut down.

In the wake of harsh initiatives of lockdowns, educational institutions across the country are closed and students are facing the enormous disruption in their everyday activities. They are confined to the boundaries of home with less opportunity for physical activities and socialization, which is essential for mental wellbeing. This sort of s condition may inflict them with psychological problems such as worry, anxiety, and fear.

Blissfully, though Pakistan does not have the conditions that are in the US or Europe, but the economic crisis in the country is making it worse with every passing day. With 25% of the population living in extreme poverty[6], people are struggling to survive in the Corona lockdown. People are fighting with Corona pandemic as well as hunger. Similarly, the healthcare professionals of Pakistan are also vulnerable as they lack self-protective gears and insufficient equipment to deal with and a large-scale flow of COVID patients. Given these evolving challenges, it's a high time for government and relevant institutions to take effective measures to curtail the loss. The government has announced a relief package, for the labour class, that needs swift implementation otherwise the situation will be severe and large.

Government needs to take immediate measures in order to provide food to the vulnerable section of society and equip the health sector with significant manpower and logistics. In order to keep our front liners motivated, the government has to ensure availability of Personal Protection Equipment (PPE) and medical machinery. Many private educational institutes are moving or have moved to online education. Many universities are offering virtual classrooms where students can log in and attend a live- session. This is a good activity to engage students in studies so they can come out from trauma like situations. By using this technique, the

[5] "Coronavirus Pandemic", *Dawn* (15 April 2020)
Available at https://www.dawn.com/live-blog/

[6] Mumtaz Alvi,"Corona to be fought with faith: PM Imran Khan", *The News International* (31 March 2020)
https://www.thenews.com.pk/print/637285-corona-to-be-fought-with-faith-pm-imran-khan

government can use state media and arrange lectures and question-answer sessions with researchers, psychologists, educationists, and motivational speakers to reduce the stress in public. Surveillance of healthcare facilities, security of staff, and swift implementation of policies will be inevitable for effective operations against COVID and limiting the psychological impact of this crisis.

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THERAPEUTIC APPROACH TOWARDS SUICIDE AMONG MUSLIM FOLKS: A TREATISE DURING COVID-19 OUTBREAK

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ABSTRACT: *Suicide is relatively rare problem affecting people irrespective of gender, age race and religion, but in pandemic infectious disease outbreak, the practice tends to increase due to various negative psychological changes. Despite the frequent reports that are showing the rise of suicidal cases and attempts globally, the menace is almost neglected by societies. This article presents brief explanations on the suicide from the Islamic perspective, which was aimed to serve as a primer for curbing the menace in the Muslim communities in particular. In the paper, risk and protective factors for suicide are discussed, Islamic ruling on suicide, and suggested ways of helping a person with suicidal thoughts are also outlined.*

KEYWORDS: Suicide, COVID-19, Religious, Depression, Islamic, Pandemic, Therapeutic

INTRODUCTION

Suicide is derived from the Latin word *Sui Caedere*; meaning to kill oneself (Uchendu, Ijomones, & Nwachokor, 2019). It has been defined as "the act of killing oneself, deliberately initiated and performed by the person concern in the full knowledge or expectation of its fatal outcome" (The World Health Report, 2001, p. 37). Across the globe, suicide is among the top ten causes of mortality in every country and one of the three top killers of youths in the age group of 15 - 34 years (World Health Organization, 2000, p. 5). Each year, approximately 850,000 people worldwide end their lives by suicide. An additional twelve to twenty-five non-fatal suicide attempts are made for every one of these deaths (Utz, 2011, p. 278). It has been predicted that by 2020, 153 million people will die of suicide, representing one in every death. Globally, the rate of suicide shows a great variation, with countries such as Lithuania and Russia federation having a rate of about 30 deaths/100,000 (high rate), while countries such as Lesotho, Cameron, and India have intermediate rate of about 10-29/100,000. Countries such as Nigeria, Congo, Mexico and Nepal have a rate of <10/100,000 (Uchendu et al., 2019).

It was indeed very pathetic that on the morning of the 6th of April 2019, the world was greeted with the suicide case of a lecturer at the Department of Mathematics in the University of Ibadan, the deceased ended his life after unfulfilled dreams of completing his PhD programme. Similarly, the following week on 19th April 2019, a 100-level student of Kogi State University, Ayingba, also died by suicide after she was reportedly jilted by her boyfriend. On the 14th May 2019, a 26-year-old hairdresser in Lagos ended her life after her boyfriend of two years ditched her. Another baffling case of suicide occurred on May 14th, 2019, involving one member of Pentecostal church in Lagos, who reportedly got depressed over his accommodation issues before taking his own life. Sadly, on the 15th May 2019, a

17-year-old in Jos Nigeria, was reported to have drunk sniper to end his life when he learned that he had failed the 2019 JAMB Exam (Obinna, C., Olawale, G. 2019). Similarly, in this COVID-19 pandemic outbreak many other suicide cases are reported in the headlines of reputable newspapers frequently which show the increase rate of it in this time, for such I find it worthy to write this article which I wish will help in curtailing the menace in this COVID-19 pandemic outbreak time.

Risk Factors for Suicide

During COVID-19 pandemic outbreak lots of people fall in the trap of fear, anxiety and depression due to loss of relatives due to the disease contraction, stigmatization of the community to the victims and their family members that contracted COVID-19, loss of love ones and fear of not surviving by the victims, during isolation and quarantines.

According to Utz (2011) "Depression and other mental disorders, substance abuse disorders, family history of these disorders, family history of suicide, history of trauma or abuse are the risk factors for suicide" (p. 278). Similarly, Uchendu et al. (2019) stated that alcohol abuse, antisocial behavior, sexual and physical abuse, poor peer relationship, suicidal behavior among peers, family discord, broken homes and social contagion are among the predominant risk factors for suicide.

"Depression is a significant risk factor for suicide" (Suicide Prevention Resource Center [SPRC] & Rodgers, 2011, p. 3). Also, Utz (2011) explains that more than ninety percent of those who commit suicide have one of the first two risk factors (p. 278). According to WHO, globally, 300 million people - 4.4% of the world population - are affected by depression, a leading cause of suicide. The WHO also notes that 5.4% of Africans have depression. In Nigeria, WHO statistic showed that depression affected about 7 million people in 2015 (3.9%), while in 2016, suicide was the second leading cause of death amongst people between the ages of 15 - 29 (Obinna, C., Olawale, G. 2019).

Islamic Rulings on Suicide

The Quran makes it clear that human life is sacred. Life cannot be taken without justification and the right to life is inherent in the tenants if Islam. Life itself is a gift from the creator that we are obliged to care for (Stacey, 2013). In Islam suicide is clearly prohibited. There are sanctions against suicide in the Quran and authentic Hadith.

Allah said:

- "And do not kill yourselves. Surely God is Most Merciful to you" (Q 4:29).
- "And do not throw yourselves in destruction" (Q 2:195).

It was also narrated in the hadith that the prophet (Pbuh) said: Whoever kills himself with an iron weapon will be carrying that weapon in his hand and stabbing his abdomen with it in the hellfire, wherein he will abide for all eternity; whoever drinks poison and kills himself with it, he will be carrying his poison in his hand and drinking it in the hell (fire), wherein he will abide for all eternity; and whoever purposely throws himself from a mountain and kills himself will be in hellfire, falling down into it, and abiding therein for all eternity. (recorded by Bukhari)

Exemption

Al-khater mentions an important point in relation to the aforementioned Hadith. The punishment mentioned here will be applied only to those who committed suicide intentionally while they were in sane mind. People who suffer from severe depression or other mental illness may not be considered legally responsible, depending on the severity of the disorder (Al-khater, 2001, pp. 26-27 as cited in Utz, 2011, p. 279). Similarly, Al-Jibaly (1998) makes it clear that in Islam sanity is a prerequisite for accountability. A mentally retarded person is only accountable in accordance with his sanity, and a totally insane person is totally unaccountable (p. 5). For such, Allah will judge them on the Day of Resurrection and send them to their appropriate destination. For this reason, one cannot justify the claim that everyone who commits suicide will be condemned to hell (Utz, 2011, p. 279).

Allah May Forgive a Suicider

Jabir reported that At-Tufayl Bin Ad-Dawsī migrated to the prophet (Pbuh) in Al-Madinah accompanied by another man from his tribe. They both dislike their stay in Al-Madinah (because they were away from their people). At-Tufayl friend then became very sick, and was so overwhelmed with pain that he used an arrow's blade to cut his fingers at the knuckles, causing bleeding that led to his death {This is similar to the method of slashing the wrist as a suicide attempt (Al-Jibay, 2006, p. 221)}. At-Tufayl then saw his friend in a dream, and his friend looked well but his hands wrapped up. He asked him "What did your Lord do to you?" He replied, "He forgive me because I migrated to prophet (Pbuh)". He asked him, "But why are your hands wrapped like this?" He replied that he was told "We will not repair for you what you have damaged". At-Tufayl related his dream to the Prophet (Pbuh), who said: O Allah, forgive his hand as well. (Recorded by Muslim, Ibn Hibban and others).

In view of this hadith, Al-Jibay (2006) said: "This dream indicates that Allah (swt) may forgive some major Sins, such as committing suicide, as in this case" (p. 221).

The Status of Deceased

The person die through suicide is to be buried as a Muslim and to be offered the rites of a Janaza (Siddiqui, 2019).

Protective Factors for Suicide

The protective factors include effective mental health care {including Cognitive Behavioral Therapy and Dialectical Behavioral Therapy (SPRC & Rodgers, 2011, p. 3)}, care for substance abuse disorders, strong connections to family, community support, cultural and religious beliefs that discourage suicide and emphasize self-preservation. Religiosity in particular, has been found to be strong protective factor against suicide. Researchers of suicide have found that rates of suicide are much lower in Muslim countries. Religiosity and religious commitment act as protective factors for both Muslims and non-Muslims. This is hypothesized to be related to basic life-preserving values, beliefs, and practices that reduce rate of suicide. For Muslims, the injunctions against suicide in religious texts, as well as the fear of eternal damnation in hellfire, are likely to play a role (Utz, 2011, p. 278).

The Fruitful Gems

The Prophet (Pbuh) said: None of you should wish for death because of a calamity befalling him, but if he were to wish for death, he should say; O Allah! Keep me alive as long as life is better for me, and let me die if death is better for me (recorded by Bukhari)

The Prophet (Pbuh) also said: ...And none of you should wish for death, for if he is a good-doer, he may increase his good deeds, and if he is an evil-doer, he may repent to Allah (recorded by Bukhari).

He (Pbuh) also said: If anyone is afflicted by distress and grief, and says: 'O Allah, I am Your slave, son of Your slave, son of Your maidservant, my forelock is in Your hand, Your command over me is forever executed, and Your decree over me is just. I ask You by every name belonging to You which You have named Yourself with, or revealed in Your book, or taught to any of Your creation, or You have preserved in the knowledge of the unseen with You, that you make the Quran the life of my heart and the light of my breast, and a departure for my sorrow and a release from my anxiety, Allah will take away the distress and grief, and replace it with joy (a sound hadith recorded by Ahmad and At-Tabarāni).

CONCLUSION: PSYCHOTHERAPEUTIC MECHANISM OF ACTION

Life is an unending succession of moments. At the two extremes there are joyful moments that make our hearts soar and dark moments that plunge us into sadness and worry or even despair. Gladness and its opposite sadness are part of the human condition, however when we lose control over our emotions we can easily fall into despair. God the most merciful, compassionate, and beneficent has instructed us to inculcate these attributes and treat each other with respect and fairness. This includes not leaving anyone alone with their problems and worries. God has promised us that He is well aware of the situations that we face and He has given us weapons with which to face them. God also tells us not to mock, scorn, insult, abuse or put down one another. A little bit of support and care might help someone avoid the sin of ending his/her own precious life (Stacey, 2013). Amongst the ways to which one can use to help someone that is suffering from suicidal thoughts especially in pandemic outbreaks like that of COVID-19 includes but not limited to:

- The psychotherapist should try as much as possible to help the client understand the temporal reality of this world, aid the client to focus on the hereafter, as well as helping the client to recall the purpose and effects of distress and afflictions (Utz, 2011, p. 297).

- Remind the person to have complete reliance on Allah, be contented with the decree of Allah, focus on the blessings of Allah and persevere:

The person should be reminded that God is Merciful and that no matter what situation we find ourselves in, He is ready to forgive and help. Farid (1996) said; being content alleviates any suffering by reason of the heart's immersion in the spirit of certainty and knowledge. If the contentment increases in its intensity, then it removes the experiencing of any suffering altogether (p. 61). If we are mindful that God has control over all things and that He ultimately want us to live forever in Paradise, we can begin to leave our sadness and worry

behind. In Sharia, perseverance means keeping the self from complaining, and the hands from beating cheeks and tearing clothes (as an expression of grief). Allah has made perseverance a tireless horse, a relentless cutting sword, an invisible, victorious army, an indestructible, formidable fortress. It and victory are inseparable companions (pp. 45-46). Allah has made mention of the virtues of perseverance in the Holy Quran in different places, among which are; Q 2:155 - 157, 3:120, 3:146, 3:200, 8:46, 14:5, 16:126, 23:111, 31:31, 32:24, 34:19 and 42:33.

If we face our fears and anxieties with complete trust in God and if we show patience and gratitude with all our circumstances, sadness and worry will disappear or at least feel lighter. Prophet Muhammad (Pbuh) said: Indeed, amazing are the affairs of a believer! They are all for his benefit. If he is granted ease then he is thankful, and this is good for him. And if he is afflicted with hardship, he perseveres, and this is good for him (recorded by Muslim).

And for all, Allah said: "So verily, with hardship, there is ease" (Q 94:5).

- Remind the person to strengthen his/her relationship with God: This can be achieved by:

  i. Observing five daily obligatory prayers: prayer energies the soul, bring comport to heart, and helps us transcend to a higher level of awareness.

     Prophet Muhammad (Pbuh) used to say to Bilāl: O Bilāl, give the call to prayer, and bring comport to my heart (recorded by Abu Dawood).

     Many studies now show the evidence of reduced rates of depression, melancholy, sorrow and pessimism among individuals who perform their prayers regularly (Ayad, 2008, p. 399).

  ii. Reading the Quran: Reading the Quran leads to total peace, awe and submissiveness to Allah the time we start listening and pondering over the meanings. Quran combines guidance, compassion and healing to enlighten your path, your life and your soul.

     "...Say, it is - for those who believe - a guidance and healing..." (Q 41:44)

     So, to start your journey to a prosperous life, healthier body and enlightened soul: the Quran is the first and most important step. A study was performed in Morocco as a preliminary examination of how, in everyday life, faith enhances the feeling of well-being. The study found that the recitation of the Quranic verses offered homemakers a way to deal with stress and to manage the emotions that caused the anguish and disturbed their hearts and bodies. The researchers describe the Quranic power of comfort and solace as '***Medicine for the Heart***' (Ayad 2008, p. 441).

  iii. Making Dhikr-Allah (Remembrance): Remembrance of Allah dispels worry and melancholy from the heart, adorns it with delight and joy, fills the heart and face with light, and cloaks the one who remembers Allah with dignity, gentleness and freshness (Farid, 1996, p. 21). Similarly, Ayad (2008) explains that chanting your daily remembrance allows you to enjoy many benefits, part

of which is: it dissipates distress and grief, relieves the anguished heart and brings you joy, happiness, tranquility and serenity (p. 418).

"...Verily, in the remembrance of Allah do hearts find rest" (Q 13:28).

iv. To be mindful of Allah and make lots of Du'a (supplication) to him: Supplication is a direct connection between you and Allah. It fills heart with humility and devotion, love and longing. It relieves sadness and strengthens the faith (Ayad, 2008, p. 434). A hadith states: There is nothing dear to Allah as supplication (by His worshipers) (a sound hadith recorded by Ahmad).

Have complete faith in Allah and believe that He wills only what is best for you, do not be impatient for the answer. The Prophet said: One's supplication will be granted if he is not impatient (recorded by Bukhari and Muslim).

Pray and be sure that Allah is always there for you. Prophet said: Allah is ever generous and if a servant raises his hands to Him (in supplication), He hates to return them empty (recorded by Tirmidhi, Abu Dawood and Ibn Mājah).

- Solving the problem as much as possible and showing care and affection to the person. (Even as those as simple as letters, SMS, Mail, or Facebook/Whatsapp/ Telegram massages and postcards). One needs to develop skill of listening without judgment, and offering empathy. Listen to the person and let the person say what he/she need to say, try your possible best to solve the problem, do all you can to let the person know that there is still someone there for them, who is just willing to listen and not to judge but rather to help. Show the person that you still love him/her (Siddiqui, 2019).

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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 patent 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.

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Volume 3, Issue 2, 2020 (pp. 33-40)
www.abjournals.org

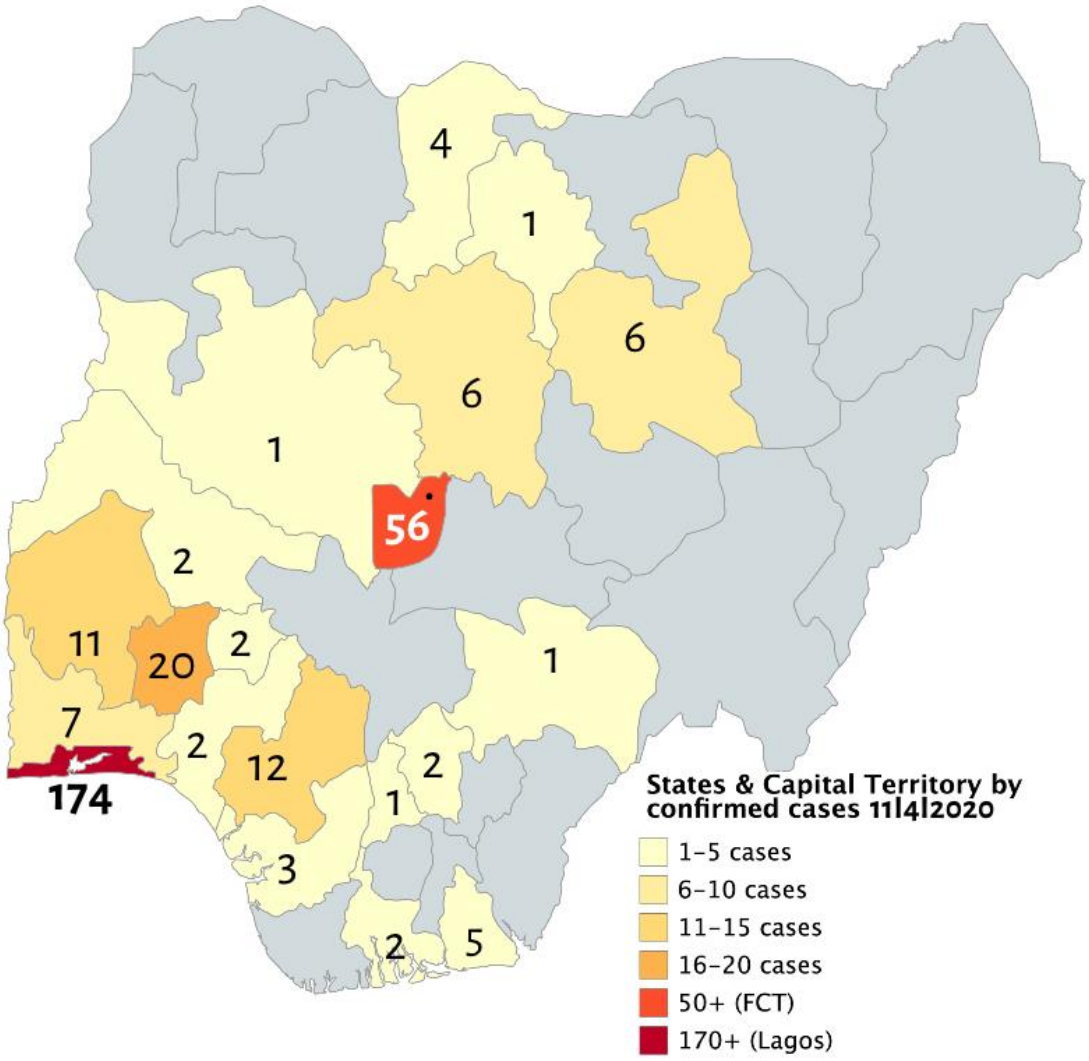

Figure 1: COVID-19 Pandemic in Nigeria as at 14th of April 2020

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.

African Journal of Biology and Medical Research
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Volume 3, Issue 2, 2020 (pp. 33-40)
www.abjournals.org

Fish-Bone Diagram

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

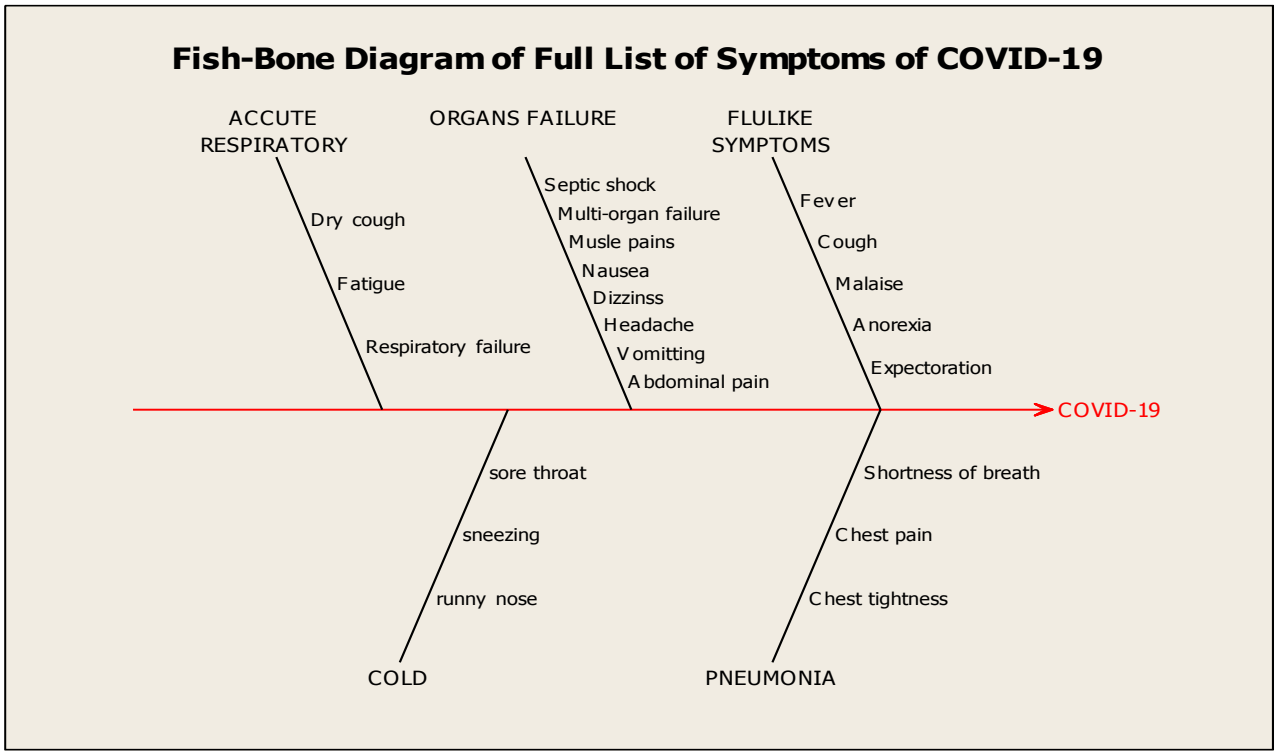

Figure 2: Fish bone Diagram of COVID-19 Symptoms

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.

African Journal of Biology and Medical Research
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Volume 3, Issue 2, 2020 (pp. 33-40)
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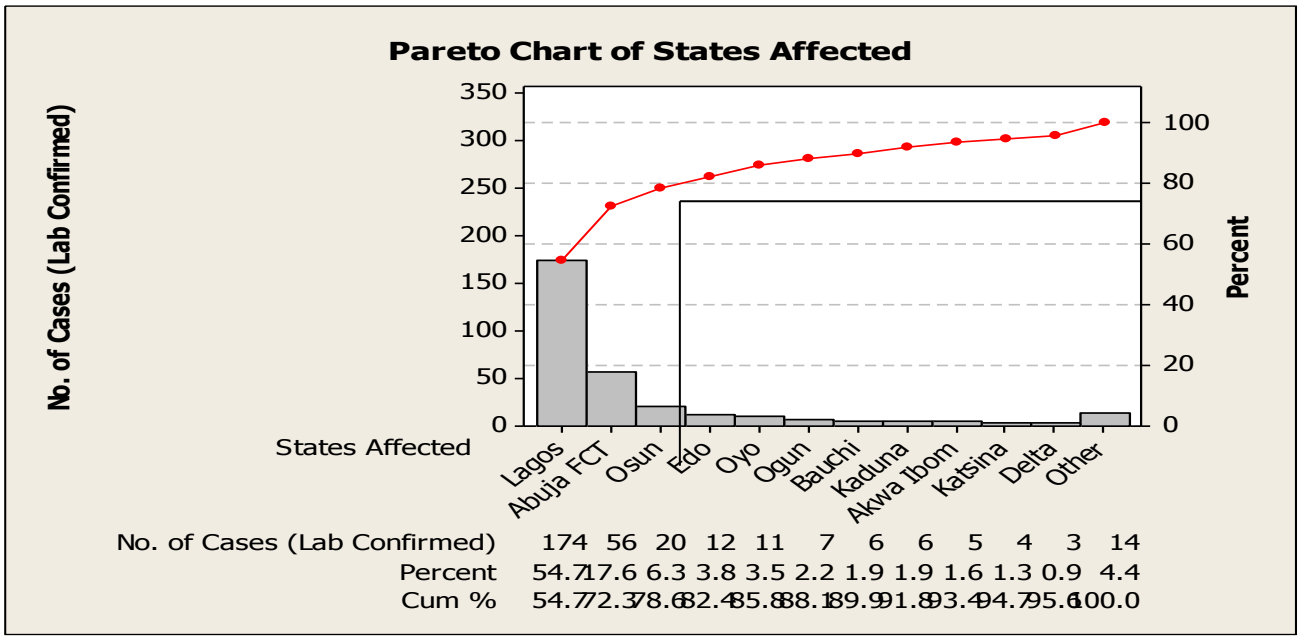

Figure 3: Pareto Plot of COVID-19 Infected State

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.

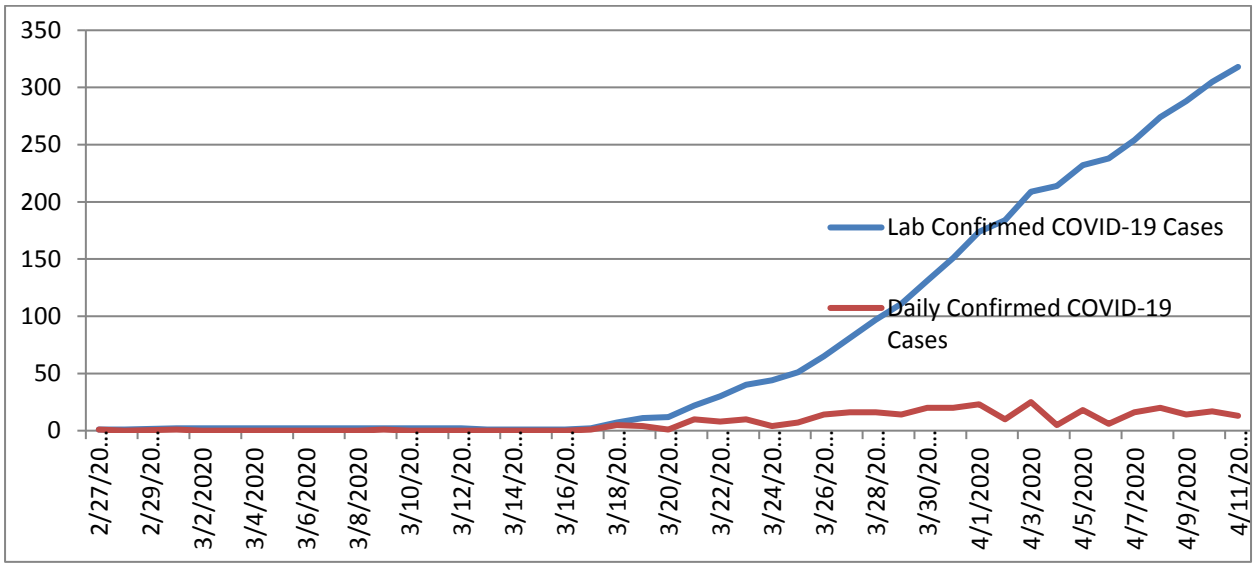

Figure 4: Trend Plot of Both Active and Daily Confirmed Cases are on Increasing Trend Since 11th March till date.

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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.

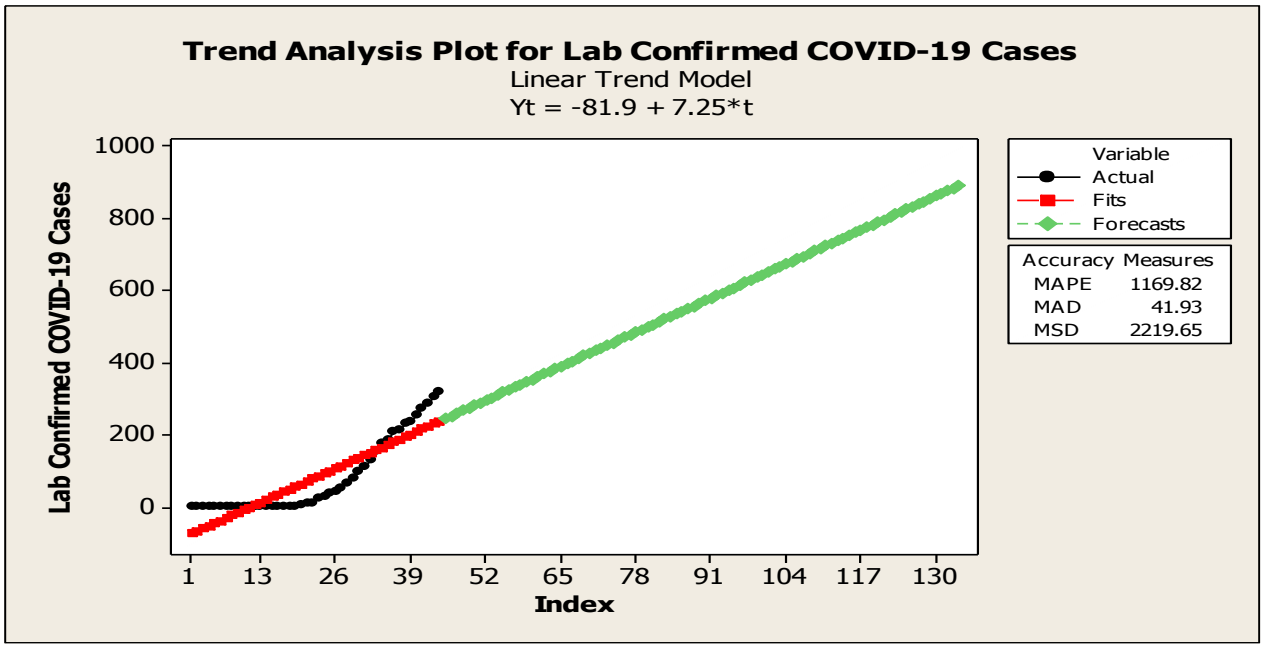

Figure 5: Linear Trend plot for COVID-19 Outbreak in Nigeria

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.

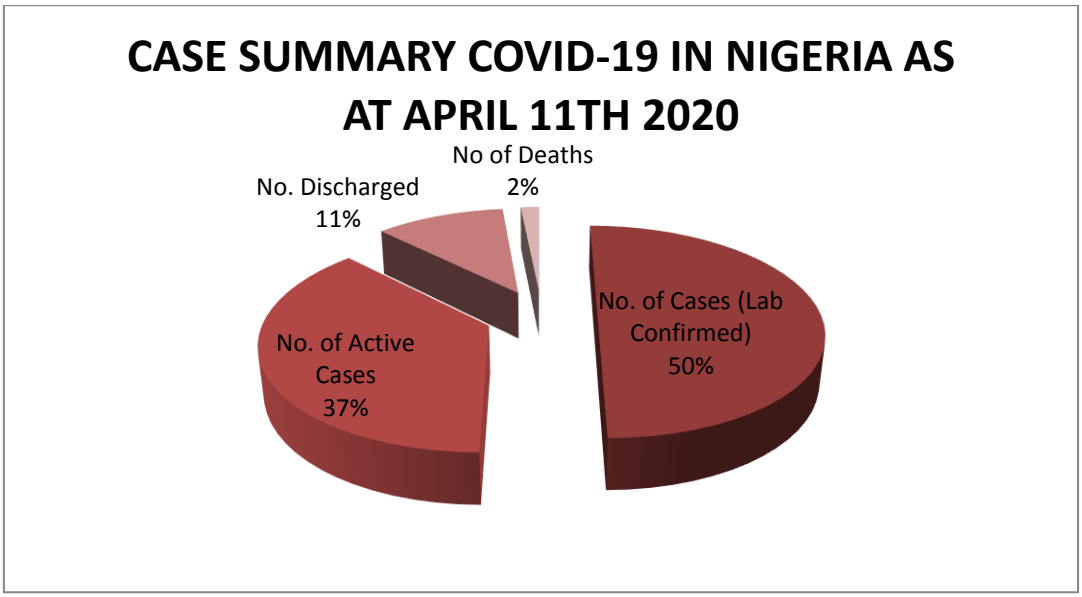

Figure 6: Pie chart of summary of COVID-19 cases in Nigeria.

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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A STUDY ON THE PSYCHOLOGICAL CRISIS DURING THE LOCKDOWN CAUSED DUE TO COVID-19 PANDEMIC[1]

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ABSTRACT: *The coronavirus (COVID-19) pandemic is the defining global health crisis of the current time and the greatest challenge that we have faced since World War II. Countries are racing to slow the spread of the virus by testing and treating patients, carrying out contact tracing, limiting travel, quarantining citizens, and cancelling large gatherings such as sporting events, concerts, and schools. The World Health Organization, which has* officially declared the outbreak a pandemic*, has called on "all countries to continue efforts that have been effective in limiting the number of cases and slowing the spread of the virus." However, the rest of the country remains under lockdown. Everyone else is only allowed to leave to purchase food or medication, visit the sick and go to the hospital. So, understanding the uncertain lockdown period, the present study focused on the psychological crisis among different categories of people during this vulnerable time of the community transmission of the virus. Twelve participants from different life roles were selected and were assessed on some negative and positive domains undergoing this worldwide phenomenon. A qualitative analysis was done to interpret the content of the information received from the participants. The study clearly indicated that apart from the life uncertainties psychological distress and economic worries that prevail genuinely but there are also some optimistic thought about the lockdown that can save our lives , rebuild trust and cooperation, within and among nations, between people and their governments and considered as a best practice in this crisis that might reduce threat among the participants during this lockdown period.*

KEYWORDS: Coronavirus, Pandemic, Psychological Crisis, Lockdown, Covid-19

INTRODUCTION

The COVID-19 pandemic has already gained its place on the dark side of world history for a variety of reasons: sudden onset, speed of global transmission, mistakes in recognition and management, politically inspired neglect or minimizations. The already dramatic infection and mortality figures have led to seemingly desperate and extreme government decisions in many countries. It has social, economic/financial, and public health impact is very impressive and, obviously, more powerful and damaging among the poor and disadvantaged population segments worldwide. Apart from this, the crisis had reminded us that our psychological well-being gets affected, the forced family time is generating new creative genres. Despite our differences we are able to rise to the occasion and help, comfort and take care of each other, remain optimistic that when we wake up from this long sleep, this long pause, we will be ready to take on the new challenges with vigour and compassion for all.

[1]Paper presented at the International E-Conference on COVID-19 Global Impacts, 20-21 July, 2020.

A pandemic is just one of nature's ways of finding some kind of balance. The present crisis is teaching us dramatic and insightful lessons. There were a smaller number of people on the streets; some are empty.

Working from home, we are realising that in many cases expensive office space is not required We are also, perforce, spending more time with family; there is greater bonding. Communication between parents and children and between life partners has improved. We have started reading books again, something that we had not done since long. Perhaps the universe is slowing us down. People who suspect they may have come into contact with the corona virus are being advised to self-isolate (stay at home) for 14 days.

According to studies, as many as 60% of those who experienced self-quarantine reported symptoms of depression, only 5% of those impacted remember a positive experience when quarantined. The isolation and boredom of the experience led to increased rates of fear and anxiety. While "lockdown" isn't a technical term used by public-health officials, it can refer to anything from mandatory geographic quarantines to non-mandatory recommendations to stay at home, closures of certain types of businesses, or bans on events and gatherings, Lindsay Wiley, a health law professor at the Washington College of Law.

With the World Health Organization (WHO) labelling corona virus a pandemic, the threat appears more real. ".COVID-19 is a corona virus outbreak that initially appeared in Wuhan, Hubei Province, China, in December 2019, but it has already evolved into a pandemic spreading rapidly worldwide .Because it makes it real , it can increase worries and anxieties .With increased worries and fears , we may also see an increase in feeling of depression", Dr. Robin Gurwitch , psychologists and professor at Duke University Medical Center, tells MEA Worldwide(MEAWW).It is not atypical to be struck by anxiety during a crisis. When the virus was raging China, a survey by Chinese Psychological Society revealed that about 43% of 18,000 participants experienced anxiety.

A new report by the Kaise Family Foundation finds that mental health burden is increasing for just about everyone. In a mid-March (2020) poll ,32% of people polled said that worry and tress about coronavirus had a negative impact on their mental health. Two weeks later in late March (2020), this number had risen to 45%. Psychotherapist Sophie Gallagher (2020) agrees but warns " panic, too ,is contagious", while the Samaritans encourage people to remember that they are not alone in feeling uneasy .So, the present case studies deals with the psychological conditions of different people in Kolkata during the lockdown due to novel corona virus (Covid-19 pandemic).A qualitative analysis was done to observe and understand the spontaneous behaviour of the participants in Kolkata in this current self- quarantine state.

METHODOLOGY

Method: The present study primarily aims to describe the qualitative description of the behaviour and events observed. The investigators collected data in the form of some narrative description for understanding and deriving necessary interpretation about the quality of the behaviour and characteristics of things observed.

Sampling: Demographical features: A purposive sampling is used which is valuable sampling type for special situations. In the current analysis twelve participants three from each group were selected from middle socio-economic strata, currently with four different life roles such as students (age 20-24 years), housewives (age 30-35 years), working males(age 30-35 years) and working females (age 30-35 years).For the desired collection of data, techniques involved was telephonic interviewing / via e-mail based on good rapport and close contact of the researcher with the participants.

Tools: A content analysis technique was used to examine the content or information and symbols contained in written documents or other communication media (/telephonic conversation/ e-mails).So here, to conduct a content analysis, investigators identified some negative and positive body of materials to analyse and then created a system for recording specific aspects in a systematic way. It uses the judgement of an expert selecting cases with specific purpose in mind.

Latent coding system (semantic analysis- look for the underlying, implicit meaning in the content of a text) was used to interpret the current psychological crisis that people are undergoing during the lockdown caused by corona virus globally. The investigators identified eight domains – four negative aspect of lockdown (Depressive mood, Distress, Uncertainty about the future life events and Lack of autonomy to move out during lockdown) and four positive aspects of (Re-establishment of emotional bonds among family members, Understanding and helping in family activities, An activity for leisure time [me time] and Getting faith in mankind) lockdown among the participants taken into considerations.

Procedure: In the present study the participants were selected by close contacts as everyone is undergoing this lockdown globally .Initially participants were considered as students, housewives, male working and female working and then they were contacted over telephonic interviews / via emails as because social distancing need to be maintained during this pandemic situation .The nature of the study was explained properly to the participants and at the same time it was also mentioned that the information would be kept confidential. Some positive and negative aspects of psychological crisis had been identified that the participants might show during this lockdown state. The responses of the selected participants were recorded over the telephone or send via emails about the psychological crisis during the lockdown caused due to Covid-19 pandemic. As the present study emphasised on qualitative research, content analysis method had been used to collect the data and interpreting the texts or content received or recorded from the participants.

RESULTS

Table 1 & 2: shows the Negative & Positive Aspects of Lockdown among different categories of people taken into consideration

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www.abjournals.org

Table 1: Domains of Negative Aspects

	Depressive Mood	Distress	Uncertainty about the Future Life Events	Lack of Autonomy to move out During Lockdown
Students	Life schedule changes, lack of interest or energy in their studies, laziness, de-motivation arises, excessive thinking about the current situation makes them feel worried and they also pray for the sufferers during this crisis period.	Longer period of home stay makes them distressing sometimes, overreaction to anticipated events are noticeable, negativity after being aware of the pandemic is dominant, it involves a lot of uncertainties and hardships in life	Currently the lives are messed up, future curriculum are questionable, feeling much tensed and worried about what may happen in the upcoming semester studies.	Going out for basic necessities also create anxiety and stress as people are not maintaining social distancing as media proactively making us aware of the accelerated chance of community spread
Working Males	Tensed about the economy. The fear of the looming unknown is definitely large. Avoiding watching news because that creates a depressed state of mind.	Creates anxiety while watching news and keep hearing about the death toll increasing around the world. Uncertainties about the migrant workers	Many people are faced with far more immediate loss of livelihood or lifestyle due to economical setback Need to re-evaluate any vacation or job-switch. Thinking positively and praying for the current situation to overcome successfully.	As lockdown was necessary for larger benefit and thinking themselves fortune because of their current socio-economic conditions which they could afford staying at home and also concerned about those people who are not so privileged to have work from home and have access to online delivery options.

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www.abjournals.org

	Depressive Mood	**Distress**	**Uncertainty about the Future Life Events**	**Lack of Autonomy to move out During Lockdown**
Working Females	As situation seemed to be unclear, sometimes anxiety, irritability arises. Longer stay at home creates emotional turmoil, anger among kid's that need to be handled, sometimes causing cabin fever among children.	Information overloaded from social media about the increasing death toll globally creates worries and tension.	Domestic violence may be the worst thing during this lockdown for many women, vacation needs to get reschedule and kid's school reopening created uncertainties.	Moving out from the house is not the current concern, willing to stay back at home and save the mankind.
Housewives	Losing interest to stick to the rules, disinterest in television channel as they are showing repeat telecast, pandemic fear leads to emotional turmoil, stress and insomnia, limited activities indoors creates frustration and monotony.	Escalating nervousness among many people as employees are getting 30-20% pay cut, daily wages earners are worst sufferer, unknown about the end of this situation creates a sense helplessness and hopelessness.	All upcoming life events are getting postponed for an uncertain period. People have limited access to resources to celebrate these events. Life events are personal but celebrations are social. If there is no gathering means there is no celebration. Uncertainty is not only around life events but also around our lives.	Feeling of helplessness as buying regular as well as lifesaving medicines, baby foods, monthly groceries, day to day requirements, students need their study material and kits, but no one can step out. A sense of worry and stress being created among all but at the same time everyone is aware that staying at home is the only way to fight against this grave situation.

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www.abjournals.org

Table 2: Domains of Positive Aspects

Categories of Participants	Re-establishment of Emotional Bonds Among Family Members	Understanding and Helping in Family Activities	An activity for Leisure Time (me time)	Getting Faith in Mankind
Students	Escalate family time, accepting and understanding undesirable habits or practices of the family members.	As no support from maids are available during this lockdown, engage themselves to help their parents with all possible household chores, making their work easier and at the same time learning a lot of things by themselves,	Constructive activities by drawing, sketching, designing cloths, stitching, glass painting, cleaning sometimes cooking, watching television, news updates, playing games and doing some college assignments.	Appreciate doctors, nurses and healthcare professionals. as local people trying their best to reach out to the poor and helping them with the essential things. Also, we need to believe in ourselves to take all precautions possible to avoid infection; hence the need to conform the recommended guidelines on prevention is very much essential in the society at large.
Male Working	A feeling of "Extended summer vacation" for the entire family, especially with the kids– without going out for any vacation or without any relatives – but with only the immediate family members.	Without domestic help, works gets divided though being the male counterpart work seemed to be less for them, healthy eating habits develop, helping in studies and teaching newer skills to the kids.	Playing piano, watching Netflix, Amazon prime movies, reading books, and developing photography skills taken from balcony or terrace.	As lockdown was necessary and no words are enough to express gratitude and thanks for the doctors, nurses, police, corporation workers, people involved in essential services – who are putting their lives on the line to ensure we can be safe. On a positive note trust and faith exists.

Categories of Participants	Re-establishment of Emotional Bonds Among Family Members	Understanding and Helping in Family Activities	An activity for Leisure Time (me time)	Getting Faith in Mankind
Female Working	Spending quality time with kid's, husband and in laws, having fruitful conversation, creates positive impact on emotional health as they do not get this opportunity every day.	Without domestic help household chores gets divided among the family members that enhance the family bonding.	Refreshing past hobbies by doing painting, watching movies which were not possible during busy work and family activities.	Happy to see people doing charity, helping the needy, believing in God, in this state treating doctors as God. They are the once who can save us now.
Housewives	Communication with the children increases, lowers lots of doubts, conflicts misunderstanding between couples as well as other family members and making their relations stronger.	Family members enthusiastically engage in r household activities. Perception of doing different household hazards are understood by the nonparticipant members.	As getting more helping hands around them, time could be redirected toward reading and writing, able to manage time for their passion.	Man was always kind before, social media makes us more aware of the facts that during this crisis many people try to help other and posting their good deeds socially. Frontline workers serving the nation worldwide.

DISCUSSION

The COVID-19 pandemic has forced millions of people to live under strict lockdown conditions, but the psychology of human behaviour predicts that people will find it harder to stick to the rules the longer the situation continues. The isolation and fear in this lockdown era are driving an escalating nervousness among many people, not just those with pre-existing conditions like anxiety, depression and obsessive –compulsive disorder but also the elderly who are struggling with new levels of loneliness and helplessness.

The present study is concerned with the students, housewives as well as working male and female groups. A content analysis on the negative aspects identified that depressed mood in all the group seemed to be ensured by thinking about the different aspects of economic crisis, anger, emotional turmoil, irritability, anxiety, cabin fever among the kids, losing interest to

stick to the rules, disinterest in television channel as they are showing repeat telecast. Pandemic fear also leads to stress and insomnia, limited activities indoors creates frustration and monotony. Distress created due to long stay at home , uncertainties and hardships about the migrant workers , information overloaded from social media about the increasing death toll globally creates worries and tension watching news and keep hearing about the death toll increasing around the world , escalating nervousness among many people as employees are getting 30-20% pay cut, daily wages earners are worst sufferer, unknown about the end of this situation creates a sense helplessness and hopelessness. Among these group of individuals taken in the present study due to prolonged closure of the educational institutions and offices uncertainty about the future life events for the students and working male seemed like a whirlwind as currently the lives of the students are messed up, future curriculum are questionable, feeling much tensed and worried about what might happen in the upcoming semester studies. Working individuals are faced with far more immediate loss of livelihood or lifestyle due to economical set-back, they might re-evaluate any vacation or job-switch. Domestic violence may be the worst thing during this lockdown for many woman, all upcoming life events need to get postponed for an uncertain period which can affect their psychological well-being in an adverse way. Lack of autonomy as being considered another negative aspect that affect their mental health where these group of participants considering that lockdown had been declared which was necessary for larger benefit and thinking themselves fortunate because of their current socio-economic conditions which they could afford staying at home and also concerned about those people who are not so privileged to have work from home and have access to online delivery options, and moving freely or going out for basic necessities also create anxiety and stress as people are not maintaining social distancing as media proactively making us aware of the accelerated chance of community spread. Sometimes a feeling of helplessness is being created as procuring some basic essentials seemed to be difficult and also a sense of worry and stress being created among all but at the same time everyone is aware that staying at home is the only way to fight against this grave situation.

The enormity and strangeness of this crisis is totally incomparable , both in scale and experience , to anything we have ever seen before in living memory and provokes in everybody a variety of responses: fear , worry ,solidarity ,grief but also the sense of being united in a common experience albeit tragic and in a purpose not letting the contagion spread. Apart, from the negative aspects there are also some alternate positive feelings that also played a significant role in order to protect the public health and prevent community transmission. Among the positive aspects include re-establishment of emotional bonds among family members where a feeling of “Extended summer vacation” for the entire family , especially with the kids– without going out for any vacation or without any relatives – but with only the immediate family members , having fruitful conversation, creates positive impact on emotional health , communication with the children increases, lowers lots of doubts , conflicts misunderstanding between couples as well as other family members and making their relations stronger. Students engage themselves to help their parents with all possible household chores, making their work easier and at the same time learning a lot of things by themselves. Apart from taking care of different household chores the participants also got opportunities to explore their passions which were shrinking due to lack of time and other life priorities. Most of them occupied themselves in some constructive activities like drawing , sketching , designing cloths ,stitching , glass painting ,cleaning sometimes cooking, ample amount of sleep of their preference, watching television , news updates , playing

games and doing some college assignments, playing piano, , reading books, and developing photography skills taken from balcony or terrace focusing on positive news , like news of people recovering from the virus also give us hope. Finally, individuals during this lockdown developed faith in mankind as lockdown was necessary, people who render selfless service in these trying times were appreciated and no words are enough to express gratitude and thanks for the doctors, nurses, police, corporation workers, people involved in essential services – who are putting their lives on the line to ensure we can be safe, as local people trying their best to reach out to the poor and helping them with the essential things Also we need to believe in ourselves to take all precautions possible to avoid infection; hence the need to conform the recommended guidelines on prevention is very much essential in the society at large... Again, during this lockdown phase, social media makes us more aware of the facts that during this crisis many people try to help each other and posting their good deeds socially. And believing in God and science will definitely help to fight and win against the greatest challenge ever globally.

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THE PERSPECTIVES OF ADULTS IN KWARA STATE, NIGERIA ON THE PREVENTION AND TREATMENT OF CORONAVIRUS PANDEMIC

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ABSTRACT: *Coronavirus disease is ravaging some countries of the world today. Efforts are being made globally to contain this deadly disease which has claimed many lives. This study therefore examined the perspectives of adults in Kwara State on the preventive and treatment measures for coronavirus. Attempt is made to explain the theories associated with the origin of coronavirus which are conspiracy theory, 5G theory and Nostradamus theory. The study adopted qualitative research approach. Population of the study comprised adults in Kwara State. Purposive sampling technique was used to select Ilorin Metropolis to participate in the study. Primary (oral interview) and secondary data were sources for data collection. Thematic analysis was employed for data analysis. However descriptive analysis was employed to analyze items. Findings showed that adults in Kwara State have their own preventive and treatment measures for the coronavirus. Among the items for prevention and treatment that reoccurred most are ginger, lemon and turmeric. Based on the findings, it is recommended that World Health Organisation (WHO) and researchers should test these preventive and treatment measures in order to accept or refute them in the containment of coronavirus pandemic.*

KEYWORDS: Perspectives, Adults, Preventive, Treatment, Coronavirus, Pandemic

INTRODUCTION

Coronavirus has made its own history in the world like other viruses such as Ebola, SAARS, HIV and Flu that have caused deaths. Viruses are submicroscopic- non-cellular structures that consist of DNA or RNA surrounded by a protein coat which relies on the existence of a living host cell to replicate. While the virus is in the living host, it causes diseases which are not easily to be cured. The emergence of these virus causing diseases are usually sudden and before any attempt could be made to discover drugs and vaccines for cure, lives have been claimed. These viruses have no respect for race or colour, hence some of them like coronavirus is pandemic while some are endemic.

Viruses are parasitic microscopic disease-causing organisms that lack the capacity to reproduce outside the host's body. Viruses have a reputation for being the cause of contagion (Durkham University, 2020). Coronavirus appeared in Wuhan, China at the beginning of December 2019(VIVEK,2020). Since then according to (VIVEK, 2020) public health experts around the globe are scrambling to understand, track and contain the virus. VIVEK (2020) further stated that the World Health Organisation (WHO) named the virus COVID-19, with reference to the type of virus and the year it emerged. Due to widespread of the virus (WHO) declared the virus pandemic in 11th of March, 2020. The (VERGE,2020) reported that

COVID-19 is a serious illness and it is more dangerous than Flu, its symptoms range from mild to severe, that the mild one does not require hospitalization. The symptoms that usually reported are fever, dry cough, itching throat and difficulty in breathing.

Several preventive measures have been recommended from reliable sources such as World Health Organisation (WHO). Such preventive measures include staying at home, keeping distance, covering one's mouth when cough or sneezing with flex elbow or tissue and discarding the tissue immediately and calling appropriate contacts when sick. Other preventive measures recommended are maintaining personal hygiene, regular hand washing with soap, use of alcohol-based sanitizers and use of face masks. Locally, communities might have their own preventive and treatment measures. However, all of them gear towards finding cure to the novel disease.

No doubt coronavirus pandemic has done a lot of harm to the word economy. Many countries are under lockdown which paralysed economic and social activities leading to economic downturn. Many countries like United States of America, Italy just to mention few countries of the word suffer unemployment, hunger and hardship. Families are counting their losses particularly the families whose member or members tested positive to the dreaded disease. Problems resulting from isolation, quarantine and even treatment of the disease are enormous.

Coronavirus otherwise called COVID-19 has thrown the world into confusion, panic, fear, apprehension and uncertainty. Following the outbreak of the virus in December 2019 the world is disorganized. The countries all over have witnessed unprecedented cases of infections and deaths. It is approximated that the disease could claim 200,000 to 1.7 million lives of people in the world (the VERGE,2020).

Purpose of the Study

The study aimed at examining the perspectives of adults in Kwara State on the preventive and treatment measures of coronavirus pandemic.

Research Questions

Two research questions were raised for the study.

1. What are the perspectives of adults in Kwara State on what can be used to prevent coronavirus pandemic disease?
2. What are the perspectives of adults in Kwara State on what can be used to treat coronavirus disease?

REVIEW OF LITERATURE

Concept of Viruses

Viruses are microscopic parasites that can only thrive in living hosts. These viruses live in the hosts and cause diseases in the hosts. Robert and Robert, (2020) define viruses as infectious agents of small sizes and simple composition that can multiply only in living cells of animals, plants or bacteria. Viruses are small infectious agents (Daniel, 2018). In another definition (Gelderblom, 1996) opined that viruses are small obligate intracellular parasites which by

definition contain either RNA or DNA genome surrounded by a protective, virus-coded protein coat. According to (Gelderblom 1996) viruses depend on specialised host cells supplying the complex metabolic and biosynthetic machinery of eukaryotic or prokaryotic cells. Gelderblom further stated that the aim of viruses is to deliver their genomes into the host cell to allow their expression by the host cell. A fully disease assembled virus is called virion. Researchers recorded that indications of biological viruses came from studies in 1892 which was led by the Russian scientist called Dmitry Ivanovsky.

Coronavirus Disease

Coronaviruses are spherical or pleomorphic enveloped particles containing single-stranded RNA associated with a nucleoprotein within a capsid comprised of matrix protein (Tyrrell and Myint(1996). Tyrell and Myint(1996) further stated that coronaviruses are classified together on the basis of the crown or hall-like appearance of the envelope glycoproteins, and on characteristics features of chemistry and replication. Coronavirus are a large family of viruses that are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) (WHO, 2020). World Health Organisation further defined coronavirus disease as an infection caused by coronavirus. WHO (2020) stated that coronavirus disease is characterized by fever, dry cough, difficulty in breathing, tiredness, aches and pains, nasal congestion, runny nose, sore throat and diarrhea. Averagely it takes 5-6 days from the time one is infected with the virus for the symptoms to show, although it can take up to 14 days. Tyrrell and Myint (1996) stated that coronaviruses cause acute or mild upper respiratory infection called common cold.

Theoretical Orientations to Coronavirus Origin

Theories are statements that explain the underlying principles concerning a given phenomenon. This study is guided by three theories which are: conspiracy theory, 5G theory and Nostadamus link theory. These theories are used because they tried to give explanation on the origin of coronavirus.

Conspiracy Theory

Conspiracy theory is a theory that explains events or situations by linking them to sinister and powerful actors who are politically motivated. Wikipedia explained conspiracy theory as an explanation of an event or situation that involves a conspiracy by sinister and powerful actors, often political in motivation when other explanations are more probable. Conspiracy theory explains circumstances or events from the point of secret plot that are usually from the powerful conspirators. It is a theory that propose that coronavirus was bioengineered as a bio-weapon in Wuhan laboratory (Micheal, 2020). Many conspiracy theories have varying degrees of popularity, usually related to clandestine activities like murder plots, and usually not proved by scientific or historical basis. The validity of conspiracy theory could only be proved through evidence. Conspiracy theories are notable in the areas of aviation, deaths and disappearances, economics and society, government, politics and conflict, medicine among others.

5G Theory

Origin of Coronavirus pandemic has been linked to the advent of 5G wireless technology. Those who propose this theory believe that coronavirus was caused from the radiations that come from the 5G technology. Among the subscribers to this theory was Keri Hilson, an American singer who has explained how 5G technology infects humans with virus. This theory is criticized because according to the critics 5G is next generation of wireless network after 4G, 3G and 2G that came before it. It is also criticized because 5G mobile data is like others transmitted over radio waves that are non-ionising, therefore cannot damage DNA inside cells.

Nostradamus-Link Theory

Nostradamus was a reputable physician and a seer whose followers believe that he predicted coronavirus. The followers believe came up with the belief when they revaluated one of his texts which had earlier been interpreted as an earthquake prediction (Micheal, 2020). The prediction read;

> "The sloppy park, great calamity,
> Through ''the land of the West" and
> Lombardy(Italy).
> The fire in the ship, plaque and captivity
> Mercury in Sagittarius, Saturn fading"

The followers of Nostradamus interpreted the sloppy park as Hankou Jiangtan which is a sloppy park in Wuhan. In the same way Lombardy means Europe, while the plaque and captivity to mean the coronavirus and city lockdown (Micheal, 2020). This theory was criticized by an American writer, Brain Dunning by saying that '' anyone who interprets Nostradamus writing as prophesies of future does so with a great deal of hindsight''.

Basic Protective Measures Against Coronavirus

Various measures have been advanced to protect people from contracting the deadly coronavirus. WHO (2020) stipulated the measures that should be taken to prevent contracting the disease. WHO (2020) advised on how to use masks in the communities, during home care, and in health care system for public health and infection prevention and control for the profesionals, health care managers, health care workers and community health workers. WHO, (2020) further recommended that people should maintain basic hand and respiratory hygiene, maintain safe food practices, avoid close contact with infected person and also with anyone showing symptoms of respiratory illness such as coughing and sneezing.

Treatment for Coronavirus

WHO (2020) stated that there is no specific treatment for coronavirus disease, although supportive care can go a longer way in assisting the infected person. WHO went further to state that there is no vaccine for the disease because it is new. Research is ongoing in some universities mainly in the western world to discover vaccine and drugs that can be used to prevent and treat deadly coronavirus disease.

Methodology

The study is qualitative research with survey research design which relies on primary sources (interviews) and secondary sources such as journals, textbook, social media, newspapers and interviews for data collection. The population is adults in Kwara State from where a sample of 50 adults were contacted for oral interview but only nine of the interviewee's responses were obtained and recorded. In-depth interview was conducted on the respondents. Data was also collected from social media. Questionnaire was not used hence the respondents were free to express themselves fully on the questions as contained in the research questions. Thematic data analysis was employed for data analysis. In addition, descriptive analysis using percentages was employed for item analysis.

RESULTS/FINDINGS

Thematic data analysis was adopted for data analysis.

Analysis of Secondary Data, (sources from social media, newspaper, books, journals e.t.c.)

Research Question 1: What are the perspectives of adults in Kwara State on what can be used to prevent coronavirus disease?

The perspectives of adults on what can be used to prevent coronavirus disease from secondary sources are as recorded below.

i. Palm oil: Drinking two spoons of palm oil prevents contracting of coronavirus.
ii. Hot liquids such as tea, coffee, hot water, turmeric in hot water can neutralize coronavirus when it is still in the throat.
iii. Gargles with salt, turmeric or any oral antiseptic can prevent coronavirus.
iv. Basking in the sun can kill the virus when it is outside the body
v. Eating fruits rich in vitamin C can boost immunity and prevent coronavirus.
vi. Maintaining great personal hygiene
vii. Unripe pineapple when eating can prevent coronavirus
viii. Inhaling steam from hot water prevents the contracting of the disease.

Research Question 2: What are the perspectives of adults in Kwara State on what can be used to treat coronavirus disease?

1. Eating of foods that have pH (alkaline level) that is above 5.5-8.5 pH level of coronavirus such as: Lemon (9.9Ph), garlic (13.2Ph), pineapple (12.7), Dandelion (22.7Ph), orange (9.2Ph), avocado (15.6Ph), mango (8.7Ph) e.t.c.
2. Drinking sliced lemon boiled with water to kill the virus in the body.
3. Gargling deep with warm water and salt will kill the virus and prevent it from entering the pharynx so that it cannot enter the lungs.
4. Taking Chloroquine when infected.
5. Skin 6 ginger, 20 cloves of garlic and lime blended together and made to paste. Put the paste in lip ton tea, also add grinded 1000mg paracetamol. Take it every 4 hours.
6. Get ginger, garlic, lemon and cook them together, add turmeric powder. Inhale the hot steam coming from the mixture by covering your head with blanket or thick towel.

7. Slice small garlic, ginger, onion, salt, lemon, boil the mixture with small water in a kettle for 5 minutes and be sniffing the content in the kettle for 20- 30 minutes daily.

INTERVIEWS

Researcher: Do you know or what people told you that can be used to prevent coronavirus apart from the ones recommended by World Health Organisation and Nigerian Center for Disease Control?

Interviewee 1: The things I know that can be used to prevent coronavirus are ginger, uzuza and uda. Boil them in a pot, then bend your face to the hot mixture and cover your head with cloth and breathe in the hot mixture, the coronavirus will die and leave that person. Coronavirus is high malaria.

Researcher: What do you know or what you heard that can be used to prevent or treat coronavirus apart from the ones recommended by World Health Organisation and Nigerian Center for Disease Control?

Interviewee 2: Yes, somebody told me that vitamin C can boost immunity. Another thing is blending pure honey with onion and black seed oil and drinking it one teaspoonful morning and night. Another thing is when you boil lemon grass and water and drink it, it will prevent the virus. Coronavirus is like high fever.

Researcher: Do you know or heard from people what can be used to treat or prevent coronavirus apart from the ones recommended by World Health Organistion and Nigeria Center for Disease Control?

Interviewee 3: Yes, eating carrot can help to bolster immunity so that you cannot contract coronavirus. Also ginger can also be used to prevent or treat coronavirus.

Researcher: Do you know or heard from people what can be used to prevent or treat coronavirus apart from the ones recommended by World Health Organisation and Nigeria Center for Disease Control?

Interviewee 4: There is a tree called “dogonyaro” used to treat malaria, when you boil the leaves in a pot, bend your face in the pot, cover your yourself with clothe and be breathing in the heat from the pot.

Researcher: Do you know what can be be used to prevent one from contracting coronavirus and also what can be used to treat the disease apart from the recommendation of World Health Organisation and Nigeria Center for Disease Control?

Interviewee 5: Eating ginger like that or when it is grinded and mixed with water, then the water is squeezed out and drank. It can prevent the virus from entering the body. It will also kill coronavirus that has entered the person’s body.

Researcher: Do you know what can be used to prevent or treat coronavirus contracting of coronavirus or to treat the disease apart from the ones recommended by World Health Organisation and Nigeria Center for Disease Control?

Interviewee 6: Yes, when you get lime, squeeze out the water and drink. You can also take lemon.

Researcher: Do you know or have heard from people what can be used to prevent or cure coronavirus apart from the ones recommended by Word Health Organisation?

Interviewee 7: Yes. Bitter kola is used to prevent or even to cure coronavirus. Grind bitter kola into powder and be bathing with it.

Researcher: Do you know or heard from people what can be used to prevent or cure coronavirus apart from the ones recommended by World Health Organisation and Nigerian Center for Disease Control?

Interviewee 8: I don't know much about that. They said that bathing with warm water and also drinking it kills the virus.

Researcher: Do you know or you have heard from people what can be used to prevent or treat coronavirus apart from the ones recommended by World Health Organisation and Nigerian Center for Disease Control?

Interviewee 9: Yes, 'dogonyaro' which is called 'kashia' in Yoruba language is ushed to prevent or cure coronavirus.

Table 1: Item Analysis on Prevention and Treatment of Coronavirus from Primary and Secondary Sources of Data.

Item	Frequency	Percentage
Palm oil	1	3.45
Lemon grass	1	3.45
Turmeric	4	13.79
Salt	2	6.89
Hot/warm water	6	13.79
Bitter kola	1	3.45
Lemon	6	20.68
Ginger	6	20.68
Garlic	2	6.89
Pineaple	1	3.45
Mango	1	3.45
Chloroqiune	1	3.45
Dandelion	1	3.45
Orange	1	3.45
Avocado	1	3.45
Uzuza	1	3.45
Uda	1	3.45
Dogonyaro	2	6.89
Onion	2	6.89
Pure honey	1	3.45
Black seed oil	1	3.45

Lemon grass	1	3.45
Carrot	1	3.45
Lime	2	6.89
Coffee	1	3.45
Basking in the sun	1	3.45
Lipton tea	1	3.45
Vitamin C	1	3.45
Paracetamol	1	3.45

Table 1 showed that the items which have the highest percentage of being mentioned as what can be used to prevent/treat coronavirus were lemon and ginger with 20.68% each followed by turmeric and hot or warm water with 13. 79% each followed by garlic, salt, dogonyaro, onion and lime with 6.89% each. Other items have 3.45% each.

DISCUSSION

In research question one, the findings from the secondary sources showed that palm oil, hot liquids like coffee, gargling with salt, turmeric, basking in the sun among others are what can be used to prevent the contracting of coronavirus disease according to adults in Kwara State perspective. This finding may be so because coronavirus disease shows the same symptoms like malaria which they use those methods above to prevent. However, the finding is not in tandem with (WHO and NCDC,2020) who stated that face masks, hand washing with soap, sanitizers and social distancing should be used to prevent coronavirus disease.

The findings from the secondary sources in question one also showed that drinking sliced lemon boiled with water, gargling deep with warm water and salt, boiling small sliced garlic, onion, ginger, lemon and salt for 5 minutes in a kettle and sniffing the content for 20-30 minutes cure coronavirus. Also eating fruits that have pH level that is above the pH level of coronavirus among other findings can cure coronavirus. The findings may be so because coronavirus has symptoms that are the same thing with diseases people treat with those things. These findings did not corroborate (WHO, 2020) who stated that coronavirus has no cure now because it is a new disease.

The findings from interviews showed that the interviewees said that vitamin C, onion, black seed oil ixed with pure honey, carrot, lime, ginger, lemon, among other things said can be used to prevent coronavirus. They findings were so probably because the respondents know that those things can be used to bolster body immunity and some of them serve as antibiotics. These findings did not corroborate (WHO, 2020) who said that hand washing with soap for 20 minutes, social distancing, use of sanitizers, face masks and personal protective equipments should be used to prevent coronavirus. Also Nigeria Center for Disease Control (NCDC, 2020) argued that social distancing by one meter distance, covering mouth with flex elbow when coughing or sneezing, washing hands with soap and water for 20 seconds, spraying surfaces, and using alcohol based sanitizer for coronavirus prevention are not in support of these findings.

In research question two, the findings from the interviewees showed that blending onions, black oil seed, and mixing them with pure honey can be used to treat coronavirus disease.

Other things the interviewees said that can be used are local spices such as uzuza, uda and local leaves such as 'dogonyaro'. These findings are not in consonance with (WHO, 2020) who argued that coronavirus disease has no drugs for cure because it is new. WHO 2020) added that currently there is no vaccine for prevention of coronavirus disease.

The findings from the study clearly showed that people devised various means of preventing and treating coronavirus other than the recommendations from World Health Organisation and Nigerian Center for Disease Control. It should be noted that those things found out from the secondary sources and interviews have never been tested for either for coronavirus prevention or treatment. Hence, there use can endanger health. So, there is need for those things to be tested formally before they can be used to prevent or treat coronavirus.

Implication of the Study to Research and for Counselling Practice

Coronavirus is a deadly disease that spreads rapidly to humans. It is not a virus that can be handled with levity. Many countries are counting their loses, as it has claimed so many human lives and the end of the pandemic is yet to be seen. People are devising all sorts of preventive and treatment measures without testing them. This could be dangerous to people's health. Already, Royal FM, 95.1 on the 26th of April, 2020 gave news that one hundred and nine people died in Dominican Republic after drinking a concoction they believed that can prevent the contracting of coronavirus. There could be other such incidents that were not covered by the media.

Therefore, there is need to reach the public through counselling on the dangers of using un recommended drugs and items for coronavirus prevention and treatment. Efforts should be intensified by the researchers to discover potent drugs that can be used to treat coronavirus disease so that people will not endanger their lives with concoctions they believe that can prevent or cure the disease. In addition, researchers should speed up action to discover vaccines for the prevention of the disease. Those items which include leaves, spices, roots among other things which the secondary sources and primary sources (interviews) suggested that can prevent and cure coronavirus should be properly tested to establish their potency or otherwise. WHO should mount up campaign through counselling to encourage people to apply the prevention measures and any treatment that may be recommended by World Health Organisation.

CONCLUSION

The study examined the perspectives of adults in Kwara state of Nigeria on what could be used to prevent or treat coronavirus. It was a qualitive research which gathered data through primary and secondary sources. Findings from the sources showed that the adults in Kwara State have other preventive and treatment options for coronavirus other than the recommendations for treatment and prevention methods from World Health Organisation and other authorized bodies like Nigeria Center for Disease Control.

RECOMMENDATIONS FOR FUTURE RESEARCH

1. Researchers can replicate the study in other states of Nigeria.
2. Lockdown imposed by the state government did not make it possible for the researcher to interview many people, therefore the sample of the study can be increased by another researcher.
3. The study can be replicated in another country in Africa.

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COVID-19: THE ROLE OF WELFARE AND SAFETY OF HEALTH WORKERS IN COMBATING THE OUTBREAK[1]

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ABSTRACT: *At the conclusion of year 2019, a novel coronavirus was distinguished as the cause of a cluster of pneumonia cases in Wuhan, a city within the Hubei Area of China. It quickly spread, coming about in a scourge all through China, taken after by an expanding number of cases in other nations all through the world. The name, Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was assigned to the virus that causes COVID-19. Understanding of the transmission risk is inadequate. The COVID-19 outbreak has been seen to have huge toll on the physical, mental, and feeling on the world's public health workforce. Health workers are at the front line of the COVID-19 outbreak reaction and as such are uncovered to dangers that put them at chance of contamination. It is of significance to avoid the spread of this illness, by executing work environment assurances for front line healthcare workers whose proficient obligation is to protect patients. The tall rate of diseases among healthcare staff universally could be a genuine concern since workers who are infected must remain absent from work for at least 14 days, depleting the already exhausted workforce. The chaos of coronavirus underscores the challenge that public health workers face in prioritizing their own wellness in the face of limited resources, the confront of restricted assets, regularly brutal hours, and apparently perpetual requests on their transfer speed. It would be a public health fiasco if huge numbers of health workers get debilitated or are isolated. COVID-19 is a novel disease that is not yet fully understood and therefore the need for enforcement of critical safety measures, provision of adequate personal protective equipment (PPE), and update safety trainings for health workers. Health workers are expected to take maximum precautions to prevent getting infected. Guaranteeing protection and satisfactory welfare for the health workers with the incorporation of insurance cover in case of accidental loss of life on account of contracting COVID-19 are exceptionally basic in combatting the outbreak.*

KEYWORDS: COVID-19, Safety, Welfare, Health Workers, Outbreak, Coronavirus.

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INTRODUCTION

Coronaviruses are critical human and animal pathogens. At the end of 2019, a novel coronavirus was distinguished as the cause of a cluster of pneumonia cases in Wuhan, a city in the Hubei Province of China. It quickly spread, coming about in an epidemic all through China, followed by an expanding number of cases in other nations all through the world. In February 2020, the World Health Organization assigned the illness COVID-19, which stands for coronavirus disease 2019 [1]. The virus that causes COVID-19 is assigned severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2); previously, it was alluded to as 2019-nCoV. Understanding of COVID-19 is advancing. Between times direction has been issued by the World Health Organization and by the United States Centers for Disease Control and Prevention. However, cases have been reported in all continents, except for Antarctica, but for Antarctica, and have been relentlessly rising in numerous nations. These include the United States, most countries in Western Europe (including the United Kingdom), Iran and in many African countries [2].

Since the primary reports of COVID-19, disease has spread to incorporate more than 300,000 affirmed cases across the world, inciting the WHO to pronounce a public health emergency towards ending of January 2020 and in March 2020, it was characterized as a pandemic. Understanding of the transmission hazards is inadequate. Epidemiologic examination in Wuhan at the starting of the outbreak identified an initial association with a seafood market that sold live animals, where most patients had worked or gone by and which was along these lines closed for disinfection [3]. Be as it may, as the outbreak advanced, person-to-person spread got to be the most mode of transmission.

Person-to-person spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is thought to happen primarily through respiratory beads, taking after the spread of the flu. With droplet transmission, virus discharged within the respiratory secretions when an individual with infection coughs, sneezes, or talks can contaminate another individual in case it makes coordinate contact with the mucous layers; contamination can moreover occur if a individual touches a contaminated surface and after that touches his or her eyes, nose, or mouth. Typically, the distance droplets can travel is not more than six feet (around two meters) and do not hold up within the discuss; one study however reported that under experimental conditions, SARS-CoV-2 remained viable in aerosols for the minimum of three (3) hours [4]. Given the current instability with respect to transmission mechanisms, airborne safety measures are suggested routinely in few nations and within the setting of certain high-risk strategies in others. Upon doubt of COVID-19, infection control measures ought to be executed and public health officials informed. In health care settings in the United States, the Centers for Disease Control and Prevention (CDC) suggests a single-occupancy room for patients and gown, gloves, eye protection, and a respirator (or an alternative like facemask) for health care professionals. According to the daily situation report of World Health Organization (WHO) as regards COVID-19 pandemic on 8th April, 2020, more than 22,000 healthcare workers across 52 nations and regions has been infected with the virus, which was indeed said the number is likely under-represented as there's so far no efficient detailing of infections among healthcare workers to the WHO [**5**]. The COVID-19 outbreak has been seen to have colossal toll on the physical, mental, and emotion on the global public health workforce [6].

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Health Care Workers Exposure and Hazards

Responding at the front line to the COVID-19 outbreak are the health workers and as such are uncovered to hazards that put the at the risk of being infected with the virus. The risks among others are pathogen exposure, mental distress, fatigue, long working hours, occupational burnout, stigma, and physical and psychological savagery [**7**]. More than 3,000 health care workers in China have been infected and among the death toll are the health workers who lose their lives not from the virus itself, but from cardiac arrest and other conditions caused by being overworked, exhaustion and fatigue. Within the U.K., NHS contract workers live in fear that an isolation could keep them from work for weeks on end—and without pay. And here in the U.S., a single patient who was denied a coronavirus diagnosis exposed dozens, if not hundreds, of UC Davis Medical Center staff to the disease, pointing out the dire consequences of having inadequate safety measures in place [6]. Of significance to avoid the spread of this disease, is executing work environment protections for front line healthcare workers whose professional obligations is to protect patients. There are as of now over 116,000 coronavirus infections worldwide, counting over 1000 cases in the United States [8]. China's outbreak infected over 3,300 healthcare workers by late February and included the deaths of 13 workers [9]. In the United States hundreds of healthcare workers are already in quarantine since the virus's first known American case in January [10].

Out of more than 41,000 COVID-19 cases recorded in Italy, the minimum of 2,609 of them includes healthcare workers, greater than 15,000 are hospitalized. In the intensive care units are 2,498 patients and at least 2,609 of them are healthcare workers. The deaths recorded has gotten to 3,405 which is more than in those recorded in China [11]. Healthcare workers make up 9% of Italy's COVID-19 cases which is really too high but in 24 hours a figure of 12% was seen in Spain. Deplorably, death of health workers in Indonesia, Iran, Spain and Italy was also detailed [12]. The high rate of infections among healthcare staff is a serious concern because workers who are infected must stay away from work for at least 14 days, depleting the already exhausted workforce. As more cases of the disease develop around the world, we can anticipate the strain on health care personnel to be more regrettable. Stockpiles of medical supplies will wane. The tide of clinic patients will rise and the deficiency of test kits might develop. The flu will proceed to tangle efforts to distinguish who has coronavirus and who doesn't. Together with the combination of long shifts, high stress, and understaffing could bring down the immune systems of health care workers and expose them to be more vulnerable to the disease and other illnesses than they ordinarily would be. An associated lack of sleep also threatens to debilitate their immune system response [6]. Coronavirus anarchy underscores the challenge that public health workers encounter in prioritizing their own wellness within trying to cope with limited resources, regularly brutal hours, and apparently perpetual requests on their transmission capacity. These issues are not interesting to times of emergency, but a chronic and worsening pattern in health field.

And it's a design that can have annihilating consequences not just for the public health community but for that of the individuals they care for. We know that supplier burnout is related with an uptick in medical blunders. And sick, exhausted health workers can lead to further staff deficiencies, longer hospital hold up times, and poorer patient outcomes generally [**6**]. It would be a public health catastrophe if large numbers of health care workers get debilitated or are quarantined.

Actions to be Taken to Protect Health Care Workers

COVID-19 is a novel disease that is not yet fully understood and in which the exposure can possess higher risks comparing to the present findings. The health workers which are at front line of combatting the outbreak need to be adequately protected.

The immediate actions to be taken in order to protect the health workers includes:

1. **Enforcement of Critical Safety Measures:** The most effective and quick action that can be taken to protect frontline workers from coronavirus exposure is to mandate that the health occupational safety body e.g. OSHA and others to issue an Emergency Temporary Standard (ETS) that will put an infectious disease standard into action that protects healthcare and other high-risk workers. Multiple agencies, including OSHA [13], have released guidance and best practices for workplace exposure to COVID-19. These assets are fundamental but will not enforce employer responsibility to actualize safety precautions or a robust exposure control plan. The agency whose mission is to assure safe and healthful conditions for workers must step in and enforce these critical safety measures.

2. **Provision of Adequate Personal Protective Equipment (PPE):** Majorities of the facilities globally lack adequate PPE in responding to COVID-19 positive patients. There is lack of sufficient protective equipment to keep healthcare workers in Italy secure, thereby relinquishing their health within the fight to combat COVID-19 outbreak. The is warning from some professional councils and associations (e.g. the International Council of Nurses (ICN) and the Italian Nurses Association (CNAI)) of the dire dangers of not providing adequate personal protective equipment for nurses and other health workers who works with COVID-19 patients. Few hospitals do have sufficient Personal Protective Equipment (PPE), but in most cases, Nurses, Doctors, Medical Laboratory Scientists and other health workers are constrained to wear masks which are distant past their viable utilize, and in some facilities in central and southern Italy, staff have no PPE at all [11]. These feel like going into fights with paper shields and toy weapons. These supplies are imminent now and not later. There is ought to be complete PPE mass production in this COVID-19 outbreak for health workers use (such as masks, gloves, goggles, gowns, hand sanitizer, soap and water, cleaning supplies) and must be made available for use.

3. **Adequate and Update Safety Trainings:** The Bosses and Directors in health facilities should assume overall responsibility to guarantee that all essential preventive and protective measures are taken to minimize occupational safety and health risks. There should be provision of information, instruction and training on occupational safety and health, which should include; (a) Refresher training on infection prevention and control (IPC); (b) training on the use, putting on, taking off and disposal of personal protective equipment (PPE) [1]. There should also be provision of adequate IPC and PPE supplies (masks, gloves, goggles, gowns, hand sanitizer, soap and water, cleaning supplies) in adequate quantity to healthcare or other staff caring for suspected or confirmed COVID-19 patients, such that workers do not personally incur cost for occupational safety and health requirements; familiarize workforce with specialized overhauls on COVID-19 and provide fitting apparatuses to assess, triage, test and treat patients and to share infection prevention and control information with patients and the public [1].

Role of Health Workers in Ensuring Safety

Health workers are expected to take necessary precautions to prevent getting infected. They ought to follow established occupational safety and health procedures; avoid exposing others to health and safety risks and participate in employer-provided occupational safety and health trainings. They should always put on, use, take off and dispose personal protective equipment properly. They should self-monitor for signs of illness and self-isolate or report illness to managers, in case it happens. They should use provided protocols to assess, triage and treat patients [1]. They should follow proper guidelines as described by World health organization (WHO).

Welfare of the Health Workers

In a way of combatting the COVID-19 outbreak, health workers professionals who are not considering their own health risks and have been attending to COVID-19 patients are to be motivated specially; governments and authorities are advised to be committed to it [14]. This will go a long way of making them put in their best in combatting the outbreak. The special motivation should be in form of the following:

1. Robust special welfare package and good incentives for the health workers at the frontline of combating the outbreak
2. It is emphatically recommended that, there should be an insurance cover provision for the health workers at the 'war' front who may have to be in direct contact and care of COVID-19 patients and who may be at risk of being affected by this. It should also include cover for inadvertent misfortune of life or accidental loss of life on account of contracting COVID-19.

CONCLUSION

Combating COVID-19 starts with keeping health workers very well. Ensuring protection and satisfactory welfare for health workers are exceptionally basic. This audit in this manner prescribe that appropriate protection mechanism and special welfare package should be provided for the health care workers; which could be a way of maintaining a strategic distance from diminishment in health workforce, decreasing the spread of disease, also a way of motivating, persuading and empowering the health workers.

Competing Interests

The authors declare no competing interests.

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IMPACT OF HYDROXYCHLOROQUIN/AZITHROMYCIN PROTOCOL ON COVID-19 CASE-FATALITY RATE REDUCTION IN ALGERIA

Ahmed Youssef Kada, Kheireddine Abdelouahed Bouyoucef and Kouider Sahraoui

Blida 1 University - School of Medicine

ABSTRACT: *This study aimed to demonstrate the effectiveness of hydroxychloroquin/ azithromycin protocol in Algeria, in particular after its extension to all patients diagnosed COVID-19 positive on RT-PCR test. We were able to illustrate this fact graphically, but not to prove it statistically, indeed in the 7 days which followed generalization of therapeutic protocol, case fatality rate decrease and doubling time increase, thus confirming the impact of wide and early prescription of hydroxychloroquin/azithromycin protocol.*

KEYWORDS: Algeria, Covid-19, Pandemic, Hydroxychloroquin, Azithromycin, Case Fatality Rate.

INTRODUCTION

Covid-19 is an emerging infectious disease like viral zoonosis caused by new coronavirus SARS CoV 2.

On December 31, 2019, Wuhan Municipal Health Commission in Hubei province (China) reported cases of pneumonia, the origin of which is a new coronavirus.

Rapidly extendable around the world, the World Health Organization (WHO) declares it pandemic on March 11, 2020.

This pandemic reaches Algeria on February 25, 2020, date on which the Algerian minister of health, announced the first case of Covid-19, a foreign citizen.

From March 1, a cluster is formed in Blida and becomes the epicentre of the coronavirus epidemic in Algeria, its total quarantine is established on March 24, 2020, it will be smoothly alleviated on April 24.

A therapeutic protocol based on hydroxychloroquine and azithromycin was put in place on March 23, for complicated cases, it was extended to all the cases confirmed on April 06.

Patients and Method

We have analyzed the data collected from press releases and follow-ups published daily by the Ministry of Health, we have studied the possible correlations of these data with certain events or decisions having a possible impact on their development, such as confinement at home and its reduction, the prescription of hydroxychloroquine/azithromycin combination for serious patients and its extension to all positive COVID subjects. Results are presented in graphics, the data collection was closed on 26/05/2020.

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www.abjournals.org

RESULTS

Covid-19 pandemic spreads from February 25, 2020, when a foreign citizen is tested positive, on March 1 a cluster is formed in the city of Blida where sixteen members of the same family are infected during a wedding party.

On 26/05/2020 :

Days of Pandemic	Cumulative Cases	Cumulative Deceased	CFR	DT (days)
92	8697	617	7,09 %	23

CFR (Case-fatality rate). DT (Doubling time).

Data from the Algerian Ministry of health

Wilaya of Blida becomes the epicentre of coronavirus epidemic in Algeria and lockdown measures taken, while the number of national cases diagnosed begins to increases (Figure1).

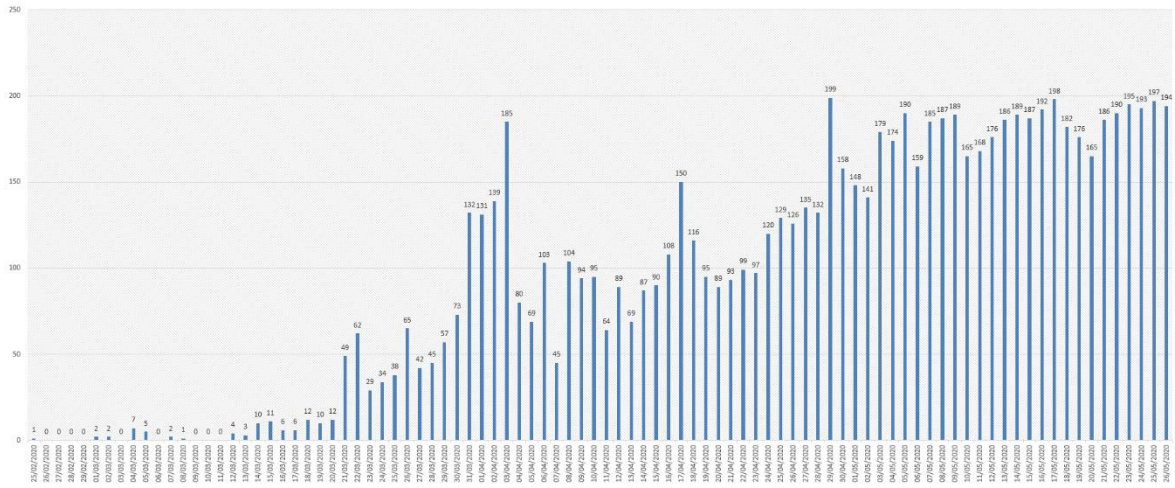

Figure 1: Daily New Cases of COVID 19 in Algeria

The rapid increase of cumulative cases in the country is shown in the following figure (Figure 2), the second curve corresponds to a cumulative number of deaths.

African Journal of Biology and Medical Research
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Volume 3, Issue 2, 2020 (pp. 66-72)
www.abjournals.org

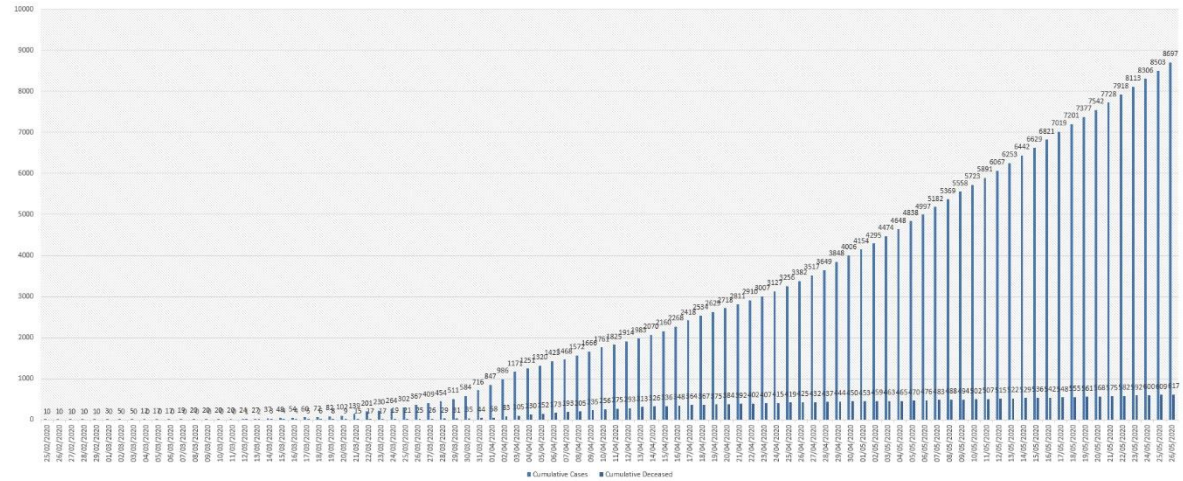

Figure 2: Cumulative COVID19 Cases and Deaths in Algeria

Case-Fatality rate curve evolves gradually from March 12, at the very beginning of the epidemic, it reaches 15.78% on April 13, then decreases gradually to be around 7,09 % on May 26 (Figure 3).

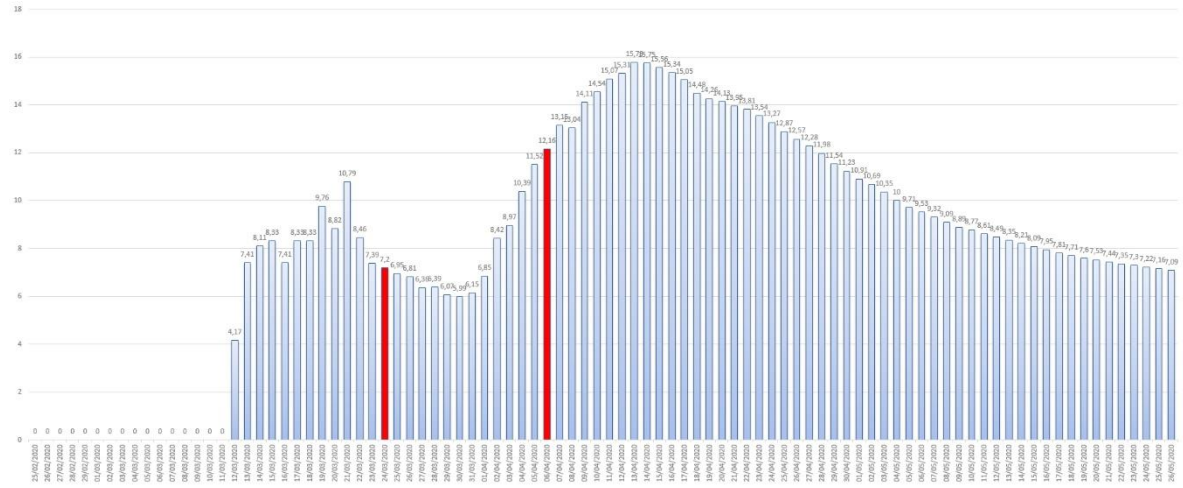

Figure 3: Case-Fatality Rate of COVID 19 in Algeria

First red markings: Introduction of hydroxychloroquin/azithromycin protocol (23/03).

Second red markings: Generalization to all positive cases (06/04).

Regarding the doubling time, it is in constant progression, first extremely fast at the start of the epidemic, it gradually decelerates to reach 23 days on May 26, (Figure 4).

African Journal of Biology and Medical Research
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Volume 3, Issue 2, 2020 (pp. 66-72)
www.abjournals.org

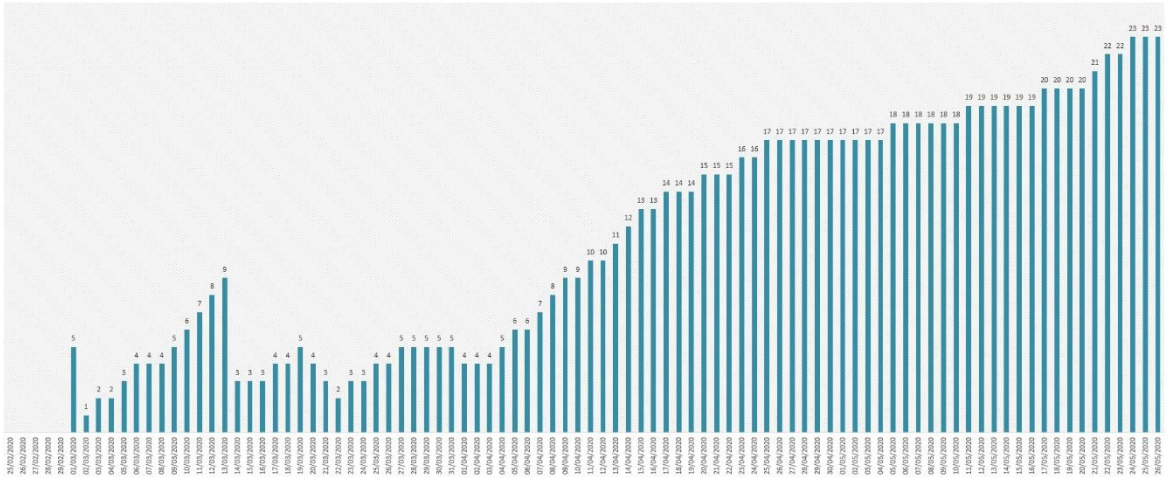

Figure 4: COVID 19 Doubling Time in Algeria

Their progressions being opposite, case-fatality rate and doubling rate curves cross twice, a first time, on 03/14/2020, when the epidemic is active and when it is moving towards its maximum, and a second time, around 20/04/2020, 7 days after the extended prescription of therapeutic protocol and stabilization of the epidemic (Figure 5).

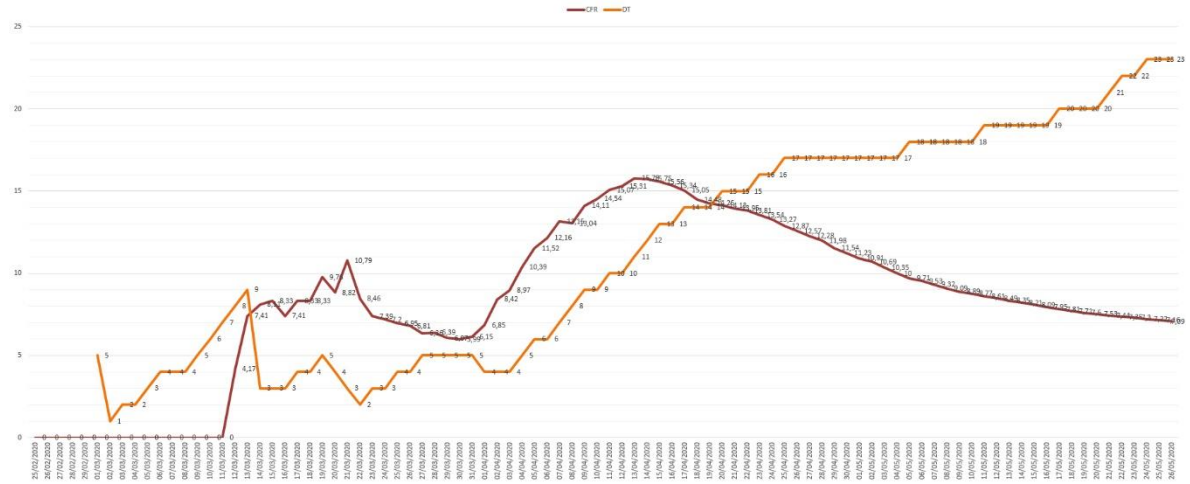

Figure 5: Evolution of Case Fatality Rate and Doubling Time in Algeria.

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ANALYSIS

In first the sustained increase in the number of diagnosed in Algeria seems to be linked to the increase in the capacity to carry out the RT-PCR test, indeed, for a moment limited to the Institut Pasteur in Algiers (IPA), this possibility was quickly extended to other cities with the creation of IPA annexes.

The different curves allow us to understand certain key elements in the progression of this epidemic in Algeria:

The case fatality rate: it is established from the number of positive cases and deceased persons, it is used to assess the mortality linked to Covid-19, in our analysis, it gradually decreases after generalization of the use of the therapeutic protocol, this progressive decline begins 7 days after generalization of therapeutic protocol, whereas when the treatment was reserved only for severe cases its impact was limited.

Doubling time: this is the time it takes for a population with COVID-19 to double its value, to measure it, we estimate the number of days it takes to double the number of people hospitalized.

Concerning Ro (basic reproduction rate), It is an index of the contagiousness of this disease[1], this doubling time is constantly slowing down in our study, it is currently around 23 days, it is a good indicator of the effective impact of the measures adopted.

The control of this doubling time could be done by actions on the three parameters of Ro[2]:

1. Reduction of the probability of transmission by hygiene and prophylaxis measures (handwashing, protective masks).
2. Reduction of the rate of contacts by reduction of social life (social distancing by closing places of worship, schools, universities, the suppression of public gatherings, the reduction of the circulation of the population).
3. The decrease in the duration of contagiousness (use of symptomatic drugs and isolation of contaminated subjects).

DISCUSSION

The lethality of COVID-19[3] is extremely versatile in the world[4], the difficulty of estimating the real number of carriers in the absence of systematic tests makes this figure highly variable according to the countries[5], it is more logical to analyze the daily evolution in each country[6], in particular when the therapeutic approaches are different[7].

In Algeria, the overall case fatality rate, first estimated at 15.78 % on 13 April, begin to decrease 7 days after generalization of therapeutic protocol, to reach 7,09 % on May 26, confirming the effectiveness of the measures taken and the merits of using hydroxychloroquin/azithromycin protocol.

This therapeutic protocol, although disputed[8], has largely proven its effectiveness since[9], both in terms of mortality and in the evolution of the disease[10].

Inexpensive, hydroxychloroquine has been widely prescribed worldwide for more than 70 years, it is known for its antiviral and anti-inflammatory effect[11], while azithromycin is an antibiotic from the macrolide family widely prescribed in respiratory conditions.

The establishment of home confinement[12] on March 24, when only 264 cases had been officially identified in Algeria resulted in the improvement of the doubling time, initially estimated between 1 and 4 days, it is progressively improved to around 23 days on 26/05/2020, comparatively, this decision to confine was taken in Italy when 9000 cases had been diagnosed (around 7000 cases in the United Kingdom and France)[13].

In any event, the association of early containment measures combined with a generalized initial treatment for all positive cases, whatever their degree of severity, will have contributed to a reduction in the fatality rate of COVID 19 and a slowing down of its doubling time.

CONCLUSION

In Algeria, the rapid combination of rigorous containment measure at home and early generalized treatment with hydroxychloroquin have demonstrated their effectiveness in terms of morbidity and mortality, the classic measures of social distancing and hygiene will make it possible to perpetuate these results by reducing viral transmission, the only unknown, the reopening procedure which can only be started after being surrounded by precautions aimed at ensuring the understanding of the population.

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RECURRENT PREVALENCE OF COVID-19 SYMPTOMS AMONG INHABITANTS OF MADOBI TOWN, KANO-NIGERIA COINCIDES WITH THE PERIOD OF DISEASE OUTBREAK IN THE STATE: A TIMEFRAME FROM APRIL - MAY 2020

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ABSTRACT: *Ever since the outbreak of the novel coronavirus infection which emanated from Wuhan, a city in Hubei province of China and subsequently leads to the current global pandemic, the disease has been travelling and fast spreading across various nations of the world. As of 07 June 2020, there were 3,230,031 active cases and 406,343 deaths reported globally. Out of this, Nigeria current cases stood at 8,173 persons with 354 deaths, while specifically in Kano State; the total active cases hit 501 with 48 deaths respectively. Not much long after confirmation of the first positive index case of this villain virus in Kano city, on 11th April, 2020, there have been frequent reports of people across the state exhibiting symptoms (such as high fever, headache, cough, loss of smell, loss of taste, fatigue, loss of appetite, vomiting, diarrhea and shortness of breath) that are similar to COVID-19 infection as defined by the Nigerian Center for Diseases Control (NCDC), but however with subsequent high recoveries. Owing to this development, the present study entitled to assess the situation pertaining to occurrence of these cases, recoveries and the method of treatment applied in the study location. A semi-structured questionnaire was designed and administered to a total of fifty (50) respondents pulled out randomly from the study area. It was found out that 41(82%) of the respondents catches common cold/catarrh during the timeframe of the study against the remaining 09(18%) who did not. In general, out of the 50 samples interviewed, 96% representing 48 persons exhibited two or more of symptoms that are similar to COVID-19 infection, while 02 (4%) did not experience any of the signs. However, out of these 48 suspected persons, 32(66.7%) receive medical care either from hospital or pharmacy, while 16(33.3%) of them did not seek for any medical assistance. In terms of body conditions improvement, 42(87.5%) persons recovered fully from the symptoms and 06(12.5%) are still battling with one or two of the symptoms. Moreover, 10(20.8%) persons reported to have use herbal therapy during the course of the treatment while 38(79.2%) did not. Based on the outcome of this finding, it can be deduced that the possibility of communal COVID-19 transmission among the inhabitants of the study area during the timeframe cannot be totally overruled even though that no single COVID-19 confirmatory test was carried out. Hence, there is need for government and other concerned authorities to establish more testing facilities in remote areas and also review their protocols towards containment of this pandemic as this unending lockdown seem to be no longer sustainable.*

KEYWORDS: Madobi, COVID-19, Infection, Treatment, Recovery, Nigeria

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Volume 3, Issue 2, 2020 (pp. 73-83)

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INTRODUCTION

The novel coronavirus are a family of viruses that cause illnesses associated with the common cold. The first case of coronavirus infection was identified and reported as cold in 1960 (Kumar *et al*., 2020). Specifically, coronaviruses were known to cause respiratory and intestinal infections both in animal and human models (Cui *et al*., 2020). However, these viruses were not considered to be highly pathogenic to humans until the outbreak of the diseases namely; Severe Acute Respiratory Syndrome (SARS) in 2002-2003 in Guangdong province, China (Drosteen *et al.,* 2003; Zhong *et al*., 2003; Fouchier *et al.,* 2003; Ksiazek *et al.,* 2003) caused by a particular strain of the corona viruses. Meanwhile, the coronaviruses that circulated before that time in humans mostly caused mild infections in immuno-competent people. Ten years after SARS, another highly pathogenic coronavirus, Middle East Respiratory Syndrome Coronavirus (MERS CoV) emerged in Middle Eastern countries (Zaki *et al*., 2012).

December 2019 has been a tragedy to the entire world, more especially to the Chinese citizens due to the emergence of a series of pneumonia cases of unknown cause in Wuhan, a city in Hubei province of China (Rahman and Bahar, 2020). In early January 2020, after a series of deep sequencing analysis from lower respiratory tract samples of the infected peoples, scientists were able to identified a novel coronavirus, termed as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2; formerly called 2019-nCoV) as the causative agent for that observed pneumonia cluster (Huang *et al*., 2020). Additionally, on 11th February, 2020, the Director-General of World Health Organization (WHO), Dr. Tedros Adhanom Ghebreyesus, during a briefing pronounced the disease caused by the SARS-CoV-2 as Coronavirus Disease 2019 coded as "COVID-19" (Di Gennaro *et al*., 2020). Subsequently by March 11th, 2020 when the number of countries involved with the infection hit 114, with more than 118,000 cases and over 4000 deaths, the WHO then declared the disease a pandemic status (WHO, 2020).

Signs and symptoms of COVID-19 infection typically occur within 2-14 days after a person comes into contact with the virus. According to WHO, typical signs of infection include fever, cough, muscle pain, tiredness, and shortness of breath. In more severe cases, it can lead to pneumonia, multiple organ failure and even death. Most infected people show symptoms within 5-6 days after counteracting the virus. However, some infected patients can be asymptomatic, meaning they do not display any symptoms despite having the virus in their systems but have the potential of transmitting it to others. Generally, older people and those with underlying medical conditions (such as hypertension, heart disorders, diabetes, liver disorders, and respiratory disease) are expected to be at higher risk of developing severe symptoms.

Governments are warning people at high risk to be particularly stringent in observing social distancing measures and in some cases total or partial lockdown protocol of a province(s) were put in place as the COVID-19 pandemic accelerates globally. This is because if they become ill, they are more likely to need critical care including ventilation, and may even leads to death (Public Health England, 2020). Data on COVID-19 from China suggested that most confirmed cases have been classified as mild or moderate, 14% are severe and 5% critical (Wu and McGoogan, 2020). Case fatality rates (CFR) are difficult to assess with certainty but currently could be as high as 4-6% which is much greater than seasonal influenza that was about 0.1%.

African Journal of Biology and Medical Research
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www.abjournals.org

In view of the current ravaging pandemic situation, the present survey research seeks to assess the possible COVID-19 infection due to prevalence of its symptoms among the inhabitants of Madobi town in Kano state, Nigeria and to also proffer alternative approaches that are more bearable to the populace in curbing its transmission.

MATERIALS AND METHODS

Study Area

Madobi is found in Kano State, Northwestern Nigeria. It is located between Latitudes 11^0 42` N to $11^0$ 54` N and Longitudes $8^0$15` E to $8^0$ 33` E. It is bounded to the North by Tofa LGA, to the North-west by RiminGado and Kabo LGA, to the West by Kiru LGA, to the South-west by Bebeji LGA, to the South by Garun Malam LGA, to the East by Kura and Dawakin Kudu LGAs, and finally to the North-east by Kumbotso LGA (see fig 1). The estimated population of Madobi according to 2006 population census stood at 136,623 inhabitants with an estimated land mass of 273km^2. The area is predominantly populated by Hausa and moderate Fulani ethnic groups (Mukhtar *et al*., 2019). Madobi has mean annual temperature of about 26^{o}C, but mean monthly values range between 21^{o}C in the coolest months of December/January and 31^{o}C in the hottest months of April/May (Olofin, 2008).

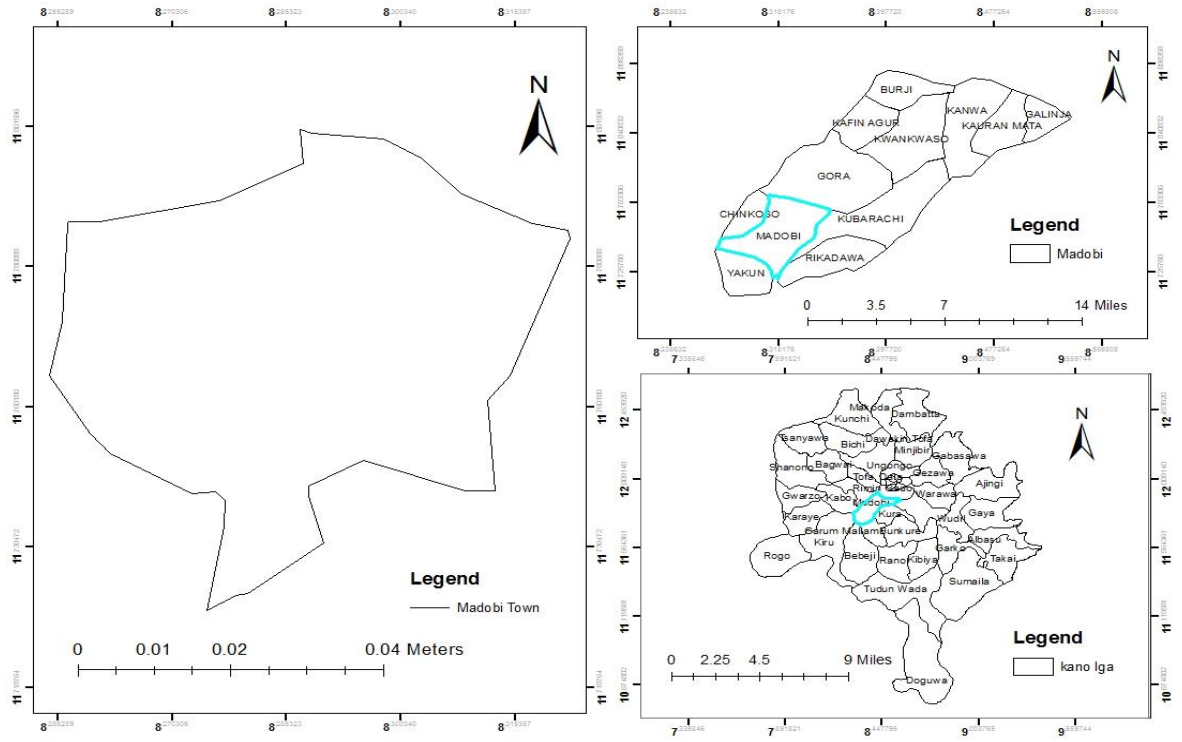

Figure 1: Map of the Study Area

Source: GIS Lab, Kano University of Science and Technology, Wudil, Kano

Data Collection

Data from the study area were obtained through oral interviews and administration of semi-structured questionnaires principally to the inhabitants of the study area. A total of fifty (50) participants were pulled out using stratified random sampling technique. In each case, the objective of the study was explained to them in Hausa which is the local language of the peoples in the study location. Questionnaires were designed to obtain data on the demographic information of the respondents, their awareness about the recent pandemic due to novel coronavirus and recurrent prevalence of COVID-19 infection related symptoms among the inhabitants in the study area respectively.

RESULTS

Demographic Characteristics of the Respondents

The demographic data collected from the inhabitants in the study area indicated that out of 50 respondents selected and interviewed, 37 were males (74%) while 13 were females (26%) (Table 1). The respondents were of different ages, where by 24% fall below 20years, 50% ages between 21-30 years, 8% were between 31-40 years, 12% were between 41-50 years, 2% were between 51-60 years, meanwhile 61years and above ages made up of 4% of the respondents. The educational status of the respondents was also promising as 20% of them possessed basic education, primary (12%), secondary (34%), and tertiary (34%) respectively. In terms of occupation, majority of the respondents were students (56%), housewives (14%), businessmen/women (6%) farmers (8%), civil servants (8%) while respondents belonging to other categories of occupation including Almajiris, tailor and laborers comprised of 8%.

Table 1: Demographic Data of the Respondents

Variables	Frequency	%Frequency
Sex		
Male	37	74.00
Female	13	26.00
Age		
Below 20	12	24.00
21-30	25	50.00
31-40	04	08.00
41-50	06	12.00
51-60	01	02.00
>61	02	04.00
Educational status		
Basic	10	20.00
Primary	06	12.00
Secondary	17	34.00
Tertiary	17	34.00

Occupation		
Students	28	56.00
Civil servants	04	08.00
Farmers	04	08.00
Businessman/woman	03	06.00
Housewives	07	14.00
Others	04	08.00

Source: Field survey, June 2020

Assessment of Prevalence of COVID-19 Symptoms

Suffering from Common Cold/Catarrh

The finding of the study shows that 41(82%) persons have suffered from common cold/catarrh during the period of April-May while 09(18%) did not. The result is presented on the pie chart below

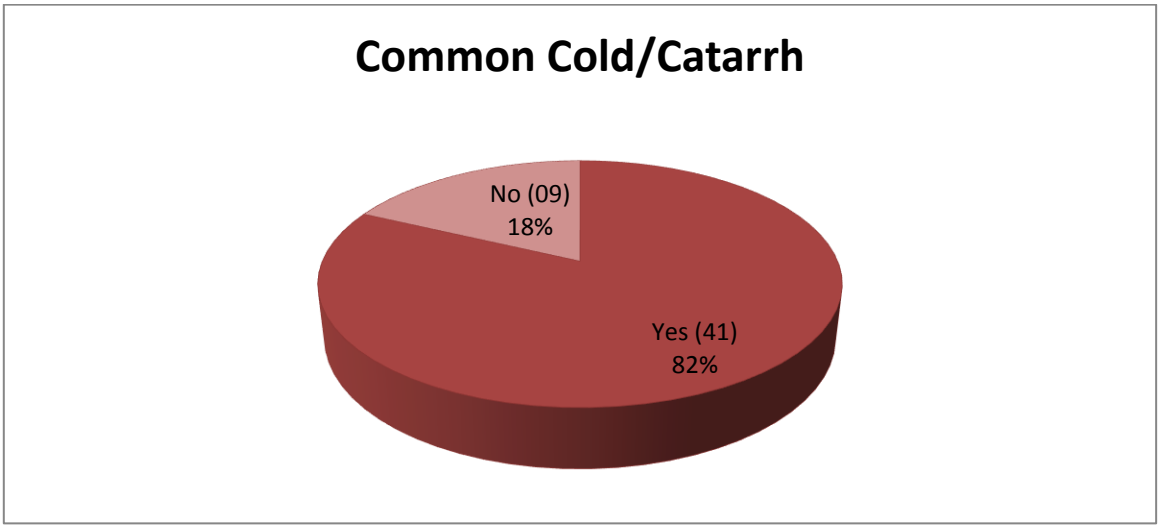

Figure 1: Number of Respondents that Suffered from Common Cold/Catarrh

Exhibition of Similar COVID-19 Symptoms

Only two (02) subjects among the persons interviewed did not experience any of the COVID-19 similar symptoms and this represent 4% of the total number of the respondents. The findings of the present survey also found out that a total of 48 (96%) respondents were able to suffer from one or more of symptoms that are similar to COVID-19 infection during the timeframe for the study. Out of these, 21 (42%) battle with fever, headache 35(70%), cough 18(36%), loss of smell 35(70%), loss of taste 18(36%), weakness 36(72%), loss of appetite 25(50%), vomiting 04(8%), diarrhea 06(12%), breathing difficulties 05(10%), while 01 (2%) person experienced all of the aforementioned symptoms. In general, each of the respondents suffered one or more symptoms related to the disease. The result is tabulated below.

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 73-83)
www.abjournals.org

Table 2: Number of People that Exhibits Various COVID-19 Symptoms

COVID-19 Symptoms	Frequency	%Frequency
Fever	21	42.00
Headache	35	70.00
Cough	18	36.00
Loss of smell	35	70.00
Loss of taste	14	28.00
Fatigue	36	72.00
Loss of appetite	25	50.00
Vomiting	04	08.00
Diarrhea	06	12.00
Breathing difficulties	05	10.00
All of the above	01	02.00
None of the above	02	04.00

Source: Field survey, June 2020
Note: Number of suspected respondents with COVID-19 symptoms is now 48, not 50!

Recovery

Out of 48 people that battled with one or more of symptoms similar to COVID-19 infection, 42(87.5%) were fully recuperated and only 06(12.5%) of them are still suffering from some of the symptoms as of the time of the data collection.

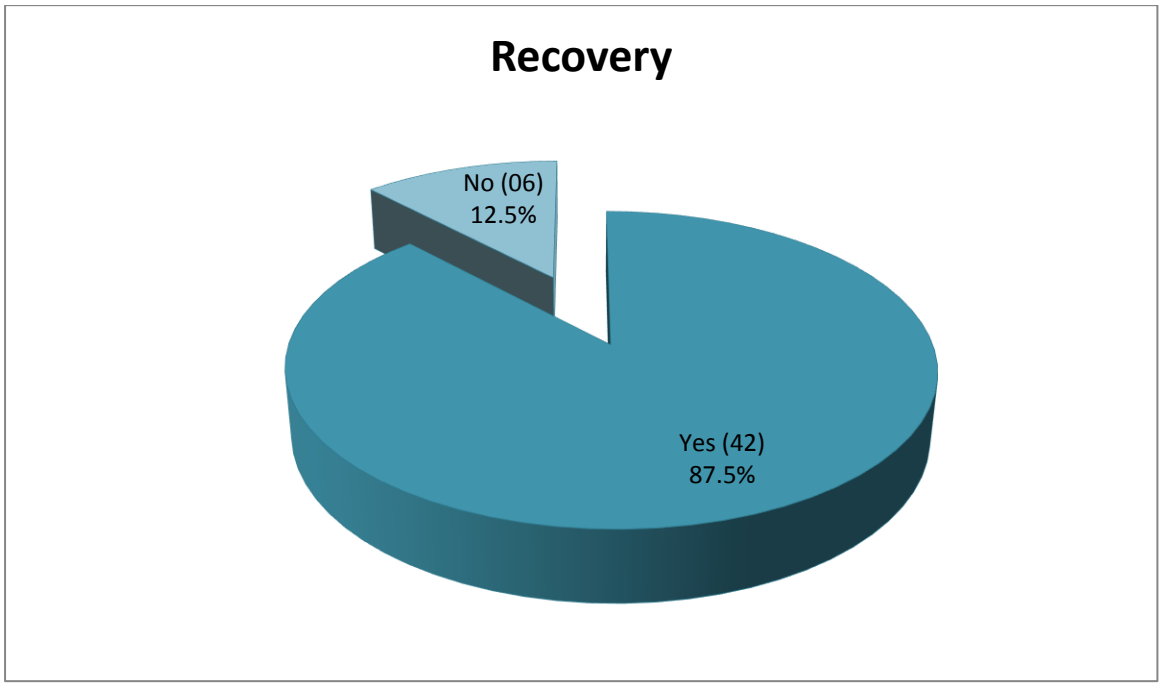

Figure 2: Recovery from COVID-19 Similar Symptoms

Application of Conventional Medicine

Out of 48 people that suffered from symptoms similar to COVID-19, only 32(66.7) seek for medical care either from hospital or chemist's shop before recovery, while 16(33.3%) did not enjoy any medical attention but also recovered fully on their own.

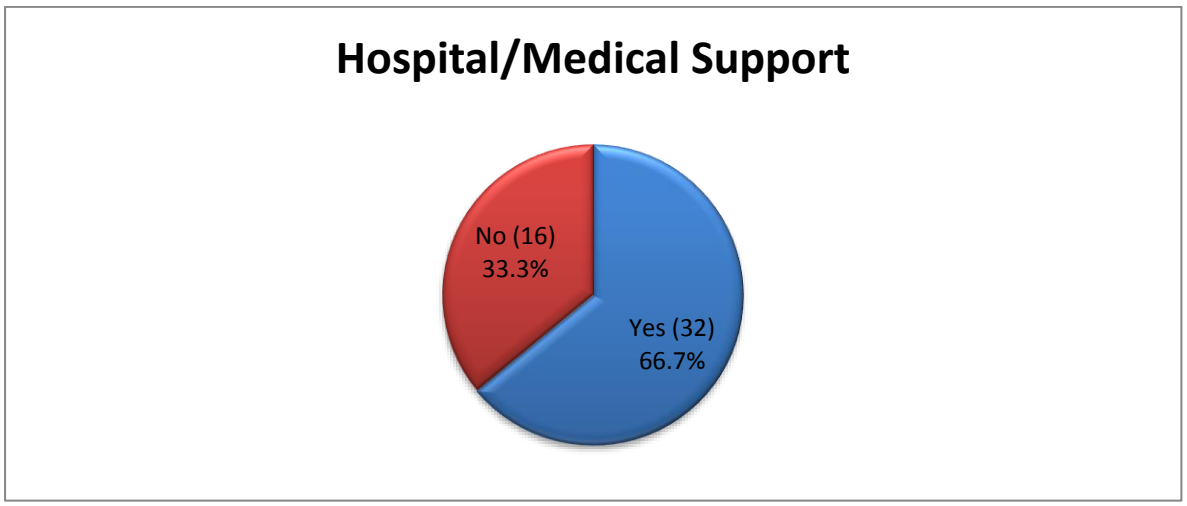

Figure 3: Medication Due to Similar COVID-19 Symptoms

Use of Traditional Medicine

The pie chart below indicated that 20.8% of the respondents used herbal treatment while greater portion of them i.e. 79.2% did not.

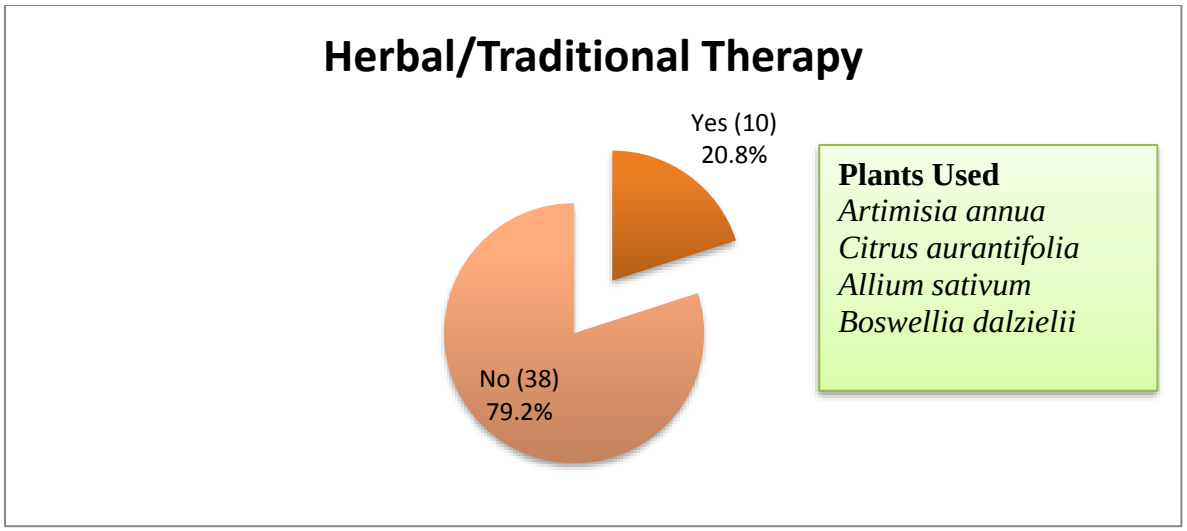

Figure 4: Application of Herbal/Traditional Therapy

DISCUSSION

Toward the end of 2019, there was outbreak of a novel virus, known as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), formally called coronavirus disease 2019 (COVID-19). The said virus causes severe acute respiratory syndrome which spread out globally from a related sea food market in Wuhan, China. This prompted the World Health Organization declared the SARS-CoV-2 virus a global pandemic status on 11th March, 2020. The family of novel coronaviruses were known to cause infection related to common cold and it was evident that the first case of coronavirus infection confirmed and reported in 1960 was identified as cold (Kumar *et al*., 2020). The finding of the present study has no doubt corroborated the above statement because 41 (82%) of the respondents interviewed have suffered from common cold/catarrh during April to May, 2020.

Evidence indicates that SARS-CoV-2 is transmitted from human to human by infectious droplets (Questions and Answer on COVID-19, 2020). A person who has symptoms from the virus including cough and sneezing can infect others through close contact. Generally, corona virus was spread via airborne zoonotic droplets. According to a report published on 24 January 2020, corona virus infected patient has many common features such as headache, fever, cough, fatigue, diarrhea and dyspnea (Di Gennaro *et al*., 2020). In addition to these aforementioned signs, the NCDC in its new definition of COVID-19 stated that; any person with characteristics of high fever, headache, continuous cough, loss of smell, loss of taste, tiredness, loss of appetite, vomiting, diarrhea, mild shock, and shortness of breath could be regarded as possible COVID-19 patient. This opinion is not surprising and has tallied with the outcome of the present survey, because it was revealed that 96% of the respondents have exhibited many of the said symptoms. The prevalence of these symptoms during the time frame for this study was excessively abnormal and was not frequent as when compared with the time before the outbreak of the disease in the state. Albeit, no laboratory test was conducted on any suspected case to confirm the infection of the novel virus in the study area, nevertheless, the possibility of COVID-19 infection cannot be completely disregarded especially when factors such as period of transmission/infection (i.e. immediately after the outbreak of the diseases in the state) and continuous prevalence of the symptoms among the inhabitants in the study area are given due consideration. The mean incubation period (the period between infection and onset of symptoms) is about 4-6 days with about 95% of individuals developing symptoms within 14 days from infection (Backer *et al*., 2020).

Currently there is no special vaccine for this virus yet and only supportive therapy is the treatment strategy followed by health professionals. This includes administration of antipyretic and analgesic, maintenance of hydration, mechanical ventilation as respiratory support and uses of antibiotics on the patients. In this study, out of 48 symptomatic respondents, 42 (87.5%) were able to fully recover from the symptoms after treatment. Interestingly, only 32 persons (66.7%) seek for medical care during the course of managing/treating the symptoms, while 16 persons (33.3%) recovered on their own without any medical support. This phenomenon vindicated the claims of researchers that; it is possible that some people can even counteract the virus thereby becoming infected and subsequently get recuperated automatically without any medical intervention as a result of their body's immune system. This remarkable development was also encountered in the present study and the plausible explanation could be that; the respondents developed most of the common symptoms of COVID-19 but their body immune system was such strong that it was able to make antibodies that fight against the virus before reaching a critical stage which

is characterized by possible organ failure and shortness of breath that subsequently requires admitting of the patient into intensive care unit (ICU) for placement on mechanical ventilators to aid respiration, thus they become recuperated (turn out negative to the virus). Some of the symptomatic respondents (20.8%) reported to have used herbal therapy during the course of the treatment. Plants that were used includes; a tea preparation of *Artimisia annua, Citrus aurantifolia* dissolved in hot water and drink as tea, *Allium sativum* (tea preparation), and *Boswellia dalzielii*. The use of Artmisia (called Tazargade in Hausa language) is also evident from Madagascar as they were able to develop a formulation from this renowned antimalarial plant officially called "COVID ORGANIC" which is believed to be very effective (but without clinical validation) in suppressing COVID-19 symptoms among the treated patients.

Data collected from this survey shows that male (74%) were more associated with these symptoms as against their counterpart females with 26%. According to a study from China CDC weekly report, males represented 51% of the confirmed cases (M:F ratio 1.06:1). Case fatality ratio (CFR) for men was 2.8% versus 1.7% for women. In the Lombardy (Italy) outbreak, a large retrospective case-series of 1591 COVID-19 patients admitted to ICU, 82% were male (Grasselli *et al*., 2020). In Zhou *et al*. study, 62% of the 191 hospitalized patients were males. All findings from the above studies regarding gender are in conformity with the present outcome of this research. However, male gender was not identified as a risk factor for in-hospital death for the disease (Zhou *et al*., 2020). Although younger people appear generally at lower risk, everyone must adhere to government restrictions to protect the millions of people at higher risk due to age or serious comorbidities (history of medical conditions such as diabetes, hypertension, heart diseases, cancer, kidney or liver diseases etc.). In order to minimize future social and economic disruption, high quality data at the population level are urgently needed—as soon as a reliable test for past infection becomes available.

CONCLUSION AND RECOMMENDATIONS

The outcome of the present study found out that greater percentage of the respondents have suffered from corresponding COVID-19 symptoms during the timeframe for the study and were subsequently able to recover later with or without any form of medication, possibly due to their stronger body immune system. The global fast spread of this virus is imposing new rules on our life, our relations and our activities. As a result of the ravaging coronavirus pandemic, most countries across the world were in total or partial lockdowns so as to prevent its transmission leading to the ban of religious gatherings, while markets, schools, restaurants, hotels, companies, malls and host of others were all closed. This lockdown protocol which is without reasonable success is inflicting countless damage on populace especially those in developing and undeveloped countries, because there has been halt on socio-economic, cultural and political activities. Unfortunately, upon all these measures put in place, the villain virus has keep on spreading with no sign of stoppage in a near future and it seem that the virus is going to be with us for the foreseeable future and nobody wants to continue having lockdowns as we have at the moment . It is recommended that government should prepare a COVID-Ready society in which people will learn to live with the virus instead of this unending lockdown as a preventive measure having produced no vaccine or cure for the virus. It is hope that the government as a matter of urgency will review its guidelines and

protocols towards containment of this pandemic so that the world can quickly regain back its peace and fitness. Lastly, more testing centers especially in remote areas should be established and mode of contact tracing be enhanced as this will greatly facilitate and expedite the fight against this devilish novel virus.

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Conflicting Interest

The authors declare no any form of competing interest.

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CORONAVIRUS: THE ECONOMICS OF THE PANDEMIC AND PERFORMANCE OF THE NIGERIA ECONOMY[1]

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ABSTRACT: *Coronavirus is an infectious disease that originated from Wuhan, China in December 2019caused by severe respiratory syndrome and has spread to about 196 countries in the world. The outbreak of the virus has altered the economic behavior of the Nigeria economy and has had a negative multiplier effects on all the sectors of the economy. The objective of the study therefore is to examine the effect of the Coronavirus on the Productive Performance of the Nigeria Economy while the major problem of the study is that the abysmal performance of the economy under this period of pandemic is due to the lack of effective economic management strategy of the economy and projection of outrageous daily figures, instead of researching into alternative cure for the virus and effectively managing the economy in Nigeria, the figures are moving in a geometric progression .Despite the huge monetary donations from local and foreign donors towards fighting the pandemic, the situation has not improved in Nigeria. The government claimed to have the capacity to manage the economy under lockdown and contain the virus without vaccine, why the unjustifiable increase in the prices of domestic commodities and goods in Nigeria; Why is corruption taking a different dimension and the daily index figures accelerating in a geometric progression. The study was designed to be a descriptive study and analyzed using content analysis technique. The findings revealed that Covid-19 pandemic drove the Nigeria economy into hyperinflation. The study therefore concluded since the overall business environment was particularly tough for the Nigeria economy in 2020, largely driven by the excruciating high cost of goods. The government should take a proactive steps in fixing the economy and get the economy back on track and further recommended that the federal government through the fiscal and monetary authorities should develop and provide stimulus packages and growth incentives to investors especially small and medium scale industries that will enable them increase investment and productivity in the country and get the economy back on track.*

KEYWORDS: Coronavirus, Economics, Pandemic and Performance of the Nigeria Economy

INTRODUCTION

Coronavirus is an infectious disease that originated from Wuhan, China in December 2019 caused by severe respiratory syndrome and has spread to about 196 countries in the world of within the period under review. Coronavirus is less severe than the SARS outbreak in 2003 with mortality rate of 2-3%. The older and elderly people are more vulnerable to this pandemic, due to the weak immune system and pre-existing health conditions.

The wide spread apprehensions and panic in Nigeria is due to the unverified facts and rumors associated with the outrageous figures released daily by the National Center for Disease

[1] Paper presented at the International E-Conference on COVID-19 Global Impacts, 20-21 July, 2020.

Control (NCDC). The most important thing is that when a virus is new there may not be a laboratory evidence to determine the mode of transmission and how it affects the economy in general. The pandemic was described as a Chinese biological weapon designed and developed by the Chinese Government to destroy the world economies with the aim and intention of gaining control of the world economies as the major producer and exporter of finished products. This was the reason why the United State of America President (USA) Donald Trump described the virus as a Chinese virus. While there is ongoing effort to curtail and contain the virus globally, cases recorded in Nigeria accounted for over 11,000 confirmed cases, over 2,500 patients recovered and discharged and with a mortality figure of over 220.

The Nigeria economy was still sluggishly recovering from the 2016 economic recession caused by the global oil crash and insufficient foreign exchange before the pandemic. The outbreak of the Pandemic further led to economic contraction as a result of decline in productivity index to about 45%. The lockdown pronounced by the government was a control measures designed to contain the virus but without an appropriate strategic framework on when and how the lockdown would be managed without affecting the productive Performance of the economy, most government officials took advantage of the lockdown to fraudulently enrich themselves and this economic sabotage has altered the economic behavior of the Nigeria economy with all the sectors seriously been affected. The public and private sectors have lost substantial amount of money, Production and service sectors are under performing without growth in output. The country could no longer produce enough to either satisfy domestic consumption and for export, hyperinflation was created in the economy due to excessive home demand without a corresponding increase in production and supply. Economic experts and policy makers in Nigeria have predicted that the impacts and effect on the Nigeria economy will be short lived but with serious economic losses to the country and economic activities would return to normal thereafter. This thinking and predictions were in line with 2007 global economic crisis which emanated from the United State of America but with proactive steps taken by the Nigeria government then, the global economic crisis later became a blessing to the economy.

In Nigeria, beyond the health hazards and human consequences of the COVID- 19 pandemic, the economic consequences are enormous. The pandemic spread like a wild fire and has seriously ravaged the Nigeria economy with the United Nations Trade and Development Agency (UNCTAD) putting an estimated cost of loss of the outbreak to the world economy at 20 trillion in 2020.

Most countries in the world shut their international Airports against foreigners but provided relief packages to cushion the effect of the Pandemic on the lives of their citizens but the Nigeria government over delayed in responding to measures to fight the scourge. With the first outbreak on Febuary 27,2020 in Lagos State, the Nigeria commercial nerve centre was grounded and it began to spread to other parts of Nigeria with Abuja recording the second case mostly from the Nigeria Law makers and presidential aides contacting and contracting the virus.

The Buhari led federal government quickly set up the Presidential taskforce (PTF) headed by the Secretary to the Government of the federation (SGF), Mr Boss Mustapha who of course by training was not either a virologist nor an epidemiologist. Lack of relevant knowledge and experience led to the abysmal performance of the task force in effectively managing the pandemic and the economy from further economic damage within the period of spread of the

pandemic. The taskforce was mandated to work in collaboration with the National Centre for Disease Control (NCDC) and the Federal Ministry of Health.

In a nutshell, the Nigeria economy still recovering from the 2016 economic recession, unquantifiable amount of money has been lost as most public institutions, Ministries and agencies operated partial and skeletal services while productive firms were closed down indefinitely. Government revenue targets and fiscal projections were also affected, crude oil price declined, the global oil war between Russia and Saudi Arabia contributed significantly to the economic decline in Nigeria. Despite huge amount of money and material resources donated by individuals and corporate organizations both local and international donors; palliatives packages were politicized in Nigeria without appropriate welfare policy direction.

The major objective of the study therefore is to examine the effect of the Coronavirus on the Productive Performance of the Nigeria economy.

Statement of the Problem

Coronavirus is a recent pandemic and has gained fast penetration into the Nigeria economy, but the methodology adopted in managing the economy and the pandemic differ among countries affected.

In Nigeria, instead of seeking for an appropriate ways of bringing the situation under control, the Presidential Task force (PTF), National Center for Disease Control (NCDC) and Ministry of Health charged with the responsibilities of managing the pandemic circumvented the process for personal gain by projecting outrageous daily figures, instead of researching into alternative cure for the virus and effectively managing the economy in Nigeria.

The major problem of the study therefore is that the abysmal performance of the Nigeria Economy in this period of global pandemic was due to the lack of effective economic management strategy of the economy and projection of outrageous daily figures, instead of researching into alternative cure for the virus and effectively managing the economy in Nigeria, the figures are moving in a geometric progression. Despite the huge monetary donations from local and foreign donors towards fighting the pandemic, the situation has not improved in Nigeria. Since the government claimed to have the capacity to manage the economy under lockdown and contain the virus, why the unjustifiable increase in the prices of domestic commodities and goods in Nigeria; Why is corruption taking a different dimension and the daily index figures accelerating in a geometric progression.

Nigerians have been reacting on why and how the productive performance of the Nigeria Economy be enhanced to achieve a sustained economic growth before and after the lockdown, Why has the NCDC and the Federal Ministry of Health not found an effective way of bringing under control coronavirus in Nigeria and those treated and discharged, what kind of medications were there given that cannot be administered on those that tested positive in order to quickly put an end to the lockdown. The Chairman of the Presidential Task force on Covid – 19 said, those who recovered and discharged should not disclose to the public the kind of medications administered and this statement calls for further probe and justifies the argument presented earlier than that the government has circumvented the process for personal gain. The World Health Organization (2020) at some point questioned the high index figures released from Nigeria and the politics involved in managing the pandemic in Nigeria.

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EMPIRICAL FRAMEWORK

Existing literatures on coronavirus is quite scanty as a result of the new discovery of the virus and its devastating effect on economies and humanity. Though a few recent studies, mainly on the review of policy documents and public lectures existed and the researcher exploited some of such available studies.

Soludo (2020) in a lecture delivered to the West Africa Green Economics Development Institute (WAGEDI) Gregory University Uturu, Abia State Nigeria on post Covid–19 and Africa's Sustainable Future posits that, the idea of lockdown and border closure, means we will continue to do so (with extensions) until such a time we are satisfied that the spread of Covid–19 has been arrested or declined. He added that If the strategy is to lockdown the Nigeria economy until an infection stop or significantly declined, then we would have a suicidal indefinite waiting game. He further added that the lockdown of the Nigeria economy suffers time inconsistency problem without credible exit strategy. The author was quite analytical and his view is in agreement with the researchers' opinion. The researcher accepted the fact that the present lockdown of the Nigeria economy is not economically beneficial and may negatively affect the Productive Performance of the Nigeria economy.

According to Ekeruche (2020), the coronavirus pandemic affected oil as it hits its lowest price level in 17 years declining from $59 to $28 per barrel within a month and is still falling as a result of low demand an after effect of the lockdown alongside other restrictive measures and a lack of coordination between OPEC and Russia to reduce supply. The researcher's observation is that the Nigeria government did not foresee the danger that lies ahead of the economy in order to plan effectively manage the economy from further decline. Rolake (2020) said that the effect of the sharp and persistent fall in the price of oil has made government to cut down its expenditure and mounted pressure on the foreign exchange due to its shortage. This has led to the devaluation of the Naira by CBN with the official rate of N360 per dollar from N307. The devaluation would lead to increase cost of importation and raw materials and other soft and hard commodities that have to be paid for using foreign exchange. This implies that the inputs to production will become expensive leading to a fall in the purchasing power of consumers because prices of goods in the economy would eventually rise and has led to an increase in inflation.

Peterson, and Thankson (2020) stated that, "many import-dependent countries were severely affected during the coronavirus pandemic. Many countries imported their essential commodities from major exporting countries like China, India and Japan, and depend largely on these countries for the consumption of these essential commodities that are imported. The reduction in goods flowing through the global supply chain, and substantial reliance on China for imported goods, led to shortages of supplies to import-dependent countries like Nigeria as China shut down many of its export factories. This led to increases in the prices of the remaining stock of imported supplies already in import-dependent country, which also triggered inflationary pressures on the price of basic commodities despite the general low demand for imports due to the coronavirus pandemic. The researcher agreed with the view of the author. The inflationary pressure on the economy was an effect of the Pandemic and the economy cannot perform optimally under such circumstances.

Patterson (2020) in a forwarded message in the social media reacted to the outbreak of the pandemic and said that the Coronavirus is a biological weapon which slipped off in Wuhan

China in 2019. Even Saddam Hussein talked about it in his meeting which means the idea have been conceived longtime but nobody cared to listen. The researcher agreed with the Patterson opinion which was in support of the claim made in the introductory component of the Study. But hence the authors claims cannot be substantiated, apparently most nations took it for granted, and nobody ever saw the devastating effect the outbreak would have on most developed and developing economies.

Paolo and Andrea, (2020) pointed out in their publication, the economics of a pandemic. The case of covid -19, that the case of coronavirus has lowered in China which means that laboratory trials and the production of vaccines are ongoing. The author's opinion is in collaboration with the introductory component of this study which says that covid -19 originated from China and their mandate is to clampdown on world economies and become the world economic powers. This justifies the fact that in recent time no death cases of covid -19 had been recorded in China since the outbreak became pandemic and the daily index cases in China had significantly dropped.

WHO (2020) in their response to the pandemic said that, coronavirus is the world wide spread and a new disease. An influenza pandemic occurs when a new influanza virus emerges and spreads around the world. But unfortunately, the World Health Organization did not explain the economic implication of this pandemic to the World economies or even suggested any laboratory trials conducted or currently been experimented to quickly produce the vaccine that will help rescue the world.

FMH (2020) reported in its tweeter handle that the National Centre for Disease Control (NCDC) is projecting seven more molecular laboratories in Abakaliki, Kaduna, Jos, Kano, Maidugri and port Harcourt and Sokoto to further expand testing capacities nationwide. The NCDC did not in any way explain to Nigerians how fast the agency is working to bring the pandemic under control. Their major interest is to continuously projecting unverified figures daily to Nigerians.

Ehanire (2020) briefing the media on the cases of Covid-19 in Nigeria narrated how the virus was brought into the country by on Italian engineer traveling from Milan (European Centre of the virus outbreak) Via Istanbul to Lagos on aTurkish Airline on February 25, 2020. Ebola also was introduced into Nigeria in 2014 by a foreigner (A Liberian American, living in Minnesota) travelling from Liberian, an infected region to Lagos where he died at a hospital. The author having briefed the nations on the origin of the viruses to Nigeria did not also question the rationale on how and why Nigeria is the only dumping ground in Africa where foreigners enter into the country freely without any form of quarantine or checks in order to prevent or avoid the spread of any virus to Nigeria. He did not also mention the danger that awaits the nation interns of having negative effect on the productivity index of the country but merely concentrated on briefing the nation on the need to practice personal hygiene.

Lateef, and Chukwudi, (2020) in analyzing the implication of Covid-19 on the Nigeria Economy from the centre for the study of Economics of Africa. They pointed out that the global coronavirus outbreak has put severe pressure on the Nigeria economy. Despite its sluggish recovery from the 2016 economic recession which came as a result of the global oil price crash and insufficient foreign exchange earning to meet imports, it was also observed from the findings that emergence of covid -19 has called for a drastic review of revenue expectations and fiscal projections. But the authors failed to identify the effect of the pandemic on the living

standards of Nigerians, how it affects the people and the economy. Despite absence of objective criteria in providing palliative to Nigerians from the huge donations generated from donors the economy is still struggling to survive.

CBN (2020) in response to the pandemic and how it affects the economy, took proactive steps as an intervention measures to combat Covid–19. The apex financial regulatory authority in Nigeria initiated an adopted some fiscal mechanism by reducing the interest rate from the central bank of Nigeria intervention fund of 9% - 5%, the creation of ₦50 billion credit facility for households and small and medium Scale Enterprises and the provision of N100 billion credit support to further bring the economy back on track. But the Apex bank did not mention how flexible the modalities for accessing the fund would be especially on the poor households seriously affected by the executive order of sit at home.

Thelma, and Adedeji, (2020) carried out a study on risk control measures and threat to deepen Nigeria educational crisis under the covid-19 and pointed out the effect of the pandemic on the Nigeria fragile educational system. It possesses serious challenges on the government, students and parents. But the authors did not in their study mention the effect of the pandemic on private schools' proprietors who have lost substantial amount of money from the shutdown of economic and commercial activities. Internally generated revenue (IGR) from and within the private schools especially the higher institutions have seriously declined with negative multiplier effect on the entire school system and community in general. Private business operators within and around the schools and communities have suffered as the lockdown of economic and commercial activities have affected the entire business operations negatively.

Obinna, and Basil (2020) also in a similar study on the implication of the pandemic on the Nigeria economy, focused their attention on the internally displaced persons (IDP's) as the most vulnerable population at risk. Such category of people among the population have suffered so much as information of this pandemic are not fully appreciated by the poorly educated person such as the IDP, even when they can access such information, interpretation into local languages for proper comprehension is lacking. The author however did not mention the economic effect on IDP Camps, Social and physical distancing, to and how to mitigate the virus from such people. Government therefore need to carry out a special testing exercise in the IDP comps and possibly create a mechanism for dealing with the scourge in the IDP's camps.

In summary, from the avalanche of studies reviewed in the literature, all the authorities have given an insight on how the pandemic and continuous lockdown of the economy may affect economic performance in the long run especially certain key sectors like Education, Health, Manufacturing, Agriculture among others.

All the studies in the literature were mainly review of Policy documents, economic analysis and public lectures but none of such studies focused on the economic performance of the Nigeria Economy at the macro level and the adoption of content analysis as the analytical technique.

The dearth of such studies therefore claimed the attention of this study and this constituted the gap this study intends to fill.

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Review and Analysis of the Government Control Measures

Since the outbreak of the Pandemic in Nigeria, there has been a total decline in economic and commercial activities and the economy slided into recession without any proactive steps taken by the government to quickly end the pandemic. Certain control measures were enumerated for Nigerians to comply with, but how such measure affects the growth of the economy is another issue for debate.

1. On the outbreak of the Pandemic, the Federal government and the National Center for Disease Control (NCDC) promised Nigerians that it has the capacity to carry out 40,000 testing of people in one month, and this is almost two months into the pandemic and the agency haven't tested 20,000in a month since the pandemic started. The Nigeria government instead of working out modalities on how to get the economy back on track, they were very busy creating fears, hardship, apprehension and tension on innocent Nigerians by manipulating the daily index figures. People are dying every day for more serious ailments because they can't access hospitals with high quality medical services from other states due to the ban on interstate travel.

2. The Federal Government as part of the measures to fight the pandemic and the bring the economy back on track promised to strengthen the Government emergency operations Centre nationwide. But two months down the line, Nigerians are yet to see any positive effect of such promise on the economy. Even in major cosmopolitan cities in Nigeria, no emergency center was properly established within and around worship centers where Nigerians can easily access for testing.

3. Establishment of Isolation Centres in Nigeria**.** The researcher agreed that almost all the states of the federation with index cases in Nigeria had established isolation Centres. But with donations to government towards fighting the pandemic, the Nigeria economy is yet to get back on track. Palliatives measures were hijacked by politicians and average Nigerians could not easily have access to the relief package

4. Establishment of a multi sectional rapid response team comprising of the representatives of the relevant government agencies, ministries, and Departments including collaborations with local and international partners such as National Centre for Disease Control (NCDC), World Health Organizations (WHO), United Nations international Children Emergency Fund (UNICEF) etc. if actually the collaboration had been perfected with such agencies, the pandemic should have declined for the economy to speed up growth. But the researcher observed that the Nigeria government agencies may have circumvented the process for personal gain thereby jeopardizing the growth of the Nigeria economy.

5. Closure of all educational institutions in Nigeria**.** Initially it was a welcome development. But the continuous extension of the lockdown without any positive measures to safeguard the lives of the school children is more endemic than the pandemic. A nation without regard to her educational system will see nothing wrong in continuously shutting down the schools. There will be brain drain, prostitution, Urban terrorism among other vices arising from such closures. Two months after the closure of schools, no fumigation exercise of any kind in any school in Nigeria by the government. What will then be the

furture of our educational system despite poor budgetary allocation to the sector. No matter what ever the problem is, education is still the solution to the problem.

6. The Closure of all international airports and flights. Though this directive was good but came at the wrong time. If the government was proactive in fighting the pandemic, closure of all international airport's and flight would have been the first step taken in line with global best practices. The government became serious in shutting down all air routes and operations only when the Covid – 19 cases started manifesting in Lagos and Abuja especially among the Nigeria law makers and Presidential aides. Till date, the aviation sector has not generated any revenue to the government and workers are redundant and the sector stagnated.

7. Closure of all event Centres. Analysis shows that such event Centres are breeding Centres for contracting the virus. But with the high poverty index facing the country, such businesses are losing substantial amount of money due to lack of patronage. What stimulus package has the government provided to support such Small and Medium scale businesses and what will be the condition to access such stimulus packages without further endangering the chances of growth.

8. Closure of all worship Centres in Nigeria sis good and such worship Centres should have collaborated with the government to fight the pandemic. It was only the Catholic Church of the Abuja metropolitan Archdiocese led by the Arch Bishop Ignatius Kaigama that led a delegation to the secretary to the government of the federation (SGF) and handed over 456Catholoic hospitals in Nigeria to the Nigeria government as testing and Isolation Centres. The questions are, was the donation by the Catholic Church optimized? If yes, the growth of the daily index cases would have declined and Nigeria would have been on the verge of lifting the ban on lockdown and getting the economy back on track.

9. Closure of all open Markets. The government eventually closed down all open markets especially those selling non-essential goods and commodities. But the issue is that closing the market without measures to end the pandemic makes no economic sense. No fumigation of any kind and the faith of such traders hangs in the balance.

10. Closure of all international Land boarders. This policy directives were highly abused and violated and Nigerians may be forced to open the borders for importation of stable food because the economy could not guarantee sustainable food security to feed her citizens. Even the security agencies compromised on the process by collecting gratification from the range of five thousand naira (#5,000) and above from transporters before allowing them cross over the borders due to the harsh economic realities. Such action affected the economy badly and the government was not bordered on the negative effect such action has had on the economy.

11. Closure of all civil service operations and civil servants to go home for two weeks, with possibilities of extending the executive order. But this is the second month offices were shut down in Nigeria with no means of livelihood and Nigeria government is busy counting numbers of people infected with coronavirus. The executive order has become counterproductive to the Nigeria economy. Staying at home doing nothing while the economy losses substantial amount of money makes no economic sense. With the fall in global oil price, which has instigated adjusting the Federal budget down words,

government problem is lack of planning and plan implementation. The economy having recovered from the previous economic recession has been struggling to pick up and enhance productive performance and within a twinkle of an eye everything is back to zero, no state in Nigeria can boast of generating one billion naira from her internally generated revenue (IGR) today due to the continuous and endless lockdown of the economy.

RESEARCH METHODOLOGY

The study was designed to be a descriptive study and was analyzed using content analysis technique.

Techniques of Analysis

As earlier indicated in the research methodology, the study adopted content analysis technique. This technique is justified on the ground that the issue in focus has not really generated extensive research findings but merely based on the review of Policy documents relating to the pandemic.

Descriptive Statistics of Coronavirus Pandemic in Nigeria

Table 1: Coronavirus Update in Nigeria as at June 7, 2020

Total Number of confirmed cases	**12,486**
Total number of Recovered cases	**3,959**
Total number of Deaths	**3,54**
Total number of active cases	**8, 173**

Source: National Centre for Disease Control Abuja, 2020

With over 12,486 index cases in Nigeria, over 3,959 and recovered and discharged and with over 354 deaths as shown in the descriptive Statistics according to the National Center for Disease Control (NCDC). The researcher would want to ask, what kind of medication was administered to those recovered and Discharged that cannot quickly be administered to the high index cases in order to free the economy from the virus.

It was observed from the review and analysis that the daily index figures announced by the NCDC are quite fraudulent as it doubles in geometric progression. The United Nations and the World Health Organization (UN and WHO) directly referred to the numbers from Nigeria as pure scam and it has the tendency of having adverse effect on the productive performance of the Nigeria economy. Some of the sick alleged to have Coronavirus had flu or malaria, but they are added to boost the numbers and make claims for more funding which eventually will be diverted to private account of the agency staff.

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www.abjournals.org

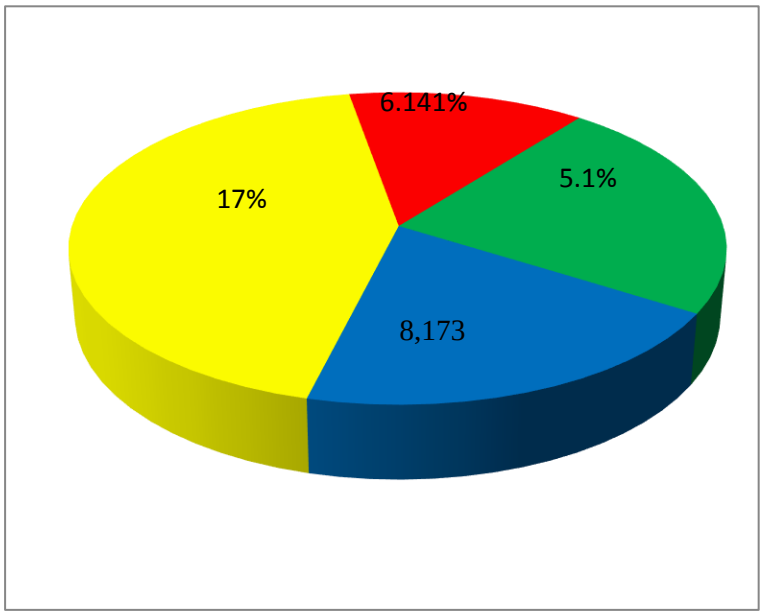

Figure 1: Pie Chart Showing Percentage of Index Cases in Nigeria as at June 7, 2020

Key: Yellow: Index cases (12,486)
Red: Death cases (354)
Green: Recovered cases (3,959)
Blue: Active cases (8,173)

The World Health Organization cried out loud that Nigeria government is playing politics with coronavirus considering the enormous resources injected into fighting the pandemic and yet index cases is still on the increase. The Kogi State Governor, Alhaji Yahaya Bello also cried out aloud that the NCDC is marketing coronavirus and Kogi State will not be Part of the scam.

It is crystal clear that the pandemic has come to stay in Nigeria and would continue to ravage the economy if urgent steps are not taken by the government to alleviate the suffering of Nigerians and lift the ban on the lockdown of the economy.

Further review of the economy shows that there is a clear case of financial mismanagement of fund and resources allocated to fight the pandemic. The NCDC claimed to have spent over seven billion naira on SMS messages to sensitize Nigerians on Coronavirus. The researcher would want to ask, is there no policy on Corporate Social Responsibility (CSR) of all the telecommunication operators in the country and how do such companies extend their Car to the society especially during this period of Coronavirus pandemic when Individuals and corporate organization are contributing towards fighting the scourge.

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Table 2: Showing Some List of Donors to the Nigeria Government, 2020

S/N	Individual Donors	Amount in NigeriaNairaand dollars/Materials Resources	Beneficiaries
1.	Alhaji Aliko Dangote	N200,000,000, four fully equipped Ambulance Vehicles	FGN/NCDC
2.	Mr. Adebayo	Respirators and Ventilators	FGN/NCDC
3.	AlhajiAtikuAbubakar	N50,000,000	FGN/NCDC
4.	Chief (Mrs) FolarunshoAlakija	N1 billion Pius N35,000, 000 worth of medical items	FGN,/NCDC
5.	Jackma (Chinese Billionaire)		

1.	306 House of Reps members	50% of their March salaries
2.	Nigeria 53 Ministers	50% of their March salaries
3.	Abdusalnwrabi	N 1 billion
4.	Femi Otedola	1 billion
5.	Tony Elumelu	1 billion
6.	Herbert Wigwe	1 billion
7.	Segun Agbaje	1 billion
8.	Jim Ovia	1 billion
9.	TufaceIdibia	10,000,000

Corporate Donors (Amounts in Nigeria Naira/Dollars)			
1.	GT Bank	1 billion and 1,000 bed ICU	
2.	Access Bank	1 billion and 1,000 bed ICU	
3.	Zenith Bank	1 billion	
4.	NNPC	11 billion	
5.	Aero Contractors	Logistics Services	NCDC
6.	God is Good Moters Ltd	Logistics Services	NCDC
7.	Sustainable Health Initiative	5 store building as Isolation Centre at Idu, Lagos	Lagos
8.	Federal Government of Nigeria	N23 billion	FGN/NCDC
9.	German Government	2.2 billion Dollars	Federal Government of Nigeria
10.	United Nations	2 million Dollars	Federal Government of Nigeria
11.	INEC	All the polling Units in Nigeria for of palliatives to Nigerians and 100 trucks for logistics Services	Federal Government of Nigeria
12.	28 Exco Members in Benue State	N100, 000 each, till the virus is over.	Benue State Government

Source: Author's findings from Different Media Sources,2020

1. The Federal ministry of humanitarian affairs also claimed to have spent 72bn naira in 24hrs as palliatives to the poorest of the poor in Nigeria to cushion the effect of Coronavirus. The major problem of this expenditure is on whom and how was the money spent. Was there any data base and demographic data used to capture and distribute such palliatives to Nigerians?
2. Another observation was the outrageous expenditures by the Nigerian Military. The military hierarchy claimed to have spent 10bn naira for Military Isolation centres on Coronavirus. The researcher found these expenditures to be a very ridiculous and has no positive multiplier effect on the economy.
3. The Nigeria economy cannot be said to be a virile economy when the Federal Task force members on Coronavirus are collecting five hundred thousand naira (#500,000) as sitting allowances.

Further review and analysis shows that lack of productivity in the economy within this period of economic lockdown has led to low Capacity utilization in Nigeria to about 45%. The economy is already besieged by series of decay and poor critical infrastructures (energy and road network etc) , high cost of funds from the banks and inadequacy of long-term loan windows to support long gestation investments and absence of other fiscal stimulus packages that could drive production in the economy.

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

Summary of Findings

1. The study discovered that the economy was experiencing contracting economic growth from all sectors of the economy. This is as a result of low production index and continuous lockdown of the economy.
2. The poor performance of the Nigeria Economy was brought about by inappropriate economic management strategy and resumption plan which has led to an endless waiting game and has given rise to further economic contraction.
3. It was observed from the study that there was a clear case of Economic sabotage which eventually led to the contracting Economic growth currently experienced in Nigeria.
4. The study observed that the COVID-19 pandemic drove the Nigeria Economy into hyperinflation. Prices of goods and services went beyond the reach of the common man.
5. The study revealed a high-level corruption in the management of the economic resources. The Federal Ministry of Health, National Center for Disease Control and the Presidential task force on Covid-19 saw the adversity as an opportunity to fraudulently enrich themselves at the detriment of the Nation's economy.
6. Declining oil price and poor Revenue targets to the economy also contributed to the poor performance of the economy due to the economic crisis between Russia and New Saudi Arabia and the outbreak of the global pandemic.

7. The Nigeria Naira was devalued and could not have the strength to withstand the dollars. This is due to poor and unproductive capacity of the economy.

8. It was also discovered from the Study that capacity utilization in the economy has declined. Most productive firms both public and private were shut down, Staff rendered redundant and starting a new business was chaotic.

9. Accessing the stimulus packages announced by the Central Bank of Nigeria (CBN) to rescue the economy was chaotic and was not flexible enough to be accessed by the targeted audience.

CONCLUSION

In conclusion, the overall business environment was particularly tough for the Nigeria economy in 2020, largely driven by the excruciating high cost of goods. Therefore, the government should take a proactive step in fixing the economy and get the economy back on track.

Policy Recommendations

1. It is further recommended that the Nigeria government should adopt certain proactive policy measures to get the economy back on track and provide some comfort zones for the citizens.

2. The fiscal authorities (such as the Federal Ministries of Finance, Trade and Investment, Budget and National Planning) should develop and provide stimulus packages, conducive, favorable comfort zones for smooth business operations in Nigeria. This will enable them increase productivity in the country.

3. The monetary authorities should develop and provide some incentives to growth especially to the small and medium scale industries who of course are key drivers of the economy. This incentive will expand the contraction and boost economic productivity in the country.

4. As the dwindling oil revenue bites harder, due to the fall in oil prices and the global pandemic, the government should borrow and invest into key sectors in Nigeria such as the Health sector, Power sector, Agricultural Sector and the Educational sector.

5. Welfare Policies should be developed by the government to further reduce the sufferings and poverty level in the economy.

6. Government as a matter of urgency should lift the ban on the lockdown of the economy and allow the economy get back to track.

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ASSESSMENT OF THE CONTRIBUTION OF COMMUNITY ACTIVE SURVEILLANCE TO COVID-19 CASE DETECTION IN THE FEDERAL CAPITAL TERRITORY, ABUJA, NIGERIA

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ABSTRACT: *Background: Coronavirus disease (COVID-19) is a global pandemic. Effective surveillance is needed to monitor disease trends, guide risk assessments and ultimately control the spread of the disease. Community active disease surveillance is a process of ensuring community participation in detecting, reporting, responding to and monitoring health events in the community. Objective: The objective of this study is to highlight the significant contribution of community active surveillance to the detection of community transmission of COVID-19 cases in the Federal Capital Territory (FCT), Abuja. Materials and Methods: We retrospectively reviewed the performance of COVID-19 surveillance in the FCT, Abuja with particular focus on the community active surveillance between April 13 to May 18, 2020. We identified COVID-19 high risk communities in which nasopharyngeal and oropharyngeal samples from both symptomatic and asymptomatic community members were collected. Samples were analyzed at the National Reference Laboratory of the Nigerian Centre for Disease Control (NCDC), Gaduwa, Abuja. We evaluated the performance of COVID-19 surveillance both before and during community active surveillance. We also analyzed the epidemiological profile of confirmed COVID-19 cases from the COVID-19 database of the Public Health Department of the FCT, Abuja. Results: A total of 2,753 suspected and 205 confirmed COVID-19 cases were reported during the study period. The number of suspected and confirmed COVID-19 cases reported before the community active surveillance initiation was 3,876 and 212 respectively. The settlements with the highest (85) number of COVID-19 Laboratory confirmed cases during the community active surveillance were Mabushi in the Municipal Council area. The male to female ratio of the COVID-19 confirmed cases was 3:1. The majority of confirmed COVID-19 cases i.e., 57% belonged to age group between 20 to 39 years with mean age of 36 years. Conclusion: Community active surveillance has significantly improved detection of COVID-19 cases and has highlighted the burden of community transmission of the disease. There is the need to expand this approach to other area councils in the FCT. In addition, COVID-19 surveillance should be intensified in the health facilities. Timely detection, reporting, isolation and management of confirmed cases as well as contact tracing and monitoring are essential to curbing the spread of COVID-19.*

KEY WORDS: COVID-19, Community, Surveillance, Federal Capital Territory, Abuja

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INTRODUCTION

In late December 2019, a novel corona viral disease caused by the SARS-CoV-2 virus was first identified in Wuhan, China. The disease, initially known by various names including 'Severe Pneumonia with Novel Pathogens' by the Taiwan Centre for Disease Control (CDC), has been officially named by the World Health Organization (WHO) as 'Coronavirus Disease-2019 (COVID-19), on February 11, 2020[1]. The first COVID-19 cases in Nigeria and the FCT were confirmed on the 27th of February and 20th of March 2020 respectively[2,3]. The outbreak of COVID-19 has currently spread widely around the world, affecting more than 120 countries and territories. As at May 18, 2020, there were 4, 618, 821 and 6,175 cases of COVID-19 globally and in Nigeria respectively. The corresponding number of deaths was 311, 847 and 216[4]. The disease was declared a public health emergency of international concern (PHEIC) by the WHO on 30 January 2020 and subsequently a global pandemic on March 11, 2020[5,6].

Transmission of COVID-19 is through droplets from close contacts or contaminated fomites. There is no sufficient evidence to support airborne or faeco-oral transmission. The mean incubation period is 3-9 days with a range between 0-24 days[7]. Symptoms of COVID-19 infection appear after an incubation period of approximately 5 days. The most common symptoms are fever, cough, and fatigue, while other symptoms include headache, diarrhoea, dyspnoea, and sore throat[8]. While patients with confirmed COVID-19 disease can be asymptomatic or pre-symptomatic (patients not yet symptomatic); however, both categories of cases have been shown to transmit the disease and constitute a group of 'silent spreaders' together with the very mildly symptomatic. Indeed, abnormalities on chest imaging have been noted in some patients before the onset of symptoms[10].

The preferred specimens for COVID-19 diagnosis are nasopharyngeal and oropharyngeal swabs preferably during the early stage of the disease. The molecular test of choice is the reverse-transcription polymerase chain reaction (RT-PCR) assays. There however exist other supplementary diagnostic tools such as the antibody -based serological techniques which are gradually being introduced[11].

There is no current evidence from randomized controlled trials (RCTs) to recommend any specific anti-COVID-19 treatment for patients with a suspected or confirmed COVID-19 infection and vaccine is not yet available. Management is largely supportive in isolation centres to prevent disease transmission to others. Several treatment modalities have however been tried including use of anti-viral drugs (Remdesivir, lopinavir/ritonavir), anti-malarial drugs (chloroquine phosphate, hydroxyl-chloroquine), anti-parasitic drug (Ivermectin), steroids and serum antibodies[12-15].

Case fatality rate from COVID-19 ranges from 1% to 2% depending on the study and Country. Majority of deaths have occurred in elderly patients (over 65 years of age) with pre-existing diseases such as cancer hypertension, coronary heart disease and diabetes. In patients with severe disease, the usual cause of death is progressive respiratory failure due to alveolar damage from the virus. Although young children appear to have mild symptoms, they may infect others and perpetuate transmission[16-18].

Robust and enhanced surveillance for COVID-19 is critical for effective control of the spread of the disease as well as guide the implementation of control measures. He main objective of a sensitive COVID-19 surveillance is to control the spread of disease such that normal socio-

economic activities can resume as early as possible. In addition, surveillance also enables monitoring trends of COVID-19 transmission and risk assessments[19].

Following the Laboratory confirmation of the first 3 COVID-19 cases in the FCT March 20, 2020, a multi-sectoral COVID-19 Emergency Operations Centre (EOC) was activated on March 23, 2020. The EOC is made up of personnel from the FCT Health and Human Services Secretariat (HHSS), Nigeria Centre for Disease Control (NCDC), World Health Organization (WHO), African Field Epidemiology Network (AFENET), Medical and Dental Consultants Association of Nigeria (MDCAN), Private Health Practitioners and other partners who coordinate nine pillars (coordination, logistics, infection prevention and control, epidemiology/surveillance/point of entry, laboratory, risk communication, case management health and safety and research) of response activities as contained in the Incident Action Plan.

METHODS

Study Area and Population

The Federal Capital Territory (FCT), Abuja is the Capital of Nigeria and lies between latitude 8.25 and 9.20 north of the equator and longitude 6.45 and 7.39 east of Greenwich Meridian. It is geographically located in the centre of the country. The FCT is bordered by the states of Niger to the West and North, Kaduna to the northeast, Nasarawa to the east and south and Kogi to the southwest. The total population is close to five million and is sub-divided into 6 Area Councils (Abaji, Bwari, Gwagwalada, Kuje, Kwali and Municipal) which are equivalent to Local Government Areas (LGAs) in other states of Nigeria. The Municipal Area Council is the largest of all the area councils in the FCT accounting for over 55% of the total population. In addition, there are 62 political wards and 2,652 settlements. This study is however, confined to the rural slums which did not report any COVID-19 case but thought to have possibility of significant contacts with confirmed cases that were mainly from the urban locations of the FCT.

Brief Description of COVID-19 Surveillance Including Community Active Surveillance in FCT, Abuja

At the start of COVID-19 outbreak in the FCT, the initial strategy of detecting suspected cases was through receipt of alerts/calls from suspected cases or their proxies (e.g. relations, neighbors or clinicians) by designated members of the EOC who in turn verified that the suspected case satisfied the COVID-19 case definition before arranging for sample collection either in the homes of suspected cases or in a designated area near the International Conference Centre (ICC), Abuja. Through this strategy, a total of 698 samples have been taken as at April 12, 2020 out of which 56 were positive. Contacts of positive cases were line listed and followed up. Samples were not taken from contacts if the contacts did not exhibit symptoms. COVID-19 positive cases were evacuated to designated isolation centres in Abuja University Teaching Hospital, Gwagwalada and the National Hospital for treatment.

Since the onset of the lockdown in Abuja on March 31, 2020 to April 4, 2020, a total of 140 samples were collected down from 255 during the previous five (5) days. This was a decline of 45% and was a reflection of the decline in the alerts received at the EOC. The decline was attributed to several reasons such as real reduction in the number of suspected cases, some of the suspected cases did not know the number to call, inadequate mobilization of the public, the

suspected cases did not want to call for fear of being stigmatized, it could be as a result of the lockdown of Abuja with attendant poor access to health facilities; or suspected cases were patronizing other health care providers in the community (patent medicine vendors, traditional and spiritual healers). Whatever may be the cause of the decline, it was imperative that COVID-19 surveillance be intensified such that all infected cases were identified and put under isolation and their contacts followed up. This was what informed the initiation of community active surveillance for COVID-19 in the FCT. The EOC developed a concept note for a ‘’modified’’ community surveillance. The search was not based on house-to-house visitation, but community leaders were sensitized and they in turn mobilized community members to avail themselves to be tested at the designated client triage and sample collection sites in the community. Key areas of methods adopted are highlighted below:

- The NCDC was informed of the plan to improve COVID-19 surveillance in the FCT. This was done to prepare the laboratory of the anticipated increase in the number of collected samples such that the laboratory was not overwhelmed. In addition, to cover as many communities as possible.

- Community active case search for COVID-19 cases was conducted in settlements adjacent to where most of the COVID-19 cases were confirmed (Maitama, Wuse 2, Asokoro, Gwarimpa) based on the existing epidemiology. The settlements adjacent to these urban areas are mostly slum areas, where domestic house helps (drivers, cleaners, gardeners) of the confirmed cases who just returned from trips abroad resided.

- Before the initiation of community active case search, there was sensitization meetings with community leaders of targeted settlements. The meetings highlighted the objectives and importance of the active case search, the role of community leaders and identification of sample collection points in the community, usually primary schools since the schools were closed due to the pandemic.

- Because of the limited supply of sample collection materials, samples were collected from community members with emphasis on symptomatic members of the community. Samples from close contacts of confirmed cases regardless of symptoms and random samples from alerts received from community members regardless of fulfilling case definition criteria were also collected.

- Public sensitization was intensified through integrated media approach (print, radio, television, social media). Emphasis was placed on the need for individuals with symptoms to call for testing. The EOC phone numbers to call was announced.

- Community sensitization through the use of public Announcement Vans going round the community during the community active case search was conducted to further mobilize community members to the sample collection points. At least two or three sample collection points were identified in order to reduce overcrowding at sample collection points. The already mobilized community leaders ensured proper crowd control, dispensed masks, hand sanitizers and ensured social distancing was respected.

- Community sensitization at sample collection points on Coronavirus disease, its prevention, the objective of the sample collection and possible outcomes was conducted daily before sample collection was started. In addition, community members were allowed to ask questions on the disease and answers were provided.

- COVID-19 confirmed cases were appropriately isolated, close contacts were followed up and monitored.
- Throughout this period of community active case search for COVID-19, the usual surveillance through alert receipts continued.

Data Collection and Analysis

Data sources for analysis were from the COVID-19 excel database of the Public Health Department of the FCT as well as the master list of FCT settlements at the WHO office in the FCT. We abstracted data from the start of the outbreak on March 20, to May 18, 2020. We conducted key analysis using Microsoft Office Excel 2010 to highlight the following:

- Trend and number of samples collected
- Trend and number of samples with positive results
- Number of communities and area councils in which active case search was conducted
- Epidemiological profile (age, sex, location) of confirmed COVID-19 cases

The Chi Square test was used to compare COVID-19 detection through the alert surveillance system and in the community active case search using WinPepi version 3.85. A 95% confidence interval was calculated and values of $P < 0.05$ were considered significant

RESULTS

The total number of samples collected as at May 18, 2020 was 6,629 (Figure 3) out of which 417(6.3%) was confirmed and 8 died (Figure 1). Of the 8t cases that died, 7(88%) were males. The total number of samples collected during COVID-19 community active case search (from April 13, to May 18, 2020) was 2,753 out of which 205(7.4%) were confirmed. A total of 275(65%) of the 417 confirmed COVID-19 cases were asymptomatic at admission. The Male to female ratio of COOVID-19 cases was 3:1. The majority of COVID-19 cases i.e., 57% belonged to age group between 20 to 39 years with mean age of 36 years (Figure 2). The contribution of community active case search for COVID-19 was significant ($P = 0.002$). The number of settlements in which community active case search was conducted was 22 in Nine political wards of two area councils (Table 1). The most COVID-19 affected communities were Garki village, Mabushi, Nyanya and Lugbe all in municipal area council and Kubwa village in Bwari area council.

DISCUSSION

The decline in the COVID-19 alerts received that necessitated the initiation of community active cases search could be due to poor knowledge of COVID-19 in addition to digitally marginalized population who do not have access to COVID-19 testing information, do not have phones or credit in their phones due to poverty. During the period of community active surveillance (April 13 to May 18, 2020), the number of COVID-19 samples collected (2,753)

as well as the number of laboratory confirmed cases (205) represent 42% of the total samples (6,629) and 49% of the total laboratory confirmed (417) cases in the Federal Capital Territory, Abuja. The success of the community active surveillance was enhanced by the circular on compulsory work at home for non-essential civil service staff as well as the lockdown in the FCT. The lockdown meant that many businesses were closed as people were required to stay indoors, except for essential journeys. In addition, the role of community involvement in improving the quality of disease surveillance such as polio, Guinea Worm and Smallpox has been well documented[20-22].

Initially as with every region of the world, the first COVID-19 cases in the country and indeed the FCT came from exposure to international contacts—travel, trade, tourism, or business (x). These initial cases were mostly clustered in Maitama settlement in the Municipal Area Council. Subsequently, community transmission set in[23]. The rising new COVID-19 cases where there is no recent history of travel to infected areas or recent contact with confirmed cases is strongly suggestive of community transmission. this underscores the need for COVID-19 preventive measures such as physical distancing, use of masks, hand hygiene, cough etiquette and expanded testing[24]

The male to female ratio of COVID-19 cases in the FCT was high at 3:1. While some countries have similar pattern of sex ratios, in others no difference in the proportion of males and females with confirmed COVID-19 was observed[25]. If the proportion of people tested from each sex that are tested is not known, it will be difficult to fully interpret these sex figures. In addition, many countries are yet to disaggregate their COVID-19 data by sex.

However, the sex difference in infection rate may be artificial especially in some communities where female movements in the community are restricted due to cultural practices and hence their access to COVID-19 testing is limited. It may also be a reflection of poor surveillance and lesser testing capacity and misdiagnosis due to high prevalence of other infectious diseases with similar symptoms especially fever[26].

Of the total 417 laboratory confirmed COVID-19 cases in the FCT as at May 18, 2020, 275(65%) were asymptomatic at admission. This prevalence of asymptomatic presentation is relatively high considering findings from one study of 213 PCR-confirmed COVID-19 patients in South Korea that reported asymptomatic prevalence of 19.2% at admission[27]. Another study from Yokohama, Japan, using statistical modelling to derive the delay-adjusted asymptomatic proportion of infections estimated asymptomatic proportion to be 17.9%[28]. What is important here however is the fact that transmissibility of the asymptomatic cases among close contacts is comparable to that of symptomatic cases[29].

Of the eight COVID-19 cases that died in the FCT, 7(88%) were males. While men and women may have the same prevalence, it is almost unanimous that men with COVID-19 are more at risk for worse outcomes including need of intensive care and death, independent of age[30]. Many postulates tried to explain this observation as caused by the genes, hormones, the immune system, behavior (e.g. smoking) and prevalence of chronic diseases (e.g. heart disease, diabetes and cancer)[31].

The FCT has relatively younger age group of COVID-19 cases. The most affected age group was 20-39 with a mean age of 36 years. This may have contributed to the observed relatively low case fatality (1.9%); but the economic impact may be significant considering the

productivity of this age group. Five (63%) of the 8 confirmed COVID-19 cases that died in the FCT were over 50 years. Older population are more vulnerable to the disease. Persons older than 50 years are more likely to have the severe form of the disease given that they have a weaker immune system and are likely to have underlying chronic illnesses[32-34].

Some of the key challenges of this study are inadequate supply of testing materials and other logistics including transportation, thereby restricting optimal coverage of communities and persons within communities, low turnout of persons in some communities due to easing of lockdown, inadequate mobilization and fear of stigmatization. In addition, we encountered some data quality issues relating to missing variables of some suspected COVID-19 cases in the database.

We conclude that the community active case search for COVID-19 has significantly improved COVID-19 detection in the FCT and has demonstrated intense community transmission of the disease. The settlements most affected were Garki village, Mabushi, Nyanya and Lugbe in municipal council and Kubuwa village in Bwari area council.

With increasing community transmission of COVID-19, we recommend that all the EOC pillars of response be further strengthened in addition to maintaining a strong community engagement and participation in order to improve timely case detection, fortify prevention, interrupt transmission and reinforce the capacity of the health care system at all levels. Particular attention should be given to expanded testing capacity (in communities and health facilities) considering the NCDC's target of testing two million people over the next two months, timely isolation and treatment as well as contact tracing and monitoring.

Community involvement in surveillance should be strengthened. This involves involvement of community leaders, identification and engagement of community surveillance focal points, identification and working with traditional community health care providers including traditional and spiritual healers as well as giving regular feedback to community

Author Contributions

All authours have made significant contributions to the conception of the work, data collection and to literature search. They also contributed substantially to writing the manuscript, its critical review for quality, approved its final version, and agreed to its submission.

Conflict of Interest

The authors declare no conflict of interest, be it commercial, financial or sentimental.

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African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 98-110)

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APPENDIX

Table 1: Distribution of COVID-19 Sample Collection and Confirmed Cases during Community Surveillance in the FCT as at May 18, 2020

Date	Area Council	Ward	Settlement	No. tested	No. Confirmed (%)
13-14/04/2020	Bwari	Dutse	Mpape	189	1(0.5)
15-16/04/2020	Municipal	Gwarimpa	Utako Village	98	2(2.0)
15-16/04/2020	Bwari	Kubwa	Kubwa Village	56	9(16.1)
15-17/04/2020	Municipal	Gwarimpa	Gishiri	144	1(0.7)
15-28/04/2020	Municipal	Asokoro	Guzape	70	0(0.0)
15-28/04/2020	Municipal	Gwarimpa	Mabushi	447	85(19.0)
23-24/04/2020	Municipal	Karu	Karu	70	6(8.6)
23-24/04/2020	Municipal	Nyanya	Nyanya	70	10(14.3)
23-24/04/2020	Municipal	Karu	Jikwoyi	72	1(1.4)
27-28/04/2020	Municipal	Kabusa	Lugbe	171	12(7.0)
29-30/04/2020	Municipal	Garki	Garki Village	230	44(19.1)
1-2/05/2020	Municipal	Garki	Durumi I	109	4(3.7)
1-2/05/2020	Municipal	Garki	Durumi II	89	4(4.5)
1-2/05/2020	Municipal	Gwarimpa	Daki Biu	185	7(3.8)
5-6/05/2020	Municipal	Gwarimpa	Jahi II	101	10(9.9)
5-6/05/2020	Bwari	Dutse	Dutse Alhaji	92	6(6.5)
5-6/05/2020	Municipal	Kabusa	Aleyita	87	0(0.0)
8/5/2020	Bwari	Byazhin	Fulani Hamza Nomadic	37	0(0.0)
14/05/2020	Municipal	Gwarimpa	Kuchingoro	122	1(0.8)
14/05/2020	Municipal	Gwarimpa	Kado Kuchi	77	2(2.6)
14/05/2020	Municipal	Kabusa	Chika	42	0(0.0)
15-16/05/2020	Municipal	Kabusa	Kabusa Village	195	0(0.0)
FCT	**2 Area Councils**	**9 wards**	**22 settlements**	**2753**	**205(7.4)**

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 98-110)
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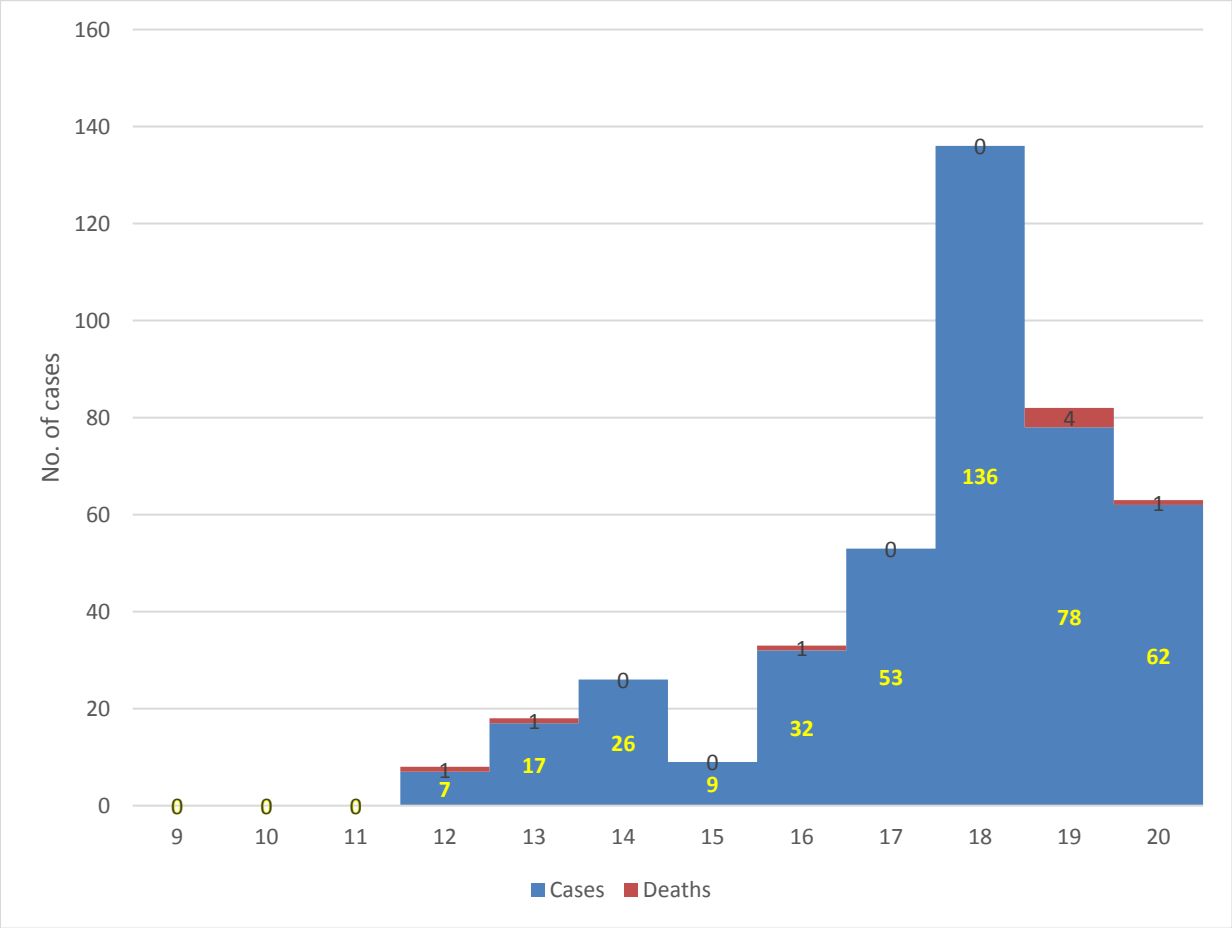

Figure 1: Epidemic curve of COVID-19 in the FCT as at week 20, 2020

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 98-110)
www.abjournals.org

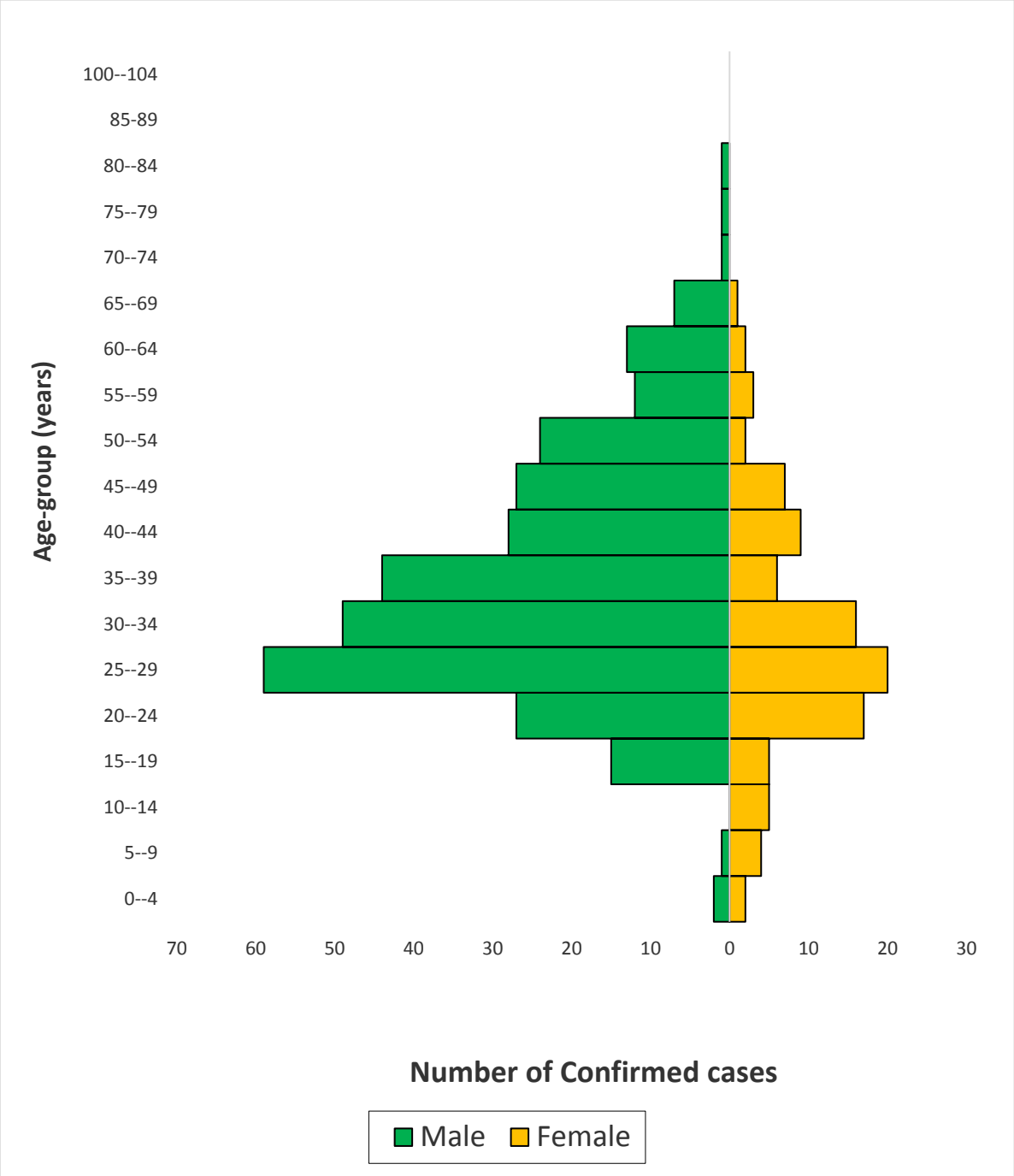

Figure 2: Age/Sex distribution of confirmed COVID-19 cases in the FCT as at May 18, 2020

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 98-110)

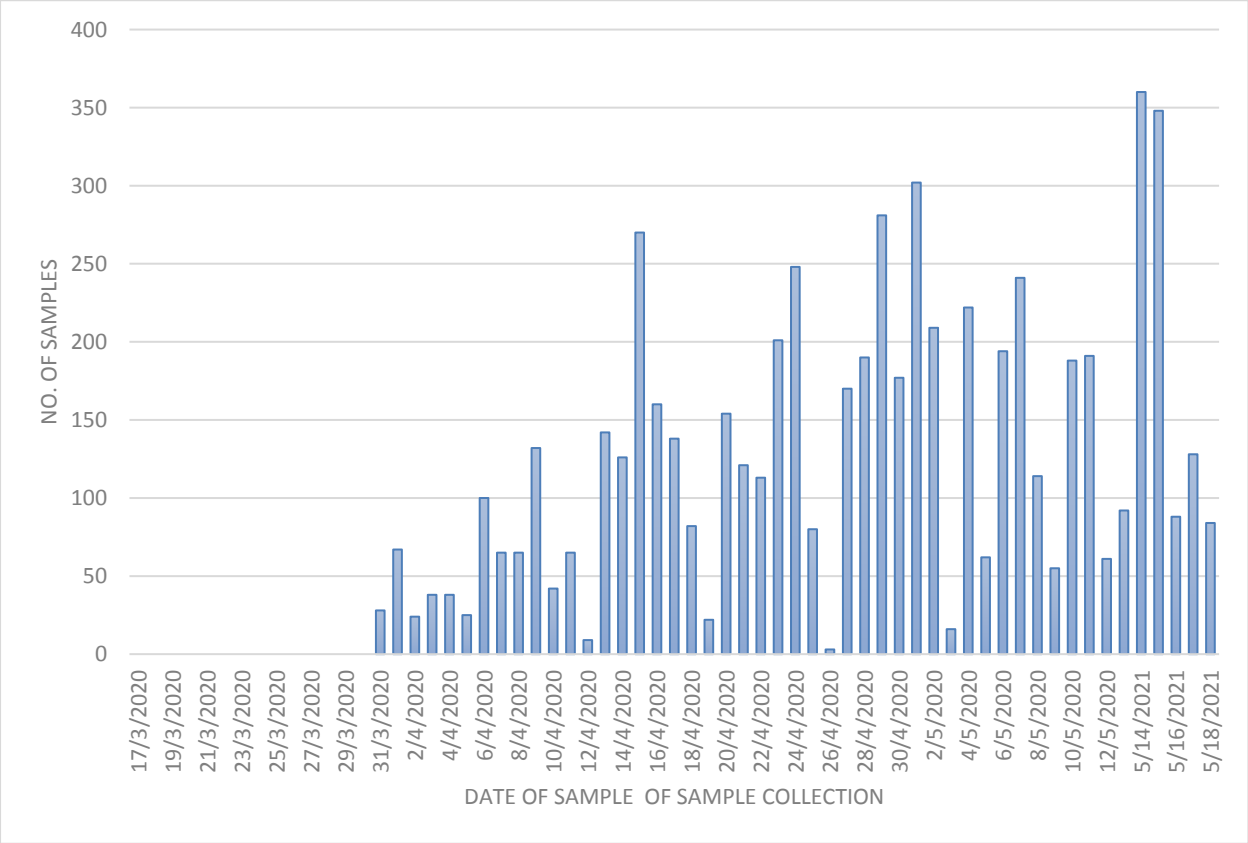

Figure 3: Daily COVID-19 sample collection in the FCT as at May 18, 2020

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 111-125)
www.abjournals.org

COVID-19 PANDEMIC IN NIGERIA: THE RESPONSE OF THE CHRISTIAN CHURCH

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ABSTRACT: *The advent of the novel coronavirus pandemic in Nigeria on 27th February, 2020 evinces different responses from the Christian Church. As the nation began to witness regular increase in the number of confirmed cases of the virus, government both at the federal and state levels imposed a lockdown on the country. This study looks at the various responses of the Christian Church to the happenings in the country with the emergence of the virus and the subsequent lockdown of the whole country. The data collected for the study were analysed using socio-historical approach.*

KEYWORDS: COVID-19, Pandemic, Christian Church, WHO, Christian Church

INTRODUCTION

The virus initially titled 2019 novel coronavirus (2019-nCoV) and subsequently named COVID-19 by the World Health Organisation (WHO) on 11th February, 2020, is according to Lin et al (2020), a series of pneumonia cases of unknown aetiology. It belongs to a family of viruses that may cause various symptoms such as pneumonia, fever, breathing difficulty and lung infection, but some variants have caused severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) (Adhikari et al, 2020; Gøtzsche, 2020). Thus, WHO (2020) defines COVID-19 as the infectious disease caused by the most recently discovered coronavirus, which is seen as a new virus and disease and unknown before the outbreak began in Wuhan, China, in December 2019.

From its origin in Wuhan, China, COVID-19 is now a pandemic affecting many countries globally; it had spread rapidly to the rest of the world. Starting with each affected patient and their families to communities, socioeconomic systems to whole nations, not a single person on planet earth has been spared from the direct and indirect effects of the ensuing pandemic. As at Friday, 14th February, 2020, there were 49,053 confirmed cases and 1,381 deaths that have been reported globally (Harapan et al, 2020; Centre for Disease Control and Prevention, 2020; Lin et al, 2020). These cases have increased exponentially as of Thursday, 21st May, 2020 (9:32:43am) with 5,011,467 confirmed cases and 328,368 deaths globally (TMC Library, 2020). With the increase in death rate, the perceived risk of acquiring the disease and with no effective treatments or vaccines till now, many governments have had to institute a variety of control measures. The same is not farfetched in Nigeria who recorded the existence of the disease on Thursday, 27th February, 2020 in Lagos State through an Italian resident in Ogun State.

In order to contain the spread of the disease in Nigeria, the Federal Government of Nigeria issued a ban on all international flights effective from the 23rd March, 2020, except for emergency and essential flights (Nigeria Centre for Disease Control, NCDC 2020). On 30th

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 111-125)

March, 2020, the Federal Government also imposed a lockdown of non-essential activities in the Federal Capital Territory (FCT), Lagos and Ogun States due to their confirmed positive cases (See NCDC, 2020; PM News, 2020; Emorinken, 2020; Owoseye, 2020). But before this time, these majorly affected states (including the FCT) had issued a ban on any gathering of more than 50 people (Onyeji, 2020; Ogundipe, 2020; Ade-Rufus, 2020; Ojerinde, 2020; Olatunji, 2020). As of 23rd May, 2020, there were 7526 confirmed cases, 2174 discharged cases and 221 confirmed deaths. Hence, this study looks at the responses of the Christian Church to the advent of this pandemic in the country amidst the lockdown thus far.

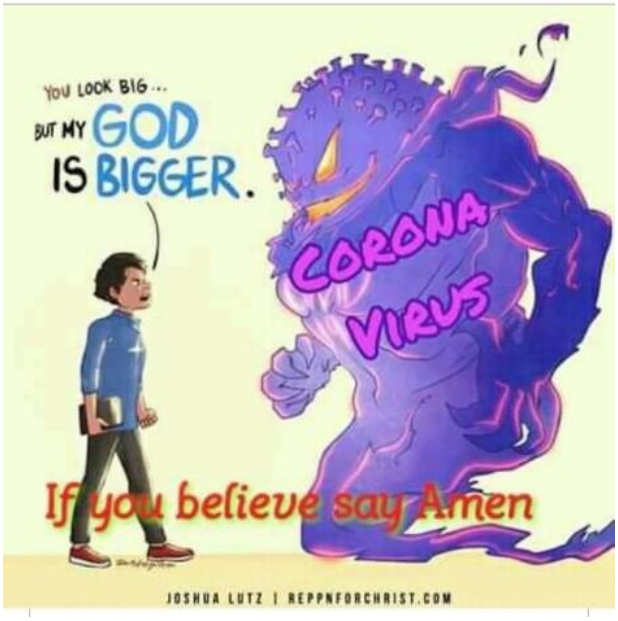
Response of the Christian Church

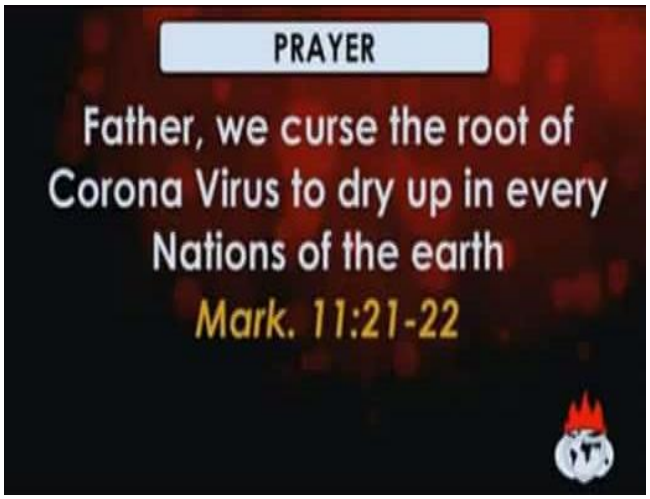
The emergence of COVID-19 in Nigeria was treated with different views by Christians in the country. Many Christians do not take the existence of the virus seriously as they believe God is able to heal them of any kind of diseases that comes their way. They believe so dearly the part of the Bible in Psalm 91:10 that says, "No evil shall be allowed to befall you." Some have even abbreviated and personalised the meaning of the virus to be:

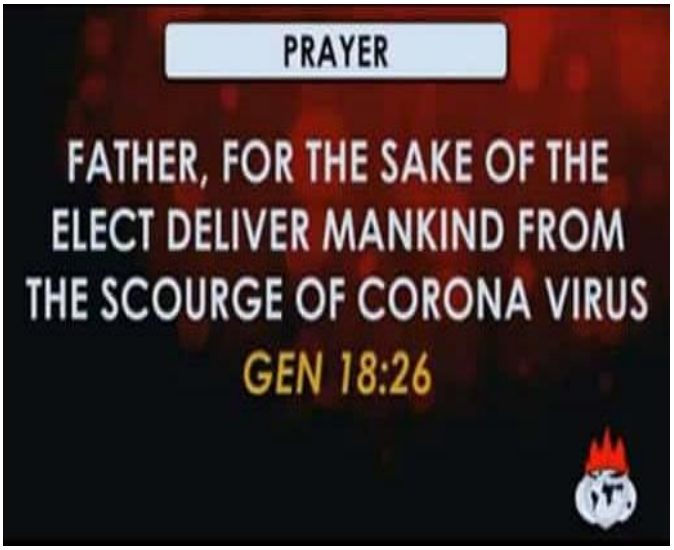
> Christ Jesus defeated you (Coronavirus)
> On Calvary tree,
> Return to where you came from
> Our homes and bodies are untouchable,
> None of your weapons (virus) formed,
> Against us will succeed,
> Victory over you (Coronavirus),
> Is,
> Reassured through our,
> Undefeated,
> Saviour Jesus Christ. Amen (Inuwa, 2020).

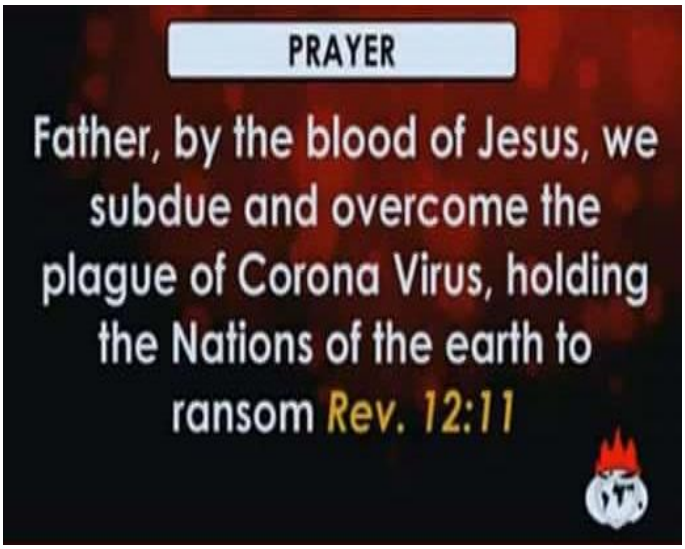
The pictures below also depict the belief of many Christians on the coronavirus:

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 111-125)
www.abjournals.org









Source: WhatsApp Social Media (2020)

The above are spurred by the fact many Christians and Nigerians at large are deeply religious and they exhibit this their belief in the supernatural being. This is why Afe Adogame (2010) notes that:

> *Religious ideas and world views continue to shape the ways that Nigerians explain, predict, and control the events and life circumstances that surround them. Religion or spirituality has served as a significant source through which many Nigerians seek understanding of their complex reality and existence, and it serves as a panacea for their various existential problems of day-to-day living.*

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 111-125)
www.abjournals.org

This complex reality in this instance is the coronavirus which many Christians have interpreted as being under the control of God. According to Inuwa (2020), though coronavirus is unexplainable, Africans, especially Nigerians, believe that it is God alone that can bring an end to it. Supporting this assertion, a poll conducted by the World Values Survey in 2015 as quoted by Falade and Bauer (2018) shows that 88% of respondents in Nigeria agree that, "Whenever science and religion conflict, religion is always right". With this, it is not surprising to see Christians in the country responding that God is worthy to save them and even rescue them if at all they are infected by the disease.

In another case in point, some Christians believe that the existence of the virus in the country and the world at large is as a result of the sins committed by people. They see it as the punishment for the world's sins that God is melting out on sinners. Also, it is seen as a curse; this curse is punishment of the many sins of the world. Thus, for the virus to go away, Christians and the entire world must ask for the forgiveness of their sins and draw back to God. But if the virus is the punishment and a curse for sinners, why are the supposed righteous also affected by the scourge of the virus? Is God now interested in the death of a sinner than for such to repent?

Some Christians also responded to the presence of the virus by adhering to the directive of the government on the use of face mask. Starting with the Lagos State government on 25th April, 2020 mandating the use of face masks in public, many have adjusted to this new means of life. While some make use of the medical face masks, others make use of cloth face masks. Below are some of the different face masks being worn by some Christians:

Source: WhatsApp Social Media (2020)

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 111-125)

www.abjournals.org

Pictures from the above show different shades of face mask being worn by Christians. The first one appears to make use of the Gideon's New Testament & Psalms Bible while the second one portrays an Aladura church member who makes use of a self-sown face mask with a blue colour insignia as a cross. These mostly signify safety and protection in times of need, especially during the COVID-19 pandemic.

Response of Some Church Leaders

Immediately after the announcement of the first case of COVID-19 in Lagos, Catholic Church authorities in Lagos State announced the suspension of handshakes or other personal contact at Mass (Lawal, 2020). It also gave a directive as a way to encourage members to observe 'Stations of the Cross' (the church's special programme) privately on Wednesdays while public celebrations would take place only on Fridays, in order to reduce the number of gatherings in church to the barest necessary. This was the immediate response of the church even before the public directives of the Government.

On the directive given by the Government on 18th March, 2020 banning large gatherings that led to the closure of religious centres and schools, the responses of the Christian churches differ. Taking a look at some of the megachurches in the country, one would see a divided response. While some complied with worship of less than 50 worshippers before it was later reduced to 20 worshippers (Lagos and Ogun states on 21st March), others flaunted the directive. One prominent church which flaunted this directive is the Living Faith Church Worldwide, otherwise known as Winners' Chapel. This church held a complete service with members filled to its full capacity to the chagrin neglect of government's directive, even without the provision of safety measures (See Ogundipe, 2020; Ade-Rufus, 2020). Other churches which followed suit includes: Commonwealth of Zion Assembly (COZA), Dunamis International Church in Abuja (See Ayado & Kwen, 2020) and so on. The leader of COZA, Pastor Biodun Fatoyinbo on his Twitter handle (@biodunfatoyibo) gave the following directives for his church members:

> *Following a directive from the FCT Administration, please be informed that service would hold tomorrow, 22nd March, 2020 by 7:30am @Evelyn Centre and 9am at The COZA AUDITORIUM, Guzape Hills, Asokoro Extension, Abuja. 1) Electronic thermometers will be used (2) There will be alcohol-based sanitizers (3) There will (be) a considerable space between the worshippers. (4) The Air flow systems are effective. (5) The blood of Jesus puts the enemy (pestilence) at bay. #FearNot*

The above shows a flagrant disregard of the directive given by the FCT Administration. Even with all that have been listed as safety/precautionary measures, the church was filled to an overflow on the 22nd March, 2020 (See Ayado & Kwen, 2020). This is also the case for some other churches which also violated the directive given by the government. However, it must be noted here that it only took the government to use force and arrests for some of the churches to later on adhere to the directive. Emphasising on this, Orjinmo (2020) notes that,

> *The auditoriums of Nigeria's mega churches are empty and their gates are shut as they are forced to observe a government ban on large gatherings to halt the spread of coronavirus. But it took not only threats, but force and arrests for the message to get across.*

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 111-125)

On the other hand, The Redeemed Christian Church of God (RCCG), led by Pastor E. A. Adeboye complied with this directive as his church directed all its branches to obey the directive. The service held on Dove Television (the church's owned cable television) on Sunday, 22nd March, 2020 showed Adeboye ministering to less than 20 people, in accordance to the directive.

Source: WhatsApp Social Media (2020)

The above picture shows a Celestial Church of Christ (Ibara Cathedral, Ogun State Area "A" Headquarters) which categorically asked both members and visitors to stay away from the church premises until further notice. This shows a good compliance with the government's directive.

Church Online Services

In order to continue the spread of the gospel during the coronavirus pandemic and in compliance with the directive of the government banning various gatherings, many of the churches responded by conducting their services online. This means that many churches have devised a means of worshipping together howbeit through the services provided over the Internet. The churches that can afford the cost of streaming their services online have really adapted to the changes brought by the existence of the virus in the country. Those that are already used to online services, especially the megachurches only complemented their past efforts for adequate coverage, while others had no choice but to hold their services online during this period. The online services include the use of: Facebook, WhatsApp, YouTube, Instagram, Twitter, Mixlr, Zoom, Vimeo and so on. Below are some of the pictures to show different adverts of churches on their transformation to online services from physical services in church buildings:

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 111-125)

Source: WhatsApp Social Media (2020)

From the pictures above, one noticeable mantra is: "Online service". For example, the Daystar Christian Centre issued out a circular which reads:

> *From the 21st of March, 2020, the church will not hold physical gathering for worshippers in the following branches Oregun, Lekki, Ikorodu and Badagry till further notice… henceforth services shall be conducted online on designated platforms on Saturdays, Sundays and Wednesdays* (Oyero, 2020).

While many Christians have keyed into the online services of these churches, others have criticised the churches, hinging their claims on the continuous request for tithes and offerings by the churches even during the lockdown period where most people are not working. Also, there is no gainsaying that some churches and their leaders lack the technical know-how when it comes to the usage of online services. This in no small means have caused their inability to continue their various churches services during the pandemic lockdown in the country.

Response through Controversies

666 Controversy

Another response of the Christian church is in the area of "666" controversy. Some of the Christians believe COVID-19 is linked to 666, the number believed to be the "mark of the beast" recorded in the Book of Revelation 13:18. They believe the quarantine or a vaccine is linked to the supposed mark. Using gematria, they apportioned a numerical value to the name of the disease based on its letters. See the calculation below using the English alphabets:

A=1, B=2, C=3, D=4, E=5, F=6, G=7, H=8, I=9, J=10, K=11, L=12, M=13, N=14, O=15, P=16, Q=17, R=18, S=19, T=20, U=21, V=22, W=23, X=24, Y=25, Z=26

C - 3

O - 15

R - 18

O - 15

N - 14

A - 1

6 66

666

The word "corona" is a six-letter word amounting to 6, while the number equivalent is 66 in total. Joining the two together then gives the number 666.

But what must be noted here however is that, the calculation literally has been punctured as the use of just "corona" can depict different things (like Corona Group of Schools or even Toyota

Corona Car) without adding the "virus" to it. And once the virus is added, the calculation will be more than the supposed 666. That being said, another thing that must be noted is that, the "mark of the beast" as shown in the Scripture is expected to be linked to a man and not a virus (See Michael, 2010). Ordinarily, it implies an engraved mark or a seal impression, or inscription (Judge, 1991).

5G Controversy

During the lockdown, this controversy was propagated by Pastor Chris Oyakhilome, the founder and lead pastor of LoveWorld Incorporated or Believers' Loveworld, otherwise known as Christ Embassy, who in a YouTube video post that went viral on April 8, 2020, linked the virus to 5G networks and alleged that it was part of a plot to create a "new world order" (Orjinmo, 2020). This "new world order" as claimed by Oyakhilome is where some figures of authority in the world were trying to build a religion, economy and government for the entire universe (Olowoyo, 2020). Also, he claimed that the lockdown was to enable the Federal Government to install 5G in Abuja and Lagos (Olowoyo, 2020). These views were more consolidated on the church-owned television network - LoveWorld Television Ministry, which aired some programmes in early April and claimed there was a "global cover-up" over 5G networks being the cause of the pandemic (Akinwotu, 2020). In one of those programmes aired by the same television network in South Africa titled, "Why is 5G linked to Covid-19?" it was further claimed that the technology was fuelling an outbreak of the virus. One of the presenters of the programme opined that,

> *With the classification of a weapon, 5G technology is very dangerous. When it comes into contact with a human body it can provide some poisons to the cells … This shows that what's killing people, it's not coronavirus, but 5G* (Akinwotu, 2020).

But how can a telecommunication technology of this nature be a weapon? This is one of the questions in the minds of many people and this view as expatiated by Oyakhilome and his supporters has spread so widely that many see it as a conspiracy theory, aimed at casting aspersion on the 5G network. Obviously, the 5G is a fifth-generation wireless communications technology supporting cellular data networks, an upgrade to the previous technologies from the 2G Global System for Mobile (GSM) to the 4G Long Term Evolution-Advanced (LTE-A) system (Mitra & Agrawal, 2015). The major advantage of this network is the greater bandwidth it has, which enables faster download speeds per second (See Bhalla & Bhalla, 2010; Jain, Jain, Kurup & Gawade, 2014; Kachhavay & Thakare, 2014; Mitra & Agrawal, 2015; Ezema, Okoye, & Okwori, 2019).

Many of Oyakhilome's church members supported this spurious claim and also joined in its spread in the country. But the Nigerian government through the National Orientation Agency (NOA) on Sunday, 5th April, 2020 debunked the claims as not having scientifically-proved evidence. Earlier, on Saturday, 4th April, 2020, Nigeria's ministry of Communications and Digital Technology also made a denial in a similar circumstance (Akinrujomu, 2020). In this wise, Oyakhilome later backtracked on his claim that the introduction of 5G network was responsible for the coronavirus pandemic, citing perceived health risks and the seeming silence of authorised regulators to address the advantages and disadvantages of the network (Olowoyo, 2020). However, Oyakhilome's television service was sanctioned by Ofcom (United Kingdom's communications regulator) for airing "potentially harmful statements" about the

Covid-19 pandemic, including a baseless conspiracy that the virus is linked to the rollout of 5G phone networks (Akinwotu, 2020).

Prediction

One of the most famous of this is Prophet Temitope B. Joshua – Founder of Synagogue Church of All Nations (SCOAN), who in the month of February claimed to be divinely inspired, predicting that the coronavirus pandemic would be over by 27th March, 2020. In his words, he said: "By the end of this month, whether we like it or not, no matter the medicine they might have produced to cure whatever, it will go the way it came" (Orjinmo, 2020). Apparently, this was only a prediction that did not come to past, even though Joshua later on linked his prediction to the decline of the virus in China where it all started from.

Responses through Welfarism and Government's Cause

Since welfarism is the belief/principle that social welfare depends (positively) only on individual welfare (or utility) levels (Ng, 2000), many of the Christian churches in Nigeria responded by giving out relief packages like foodstuffs, money and so on to their members and the less-privileged ones. This was to really cushion the effects of the COVID-19 pandemic lockdown on their members. Some of the churches also donated either money or various items to the government in order to support the government's effort at containing the spread of the disease. As this is being done, some believed it is one of their civic responsibilities to do in times like this. Below is the list of some of Christian churches that donate to this cause:

S/N	Name of Christian Church	Items/Money Donated	Date
1.	Dunamis International Gospel Centre .	Medical supplies to the Federal Capital Territory Administration, Abuja	25th March, 2020
2.	The Redeemed Christian Church of God	11 ICU beds with ventilators to Lagos, Ogun and Plateau states	27th March, 2020
3.	Living Faith Church Worldwide	Ambulances, test kits, and personal protective device (PPE) to the Lagos and Ogun state governments	30th March, 2020
4.	The Redeemed Christian Church of God	Medical supplies to Lagos state government	31st March, 2020
5.	The Redeemed Christian Church of God through its General overseer, Pastor Enoch Adeboye	Donation of 20 million Naira to support Osun state COVID-19 relief package	3rd April, 2020
6.	Christ Apostolic Church	Donation of 5 million Naira to the Oyo state COVID-19 funds	5th April, 2020
7.	All Saints' Church	Donation of 250,000.00 Naira to the Oyo state COVID-19 funds	5th April, 2020
8.	The Apostolic Church Nigeria Ibadan Metropolitan	Donation of 500,000.00 Naira to the Oyo state COVID-19 funds	5th April, 2020
9.	Christ Miracle Church Mission	Donation of 250,000.00 Naira to the Oyo state COVID-19 funds	5th April, 2020
10.	Cathedral of St. Peter	Donation of 200,000.00 Naira to the Oyo state COVID-19 funds	5th April, 2020

11.	CDB People of Faith Gospel Church	Donation of 20,000.00 Naira to the Oyo state COVID-19 funds	5th April, 2020
12.	Kingsway International Christian Centre	Donation of 10,000,000.00 Naira to the Lagos state government	5th April, 2020
13.	Daystar Christian Centre	Launches feeding programme and donates protective equipment in response to COVID-19	6th April, 2020
14.	Nigeria Baptist Convention	Donation of relief materials to the Oyo state government	6th April, 2020
15.	Diocese of Lagos West, Anglican Communion	Donation of 5,000,000.00 Naira to the Lagos state government	6th April, 2020
16.	Fountain of Life Church	Donation of 10,000,000.00 Naira to the Lagos state government	
17.	The Christ Miracle Mission	Donation of 2,000,000.00 Naira to the Lagos state government	9th April, 2020
18.	Deeper Christian Life Ministry	Donation of 50,000,000.00 Naira to the federal government	9th April, 2020
19.	God's Chamber Church	Donation of 100,000.00 Naira to the Lagos state government	
20.	The Foursquare Gospel Church Nigeria	Donation of foodstuffs to the Lagos state government	19th April, 2020
21.	The Church of Jesus Christ of Latter-day Saints	Donation of personal protective equipment and other basic necessities to the Lagos state government through the Ministry of Health	29th April, 2020
22.	The Citadel Global Community Church, formerly known as Latter Rain Assembly	Donation of three church buildings to the Lagos and Ogun state governments as isolation centres	10th May, 2020
23.	The Apostolic Church (LAWNA Territory)	Donation of 5,000,000.00 Naira to the Lagos state government	
24.	Catholic Church of Nigeria	425 health facilities across the country as isolation centres for COVID-19	11th May, 2020

Source: The Author

With most churches rising up to help their members and the less privileged ones during the lockdown, many have seen them living up to the bidding of a called-out assembly of believers. But in another view, this move by the churches in making donations to the government and financially troubled members is likely to see them maintain popularity and portray them as helpers in times of need. Nonetheless, the churches have really shown that welfarism is centrally concerned with the welfare or well-being of individuals (Keller, 2009) and if they help the government, they are also helping both Christians and non-Christians alike.

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www.abjournals.org

Response through Agitation for the Opening of Churches

Several calls were made by some church leaders for the opening of closed down churches. Leaders like Bishop David Oyedepo and Pastor Chris Oyakhilome were at the fore front in this advocacy. Oyedepo believes that the continuing lockdown of churches is a move by the government in targeting churches. He is of the opinion that if markets could be opened, there is nothing stopping churches from being opened. But looking at it vividly, comparing church with markets is just out of it as the continuous closure of markets would spell doom for the country as hunger strikes are bound to take place. Oyakhilome on his own part believes ministers of God who do not advocate for the opening of churches are not genuine ministers of God. These pastors were however berated by their fellow pastor, Tunde Bakare of The Citadel Global Community Church, formerly known as Latter Rain Assembly. He said, "Instead of criticising the government, they should collaborate with them…. They must be prepared to offer some of their halls for the government to use as isolation centres" (Krippahl, 2020). This is also supported by the Christian Association of Nigeria (CAN) through its leader, Rev. Samson Ayokunle, who notes that the continuous closure of the church is to the good of every citizen of the country. Ayokunle enjoins all churches to continue to adhere to the guidelines as laid down by the government. Notwithstanding, some Christians believe that it is only the physical church that has been shut down, but not the spiritual church. This spiritual church is seen as a personal thing, which is the communication with their God.

REFLECTION

The advent of the COVID-19 pandemic in Nigeria has in no small measures brought about different perspectives to the church. This is because the continuous lockdown placed on the country to contain the spread of the virus has affected the church both positively and negatively. On the positive perspective, it has seemingly been used by the government in order to contain the spread of the disease, even though the number of infected people keeps on increasing day after day. Secondly, it has been able to make Christians know that the main church is the people and not the church building itself, which is to help them increase their personal relationship with God. Thirdly, it has helped to bring to fore the importance of social media and online services in the continuous spread of the Christian faith even in the face of lockdown. Those who do not give emphasis to information, communication and technology in churches have suddenly developed interest in it in order to continue to reach out to their members and non-members alike. Really, this is not surprising as many must do this to keep hold on their members in this 21st century and will further enhance leaders-members relationship. Fourthly, it has shown that the church can also give physical blessings (social welfarism) apart from the spiritual intervention it can render in a pandemic period like this.

On the negative perspective, the resultant effect of the continuous lockdown is seen in the reduction or extinction of the Christian faith from some of its adherents. With no adequate gathering together for worship, some Christians who are not deeply rooted in their faith might be turned aside from their faith. Even while there was constant worship together, many were not deeply rooted talk less of when they are not worshipping together. Also, many businesses have been gravely affected by the continuous close down of churches in the country with no adequate compensation from the government. Small scale businesses like the motorcycle (Okada) riders, bus drivers, confectionary sellers, and so on that normally boost their income

anytime there is worship in church centres are at a loss. With this, others too like the petrol stations and even banks would have counted their losses with little patronage and deposit of church money. Also, it has belittled the importance of churches that are to pray and maybe, bring about a possible solution to the pandemic that has proved too difficult for science to handle. In another instance, the Christian religion is getting a lot of misrepresentations by some of its adherents who believe the pandemic is caused by the 5G technology or even the quarantine and vaccine for treating it (which is not even known yet) as the "mark of the beast" (666). This shows nothing but the ignorance of the biblical text.

CONCLUSION

This paper gives an overview of the response of Christian Church on the advent of the novel coronavirus in Nigeria and the aftermath directives by the government. While some of the church leaders adhered strictly to the directives of the government to contain the spread of the virus, others disobeyed the directives. But despite this disobedience of the church leaders during this pandemic period, many of the churches were able to help their members and the government. One thing that is very important is that, many of the Christians believe it is only God that can really help them out of the pandemic, and at the same time, they are to take every precautionary measure as stated by the government in containing the spread of the virus. Be that as it may, a virus that has killed many in the country and the world at large should not be taken for granted. The fact that the belief in God to heal every kind of disease is very strong, so also should every citizen of the country be obedient to the government's directive and make use of every precautionary practice that has been laid down for the containment of the disease in the country.

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RESPONSE TO THE SPREAD OF CORONAVIRUS BY KATSINA STATE GOVERNMENT, NIGERIA

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ABSTRACT: *The continent of Asia has in the last two decades became the origin of disease outbreaks that affected the continent and areas beyond. These disease outbreaks include SARS-CoV-1 that broke out in the year 2003 and MERS that broke out in the year 2012. The most recent is SARS-CoV-2 otherwise referred to as Coronavirus or COVID-19 that broke out in 2019 at Hubei Province of China and then spread rapidly to other parts of the world emerging as a significant public health threat. The disease has since spread to Africa with Nigeria presently ranked the third most infected country after South Africa and Egypt. Federal and State Governments in Nigeria have adopted a number of measures to respond to the spread of disease. This article examines the response to the spread of coronavirus by Katsina State Government. Data for the study were generated mainly from secondary sources and informal discussions with some of the people of the State. The results have shown that the State Government has responded adequately by adopting a number of measures to contain the spread of the disease. These responses closure of schools and inter-state borders, imposition of lockdowns on affected Local Government Areas, creation of working committees and mobile courts, and a number of directives to business owners and transporters among others. These responses however have certain limitations and have generated many complains from the people of the State. It is therefore recommended that the State Government should tackle the limitations and address complains for more effective responses to the spread of diseases.*

KEY WORDS: Response, Spread, Coronavirus, Limitations, Complains, Covid-19, Nigeria

INTRODUCTION

The continent of Asia has in the last two decades became the origin of disease outbreaks the affected the continent and other continents of the world. One of these disease outbreaks was the Severe Acute Respiratory Syndrome (SARS) or SARS-CoV-1 that was detected on 16th April 2003 in Taiwan that then spreads to other parts of Asia (WHO,2003). The geographical spread of this outbreak remains within Asia. In the year 2012, Middle East Respiratory Syndrome (MERS) broke out in Saudi Arabia then spreads to South Korea and United States of America (CDC,2012). The spread of MERS does not cover the large parts of the world and therefore its impacts are limited.

In the year 2019, SARS-CoV-2 broke out again in Asia in the Hubei Province of China.SARS-CoV-2 is a new virus that is responsible for the outbreak of respiratory illness known as COVID-19. Coronavirus belong to a group of viruses that may cause symptoms such as pneumonia, fever, difficulty in breathing, lung infection, sneezing and coughing (Awaji,2020).

The virus is mainly spread through close contact between persons and by small droplets produced during coughing, sneezing and talking (ECDP, 2020). The people that are more likely or susceptible to acute coronavirus infections are the aged or elderly people and people with underlying medical conditions such as hypertension, diabetes, HIV Aids and others (WHO, 2020a).

Since the report of the first case of the disease in December 2019, cases of the disease have spread rapidly around the globe emerging as a significant public health threat worldwide (Kowalik et al,2020). By 16th March,2020 the number of infections outside China increased drastically and the number of affected countries. States or territories reporting infections to the World Health Organization (WHO) was 143 (Bradford, 2020). On the basis of alarming levels of spread and severity and by the alarming levels of inaction, the Director General of WHO described the situation as a pandemic (Bradford et al, 2020). By 19th June 2020 6.33 PDT coronavirus has spread around the globe infecting more than 8.5 million people and killed more than 450,000 worldwide since January when it was first reported.

In the continent of Africa, WHO has observed that the number of coronavirus cases has been steadily increasing rising to more than 75,000 as at 7th June 2020 (WHO, 2020b). South Africa, Egypt and Nigeria records the highest number of infections. South Africa has recorded 118,375 cases with Egypt recording 61,130 cases and Nigeria recording 22,614 cases as at 25th June 2020 (ECDC, 2020 and NCDC, 2020). The spread of the disease to the continent raised special concern from the international community and WHO in view of poorly developed healthcare systems, inadequate budgetary allocation to healthcare and inadequate emergency preparedness for disease outbreaks of global proportion.

Nigeria has in the past two decades witnessed and experiences a number of disease outbreaks of different severity and geographical spread. These include HIV aids (2005-2012), Lead poisoning (2011), Ebola virus (2014-2015), Acute hepatitis E (2017), Cholera (2017), Monkey pox (2017-2018), Yellow fever (2019) and Lasser fever (2018-2020). The Coronavirus that broke out in 2019 is unique as it started as an epidemic to reach a pandemic proportion with simultaneous infections across the world within 1-3 months, its global coverage and rapid spread of the virus (Bradford,2020). Also, there is no known cure or anti-viral treatment leading to high mortality rates among infected persons even in the most advanced nations of the world such as USA, United Kingdom, Germany, Italy and Spain.

The first case in Nigeria was an Italian migrant worker who landed at Lagos on 24th February 2020. The disease infection then spreads to Ogun State that shares boundary with Lagos and later to Abuja, the Federal Capital Territory (Adamu, 2020). The arrival of the disease to Abuja and then Bauchi State lead to the spread of the disease to the northern parts of Nigeria including Katsina State. Since the outbreak of the disease in China, the Governments of many countries have adopted a number of measures to respond to the disease which include entire nations enforcing lockdowns, widespread halt to international travels, mass layoffs of workers, halt to national and international sporting events, closure of international borders, battered financial markets (Bloomberg,2020).

In Nigeria the Federal Government has responded to the disease outbreak by outlining a number of measures that were announced through presidential addresses to the nation and other measures conveyed through the Presidential Task Force (PTF) on Coronavirus that gives daily briefings to update the people on the situation at Abuja. At the level of the State Governments,

many States in the federation have adopted different measures to respond to the disease even at a time when the outbreak has not been reported in their States. It is based on this background that this article is set to achieve the following objectives.

(i) Explain the response to the spread of coronavirus by Katsina State Government.

(ii) Highlight the limitations of the responses by the State Government.

(iii) Outline complains of the people on the response measures adopted by the State Government.

(iv) Recommend appropriate measures to make the responses more effective.

RESEARCH METHODOLOGY

This research uses mainly secondary sources to generate data for the study in order to achieve the set objectives. These sources include articles published in peer reviewed journals, development reports, Government news bulletins, press releases from government house, daily newspapers, radio and television programs on coronavirus and internet sourced materials published on the coronavirus pandemic that were retrieved through desk research .Informal discussions on the coronavirus pandemic and the measures adopted by the State Government were held with some residents of Katsina, the State capital and other Local Government Areas of the State where cases of the disease infections were detected and lockdowns were imposed on them. Descriptive statistics was used to analyze the data particularly use of tabulation in arranging the responses according to their effective dates. The data collected from these sources highlighted above sources were edited to suit the writing of the paper.

Response to the Spread of Coronavirus in Katsina State

The State Government has adopted a number of measures in response to the outbreak of coronavirus even before the first case of the disease was found in the State. These measures can be seen on the table below:

Table 1: Measures Adopted by Katsina State Government to Respond to the Spread of Coronavirus

S/No	Effective date	Response of the State Government
1	23rd March 2020	Closure of public and private nursery, primary and secondary schools including tertiary institutions
2	25th March 2020	Closure of inter-State borders with Jigawa, Kano, Kaduna and Zamfara States
3.	27th March 2020	Suspension of large gatherings for weekly Friday prayers and Sunday church service
4	27th March 2020	Directing civil servants to stay at home and not to report to work
5	30th March 2020	Setting of Emergency and rapid response committee to assist Ministry of Health
6	31st March 2020	Rehabilitation of a ward to serve as Isolation and Treatment Center at Federal Medical Center Katsina

7	1st April 2020	Setting of Taskforce on public enlightenment and sensitization
8	7th April,2020	Lifting ban on large gatherings in Friday prayers and Sunday church service and provision of prevention materials to the mosques and churches
9	11th April,2020	Imposition of lockdown order on Daura LGA following detection of three cases of the disease.
10	17th April,2020	Reinstating ban on large gatherings in Friday prayers and Sunday church service
11	17th April,2020	Fifteen weekly markets in towns and villages across the State to close down
12	17th April,2020	Imposition of lockdown order on Dutsinma LGA following detection of one case of the disease.
13	20th April,2020	Presentation of breakdown of expenditure concerning donations received by the State Government
14	21st April,2020	Imposition of lockdown orders on Katsina and Batagarawa LGAs following detection of two cases
15	21st April,2020	Creation of two mobile courts to try violators of lockdown order in the affected LGA.
16	23rd April,2020	Imposition of lockdown order on Jibia and Mani LGAs following the detection of one case each
17	25th April,2020	Imposition of lockdown order on Safana LGA following detection of three cases of the disease.
18	1st May 2020	Imposition of lockdown orders on Kankia, Musawa and Matazu LGAs following detection of two cases of the disease.
19	6th May 2020	Directives to Tricyclists and commercial motorcycles to adopt preventive measures against the disease.
20	7th May 2020	Imposition of lockdown orders on Malumfashi and Rimi LGAs following detection of one case each
21	10th May 2020	Imposition of lockdown order on Ingawa LGA following detection of one case
22	14th May 2020	Lifting of lockdown orders on Jibia and Mani LGAs following positive reports on the cases.
23	18th May 2020	Lifting of lockdown orders on Katsina, Batagarawa and Daura LGAs for *eid* celebrations and re-stocking of food items and other provisions.
25	27th May,2020	Re-imposition of lockdown order on Katsina, Batagarawa and Daura LGAs following increase cases of infections in the State.
26	3rd June 2020	Lifting of lockdown order on Katsina, Batagarawa and Daura LGAs
27	14th June 2020	Directives to Quranic and Islamiyya schools to remain closed till further notice from the State Government.
28	21st June 2020	Announcement that playing football games remains suspended while football viewing centers should remain close till further directives from the State Government.

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After holding a meeting at Kaduna other members of the North West Governors forum on 17th March 2020, the State Government issued a directive that all public. private nursery, primary and secondary schools including tertiary institutions should be closed for a period of 30 days with effect from 23rd March 2020.This directive was aimed at preventing the spread of coronavirus disease across the north west zone (Alabi,2020).

The State Government issued a restriction order NOs/SEC.2/T/13 directing the total closure of the State borders and that with Niger republic with effect from 25th March 2020.This order is a precaution against the spread of coronavirus into the State. Residents of the State can move within the State's geographical boundary but not outside the area (The Cable,2020). The closure of the borders are important as they prevent infected persons from other States and the Abuja that have already recorded cases, from coming into the State to spread the virus. Consequently, health and security officials were deployed to the border entry points to restrict movement and ensure those that are coming in with genuine reasons are medically examined before they are allowed entry into the State.

The State Government issued a restriction order NOs/SEC.2/T/14 dated 27th March 2020 suspending large public gatherings for the weekly Friday prayers and Sunday church service while marriage ceremonies are to be conducted in low key manner across the State.as part of the measures taken to curtail the spread of coronavirus (Oyelude,2020).

With effect from 27th March,2020 civil servants serving in the State civil service were directed not to come to work and therefore stay at home as a preventive measure against the spread of the disease. And in compliance with the directive they stayed at home until they were directed to resume work to provide skeletal services with effect from 6th April,2020 to work from 10.00am to 2.00pm which continued up till the time lockdown order was imposed on the State capital on 21st April,2020 and the civil servants also had to stay at home.

On the 30th March 2020, the State Government inaugurated the Emergency and rapid Response Committee chaired by the Deputy Governor of the State. Other members include Commissioners of Finance, Health and Justice, the Speaker State House of Assembly, Chief of Staff Government House and Chairman Afdin Constructions Limited Katsina. The committee is mandated to assist the State Ministry of Health to combat spread of the virus in the State. In line with this mandate the committee has received donations from private individuals and corporate organizations totaling nearly 300 million Nigerian Naira. The amount was expended in training of medical personnel and disease surveillance nursing officers, procurement of medical equipment for the isolation centers, payment of allowances to medical personnel, fumigation of worship centers, procurement of hygienic materials and funding the activities of taskforce on public enlightenment (Aminu, 2020).

On the 31st March 2020, the State Government started the rehabilitation of a ward that served as isolation and treatment center at Federal Medical Center Katsina. A new well-equipped isolation and treatment center was constructed at Internally Displaced Persons camp along Jibia road, Katsina which is a 160-bed capacity center to accommodate large number of patients. Another isolation center is presently under construction on a land area Between General Amadi Rimi Specialist Hospital and Hassan Usman Katsina Polytechnic, Katsina to accommodate more patients when the need arises. The Nigerian Security and Civil Defense Corps (NSCDC) Training School served as a quarantine center for child beggars (*Almajirai*) who were

repatriated from other northern States. This was after some of the beggars returned to Kaduna State from Kano State tested positive of the virus.

On 1st April 2020, the State Government inaugurated Taskforce on public enlightenment and sensitization committee. The committee is chaired by Commissioner of Information, Culture and Home Affairs. Other members of the committee include Commissioner of Women Affairs, Special Advisers of Higher Education and Girl child Education and Child Development, Permanent Secretary Ministry of Health and Chief Imam Banu Coomassie Friday mosque Katsina. The committee has carried out public enlightenment campaigns through radio and television programs and jingles, pasting of print materials on billboards, posters and flyers. The committee also visit markets and motor parks for their enlightenment campaigns and supervise movement of people at local government and inter-State borders. They also supervise activities in LGAs that are under lockdown to monitor level of compliance to the lockdown order and supervise shops and shopping malls that were allowed to sale essential commodities to the public during lockdowns (Sardauna,2020).

The State Government lifted the ban on large gatherings for the weekly Friday prayers and Sunday church service on 7th April 2020.The are however instructions that are expected to be followed for these gatherings to take place. For the Friday prayers Imams should focus on sermons that highlight what Muslims are expected to do during disease outbreaks. Also, the sermons should be short and during the prayers, short verses of the holy Quran should be recited so that the prayers can be concluded within a short time. The State Government provided the preventive materials that people are expected to use before entering the Friday mosques such as buckets of water and soap for hand washing and hand sanitizers. A visit to two of the Friday mosques at Katsina city on 14th April, 2020 showed some level of adherence to the instructions. This ban on large gatherings was re-instated by the State Government on 17th April 2020 following increase cases of infections.

On 11th April,2020 the State Government imposed locked down Daura LGA as a means of containing the spread of the virus This was following the first case of coronavirus infection in Katsina State who was a medical doctor who travelled to Lagos for some days and upon return, felt sick and went to the Nigerian Airforce Reference Hospital at Daura, Daura LGA. The doctor died on 6th April 2020 and the samples of 23 people he came in contact with were taken to NCDC and three were declared positive and admitted at FMC isolation ward. The State Government and some politicians provided palliative support to enable the people stay at home some days after the lockdown (PM News, 2020). SEPA officials later went to the residence and clinic owned by the doctor to spray chemicals in order to disinfect them to prevent spread of the disease.

The State government issued a press release on 17th April directing that fifteen major weekly markets in the State should close down to prevent gathering of large number of people that can potentially be a source of infection and spread of the disease. The press release further stated that efforts will be made by law enforcement agents to block other entry routes used by the people to enter the markets in order to ensure total compliance to the directive. Another press release dated 3rd May,2020 directed the shutdown of three more major weekly markets following growing concern by the Government and major stakeholders over increase of confirmed cases in the State (KTSG,2020). One other major weekly market was directed to close by the State government on 7th May,2020.

The State government-imposed lockdown order on Dutsinma LGA with effect from 17th April 2020 to prevent the spread of the disease to other parts of the State This is the second LGA to record infection of coronavirus where one resident who recently returned from Lagos tested positive based on a report from the NCDC (Pulse.ng, 2020).

On the 20th April, 2020, the Chairman of the Emergency and Rapid Response Committee convened a press conference and gave a breakdown of the expenses concerning the over 207 million Nigerian Naira that was then donated to the State Government. The breakdown of the expenditure came after criticism from stakeholders on the amount so far collected and what it is being used for in the fight against spread of the coronavirus (Aminu,2020).

On the 21st April 2020, the State Government locked down Katsina LGA due to two confirmed cases that tested positive based on test carried out by NCDC. Batagarawa LGA was also locked down due to its proximity with Katsina LGA on the same date. These two cases are persons who are businessmen who have travelled and returned to Katsina from other States of the federation. The two are residing at Kofar Kaura Layout and Sabon Titin Kwado in Katsina metropolis.

Also, on 21st April, 2020 the State Government inaugurated two mobile courts to try persons who violates the lockdown order. The two courts have operated on daily basis during the period of the lockdown and they are located outside Kofar Kaura and Kofar Guga in Katsina, the State capital (Sardauna, 2020). The number of the mobile courts were increased from two to five as more LGAs were locked down in the State. As at 17th May, 2020 when the mobile courts suspended operation, the courts have trailed a total of 1,223 persons in accordance with the law for disobeying the lockdown order.

On 23rd April 2020 both Jibia and Mani LGA were locked down by the State government.

These are the fourth and fifth LGAs to record infections of coronavirus where one person each tested positive according to reports by the NCDC. The people of Jibia LGA have argued that the person that tested positive is only an indigene of the LG but he resides in Katsina metropolis and therefore there was no need to impose lockdown order on the LGA.

On 25th April 2020, the State Government imposed locked down order on Safana LGA which became the sixth LGA to record infections of coronavirus is where three persons tested positive based on reports by the NCDC. According to report these three persons are primary contacts of the index case established in Dutsinma LGA (Pulse.ng, 2020b). These three persons are residents of Tsaskiya village located in the north eastern part of the LGA.

The State Government imposed lockdown order on three LGAs are Kankia, Musawa and Matazu on 1st May 2020 in line with the decision taken by the Government and other stakeholders to shut down any LGA where coronavirus case has been detected (Misau, 2020).One person tested positive based on reports by NCDC in Kankia and another person also tested positive but the health officials could not identify whether the village he lives is in Musawa or Matazu LGA. Matazu LGA was unlocked a week later because it was identified that the village where the infected person lives is located at Musawa LGA.

From the above highlights, it can be observed that the number of infections keep increasing so also are the number of LGAs that are locked down to contain the spread of the disease. On 4th May 2020, the State Government announced that it recorded thirty-seven (37) new cases of

coronavirus which then increased the total number of the infections to seventy-five (75) cases (Nseyen, 2020). The number increases as medical officials continue contact identification and tracking with samples taken to verify the status at the NCDC whose daily reports mostly included Katsina State among the States with number of positive cases. Also, out of the 37 cases recorded above, fourteen (14) of them are medical personnel that are working at FMC Katsina and other private clinics (Nseyen, 2020). So, while attending to and treating coronavirus patients, medical personnel are also infected which increases the number of infections in the State.

On the 6th of May, 2020 the Chairman of the Taskforce on public enlightenment and sensitization issued a directive to operators of commercial motorcycles and tricyclist. The directive requested the operators to wear facemasks, use hand sanitizers and observe physical distancing while carrying passengers. This directive is for the twenty-two LGAs that are not under lockdown while the twelve LGAs under lockdown are to continue to comply with the lockdown order.

On 7th May 2020, the State government impose lockdown order on two LGAs which are Malumfashi and Rimi to stop the further spread of coronavirus pandemic in the State (Madugba, 2020). This development then brought the number of LGAs under lockdown to 12 out of the 34 LGAs in the State. These two LGAs to recorded infections of coronavirus where one person each has tested positive based on reports by NCDC. On 10th May 2020, the State government-imposed lockdown order on Ingawa LGA to stop the further spread of the disease This is the 13th LGA to record infection of coronavirus where one case has tested positive based on reports by NCDC.

On the 17th May,2020, the State Government relaxes the lockdown order for the LGAs that are still under lockdown from 18th to 26th May 2020.The relaxation is to enable conduct of prayers for the end of Ramadan month, *eid-el-fitr* celebrations and re-stocking of food and provisions. However, on 27th May,2020 the lockdown order was re-imposed on three LGAs namely Katsina, Batagarawa and Daura. According to the State Government the re-imposition was due to the addition of 12 confirmed cases in the State as announced by the NCDC on the 16th May,2020.

The lockdown orders are lifted in the affected LGAs once there are reports that the cases have been treated and show no traces of the disease as was the case for Mani, Jibia and others LGAs. By 31st May 2020, only three LGAs are under lockdown which are Katsina, Batagarawa and Daura LGAs. These LGAs account for 80% of the cases recorded in the State, as out of the 337 cases in the State 294 are recorded in these LGAs with 43 cases from other LGAs as at 26th May 2020 (Vanguard, 2020).

On the 3rd of June 2020, the lockdown order on the three remaining LGAs was lifted with the lockdown period to be observed from 10.00am to 4.00am daily. The lifting of the lockdown order has come as a welcome relief to the people especially daily income earners whose level of income has been seriously affected and are finding life difficult. Following the lifting of the lockdown, the State civil servants were directed to resume work on the 8th June 2020 but they must observe the preventive measures against the spread of the disease.

On 14th June 2020, the State Government issued a directive to Islamiyya and Quranic schools that have resumed studies on their own to be closed as the dangers of the virus is still around.

Again, an announcement by the Commissioner of Youths, Sports and Social Development directed that football matches should be stopped and football viewing centers should also close as the ban has not been lifted by the State Government.

From the above it can be observed that the positive cases keep increasing from zero case in early April to over 300 cases at the end of May 2020. The cases increase despite the several preventive measures adopted against the spread of the disease. This clearly means that there are some limitations of the preventive measures adopted by the State Government which are highlighted below.

Limitations of the response by the state government

There are many limitations of the measures adopted by the State Government which explains why the infection cases continue to rise in the State. The limitations also explain the challenges encountered while the government attempted to impose some of the preventive measures on the people of the State. These limitations are outlined below:

(i) The Taskforce on public enlightenment does not include some important personnel that should have boosted their activities and make the taskforce effective in the discharge of its mandate. These include special adviser on social media to the Governor, representative of National Orientation Agency (NOA), youth groups and non-governmental organizations.

(ii) The Taskforce on enlightenment and sensitization concentrated most of its activities in the State capital and LGAs in the northern part of the State. Some people in other LGAs were not enlightened on the preventive measures adopted by the State government such as directives to people not to gather in large numbers for the weekly Friday prayers. This led to violent protests by followers of a religious group leaders on 28th March 2020. The followers attacked policemen on duty at Kusada Police Division, burn the police station, the DPO's quarters, seven vehicles and ten motorcycles parked at the premises of the police station (Oyelude, 2020).

(iii) The representative of Nigerian Medical Association (NMA) Katsina State Chapter has observed the need for the weekly markets to be closed also in view of the first reported case of the disease in the State that was reported on 7th April 2020. Some of these markets were large number of people gather were directed to close by the State government only on the 17th April 2020, ten days after the first reported case. Other weekly markets were directed to close on 3rd and 7th May 2020. This delay in closure of the markets have contributed to the rise in infections in the State.

(ii) There is no effective monitoring and control of the State borders with other States and neighboring Niger Republic. The result was that many people entered the State through the unofficial routes such as bush paths, foot paths and cattle routes thereby raising the rate of infections. Even the index case of the State based at Daura returned from Lagos State and entered into the State on 4th April 2020, when the borders have been closed since 25th March 2020.

(iv) The closure of inter-state borders are very important in the control of the spread of infection of coronavirus in Nigeria as a whole. That is why there was a presidential directive banning inter-state travel. In some neighboring states such as Kano and Kaduna

the State Governors and their Deputies personally went to their borders with other states to monitor, control movement into their state and even event to the extent of directing the arrest and prosecution of violators. This extent of monitoring and control of entry into States was not witnessed along the Katsina state borders.

(v) In many states of Nigeria including Katsina State, politicians and government house officials are in the forefront in the fight against coronavirus rather than medical and health professionals. The politicians in most cases tend to politicize the activities of the committees they are appointed to serve at the detriment of the fight against the disease. About eighty per cent (80%) of the members of the taskforce on enlightenment and sensitization and the rapid response committee are not medical and health professionals.

(vi) The State Government did not take effective measures to monitor the activities of the index cases at Daura and Dutsinma LGAs. This resulted in release of a video and audio clips by two of the index cases denying that they are not coronavirus positive. This has created doubt and suspicion in the minds of the people on the genuineness of the index cases and the presence of the disease in general.

(vii) There was no coordination and adoption of common preventive measures adopted by Katsina State Government and the Governments of neighbouring States such as Jigawa, Kano and Kaduna concerning attendance to weekly markets, gathering for Friday prayers and eid prayers. This has encouraged the movement of people through the unofficial routes to other States to attend weekly markets and gather for Friday prayers.

(viii) The State Government did not make any provision to provide food and some basic necessities to cater for those who work daily to earn a living. This lack of palliative care has not only led to protests but people disobeying the lockdown order. The lockdowns have not been effective as some people have zero savings to survive on them and as such had to go out to engage in some jobs such as operating commercial motorcyclists, tricyclists and petty trading (Mafaa and Ahmad, 2020).

(ix) Before the completion of the 160-bed isolation centre at IDP camp, Jibia road Katsina, there are persons who received text messages that their tests for coronavirus are positive and therefore should isolate themselves at home. These patients that are not on admission in isolation centres are possibly coming in contact with other people and therefore transmitting the disease to other people. This may be one of the reasons for the rising number of positive cases in Katsina State as reported by NCDC daily updates during the months of April and May 2020.

Complaints on the response by Katsina State Government

There are many complains by the people of the state concerning the measures adopted by the state government to prevent the spread of the coronavirus disease. These complaints are highlighted below:

(i) Some medical health practitioners have complained to the State Government that they not included in the Rapid Response Committee chaired by the Deputy Governor of Katsina State. This Committee is the most powerful among the committees that were set up by the State Government and yet no medical health practitioner is included as a member.

(ii) The people of Katsina LGA have complained about the erratic supply of electricity that residential quarters are experiencing during the lockdown which is not encouraging the residents to stay at home. This complain was also put forward by the people of Jibia and Mani LGAs on the first day of the lockdown of their LGAs.

(iii) The people of Katsina LGA have complained that the time grace given to them before the lockdown to purchase foodstuffs and other provisions was inadequate as only a day and a half was given which was quite inadequate. This has resulted to traffic congestion, overcrowding in markets, and supermarkets and shopping malls, long queue in gas stations, difficulties in accessing public transportation etc. A minimum of three days are required by the people in an LGA of the size and population of Katsina LGA.

(iv) Some people of the locked down LGAs have complained to the State Government that they have no food in stock to eat during the two weeks of the lockdown. Then how can they be expected to comply strictly with the lockdown order, as they are daily income earners who have to go out to earn an income to buy foodstuff, provisions and other necessities of life.

(v) The people of Mani town have complained of lack of portable water supply as they use to travel 5kms to a village along Mashi road to fetch water. During this travel, that is mostly by trekking and the fetching of the water, social distancing cannot be maintained. Therefore, adequate water has to be supplied if social distancing is to be practiced.

(vi) The people of Jibia LGA have complained that the index case of the LGA is only an indigene whose native village is Bugaje, a village closer to Katsina city than Jibia town. Also, the index case resides at Shaiskawa quarters in Katsina city and therefore there was no need to impose lockdown order on Jibia LGA.

(vii) People have complained about the increase in the price of goods that are sold at the authorized business operators such as pharmaceuticals, grain stores and shops selling essential commodities. This tend to reduce the purchasing power of the people and increasing the economic difficulties the people are facing due to the lockdowns.

(viii) The people of Batsari, Batagarawa, Faskari, Kankara and Sabua LGAs have complained that the State government has devoted much attention and resources to the fight against coronavirus while neglecting the fight against banditry which has intensified within the end of April to middle of May 2020 claiming more lives than the coronavirus pandemic.

(ix) There are farmers who are living in Katsina, Batagarawa and Daura LGAs but they were locked at home. This does not give them the chance to go to their farmlands located outside the towns in preparation for the 2020 farming season. This is in view of the fact that the rains have started falling and farmers in neighbouring LGAs have started planting crops.

(x) Some security agents deployed at road junctions, roundabouts, checkpoints and entry points into the State in order to ensure compliance to the lockdown order were accused by members of the public of collecting money to allow violators to go free. In some instances, they even beat up people as was reported at a Friday mosque in Katsina metropolis, Dankama and Kaita weekly markets and central market, Katsina.

(xi) The imposition of lockdown in some LGAs does not give chance for the people in some LGAs to go and sell their cattle so as to escape cattle rustling by the bandits terrorizing parts of the State. A member of the State house of Assembly representing Safana LGA even called on the State Government to lift the lockdown in his constituency so as to avail his people the chance to sell the remnants of the domestic animals before cattle rustlers and bandits forcefully take them away (Kuraye, 2020).

(xii) The imposition of lockdown has put a lot of people under pressure as it restricts movement from one place to another which the bandits took advantage to launch attacks on some villages of the LGAs such as Dutsinma, Musawa and Kankara (Aminu, 2020b). These attacks during the period of the lockdown were even acknowledged by the President Buhari in his June 12th Democracy day address to the nation.

RECOMMENDATIONS

The following recommendations are made in order to ensure that effective preventive measures are adopted against the spread of coronavirus and any other disease in future.

(i) The taskforce on public enlightenment and sensitization should expand its activities to the southern parts of the state. This will enable the people of that part of the State to be fully enlightened and sensitized so that they will not resort to any act of violence that is against the law.

(ii) The State Government should continue to enlighten the public as there are some people who doubt the existence of the virus. If no action is taken such people will continue to jeopardize the health and wellbeing of the other people of the State.

(iii) The State government should ensure that relevant professionals constitute the various committees in charge of fighting disease outbreaks. This is one sure way to improving the performance of these committees towards achieving the desired goals.

(iv) The lockdown should be implemented and caution in view of the fact that majority of the people in the State are living by their daily earnings through petty trading, artisanship, handicrafts, riding commercial motorcycles and tricycles among others. So lockdown leads to total loss of income by the majority of the people in the affected LGAs.

(v) The Federal and State Governments should make and implement a program to support the owners of small businesses in order to fully recover from the impacts of lockdowns in the affected LGAs. People who lost their jobs as a result of the impacts of the coronavirus and the associated lockdowns should also be assisted to regain their jobs as a result of the pandemic.

(vi) The State Government and the Government of neighboring States should meet before taking measures against any disease outbreak in order to adopt common measures that will discourage movement of people across the boundaries.

CONCLUSION

The coronavirus pandemic has led Governments across the globe to respond by adopting unprecedented measures with the objectives of curbing the spread of the virus particularly in view of the fact that the virus does not spread itself but rather it is the people that spreads it. Some of these response measures include closure of schools, tertiary institutions, markets, industries and the imposition of lockdown order which has succeeded in containing the spread of the virus with minimal social and economic difficulties in the developed countries. The adoption of similar response measures in the developing countries such as Nigeria has brought maximum social and economic difficulties which has given rise to large number of complaints by the people as highlighted in this article using Katsina State as a case study.

Katsina State Government like other States in Nigeria has adopted many measures as a response to the spread of coronavirus even before the first index case of the disease. Therefore, it can be argued that the measures adopted to respond to the spread of coronavirus have assisted to reduce the number of infections. By 25th May 2020,Katsina State ranked fourth in the number of confirmed cases with 337 cases among the States of the federation but the State has considerably moved down to rank thirteenth with 434 cases as at 25th June 2020.This movement down the ranks is commendable as the State is no longer among the five most infected States with the coronavirus. This development notwithstanding the State Government should continue to adopt appropriate measures to respond to the threats posed by the coronavirus to the people of the State.

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COVID-19: A REVIEW OF THE IMPACTS AND IMPLICATIONS ON HAEMATOLOGY AND HAEMATOLOGICAL PARAMETERS[1]

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ABSTRACT: *Background: Coronavirus disease is a viral disease which originated from China in late 2019 and has spread to the entire surface of the earth. The clinical symptoms are usually due to the effect on the respiratory system which is the main target of the infection. This review is to find out the effect of the disease on Haematology and haematological parameters. Materials and methods: A review based on theoretical and empirical literature was done through internet search engines such as Google, Pubmed, Medline, Journals and books. The literature search spans 2003-2020. Results: A total of 103 publications were reviewed. Most of them were international articles. The review revealed that not much has been published on the effect of covid-19 on Haematology in general and the haematological parameters in particular. The main findings include lymphopenia, increased neutrohil lymphocyte ratio and thrombocytopenia. The Anti-thrombin (AT) levels were found to be lower in covid-19 patients compared to their healthy controls. D-dimer and FDP were elevated and found to be especially predictive of disease progression. Transfusion of convalescent plasma has shown improvement of clinical symptoms and laboratory parameters within few days after the transfusion. Conclusion: There is quite some level of impact of covid-19 on Haematology and haematological parameters, just as it also affects other systems, and specialties/sub-specialties. However, there is room for more research in determining more extensive involvement of the disease on haematological parameters.*

KEYWORDS: Covid-19, Impacts, Implications, Haematology, Haematological Parameters

INTRODUCTION

The Coronavirus Disease 2019 (COVID-19) is a disease caused by a new strain of coronavirus that has not been previously identified in humans.[1] It is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).[2] The disease was first identified in December 2019 in Wuhan, the capital of China's Hubei province, and has since spread globally, resulting in the ongoing 2019–20 coronavirus pandemic.[3,4]. The symptomatology of Covid-19 is yet to be fully understood as it is still evolving. However, the incubation period for COVID-19 is typically five to six days but may range from two to 14 days.[5,6] About 97.5% of people who develop symptoms will do so within 11.5 days of infection.[7]

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Epidemiology

Covid-19 began in Wuhan in China in December 2019, the virus has now spread throughout the entire world, with sub-saharan African countries bearing considerable brunt. Till date (June 24, 2020) about 9,377,609 cases of Covid-19 have been reported world-wide, with 480,242 reported deaths, representing a case fatality rate (CFR) of 5.12% globally. However, there are countries that has recorded very high CFR on account of covid-19 such as Spain and Italy with CFR of up to 10.4% and 13.3%, respectively.[1] African countries, by contrast, have recorded much lower CFR. For example, Nigeria has reported 22,020 cases with 542 deaths and CFR of 2.46%. Even within the African continent, the virus appears to be predominant in some of the most prosperous countries that are the destinations for tourists from outside the continent. Countries such as South Africa has recorded highest rates of infections and related deaths in the continent.[1] The Covid-19 has emerged as one of the most traumatic pandemics in contemporary times with implications not only for morbidity and mortality of humans, but for the overall economic survival of the entire planet.

Signs & Symptoms

Those infected with the virus may be asymptomatic or develop flu-like symptoms, including fever, cough, fatigue and shortness of breath.[8,9-10] Emergency symptoms include difficulty in breathing, persistent chest pain or pressure, confusion, difficulty waking and bluish face or lips; immediate medical attention is advised if these symptoms are present.[11] Less commonly, upper respiratory symptoms, such as sneezing, runny nose or sore throat may be seen. Symptoms such as nausea, vomiting, and diarrhoea have been observed in varying percentages.[12,13-14] Some cases in China initially presented only with chest tightness and palpitations.[15] In March 2020 there were reports indicating that loss of the sense of smell (anosmia) may be a common symptom among those who have mild disease.[16,17] In some, the disease may progress to pneumonia, multi-organ failure and death.[3,18] In those who develop severe symptoms, time from symptom onset to needing mechanical ventilation is typically eight days.[19]

Transmission

The World Health Organisation (WHO) and Centre for Disease Control (CDC) say it is primarily spread during close contact and by small droplets produced when people cough, sneeze or talk;[20,21] with close contact being within 1–3 metres.[20] A study in Singapore found that an uncovered coughing can lead to droplets travelling up to 4.5 meters.[22,23] It advised that droplets can travel around 7 - 8 metres.[24] Respiratory droplets may also be produced during breathing out, including when talking. Though the virus is not generally airborne[4,25] the National Academy of Science has suggested that bioaerosol transmission may be possible and air collectors positioned in the hallway outside of people's rooms yielded samples positive for viral RNA.[26] The droplets can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs.[27] Some medical procedures such as intubation and cardiopulmonary resuscitation (CPR) may cause respiratory secretions to be aerosolised and thus result in airborne spread.[25] It may also spread when one touches a contaminated surface, known as fomite transmission, and then touches their eyes, nose or mouth.[20] While there are concerns it may spread by faeces, this risk is believed to be low.[20,21]

The virus is most contagious when people are symptomatic; while spread may be possible before symptoms appear, this risk is low[20,21] The European Centre for Disease Prevention and Control (ECDC) says while it is not entirely clear how easily the disease spreads, one person generally infects two to three others.[28]

The virus survives for hours to days on surfaces,[20,28] specifically, the virus was found to be detectable for one day on cardboard, for up to three days on plastic and stainless steel and for up to four hours on copper.[29] This, however, varies based on the humidity and temperature.[30,31] Surfaces may be decontaminated with a number of solutions (within one minute of exposure to the disinfectant for a stainless steel surface), including 62–71% ethanol (alcohol used in methylated spirits), 50–100% isopropanol (isopropyl alcohol), 0.1% sodium hypochlorite (bleach), 0.5% hydrogen peroxide and 0.2–7.5% povidone-iodine. Other solutions, such as benzalkonium chloride and chlorhexidine gluconate (a surgical disinfectant), are less effective.[32]

Laboratory diagnosis of Covid-19

Viral culture of novel coronavirus (2019-nCoV), the causative agent of Covid19, is not recommended.[33] However, the diagnostic method preferred and recommended for diagnosis of Covid-19 is the RT-PCR (Real Time Polymerase Chain Reaction).[34-36] This is same diagnostic method developed in respect of SARS-CoV1.[37,38]

Pre-Analytical Phase

Five to six days of the onset of clinical symptoms, COVID-19 patients have shown high viral loads in their upper and lower respiratory tracts,[39-42] hence for the screening and diagnosis of early infection a nasopharyngeal (NP) swab and/or an oropharyngeal (OP) swab are usually recommended.[37,40,43]

It is preferable to use a single NP swab because it is better tolerated by the patient and is safer to the operator. Again, NP often reaches the correct area to be tested in the nasal cavity. During the COVID-19 outbreak in China, Wang et al, have just reported that OP swabs were used much more frequently than NP but the SARS-CoV-2 RNA was detected in only 32% of OP swabs, which was significantly lower than the level seen in nasal swabs (63%).[44]

Again, another advantage to limit testing with NP swabs is to prolong supplies of flocked swabs and/or transport media. However, there are few exceptions where the OP swab would be far better, for example, patients with pharyngitis as a dominant initial presenting symptom could better be sampled via the OP route.[33]

Proper collection of NP swab is a very important aspect of the pre-analytical phase. In order to properly collect an NP swab specimen, the swab must be inserted deeply into the nasal cavity. Patients may likely wince, which indicates the swab has hit the target. Swabs should be kept in place for 10 seconds while being twirled three times. Swabs should have flocked nontoxic synthetic fibers, such as polyester, as well as synthetic nylon handles. 45 Collecting an NP/OP swab specimen may carry a theoretical risk of transmitting SARS-CoV-2, particularly if airborne transmission is demonstrated as the investigation of the COVID-19 outbreak continues.[46] If personal protective equipment (PPE) cannot be used due to scarcity, other means of collecting upper respiratory tract specimens will be needed. 46 One alternative option for collecting an upper respiratory tract specimen to evaluate patients with

suspected COVID-19 pneumonia is a self-collected saliva specimen.[47-50] After collection, swabs should be placed in viral (universal) transport medium for rapid transportation to the clinical microbiology laboratory under refrigerated conditions.[45]

Late Detection and Monitoring of Patients with Severe COVID-19 Pneumonia

Ideally, sputum sampling or bronchoalveolar lavage should be used for collecting lower respiratory tract specimens as they have yielded the highest viral loads for the diagnosis of COVID-19.[46,51] Samples of bronchoalveolar lavage (BAL) fluid, according to a recent study, yielded the highest SARS-CoV-2 RNA rate, but this study did not compare results from NP swabs.[44] Patients who present with severe pneumonia and acute respiratory distress syndrome may need emergent intubation as well as respiratory isolation in a negative-pressure room. If possible, a lower respiratory tract sputum specimen should be collected during the intubation procedure. Alternatively, sputum and/or bronchoalveolar lavage fluid specimens can be collected after intubation. [37, 39]

In contrast, high viral RNA loads of SARS-CoV-2 has been shown in faecal material [52,53] in some patients with covid-19. Enteric involvement previously has been seen in patients with severe novel coronavirus infections.[39,54-60] Therefore, aside from direct respiratory sampling, the preferred method for detecting SARS-CoV-2 in advanced COVID-19 cases may be a rectal swab and real-time RT-PCR.[37,54-56, 58-62]

Safety Measures for Specimen Processing for PCR Processing and Testing

Processing of respiratory specimens should be done in a class II biological safety cabinet [34,37,38], For nucleic acid extraction before real-time RT-PCR is performed, the specimen should be transferred to lysis buffer under this BSL-2 cabinet. The lysis buffer should contain a guanidinium-based inactivating agent as well as a nondenaturing detergent. The clinical specimens/swabs should not be heated to 56°C for 30 min as evidence suggests that this process may also degrade the coronavirus RNA even as it inactivates viable coronavirus. [37,63,64] Once the clinical specimen in viral transport medium is transferred into a cartridge in a class II biosafety cabinet, the cartridge is sealed. Many of these random-access sealed devices are suitable for point-of-care testing for local hospitals and clinics without biosafety cabinets. In this situation, the specimen collector in appropriate protective gear (splash guard/goggles, mask, gloves, and disposable laboratory coat) could directly transfer the specimen into detection cartridges at bedside or in a location without a class II biosafety cabinet, and the closed cartridge could be safely placed on an instrument for testing. However, spills of transport solution during transfer to these cartridge-based tests should be avoided, and if they occur, decontamination should be performed as appropriate.

Management and Medications

People are managed with supportive care, which may include fluid, oxygen support and supporting other affected vital organs.[65-67] The CDC recommends that those who suspect they carry the virus wear a simple face mask.[68] Extracorporeal membrane oxygenation (ECMO) has been used to address the issue of respiratory failure, but its benefits are still under consideration[69,70] Some medical professionals recommend paracetamol (acetaminophen) over ibuprofen for first-line use[71,72] The WHO does not oppose the use of non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen for symptoms[73] and the FDA says currently there is no evidence that NSAIDs worsen COVID-19 symptoms.[74]

Experimental Treatment

No medications are approved to treat the disease by the WHO although some are recommended by individual national medical authorities[75-77] Research into potential treatments started in January 2020,[78] and several antiviral drugs are in clinical trials.[79,80] Although new medications may take until 2021 to develop,[81] several of the medications being tested are already approved for other uses or are already in advanced testing.[80] Antiviral medication may be tried in people with severe disease.[65] The WHO recommended volunteers take part in trials of the effectiveness and safety of potential treatments.[82]

On 17 March 2020, the Italian Pharmaceutical Agency included chloroquine and hydroxychloroquine in the list of drugs with positive preliminary results for treatment of COVID-19.[83] Korean and Chinese Health Authorities recommend the use of chloroquine.[84,85]. However, the Wuhan Institute of Virology, while recommending a daily dose of one gram, notes that twice that dose is highly dangerous and could be lethal. On 28 March 2020, the FDA issued an emergency use authorisation for hydroxychloroquine and chloroquine at the discretion of physicians treating people with COVID-19.[86,87]

Haematological Findings, Manifestations and Effects

Even though much knowledge has been gained on clinical features of covid-19, not much has been published on the effect of Coronavirus-2 on haematology and haematological parameters. However, the causative agent of COVID-19, a novel coronavirus causes haematological changes which arise from abnormal haematopoiesis. Haematology therefore plays an indispensable role in COVID-19 diagnosis and prognosis. Common haematological manifestations include thrombocytopenia, lymphopenia and leukopenia.[88,89]

LYMPHOPENIA: A significant decrease was observed in peripheral CD4+ and CD8+ T lymphocyte subsets. A number of potential mechanisms may be involved. The development of auto-immune antibodies or immune complexes triggered by viral infection may play a major role in inducing lymphopenia.[88] Some authors have reported that apoptosis is the cause of lymphopenia in coronavirus severe acute respiratory syndrome.[89-90] Lymphocyte counts may be useful in predicting the severity and clinical outcomes. Other possible reasons for the lymphopenia may be direct infection of lymphocytes by Coronavirus, lymphocyte sequestration in the lung or cytokine-mediated lymphocyte trafficking. There may also be immune-mediated lymphocyte destruction, bone marrow or thymus suppression, or apoptosis.[91]

EOSINOPHIL CYTOPENIA: Eosinophil cytopenia in addition to leukopenia and lymphopenia are more common in covid-19 patients than those in non-covid 19 patients[92]

THROMBOCYTOPENIA: Low platelet count is associated with increased risk of severe disease and mortality in patients with COVID-19, and thus should serve as clinical indicator of worsening illness during hospitalization.[92] Thrombocytopenia from Immune Thrombocytopenic Purpura due to coronavirus infection has been reported.[93] Apart from immune mediated thrombocytopenia through the development of autoimmune antibodies or immune complexes triggered by the viral infection, coronavirus may also directly infect haematopoietic stem/progenitor cells, megakaryocytes and platelets inducing their growth inhibition and apoptosis.[93] Moreover, the increased consumption of platelets and/or the

decreased production of platelets in the damaged lungs are a potential alternative mechanism that can contribute to thrombocytopenia.[93]

NEUTROPHIL LYMBHOCYTE RATIO (NLR): The trend of changes in Neutrophil (NEU), Lymphocyte (LYM) and Neutrophil Lymphocyte Ratio (NLR), which are derived by repeated blood examinations, contributes to prediction of the outcome of patients with Blood Stream Infection of Covis19.[94]

EFFECT ON HAEMOSTASIS AND COAGULATION: The Anti-thrombin (AT) levels were found to be lower in covid-19 patients compared to their healthy controls. Whereas the values of D-dimer and fibrin degradation product (FDP) and fibrinogen (FIB) values in SARS-CoV-2 patients higher than those in the control group.[95, 96]

Unlike these tests, no differences could be observed in values of Activated Partial Thromboplastin Time(APTT), Prothrombin Time (PT), PT-INR and Thrombin Time (TT) between the two groups.[63] D-dimer and FDP were found to be especially predictive of disease progression; hence, their routine monitoring would appear advisable in patients with COVID-19.[95] Studies have shown there is dysregulated thrombin generation which is further exacerbated by an inhibition of fibrinolysis and the impairment of natural anticoagulant mechanisms. To date, treatment of DIC has been focused on strategies to target the primary pathology[97] but this is limited in the case of Covid-19, until more is learnt about effective antiviral agents for this new pathogen. Otherwise, supportive care to maintain critical organ function is required. Trials of natural anticoagulant infusions have met with variable outcomes[98]

Blood and Blood Products Requirements

As COVID-19 continues to claim lives and a likelihood that many potential blood donors are going to be unwell, consideration should be given to blood conservation protocols with critical, global blood shortages on the horizon. Previous studies have reported the use of convalescent plasma transfusion in the treatment of various infections.[99-102] Preliminary studies in the administration of convalescent plasma containing neutralizing antibody was followed by improvement in the patients' clinical status.[103] However, these observations require evaluation in clinical trials. Another study shows improvement of clinical symptoms and laboratory parameters within 3 days after convalscent plasma transfusion. CP can serve as a promising rescue option for severe COVID-19, while the randomized clinical trial is ongoing.

CONCLUSION

There is quite some level of impact of covid-19 on Haematology and haematological parameters, just as it also affects other systems, and specialties/sub-specialties. However, there is room for more research in determining more extensive involvement of the disease on haematological parameters.

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MOLECULAR DIAGNOSTICS OF COVID-19[1]

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ABSTRACT: *Coronavirus disease 2019 (COVID-19) is a viral pneumonia, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease spread via respiratory droplets from coughs and sneezes from an infected individual. Symptoms range from mild to severe and even fatal, as at June 28, 2020, a total of 501,891 deaths have been recorded. Age, medical conditions, genes, sex and previous immunizations of an infected person affect severity of COVID-19. Early and accurate diagnosis helps to reduce health and socio-economic impacts of the disease, as inaccurate results may spike infection rate. The current article is a review on the various molecular diagnostics for detecting viral pathogens. Among these techniques, the Real Time Reverse Transcription-PCR, offers an effective and accurate method for detection and diagnosis of COVID-19 infection. There is no known cure for the disease, therefore it is advisable to take preventive measures to slow down infection rate before effective treatments and vaccines become available.*

KEYWORDS: COVID-19, Real Time RT-PCR, SARS-CoV-2, Symptom, Transmission

INTRODUCTION

Diagnostics refers to the techniques used to identify diseases based on either the symptoms expressed or the specific causative agents such as viral, bacterial, fungal or nematode pathogens (Cullen *et al*., 2005; Shittu *et al*., 2015). The term "diagnosis" can be described as the process of identifying or trying to identify a disease (Mauchline *et al*., 2002). Therefore, diagnostic techniques are said to be used to carry out diagnosis. In the treatment of and research into infectious diseases, such as the Coronavirus disease 2019, early and accurate diagnosis would help to curb the spread and mortality rate of the disease.

The World Health Organization on February 11th 2020, described the coronavirus disease 2019 (COVID-19) as a viral pneumonia that is caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The disease broke out in Wuhan, China, in December 2019 and its emergence has since caused a global pandemic. The pandemic has resulted in travel restrictions in many countries and lockdowns in several states where the disease occurrence is most. According to Johns Hopkins University data, as at June 28th, 2020, there has been 10,145,782 confirmed cases and 501,891 total deaths, worldwide. As there are no known vaccines for the SARS-CoV-2, it is of utmost importance to research further on developments of affordable, available and accurate treatment of the disease.

[1] Paper presented at the International E-Conference on COVID-19 Global Impacts, 20-21 July, 2020.

However, preventive measures can be taken to manage the spread of the disease and they include avoiding crowded places, social distancing, washing of hands with soap and water often and for at least 20 seconds, avoiding touching the eyes, nose or mouth with unwashed hands and practicing proper respiratory hygiene. It is strongly advised that all individuals should adhere to all safety rules and guidelines given by the World Health Organization (WHO) and Nigeria Centre for Disease Control (NCDC) so as to flatten the curve of the disease. Among the numerous techniques used for the diagnosis of viral diseases, RT-PCR has proved to be effective towards the detection of SARS-CoV-2.

Overview of Viruses

A virus is a microscopic agent that requires a living host to replicate and cause disease. Evidently, viruses are obligate pathogens, which attack all forms of life including archea, bacteria, plants, animals and humans (Koonin *et al.,* 2006). The term "virions" is used to describe viruses when they exist as independent particles outside a living cell. Virions are made up of genetic material of the virus, protein coat (capsid) and in some cases envelop of lipids. Rybicki (1980) described viruses as "organisms at the edge of life". They possess genes, evolve by natural selection and replicate by making multiple copies of themselves, qualities which make them resemble organisms, however, they lack cellular structure and become inactive outside a living cell, making them resemble non-living things as well (Holmes, 2007). Viruses exist in multiple shapes; helical, icosahedral, prolate, envelop and complex (Breitbart and Rohwer, 2005).

A virus consists of a DNA or RNA core and therefore could be called a DNA or RNA virus respectively. RNA viruses are more predominant. Viral genome size greatly varies across species, the ssDNA circovirus with the smallest genome, codes for two proteins and have a genome size of 2 kb, whereas the pandoravirus with the largest genome codes for over 2500 proteins with a genome size of 2 Mb (Belyi *et al.,* 2010; Philippe *et al.,* 2013).

Viruses are acellular, they do not grow through cell division, rather they hijack the machinery and metabolism of a host cell to produce many replicates and they are assembled in the cell (Freed, 2015). Viral life cycle greatly varies across species but there are 6 basic stages in their life cycle which include attachment, penetration, uncoating, replication, assembly and release. DNA viruses replicate in the host's nucleus while RNA viruses replicate in the cytoplasm. Reverse transcribing viruses have ssRNA or dsDNA in their particles. Reverse transcribing viruses with RNA genome use a DNA intermediate while those with DNA genome use an RNA intermediate to replicate. As a consequence of viral replication in the hosts' cells, the range of structural and biochemical effects is massive. The result of most viral infections is death of host cells due to cell lysis, alteration to cell surface and apoptosis caused by the cessation of normal cellular activities. On the other hand, some viruses cause no apparent damage (latent) on infected cells (Roulston *et al.,* 1999; Sinclair, 2008). Viruses are responsible for a myriad of human diseases including common cold, influenza, chicken pox, cold sores, rabies, ebola, AIDS (HIV), avian influenza and SARS, including COVID-19.

Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-COV-2)

Severe acute respiratory syndrome coronavirus 2, which causes COVID-19 in humans, is a type of coronavirus. Coronaviruses are a group of viruses that cause respiratory tract illnesses in mammals and birds. They are enveloped viruses with a positive-sense single-stranded

RNA genome, approximately 26 to 32 kb, and a nucleocapsid of helical symmetry (Woo *et al*., 2010). Coronaviruses when observed under the electron microscope, are seen to have spike projections from the virus membrane which gives the resemblance of a crown, from which its name is derived (Barcena *et al*., 2009; Neuman *et al*., 2006). They are the largest group of RNA viruses and are from the Nidovirales order, which comprises of the Coronaviridae, Arteriviridae, Mesoniviridae, and Roniviridae families. The Coronaviridae is divided into two subfamilies, the Torovirinae and the Coronavirinae (Anthony *et al*., 2015). The Coronavirinae are subdivided into four genera, the alpha, beta, gamma, and delta coronaviruses (α, β, γ, δ), with human coronaviruses (HCoVs) detected in the α coronavirus (HCoV-229E and NL63) and β coronavirus genera (Perlman *et al*., 2009). SARS-CoV-2, alongside MERS-CoV, SARS-CoV, HCoV-OC43 and HCoV-HKU1, belong to the β coronavirus genera.

Historical Perspective of SARS-COV-2

Human coronavirus was discovered in the 1960s (Kahn *et al.*, 2005). The earliest ones studied were from human patients with the common cold, which were later named human coronavirus 229E and human coronavirus OC43 (Geller *et al.*, 2012). Other human coronaviruses have since been identified, including SARS-CoV in 2003, HCoV NL63 in 2004, HKU1 in 2005, MERS-CoV in 2012, and the SARS-CoV-2 in 2019. Most of these have involved severe respiratory tract infections (Su *et al.*, 2016; Zhu *et al.*, 2020). The first index case of the SARS-CoV-2 strain was recorded in December 2019, in Wuhan, China (Zhou *et al*., 2020). It was traced to a novel strain of coronavirus (WHO, 2020), and was given the provisional name 2019-nCoV by the World Health Organization (WHO, 2020) and later renamed SARS-CoV-2 by the International Committee on Taxonomy of Viruses (Gorbalenya *et al*., 2020). The virus is believed to be of zoonotic origin as it has a 96% similarity to the bat coronavirus (Zhou 2020; Perlman 2020; Benvenuto *et al*., 2020; Anderson *et al*., 2020). Its emergence has since caused a global pandemic till date (Hue *et al.*, 2020; WHO 2020).

Since the earliest reports of the COVID-19 cases in Wuhan, China, there have been many theories and discussions regarding its origin. Many people have believed that it was a laboratory construct deliberately released to wreak havoc. Though the origins of the novel coronavirus is not very clear, investigations by Andersen *et al*. (2020) have shed light into the proximal origins of the virus. Three theories were formulated; natural selection in an animal before zootonic transfer, natural selection in humans following zootonic transfer and selection during passage. In all, evidence points that the virus was as a result of natural selection and rules out the possibility that it was engineered in a laboratory (Andersen *et al*., 2020).

Structure of SARS-COV-2

SARS-COV-2, is a member of the Coronaviridae family (Wu *et al.*, 2020), which are large spherical particles with average diameters of approximately 120 nm (Barcena *et al.*, 2009; Neuman *et al*., 2006; Chen et al., 2020). They are characterized by spikes that project on the surface (Goldsmith *et al*., 2004). These spikes are approximately 20 nm long (Neuman *et al*., 2006; Fehr *et al*., 2015) and give them the appearance of a solar corona (Lai *et al.*, 1997; Chen *et al*., 2020). SARS-COV-2, just like all coronaviruses, contains a positive-sense RNA genome of about 26 - 30 kb (Wu *et al*., 2020; Woo *et al.*, 2010). The genome comprises of

ten open reading frames (ORFs). The first ORFs are translated into polyproteins and the other ORFs encode four main structural proteins: spike (S), envelope (E), nucleocapsid (N) and membrane (M) proteins, as well as several accessory proteins (Xiaowei *et al*., 2020; Shou *et al*., 2016; Fehr *et al.*, 2015; Snijder *et al*., 2003). The spike protein is responsible for the attachment and membrane fusion of the host receptor (Collins *et al*., 1986; Wu *et al*., 2020). The structural diagram of SARS-CoV-2 is shown in Plate 1.

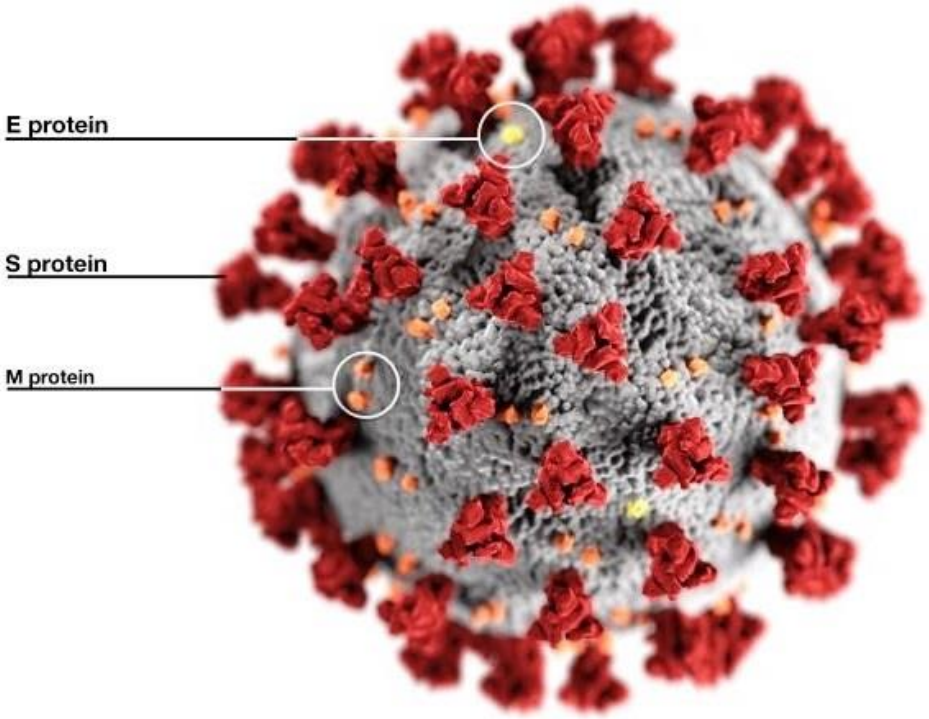

Plate 1: The Structure of SARS-CoV-2

Source: Center for Disease Control and Prevention (2019)

Mode of Transmission and Symptoms of SARS-CoV-2

The interaction of the coronavirus spike protein with its complement host cell receptor determines infectivity (Masters 2006; Cui *et al.,* 2019). It gains entrance to its host cells by attaching to the receptor angiotensin converting enzyme 2 (Li *et al*., 2005). The virus is passed when respiratory particles from coughs and sneezes are transmitted from person to person within close range. There can be indirect transmission via contaminated surfaces (WHO, 2020). Research has shown that the virus remains viable on plastic and metal surfaces for up to three days. Stool samples of infected patients have been found to contain viral loads (Holshue *et al.*, 2020) but risk of infection via faeces is very low (WHO, 2020). There is evidence of human-to-animal transmission of SARS-CoV-2 as a 4-year-old tiger, on April 2020, tested positive for COVID-19 (bbc.com/news).

The symptoms of COVID-19 range from mild to severe. Some infected individuals may remain asymptomatic, while some people may suffer mild flu symptoms, and others may contract viral pneumonia, which is resistant to antibiotics and therefore difficult to treat.

However, most people infected are likely to fully recover (Chen *et al*., 2020; CDC 2020; WHO 2020). People who have underlying medical conditions and those over 60 years old have a higher risk of developing severe symptoms that may lead to death. Symptoms of the coronavirus include fever, dry cough, runny nose and sore throat, with the fever as the most prominent symptom. Other common signs of infection include shortness of breath, breathing difficulties body aches and sometimes diarrhea (Chen *et al*., 2020). The WHO and CDC have reported that these symptoms may appear 2-14 days (virus incubation period) after exposure to the virus.

Factors Affecting Symptom Severity of Covid-19

With the novel coronavirus ravaging more than 200 countries in the world, part of what makes the pandemic somewhat unnerving is the fact that it is hard to know how the virus will affect any individual person. Although most people are equally susceptible to the virus, some present few or mild symptoms, some display severe symptoms which will require them to breath with a ventilator and others no longer breath at all. Some light has been shed on the kind of population the coronavirus hits the most as researchers continue to unravel the mysteries surrounding the pandemic. Some factors that affect the severity of Covid-19 include age, medical conditions, genes, sex and previous immunizations.

Initial reports from China suggested that the elderly was most susceptible to the adverse effects of the disease. In Italy, similar data supports this claim; analysis done by the National Health Institute on March 4th revealed that the typical age of the 105 patients who died from the virus was 81 (Irfan and Belluz, 2020). Researchers in China were the first to determine that people over age 60 are at higher risk of severe symptoms of Covid-19, with those that fall in the ≥80 age group having the highest case fatality (Ossola, 2020; Zhang, 2020). However, age does not determine the entire population of people in danger of severe symptoms, but reveals the underlying susceptibility within the larger amount of people. The adversity of the symptoms occurs more amongst the elderly, but younger adults with certain ailments are also vulnerable. People with conditions like heart disease, diabetes, chronic lung disease, moderate or severe asthma, compromised immunity, obesity, liver disease, kidney disease undergoing dialysis, poorly controlled HIV or AIDS are at risk of severe symptoms (U.S. Department of Health and Human Services, 2020). Genes may play a role in the severity of the coronavirus attack. Polymorphism in genetic makeup may be responsible for differences in severity, although not very clear, researchers believe that slight variations in the receptor protein (ACE2), the protein where the virus attaches itself in order to confer virulence in humans may play a role in affecting disease severity (Kaiser, 2020).

Reports from China, America and Italy suggest that a higher percentage of confirmed cases (>51 % in China, and in Italy, a 3 % difference in male and female cases) are men (Ossola, 2020; Zhang, 2020; Rabin, 2020). Experts suspect this on a number of reasons, one being that women possess two X chromosomes and they may have a protective quality against a number of conditions like cardiovascular diseases (Arnold, *et al.,* 2016). Also, the results from certain research have shown that previous immunizations such as the Bacillus Calmette-Guerin (BCG) vaccines designed to fight tuberculosis, may have affected the number of coronavirus cases in countries whose citizens were mandated to take the vaccines (Ossola, 2020). The BCG vaccine has been reported to be effective against some diseases other than tuberculosis, it has been reported to reduce the severity of lower lung infections caused by viruses (Stensballe, *et al.,* 2005).

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General Molecular Diagnostics Used for Viral Diseases

Molecular diagnostic techniques for viral testing have experienced a rapid development during the last years, and have been introduced in the majority of laboratories as a new way for the diagnosis of human pathogens like viruses. Generally, the main molecular techniques used in clinical virology include amplification-, hybridization- and antibody-based techniques. The nucleic acid amplification techniques are now the most common and effective methods for the diagnosis of several diseases.

(i) Amplification-based Techniques

Amplification based techniques refer to those diagnostic methods that rely on the recognition and amplification of specific DNA or RNA sequences in organisms' genomes for the purpose of identification (Shittu *et al*., 2015). Targeted sequences vary for different pathogenic organisms. Typical examples of sequences used to identify fungi pathogens include the internal transcribed spacer regions (ITS1 and ITS2), intergenic spacer region (ISR) of the rRNA genes (Shittu *et al*., 2009) and cytochrome oxidase genes (COX I and II genes) of the mitochondria (Martins and Tooley 2003). Bacteria isolates have identified through the use of the 16S rRNA, while the sequences used to identify viral particles are of whole viral genome. Since viruses do not have specialised organelles, a specific region is not chosen as the target site for amplification. In this group of techniques, the real time-quantitative PCR is the most potent molecular diagnostic tool.

a) **Basic or Traditional PCR Technique**: This process allows the synthesis of millions of copies of a specific nucleic acid sequence. In this chemical reaction the DNA polymerase acts by copying a strand of the DNA. The reaction is set up by employing a set of primers specific for the target virus. Most DNA viruses are detected by this method. The conventional PCR has been used to detect many viruses. The image below highlights some examples of viruses detected by the Basic PCR technique.

Table 1: Viral Pathogens Detected by PCR Amplification

Pathogen	References
HIV-1	Ou et al. (1988)
HIV-2	Rayfield et al. (1988)
HTLV-1 and HTLV-II	Kwok et al. (1988). Palumbo et al. (1992)
HSV Type 1 and Type 2	Rosenberg and Lebon (1991), Aslanzadeh et al. (1992)
Hepatitis B Virus	Larzul et al. (1988). Kaneko et al. (1989)
Hepatitis C Virus	Young et al. (1993)
Enterovirus	Rotbart (1990)
Cytomegalovirus	Demmler et al. (1988), Buffeone et al. (1991). Einsele et al. (1991)
Human papillomavirus	Yi and Manos (1990), Schiffman et al. (1991)
Human parvovirus B19	Koch and Aeller (1990)
Human adenovirus	Allard et al. (1990)

Source: Adapted from McCreedy (1995)

b) **Nested-PCR Technique**: This method uses two pairs of amplification primers and two rounds of PCR. The first round uses one pair of primers for 15 to 30 cycles. The resulting product of the first round of amplification is then sent to a second round of amplification with the second primer pair. High rates of contamination is a major setback of nested-PCR. BK and JC viruses have been detected with this technique. (Science Direct, 2020).

c) **Multiplex PCR Technique**: Two or more primer sets which are designed for amplification of different targets in the same mixture are used in this assay. Multiple target sequences in a clinical sample can be co-amplified in a single tube. Multiplex-PCR-based method has proved to be efficient in detecting SARS-CoV-2 at low copy numbers. Typically, clean characteristic target peaks of defined sizes that allows for direct identification of positives by electrophoresis are produced (Li *et al*., 2020).

d) **Reverse Transcriptase-PCR (RT-PCR) Technique**: This technique was introduced to amplify RNA targets. In this technique, complementary DNA (cDNA) is amplified by PCR after being produced from reverse transcription of RNA by employing the reverse transcriptase enzyme. RNA viruses such as polioviruses, hepatitis A viruses, Norwalk viruses, HIV-1 etc. are detected via this method (Clementi *et al*., 1993; Griffin *et al*., 1999).

e) **Real Time-Quantitative PCR (RT-qPCR) Technique**: In this assay, the target amplification and detection steps occur simultaneously. The data is monitored at every cycle by the computer software supporting the thermal cycler and generates an amplification plot for each reaction. Detection of PCR product is done by using fluorescent dyes or fluorescent resonance energy transfer (FRET) probes in the reaction mixture. Some of the viruses diagnosed with this technique include papovaviruses, retroviruses, herpesviruses, paramyxoviruses, etc. (Mackay *et al*., 2002).

f) **Transcription Mediated Amplification (TMA) Technique:** It is an isothermal RNA amplification technique that is designed for RNA replication. In this method, cDNA is gotten from the RNA target by reverse transcription and then copies of RNA are synthesized from the cDNA with a RNA polymerase. A feature of TMA system is rapid kinetics, a single-stranded RNA product that does not require denaturation prior to detection and no requirement for a thermal cycler. Some of the viruses that have been diagnosed with this technique include Hepatitis B and C viruses (Hofmann *et al*., 2005; Kamisango *et al*., 1999)

g) **Strand Displacement Amplification (SDA) Technique:** This technique follows isothermal template amplification and can be used to identify small amounts of DNA or RNA of a specific sequence. Currently, target generation and exponential target amplification are the two stages in which strand displacement amplification occurs. An example of a virus that has been detected by SDA technique include: human cytomegalovirus (HCMV) (Chen *et al*., 2009).

(ii) **Hybridization-Based Techniques**

Nucleic acid probes are segments of DNA or RNA, characterized by radioisotopes, enzymes or chemiluminiscent molecules that can adhere to corresponding nucleic acid

sequences of microorganisms. These probes are used to detect some viruses. This technique uses the liquid-phase, solid-phase and *in situ* hybridization (ISH) formats. In most cases, hybridization-based techniques can only be used in situations where the number of microorganisms is large as it has poor analytical sensitivity. Some examples are cytomegalovirus and hepatitis B virus diagnosis (Buffone *et al*., 1988; Burns *et al*., 1987; Blum *et al*., 1983).

a) **Branched DNA (bDNA) Assay**: This comprises of hybridization steps that leads to a complex of probes and target sequence with a branched structure. The signal in bDNA assay corresponds to the number of labeled probes. This technique has been used for the determination of the hepatitis C virus (HCV) RNA, hepatitis B virus (HBV) DNA and human immunodeficiency virus type 1 (HIV-1) (Wilber, 1987).

b) **Hybrid capture Assay:** This technique uses a chemiluminescence identification system of the hybrid molecules. Denaturation of the DNA specimen is followed by hybridization with a RNA probe. The resulting RNA-DNA hybrid is captured by an anti-hybrid antibody. This method is used for the detection of human papillomavirus (HPV) and cytomegalovirus (CMV) (Gregory, 2010).

c) **Microarray Technique:** A Microarray is a collection of thousands of spots attached to a solid support; each spot contains a single stranded DNA oligonucleotide fragment. This process follows hybridization of amplification product to the probes and then hybridization signals are mapped to various positions within the array. If the number of probes are adequate, the sequence of PCR can be identified by the hybridization pattern. The resultant product of hybridization in the sample tested are made known by scanning or imaging the array surface. In viral diagnostics, chips are designed containing viral probes for the detection of viruses, for example, SMAvirusChip v1 contains 4209 viral probes for the detection of 409 viruses, while SMAvirusChip v2 contains 4943 probes for the detection of 416 viruses. This technology has been used to detect viruses such as: Human adenovirus C (HAdV), Human astrovirus (HAstV), group A Rotavirus (RV-A), Anellovirus, Norwalk virus, Human enterovirus (HEV), Human parechovirus, Sapporo virus, and Human bocavirus (Khan *et al*., 2016; Miguel *et al*., 2015).

(iii) **Antibody–Based Techniques**

These techniques are immunological diagnostic assays that detect protein component of pathogens with the help of specific antibodies that are produced by immune system in response to pathogenic attack (Shittu *et al*., 2015). Antibodies are a group of molecules produced by the mammalian immune system that are used to identify and fight of invading organisms or substances. If produced, an antibody that recognizes specific antigens associated with a given human pathogen, can be used as the basis for a diagnostic tool (Ward *et al*., 2004).

a) **Immunofluorescence Assay (IFA):** I-Jung *et al.* (2005) reported that an antigen detection assay for severe acute respiratory syndrome (SARS) coronavirus was established in their study by an indirect immunofluorescence test, which utilized cells derived from throat wash samples of patients with SARS and a rabbit serum that recognized the nucleocapsid protein of SARS-associated coronavirus (SARS-CoV) but not that of other human coronavirus such as MERS tested. This assay is easier,

more convenient and cost effective, when compared with other diagnostic assays for detecting SARS-CoV. IFA can detect other human viruses such as CHIKV (Chikungunya virus infection), Human immunodeficiency virus (HIV), and Human herpesvirus 8 (HHV-8) (Fauvel *et al*., 1989; I-Jung *et al*., 2005; Inoue *et al*., 2000).

b) **Novel Rapid Immunochromatographic Test:** Hiroyuki *et al*, 2005 developed a novel rapid immunochromatographic test (RICT) based on the sandwich format enzyme immunoassay (EIA) with an all-in-one device for detecting the native nucleocapsid antigen (N-Ag) of SARS-CoV using monoclonal antibodies (MoAbs), which they produced by immunizing recombinant N-Ag to mice. RICT is a qualitative assay for respiratory aspirates and serum specimens. With this assay, a positive result can be judged subjectively by the appearance of a blue line on the device 15 min after the sample is applied. RICT with several pairs of MoAbs showed a high sensitivity for the detection of recombinant N-Ag as well as viral N-Ag of SARS-CoV. The specificity of RICT was 100 % when 150 human sera and 50 nasopharyngeal aspirates (NSPs) were used. This test can also detect the Avian Influenza A (H7N9) Virus and CHIKV (Chikungunya virus infection) in humans (Hiroyuki *et al*., 2005; Kang *et al*., 2014; Okabayashi *et al*., 2015).

c) **Enzyme-Linked Immunosorbent Assay (ELISA):** Engvall and Perlmann (1971) developed a rapid technique for detecting specific protein in cells, tissues, organs or bodily fluids. ELISA is a technique based on the readiness of proteins to bind to a plastic surface. It is a plate-based assay where an antigen is immobilized to a solid (plastic) surface and then complexed with an antibody linked to an enzyme. The result of ELISA is usually a colour reaction that can be observed and read using specially designed spectrophotometers (Crowther, 1995).

DIAGNOSING COVID-19

Early and accurate diagnosis of SARS-CoV-2 upon entry into a host receptor is crucial for combating its infection and spread. Diagnosis is based on epidemiological history, clinical symptoms and clinical examinations. One of the most widely used and accurate laboratory methods for detecting the novel coronavirus is the real time reverse transcription- polymerase chain reaction (Real Time RT-PCR). Clinical symptoms of infected patients are sometimes asymptomatic, as a result, Real Time RT-PCR offers a more effective and straightforward method of detection of nucleic acid from SARS-CoV-2 gotten from host samples (Xiaowei *et al.*, 2020).

Diagnosing Covid-19 using Real Time Reverse Transcription-Polymerase Chain Reaction

Polymerase Chain Reaction (PCR) has become the cornerstone of modern molecular biology all over the world. Real time Reverse Transcription-Polymerase Chain Reaction (Real Time RT-PCR) is an advanced form of the PCR that maximizes the potentials of the technique. It is a nuclear-derived method for detecting of specific genetic material in any pathogen, including a virus. Just like in the basic PCR technique, the same principle of amplification is maintained in the Real Time RT-PCR. However, the Real Time RT-PCR has several benefits over the basic PCR. In the Real Time RT-PCR, instead of looking at the bands on a gel at the

end of the reaction, the process is monitored in "real-time" on a computer screen; the efficiency of the reaction can be precisely calculated and there is no need to run the PCR products out on a gel after the reaction as the melt curve analysis is used to effectively accompany this task. Also, the data generated from this technique can be used to perform quantitative analysis of gene expression where the use of basic PCR was only ever semi-quantitative at best. Daniel *et al.* (2020) developed a two-step Real Time RT-PCR assay to detect two different regions (ORF1b and N) of the viral genome. The primer and probe sets were tailored to react with not only the novel coronavirus, but its closely related viruses, such as SARS coronavirus. A panel of positive and negative controls were used to assess these assays. Respiratory samples from two 2019-nCoV-infected patients were tested as well. The result showed that all negative control samples were negative in the assays. The specimen from the two 2019-nCoV-infected patients tested positive.

Before a coronavirus test is conducted, a suspected individual is first screened by examining clinicopathological characteristics such as body temperature, observable covid-19 symptoms and consideration of travel history. If the individual was suspected to have covid-19, a molecular assay is used for confirmation. In detecting viruses (SARS-CoV-2) using Real Time RT-PCR, a sample is collected from the body of the suspected individual where the virus gathers such as the nose (nasal swab) or throat. Total cellular RNA is extracted from the nasal swab using either Trizol or RNA extraction kit and the isolated RNA is quantified and purified. This isolated RNA is a mix of the suspected individual RNA and viral RNA, if present. The isolated RNA is reversely transcribed to cDNA via a reverse transcriptase enzyme. The cDNA is loaded into a PCR tube as a template with other PCR reaction components containing a master mix, coronavirus primers (which was made possible due to the complete sequencing of the SARS-Cov-2 virus), polymerase enzyme and a detection chemical. Two major detection options commonly used in RT-qPCR include either an intercalating dye (such as SYBR Green) or a hydrolysis probe-based detection solution (such as TaqMan, FAM, ROX, CY5). The PCR tube is placed into a RT-PCR machine, which cycles through temperatures that heat and cool the mixture to create several billion copies of new identical copies of the target section of the viral DNA. The cycle is repeated over and over; and a standard RT-PCR is usually 35 cycles. There are many different techniques that are used to monitor the progress of the PCR reaction in the RT-qPCR technique, but they all have one thing in common the generation of fluorescence, which can be linked to the amplification of DNA and can be detected with a detector during each PCR cycle. The fluorescence thus increases as the number of gene copies increases during the reaction. As new copies of the viral DNA sections are built, both of the marker labels are designed in a way that they attache to the DNA strands and then generate fluorescence during the PCR, which allows the RT-PCR machine computer to monitor the reaction in "real time" and present it on the screen. At the end of the 35^{th} cycle (as the case may be), there can only be one of two possible results depending on whether the tested individual is positive or not. Figure 1 shows a hypothetical result obtained from a Real Time RT-PCR.

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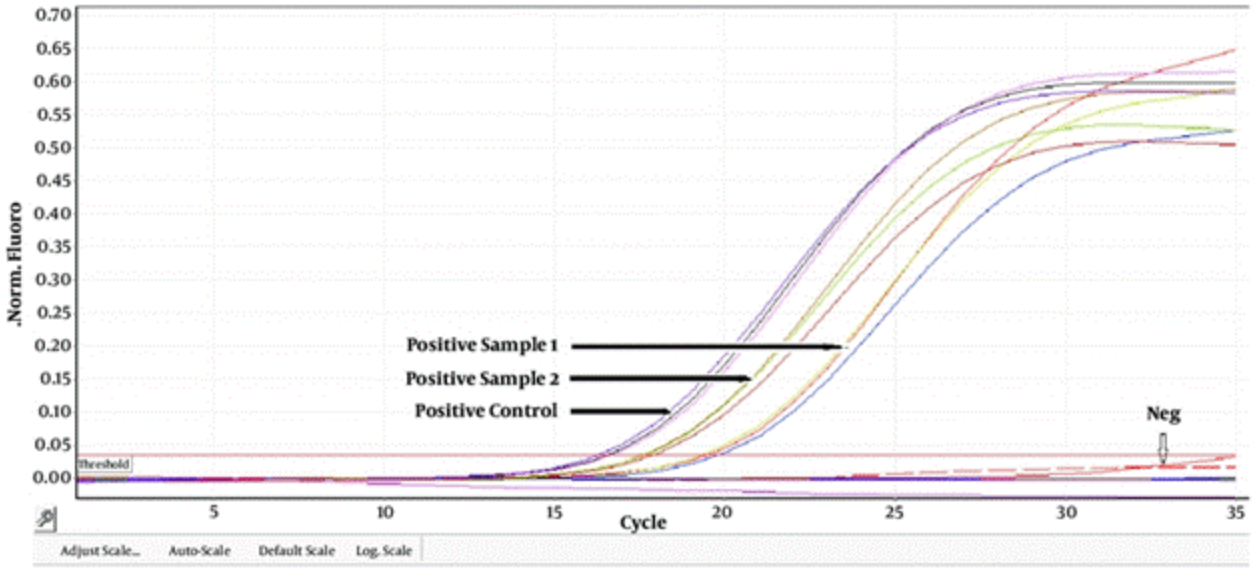

Figure 1: A Hypothetical Real Time RT-PCR Outcome

Source: Google image

Prevention and Treatment of Covid-19

Preventive measures that can be taken to curb the spread of Covid-19 include avoiding crowded places, staying at home, washing hands with soap and water often and for at least 20 seconds, avoiding touching the eyes, nose or mouth with unwashed hands and practicing proper respiratory hygiene (CDC 2020; WHO 2020). Covering of the mouth and nose with a tissue when coughing or sneezing and using the inside of the elbow if no tissue is available, has been recommended by the CDC (CDC 2020). Washing and sanitizing of hand after coughing and sneezing is advised by the CDC and WHO. The use of cloth face coverings and face masks in public settings, as a means to slow down the spread by asymptomatic individuals, is advised by the CDC (CDC 2020). As at June 2020, there are no known vaccines for SARS-Co2 (Grenfell *et al*., 2020), although Madagascar claimed to have found an herbal remedy, "Covid organic" for the treatment of Covid-19. A key part of managing the disease is inhibiting new infections and trying to decrease the epidemic peak, known as "flattening the curve" (Anderson *et al*., 2020). This is done by slowing the infection rate to reduce the pressure health services, allowing for better treatment of current cases and delaying additional cases until effective treatments or a vaccine become available (Anderson *et al*., 2020; Wiles, 2020).

RECOMMENDATION

To curtail the spread of the coronavirus and "flatten the curve", the WHO, CDC and other governmental agencies have clearly defined the roles each individual should play in fighting the spread of the virus whilst we await the development of a cure or a vaccine. Some of the precautionary measures that the WHO, CDC and other governmental agencies recommend

that citizens of affected countries should do in addition to the lockdown order by many governments of the world include:

- Wash hands often for at least 20 seconds with soap and water. In cases where soap and water are not available, an alcohol-based hand sanitizer should be used.
- Cough or sneeze into the bend of the elbow or use a disposable tissue paper, which should be thrown in the trash immediately after use.
- Objects and surfaces should be frequently cleaned and disinfected.
- Practice social distancing; stay at least 2 m apart from people, do not shake hands with or hug suspected individuals.
- Stay at home as much as possible and only go out when extremely necessary. Do not go out when you are sick. If you must go out, wear a face mask in certain public settings, carry a hand sanitizer and avoid touching the face, eyes and nose.
- Immediately contact a health worker or agency if you or a close contact displayed symptoms of covid-19.

CONCLUSION

In as much as resources are channelled towards the creation of a vaccine all over the world, early and accurate diagnosis has a major role to play in the battle against the covid-19 pandemic. Molecular diagnostic techniques, specifically the Real Time RT-PCR, continues to play an important role in the detection of coronavirus. With quick and accurate diagnosis, coupled with the creation of a vaccine (in the near future), the battle against this dreaded disease can be won from two fronts. It is strongly advised that individuals adhere to all the safety rules and guidelines given by the WHO and CDC, so as to flatten the curve of the disease.

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VECTOR AUTOREGRESSIVE MODELS FOR MULTIVARIATE TIME SERIES ANALYSIS ON COVID-19 PANDEMIC IN NIGERIA[1]

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ABSTRACT: *In this paper, we have been able to use vector autoregressive (VAR) models for modeling and forecasting covid-19 variables with special focus on Nigeria cases from 1st march to 10th June 2020. At lag of order 2, the hypothesis of non-stationary is rejected at 5% level for all the multivariate variables using the augmented Dickey Fuller and Phillips-Perron unit root tests. The Granger causality test results indicate that there is a bivariate causal relationship among the variables by rejecting the null hypothesis of no Granger causality. The determinants of confirmed cases, new cases, and total deaths from covid-19 are generally significant at 5% level with p-value 0.0001 in each of the three derived models. The criteria AIC and log-likelihood implemented on the models confirmed that the VAR model of order 2 gives a better model for predictions and forecasts of covid-19 cases in Nigeria. This paper recommends a suitable model for handling multivariate time series data and suggests a reliable approach for forecasting future cases of covid-19 variables in the country and help health policy makers in finding solution to the unceasing upward trend in the cases of the pandemic.*

KEYWORDS: VAR Model, Covid-19 Variables, Stationarity, Forecasts, Granger Causality

INTRODUCTION

On 31 December 2019, the World Health Organization (WHO) was formally notified about a cluster of cases of pneumonia in Wuhan City, home to 11 million people and the cultural and economic hub of central China. By 5 January, 59 cases were known and none had been fatal (WHO, 2020). Ten days later, WHO was aware of 282 confirmed cases, of which four were in Japan, South Korea and Thailand (WHO, 2020). There had been six deaths in Wuhan, 51 people were severely ill and 12 were in a critical condition. The virus responsible was isolated on 7 January and its genome shared on 12 January (WHO, 2020). The cause of the severe acute respiratory syndrome that became known as COVID-19 was a novel coronavirus, SARS-CoV-2. The rest is history, albeit history that is constantly being rewritten: as of 12 May, 82,591 new cases of COVID-19 worldwide were being confirmed daily and the death rate was over 4200 per day (WHO, 2020).

The Federal Ministry of Health has confirmed a coronavirus disease (COVID-19) case in Lagos State, Nigeria. The case, which was confirmed on the 27th of February 2020, is the first case to be reported in Nigeria since the beginning of the outbreak in China in January 2020. (NCDC, 2020). The spread of novel Corona Virus Disease (COVID-19) in Nigeria continue to record significant increase as the latest statistics provided by the Nigeria Centre for Disease Control reveal (NCDC, 2020).

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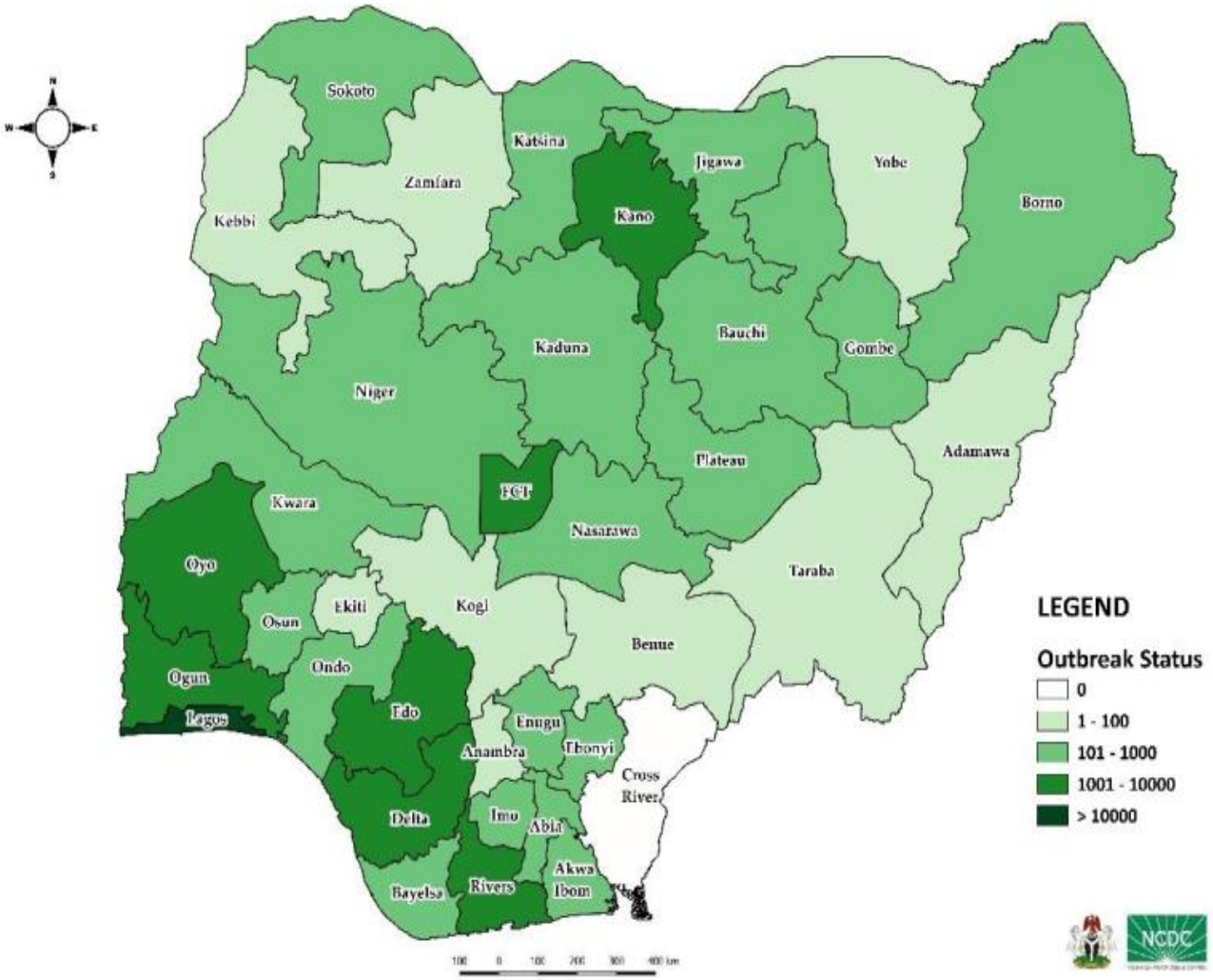

Fig.1: Map of Nigeria Showing 35 States and FCT Affected by COVID-19 as at June 10 2020

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Volume 3, Issue 2, 2020 (pp. 171-181)
www.abjournals.org

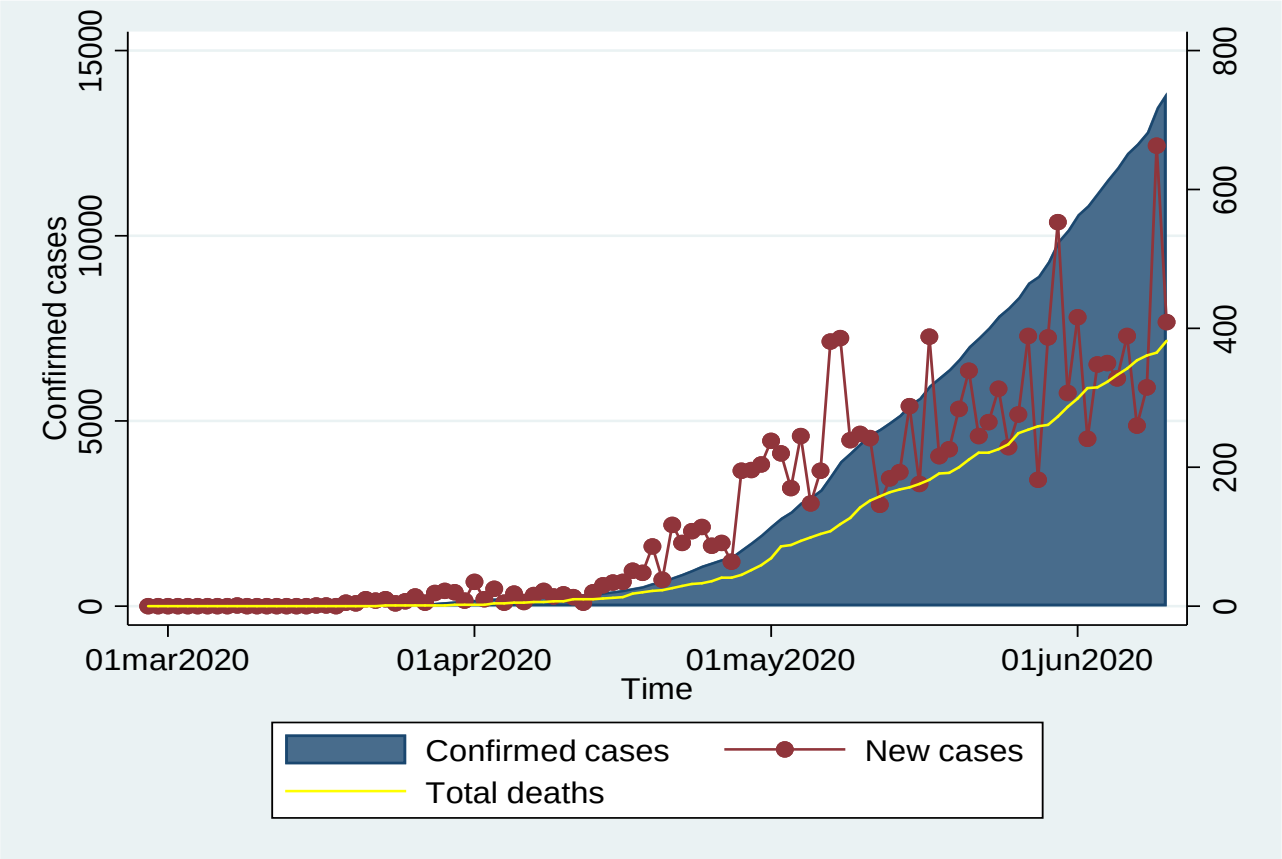

Fig.2: Chart Showing Confirmed, New, and Death Cases of Covid-19 in Nigeria from Feb. 28 to June 10

Vector Autoregression (VAR) Model

The vector autoregression (VAR) model is one of the most successful, flexible, and easy to use models for the analysis of multivariate time series. It is a natural extension of the univariate autoregressive model to dynamic multivariate time series. The VAR model has proven to be especially useful for describing the dynamic behavior of economic and financial time series and for forecasting. It often provides superior forecasts to those from univariate time series models and elaborate theory-based simultaneous equations models. Forecasts from VAR models are quite flexible because they can be made conditional on the potential future paths of specified variables in the model. VAR models (vector autoregressive models) are used for multivariate time series. The structure is that each variable is a linear function of past lags of itself and past lags of the other variables. More rigorous treatments can be found in Hamilton (1994), Lutkepohl (2005), and Amisano and Giannini (1997). Stock and Watson (2001) provide an excellent nonmathematical treatment of vector autoregressions and their role in macroeconomics. Becketti (2013) provides an excellent introduction to VAR analysis with an emphasis on how it is done in practice.

When there are no constraints placed on the coefficients, the VAR(p) is a seemingly unrelated regression model with the same explanatory variables in each equation. As discussed in Lutkepohl (2005) and Greene (2008,), performing linear regression on each equation produces the maximum likelihood estimates of the coefficients. The definitive technical reference for VAR models is Lutkepohl (1991) and updated surveys of VAR techniques are given in works of Watson (1994); Lutkepohl (1999); and Waggoner and Zha (1999). Applications of VAR models to financial data are given in works of Hamilton (1994a; 1994b); Campbell, Lo, and MacKinlay (1997); Mills (1999); and Tsay (2001).

When building a VAR model, the following steps can be used. The Akaike Information Criterion (AIC) have been used to identify the order, then estimate the specified model by using the least squares method (if there are statistically insignificant parameters, the model should be re-estimated by removing these parameters), and finally use the Qk (m) statistic of the residuals to check the adequacy of a fitted model. The time series Y_t follows a VAR(p) model, if it satisfies

$$Y_t = \emptyset_0 + \emptyset_1 Y_{t-1} + \ldots + \emptyset_p Y_{t-p} + \alpha_{t,} \quad p > 0 \quad \ldots\ldots(1)$$

where, Y_t is a vector of the dependent variable $\emptyset_0$ is a k-dimensional vector; and α_t is a sequence of serially uncorrelated random vectors with mean zero and covariance matrix Σ. Covariance matrix Σ must be positive definite; otherwise, the dimension of Y_t can be reduced. The error term, α_t is a multivariate normal and $\emptyset_j$ are $k \times k$ matrices. Using the back-shift operator B, the VAR(p) model can be written as:

$$\left(1 - \emptyset_1 \mathrm{B} - \ldots - \emptyset_p B^p\right) Y_t = \emptyset_0 + \alpha_t \quad \ldots\ldots(2)$$

where, I will be the $k \times k$ identity matrix. In a compact form, it is as follows:

$$\emptyset(\mathrm{B}) Y_t = \emptyset_0 + \alpha_t \quad \ldots\ldots(3)$$

where, $\emptyset(\mathrm{B}) = 1 - \emptyset_1 \mathrm{B} - \ldots - \emptyset_p B^p$ is a matrix polynomial, if Y_t is weakly stationary, then it reduces to:

$$\mu = E(Y_t) = \left(1 - \emptyset_1 B - \cdots - \emptyset_p\right)^{-1} \emptyset_0 = [\emptyset(1)]^{-1} \emptyset_0 \quad \ldots\ldots(4)$$

Provided that the inverse exists, since determinant of [Φ(1)] is different from zero.

then the VAR(p) model becomes:

$$\tilde{Y}_t = \emptyset_1 \tilde{Y}_{t-1} + \ldots + \emptyset_p \tilde{Y}_{t-p} + \alpha_{t,} \quad \ldots\ldots(5)$$

This results can be obatined as:

$$Cov(Y_t,\ \alpha_t) = \Sigma, the\ covariance\ matrix\ of\ a_i$$

$$Cov(Y_{t-1},\ \alpha_t) = 0, \text{for } 1 > 0$$

$$\Gamma_l = \emptyset_1 \Gamma_{l-1} + \ldots + \emptyset_p \Gamma_{l-p} + \alpha_{l,} \quad \text{for } 1 > 0 \ldots\ldots(6)$$

The equation (6) is a multivariate version of Yule–Walker equation and it is called the moment equation of a VAR(p) model. The concept of partial autocorrelation function of a univariate

series can be generalized to specify the order *p* of a vector series. Consider the following consecutive VAR models: (Hossain, Kamruzzaman, and Ali, 2015)

$Y_t = \emptyset_0 + \emptyset_1 Y_{t-1} + \alpha_t$ .....(7)

$Y_t = \emptyset_0 + \emptyset_1 Y_{t-1} + \emptyset_2 Y_{t-2} + \alpha_t$ .....(8)

$Y_t = \emptyset_0 + \emptyset_1 Y_{t-1} + \ldots + \emptyset_p Y_{t-p} + \alpha_t$ .....(9)

The ordinary least squares (OLS) method is used for estimating parameters of these models. This is called the multivariate linear regression estimation in multivariate statistical analysis (Tsay, 2001)

Data Analysis

The data used for this research was obtained from the website of the Nigeria Centre for Diseases Control (NCDC). All analyses were done using *R* version 4.0.0 and STATA version 15

Tests of Stationarity

Stationarity was achieved at d = 2 for the three variables. The Augmented Dickey-Fuller Test were carried out to test for the significance of stationarity of the data sets. (Dickey & Fuller, 1979), and Phillips-Perron test (PP) (Phillips & Perron, 1998).

Table 1: Augmented Dickey-Fuller and Phillips-Perron Tests

Variable	Lag order	Dickey-Fuller	P-value	Phillips-Perron	P-value
Confirmed cases	4	-6.7765	0.012	-127.89	0.01
New cases	4	-8.4926	0.001	-141.20	0.01
Total deaths	4	-8.2840	0.002	-110.63	0.01

The null hypothesis of non-stationarity is rejected in all the cases, this shows that the lagged series are stationary at 5% level of significance.

Granger Causality Test

This test is necessary in order to ascertain the cause of one or the other variable in the data set

Table 2: Granger test of causality

F-Test	df1	df2	p-value
3.5548	4	285	0.0075

Therefore, the null hypothesis stating that "lagged values of *confirmed cases* do not cause *new cases* and *total deaths*" can be rejected at 5% level of significance since the p-value 0.03268 is less than 0.05. This implies that *confirmed cases* Granger-causes *new cases* and *total deaths* of covid-19 in Nigeria.

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Volume 3, Issue 2, 2020 (pp. 171-181)

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Estimation of Parameters for the Models

Tables 3-5 presents the estimates of the parameters for the formulation of the models from the datasets. All are significance are measured at 5% level.

Table 3: Estimation Results for Equation: Confirmed Cases

	Estimate	Std. Error	t value	P	R-sq	Model-P
confirmedcase.L1	**2.6593**	**1.2953**	**2.053**	**0.0428**	**0.9998**	**2.2e-16**
newcase.L1	**-1.5041**	**1.2806**	**-1.175**	**0.2431**		
totaldeaths.L1	**-0.6610**	**2.6048**	**-0.254**	**0.8002**		
confirmedcase.L2	**-1.7110**	**1.3018**	**-1.314**	**0.1919**		
newcase.L2	**0.0900**	**0.1362**	**0.661**	**0.5102**		
totaldeaths.L2	**3.0310**	**2.5817**	**1.174**	**0.2433**		
const	**-25.6444**	**18.5806**	**-1.380**	**0.1708**		
trend	**1.4953**	**0.5786**	**2.584**	**0.0113**		

Table 4: Estimation results for equation: new cases

	Estimate	Std. Error	t value	P	R-sq	Model-P
confirmedcase.L1	**1.7069**	**1.3083**	**1.305**	**0.195**	**0.8350**	**2.2e-16**
newcase.L1	**-1.5641**	**1.2935**	**-1.209**	**0.230**		
totaldeaths.L1	**-0.8260**	**2.6310**	**-0.314**	**0.754**		
confirmedcase.L2	**-1.7639**	**1.3149**	**-1.341**	**0.183**		
newcase.L2	**0.1008**	**0.1375**	**0.733**	**0.466**		
totaldeaths.L2	**3.3924**	**2.6077**	**1.301**	**0.196**		
const	**-25.5337**	**18.7679**	**-1.360**	**0.177**		
trend	**1.4968**	**0.5844**	**2.561**	**0.012**		

Table 5: Estimation results for equation: total deaths

	Estimate	Std. Error	t value	P	R-sq	Model-P
confirmedcase.L1	**-0.0001**	**0.0505**	**-0.002**	**0.9981**	**0.9996**	**2.2e-16**
newcase.L1	**0.0303**	**0.0499**	**0.606**	**0.5460**		
totaldeaths.L1	**0.8996**	**0.1016**	**8.857**	**4.95e-14**		
confirmedcase.L2	**0.0029**	**0.0508**	**0.059**	**0.9533**		
newcase.L2	**0.0109**	**0.0053**	**2.058**	**0.0424**		
totaldeaths.L2	**-0.0216**	**0.1007**	**-0.215**	**0.8304**		
const	**-0.6740**	**0.7246**	**-0.930**	**0.3546**		
trend	**0.0292**	**0.0226**	**1.292**	**0.1994**		

African Journal of Biology and Medical Research
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The coefficients for a variable are listed in the estimate column. The L1 and L2 attached to each variable name indicate that they are lag 1 and lag 2 variables.

Using the notations t = time (days), C = confirmed cases, N = new cases, and T = total deaths. The equation for confirmed cases is

$$\hat{C}_t = -0.6740 + 0.0216\text{t} - 0.0001C_{t-1} + 0.0303N_{t-1} + 0.8996T_{t-1} + 0.0029C_{t-2} + 0.0109N_{t-2} - 0.0216T_{t-2} \quad \ldots\ldots (10)$$

The equation for new cases is

$$\hat{N}_t = -25.5337 + 1.4968t + 1.7069C_{t-1} - 1.5641N_{t-1} - 0.8260T_{t-1} - 1.7639C_{t-2} + 0.1008N_{t-2} + 3.3924T_{t-2} \quad \ldots\ldots (11)$$

The equation for total deaths is

$$\hat{T}_t = -25.6444 + 1.4953t + 2.6593C_{t-1} - 1.5041N_{t-1} - 0.6610T_{t-1} - 1.7110C_{t-2} + 0.0900N_{t-2} + 3.0310T_{t-2} \quad \ldots\ldots (12)$$

Using the above derived models, the following forecasts (in table 6) can therefore be made easily, and be represented in fig. 2 as extension to the actual series

Table 6: Ten Days Forecasts made From the Models

Forecasts	Confirmed cases	New Cases	Total Deaths
Jun-11	14302	429	397
Jun-12	14722	419	408
Jun-13	15162	440	419
Jun-14	15610	447	431
Jun-15	16068	458	443
Jun-16	16535	467	455
Jun-17	17012	476	468
Jun-18	17499	486	481
Jun-19	17996	497	494
Jun-20	18504	507	507

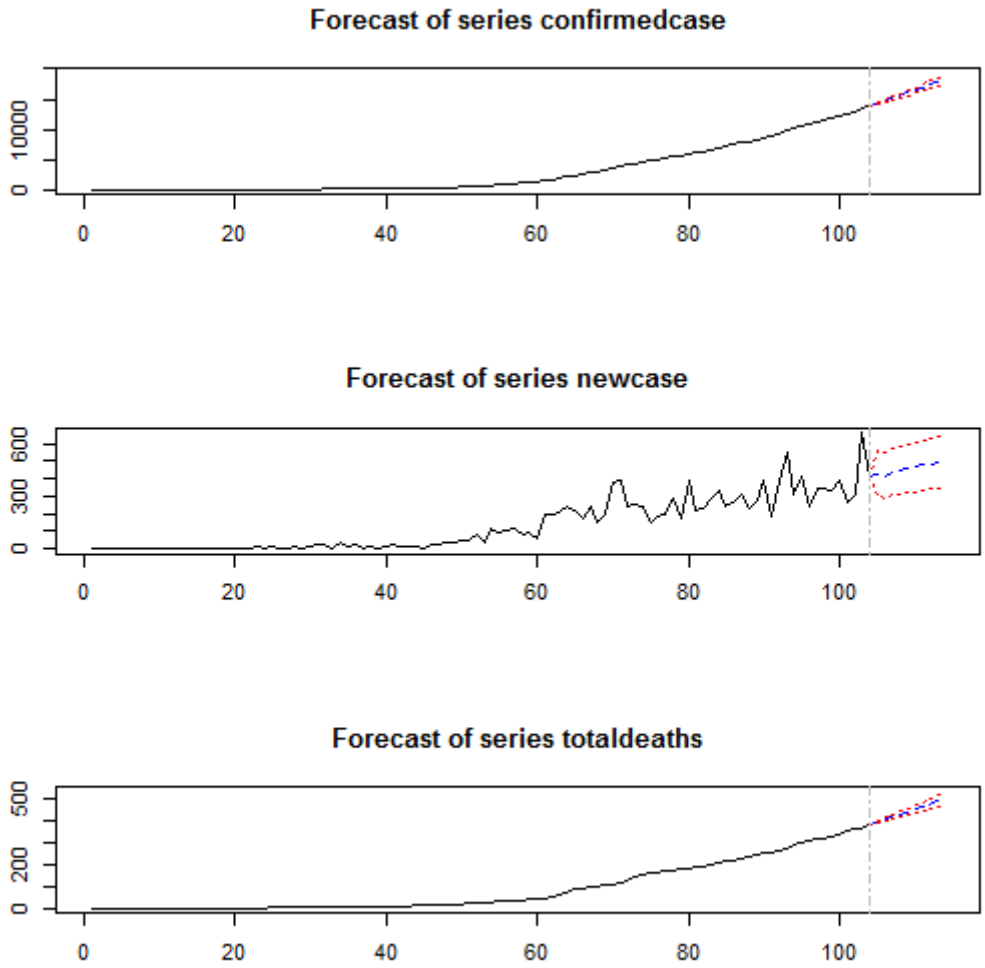

Fig. 3: Plot Showing Actual and Forecasts Values for 10 Days with CI Bounds

It is obvious from the forecasts made that the model is effective, because the forecast values follow the general pattern in the series

African Journal of Biology and Medical Research
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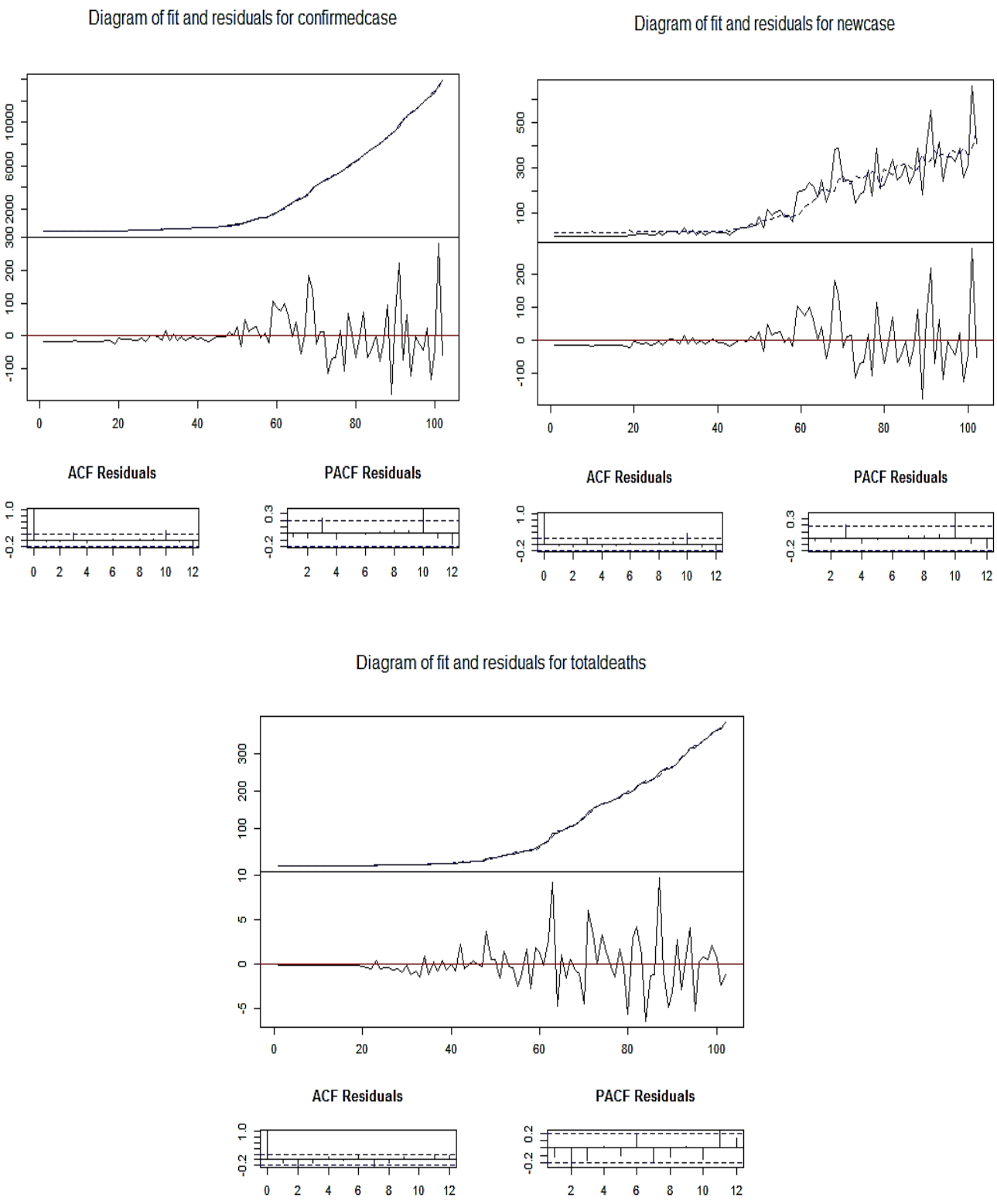

Fig. 4: Fits and Residual Plots

African Journal of Biology and Medical Research
ISSN: 2689-534X
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Model Diagnostics

The above charts (fig. 4) show the actual, the fitted lines and the residuals. For the plots on confirmed cases, the actual and the fitted are closely knitted together, signifying a good model. For new cases, the fitted passes through the actual values, this also shows that the model predicts well. Lastly, for total deaths, the difference between the fitted and the actual is not obvious, this informs us that the model predicts reliably. The residuals clustering around zero in all the three cases indicate normality of the residual values and adequacy of the models for future forecasts.

Table 7: VAR Models Selection Criteria

Order of p	AIC	Log-Likelihood
1	2256.99	-1113.5
2	2242.76	-1097.4

Using the AIC criterion, the VAR of order 2 model gives a better precision, therefore should be made use in estimating the parameters and forecasting.

DISCUSSION OF RESULTS

The general upward movements noticed in *confirmed*, *new*, and *death* cases of covid-19 in Nigeria as represented in fig. 2 above is alarming. With respect to the data coverage of this paper, the sudden rise started with *confirmed* cases on the 18th March, 2020 and maintains the upward trend until June 10, 2020. Using the Augmented Dickey Fuller and Phillips-Perron unit root tests, the null hypothesis of non-stationarity is rejected in all the cases of the variables, this shows that the lagged series are stationary at 5% level of significance. The Granger causality test reveal that *confirmed cases* Granger-causes *new cases* and *total deaths* of covid-19 in Nigeria. Using *confirmed cases* as the response variable it is discovered that there is a general significant relationship among the predictors and the response variable with p-value 2.2e-16. Having a critical examination on the estimates displayed in table 3, it will be seen that only *confirmedcase.L1* and trend are significant having p-values 0.0428 and 0.0113 respectively. The significance of relationship is also visible in the other models as revealed in tables 4 and 5. Trend is the only one significant in the second model while *newcase.L2* is the only one in the second one. The real, fitted and the residual plots displayed in fig. 4 show that the models are well fitted and that the forecasts in table 6 are reliable. The criteria AIC and log-likelihood implemented on the model confirmed that the VAR model of order 2 gives a better model for predictions and forecasts of covid-19 cases in Nigeria.

CONCLUSION AND RECOMMENDATION

Using the results from the vector autoregressive analysis for multivariate time series carried out on covid-19 cases in Nigeria, it can be concluded that the VAR model of order 2 gives a better model suitable for predicting and forecasting future occurrences of *confirmed cases*, *new cases*, and *total deaths* of pandemic in Nigeria. It is therefore recommended that researchers interested in modelling the pandemic employ the model for reliable predictions. Furthermore, the government should intervene in curbing the ever-increasing cases of the pandemic to save that population at risk.

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COVID-19: PSYCHOLOGICAL IMPACT[1]

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ABSTRACT: *The world is thrown into chaos because of the outbreak of the coronavirus disease (COVID-19) from Wuhan, China, and now life for the people around the globe has gone into a standstill. This has brought unprecedented efforts to institute the practice of physical distancing (or "social distancing") and shutdowns of usual day-to-day functioning. Research has shown that people are not only affected physically but mentally and psychologically as well, resulting in resulting in national behavioural patterns, such as spikes in mental health-related problems. This article aims to describe the psychological impact of COVID-19 onto the lives of people around the world. The pandemic has a "profound and pervasive impact" on global mental health as billions of people struggle to cope with isolated living and anxiety spikes, as showed by imposed mass quarantine applied by nationwide lockdown programs which had produced mass hysteria, anxiety and distress amongst other things. Due to the psychology of uncertainty, it causes tremendous anxiety on an individual, especially by uncertainty in the future. However certain values upheld by people can help mitigate the mindset of uncertainty, shifting one's uncertainty to a more positive and productive outlook. In conclusion, the best psychological response to the pandemic would be to build up one's psychological resiliency, and do our part by spreading awareness and positivity, by spreading hope, being empathetic and understanding those who are struggling due to the effects of COVID-19, as well as those who are suffering because of the disease.*

KEYWORD: Social Distancing, Uncertainty, Mental Health, Covid-19, Pandemic

INTRODUCTION

With the world thrown into chaos upon the outbreak of the coronavirus disease (COVID-19) from Wuhan, China, life for the citizens of countries affected by this pandemic seemed to have gone into a standstill. An attack by a family of viruses that had evolved from a previous type known as Severe Acute Respiratory Syndrome (SARS) leaves us in a state of calamity due to the lack of preparedness of all the countries by the magnitude of the effect of the virus, making us not all prepared and caught off guard. This has brought unprecedented efforts to institute the practice of physical distancing (called "social distancing" in most cases) in countries all over the world, resulting in national behavioural patterns, such as spikes in mental health-related problems, and shutdowns of usual day-to-day functioning like socialising with members of society.

While the world waits for a vaccine that can help mitigate the effect of the disease, an unthinkable move had been made just months ago, where quarantine and social distancing have now become commonplace globally as governments make concerted efforts to fight the continuous and dramatic increase of coronavirus. The change in behavioural patterns due to physical distancing can be great, which resulted to vast mental health concerns ranging from anxiety, and anger to sleep disturbances, depression and even posttraumatic stress disorder (PTSD).

[1] Paper presented at the International E-Conference on COVID-19 Global Impacts, 20-21 July, 2020.

It is normal to experience fear and anxiety about a new disease and the uncertainty of what could possibly happen can be overwhelming and cause strong emotions in both adults and children. Children are just as likely to experience it, as an adult would, such as a fear of dying, a fear of their relatives dying, or a fear of what it means to receive medical treatment. They may no longer have the sense of structure and stimulation that is provided by that environment, and now they have less opportunity to be with their friends and get that social support that is essential for good mental well-being. Public health actions, such as social distancing, can make them feel isolated and lonely and can increase their levels of stress and anxiety.

The coronavirus disease is still not well enough known to be able to anticipate its behaviour and this challenges all affected countries across the globe in more ways than they can imagine. Nevertheless, scientists are working hard to provide us with a solution as there are many ongoing clinical trials evaluating potential treatments. In the meantime, we can only wait and hope for more positive outcomes.

Effects of COVID-19 on Mental Health

COVID-19 had required many countries across the globe to implement early quarantine measures as the fundamental disease control tool. Apart from physical sufferings, the consequences of this quarantine on the mental health and well-being at personal and population-levels are grand in number. Imposed mass quarantine applied by nationwide lockdown programs had produced mass hysteria, anxiety and distress amongst other things, due to factors like sense of getting cornered and loss of control. This can be intensified if families need separation, by uncertainty of disease progression, insufficient supply of basic essentials, financial losses, increased perception of risk, which usually get magnified by vague information and improper communications through media in the early phase of a pandemic. Previous outbreaks have reported that psychological impact of quarantine can vary from immediate effects, like irritability, fear of contracting and spreading infection to family members, anger, confusion, frustration, loneliness, denial, anxiety, depression, insomnia, despair, to extremes of consequences, including suicide (Dubey, 2020).

France-Presse (2020) noted that there is a likelihood that the pandemic will have a “profound and pervasive impact” on global mental health as billions of people struggle to cope with isolated living and anxiety spikes.

A survey conducted showed how often a respondent felt sad or nervous in the last month. After comparing the responses with a sample of 19,330 demographically similar people in a 2018 government-sponsored survey of U.S. adults that asked the same questions, the staggering results showed that the 2020 participants were eight times as likely to screen positive for serious mental illness – 28%, compared to 3.4% in the 2018 survey. The vast majority of the 2020 participants, 70%, met criteria for moderate to serious mental illness, compared with 22% in 2018. Clearly, the pandemic has had a devastating effect on mental health. It showed that younger adults ages 18 to 44 have borne the brunt of the mental health effects. They’ve experienced a tenfold increase in serious mental distress compared with 2018. Meanwhile, adults 60 and older had the smallest increases in serious mental health issues. A likely cause showed that it could be because the younger adults were more likely to lose their jobs as restaurants and stores closed and were more likely to be in a precarious

financial position to begin with. The youngest adults were also already struggling with mental health issues, which were exacerbated by the pandemic (Twenge, 2020).

For those who have already been experiencing mental health problems before the outbreak, such as depression, bipolar or other mental disorders, the quarantine can aggravate an already tough situation, concurs Dr. Ronald del Castillo, a psychologist from the University of the Philippines. Add these with other circumstances, many of which are entrenched for us in the Philippines, such as poverty, unemployment or underemployment, isolation, poor transportation, limited health care access, or disingenuous politicians, then the psychological impact of the quarantine is all the more difficult, especially when the flow of everyday lives has been disrupted by something as serious as a pandemic (Co, 2020).

Furthermore, Frank McAndrew, an Evolutionary Psychologist at Knox College in Illinois had shared that being quarantined gives one a sense of being at the mercy of other people and other uncontrollable forces such as an epidemic. This brings a feeling of helplessness and uncertainty about the future that can be very unsettling. It becomes much more difficult for humans find isolation so difficult to withstand. Why is that so? One of the reasons says that is it because humans as social creature by nature. Therefore, loneliness can be damaging to one's mental and physical health. Socially isolated people are less able to deal with stressful situations. And though millions of people are coming to terms with being increasingly cut off from society, beyond the inconvenience of working from home, or not being able to go to bars, restaurants or cinemas, however, experts have found that social isolation can have a profound effect on people's physical, as well as mental health. Experts suggest that the negative feelings and experiences associated with prolonged isolation will come for us all (Molina, 2020).

With the possibility of increase in mental health problems, it is only natural for nation to increase its priority in mental health funding just as published in Lancet Psychiatry, where a panel of 24 specialists had called for more funding for research into the impacts COVID-19 may have on society's mental well-being. Two accompanying surveys of the British public showed that most people questioned had experienced heightened anxiety and fear of becoming mentally unwell since the pandemic struck.

Another possible cause for the spike in mental health issues could be the lack or struggle to obtain services and preventions during the pandemic. Among young people who reported needing mental health services, 34% have experienced delays or disruption in access to mental health medications due to COVID-19 and 47% have experienced delays or disruption in accessing psychosocial support as a result of the ongoing pandemic. It is also important to highlight that these survey findings suggest 9% of respondents requiring mental health medications have never had access to them and similarly, 14% of respondents needing psychosocial support lack access to this essential service in a non-pandemic context, a study in Asia and the Pacific showed (Apcaso, 2020).

CONCLUSION

The core question now is: why does people's mental health suffer during this pandemic? Robinson (2020) believes that it is due to the psychology of uncertainty. Like most people, uncertainty can cause tremendous anxiety on an individual, which is due to one's survival

brain, which is constantly updating one's world, making judgements about what's safe and what isn't. Its disdain for uncertainty causes it to make up a variety of untested stories hundreds of times a day, therefore uncertainty equals to danger.

Meanwhile, as many institutions undergo countless of clinical trials to create a vaccine, we slowly try to return to our normal lifestyle, some calling it the "new normal". There is no such thing as a "new normal", for we still do not know what lies ahead and what will happen in the future. There is still uncertainty in the future. These uncertainty stems from the fear of what may or may not happen in the coming days, from the fear of the lack of movement by the government, by the political strife that is mixed in during the pandemic. And these fear and uncertainty begets anxiety, which may likely lead to depression or other higher mental and/or psychological disorders.

The psychology of uncertainty (or the uncertainty mindset) becomes a palpable psychological impact. However, despite uncertainty, the mindset can be anticipated just as how one can be calmer anticipating pain than anticipating uncertainty because pain is certain, as found by certain studies. Certain values upheld by people help mitigate the mindset of uncertainty, shifting one's uncertainty to a more positive and productive outlook. Such is the case for Filipinos, who are known for their resiliency.

Filipinos, just like many other countries, continue to face the COVID-19 pandemic head on. According to Dela Cruz (2020), one of the core qualities of Filipino resiliency is hope. Hope is the essence that gives strength to men in dire straits. Faith in God and love of family strengthen these men's resolve to rise above their experience and try their best to become useful again. In other words, despite the dire crisis that we are facing, hope is what pushes the Filipinos to become resilient during this pandemic. Other major factors in the resiliency of Filipinos are Family, Faith and Fun. Perhaps this is why the Filipinos are so resilient and are able to see things in a positive light despite the many tragedies that befall their land (Manuncia, 2019).

In conclusion, the best psychological response to the pandemic would be to build up one's psychological resiliency, which is defined as the ability to sustain or recuperate psychological well-being during or after facing the stressful conditions. This can be achieved by ending the vulnerability to psychopathology and mental dysfunction when exposed to the viral infection or at-least living in the regions under threat. The health care regulatory authorities should communicate to the people that the risk of being infected may sustain for a long time, but the government will protect the nation. In addition, it should further be communicated that serious measurements will be implemented at hospitals and communities. Moreover, people should be given a hope that everything will become normal and controlled with the passage of time (Khan et al, 2020).

RECOMMENDATION

In these times of stress and uncertainty, there is not much we can do but follow instructions from the government and health institutions as we await patiently for vaccines to be made. However, we can do our part by spreading awareness and positivity, by spreading hope, being empathetic and understanding those who are struggling due to the effects of COVID-19, as well as those who are suffering because of the disease.

It is recommended by the World Health Organization (2020) to stay connected and maintain your social networks and try as much as possible to keep your personal daily routines or create new routines, if circumstances change. During times of stress, pay attention to your own needs and feelings. Engage in healthy activities that you enjoy and find relaxing. Exercise regularly, keep regular sleep routines and eat healthy food, as much as possible. Seek information updates and practical guidance at specific times during the day from health professionals and WHO website and avoid listening to or following rumours that make you feel uncomfortable, for a near-constant stream of news reports about the outbreak can cause anyone to feel anxious or distressed.

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EPIDEMIOLOGY OF COVID-19 IN THE FEDERAL CAPITAL TERRITORY, ABUJA, NIGERIA, 2020

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ABSTRACT: *Background: Coronavirus disease (COVID-19) is a global pandemic. COVID-19 epidemiology varies from one area to another. Appreciation of local COVID-19 epidemiology allows for better understanding of its distribution, description, transmission and risk patterns, clinical course, and management. In addition, through better understanding of COVID-19 epidemiology, socio-cultural factors that exacerbate the disease are revealed, hence control measures can be identified. Objective: The objective of this study is to determine the epidemiological characteristics and transmission patterns of COVID-19 cases in the Federal Capital Territory (FCT), Abuja, Nigeria. Materials and Methods: We retrospectively reviewed the COVID-19 database in the Public Health Department of the Federal Capital Territory, Abuja from the confirmation of initial case on March 20th, 2020 to June 30th, 2020. We evaluated the performance of COVID-19 surveillance, determined the epidemiological characteristics of confirmed COVID-19 cases, the transmissibility of the disease, and identified groups of people at higher risk of contracting the disease and those at higher risk of dying from the disease. Results: A total of 1,870 confirmed COVID-19 cases were reported during the study period. Of these confirmed cases, a total of 1,198(64%) were males. The number of deaths among confirmed cases was 33 (CFR, 1.8%). The male to female ratio of the confirmed cases was 3:1 and the most (56%) affected age group was 20-40 years with mean age of 36 years (range: 6 months to 87 years). The number of COVID-19 cases among health workers was 158. The number of contacts line listed was 3,358 out of which 3,266(97%) were followed up and 92(3%) were lost to follow up. The case to contact ratio was 1.8 and the number of contacts that were positive for COVID-19 was 85(2.6%). The basic reproductive number (R) based on the SEIR model ranged from 1.1-1.4 Conclusion: There was intense transmission of COVID-19 in the Federal Capital Territory, Abuja during the study period. The surveillance for COVID-19 should extend to other area councils apart from the Municipal council. Timely detection, reporting, isolation and management of confirmed cases as well as contact tracing and monitoring are essential to curbing the spread of COVID-19.*

KEYWORDS: COVID-19, Community, Surveillance, Epidemiology, Abuja, Nigeria

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INTRODUCTION

In late December 2019, a novel corona viral disease caused by the SARS-CoV-2 virus was first identified in Wuhan, China. The disease, initially known by various names including 'Severe Pneumonia with Novel Pathogens' by the Taiwan Centre for Disease Control (CDC), has been officially named by the World Health Organization (WHO) as 'Coronavirus Disease-2019 (COVID-19), on February 11, 2020[1]. The first COVID-19 cases in Nigeria and the FCT were confirmed on the 27th of February and 20th of March 2020 respectively[2,3]. The outbreak of COVID-19 has currently spread widely around the world, affecting more than 120 countries and territories. As of May 18, 2020, there were 4, 618, 821 and 6,175 cases of COVID-19 globally and in Nigeria respectively. The corresponding number of deaths was 311, 847 and 216[4]. The disease was declared a public health emergency of international concern (PHEIC) by the WHO on 30 January 2020 and subsequently a global pandemic on March 11, 2020[5,6].

Transmission of COVID-19 is through droplets from close contacts or contaminated fomites. There is no sufficient evidence to support airborne or faeco-oral transmission. The mean incubation period is 3-9 days with a range between 0-24 days[7]. Symptoms of COVID-19 infection appear after an incubation period of approximately 5 days. The most common symptoms are fever, cough, and fatigue, while other symptoms include headache, diarrhoea, dyspnoea, and sore throat[8]. While patients with confirmed COVID-19 disease can be asymptomatic or pre-symptomatic (patients not yet symptomatic); however, both categories of cases have been shown to transmit the disease and constitute a group of 'silent spreaders' together with the very mildly symptomatic. Indeed, abnormalities on chest imaging have been noted in some patients before the onset of symptoms[10].

The preferred specimens for COVID-19 diagnosis are nasopharyngeal and oropharyngeal swabs preferably during the early stage of the disease. The molecular test of choice is the reverse-transcription polymerase chain reaction (RT-PCR) assays. There however exist other supplementary diagnostic tools such as the antibody -based serological techniques which are gradually being introduced[11].

There is no current evidence from randomized controlled trials (RCTs) to recommend any specific anti-COVID-19 treatment for patients with a suspected or confirmed COVID-19 infection and vaccine is not yet available. Management is largely supportive in isolation centres to prevent disease transmission to others. Several treatment modalities have however been tried including use of anti-viral drugs (Remdesivir, lopinavir/ritonavir), anti-malarial drugs (chloroquine phosphate, hydroxyl-chloroquine), anti-parasitic drug (Ivermectin), steroids and serum antibodies[12-15].

Case fatality rate from COVID-19 ranges from 1% to 2% depending on the study and Country. Majority of deaths have occurred in elderly patients (over 65 years of age) with pre-existing diseases such as cancer hypertension, coronary heart disease and diabetes. In patients with severe disease, the usual cause of death is progressive respiratory failure due to alveolar damage from the virus. Although young children appear to have mild symptoms, they may infect others and perpetuate transmission[16-18].

Robust and enhanced surveillance for COVID-19 is critical for effective control of the spread of the disease as well as guide the implementation of control measures. He main objective of a sensitive COVID-19 surveillance is to control the spread of disease such that normal socio-

economic activities can resume as early as possible. In addition, surveillance also enables monitoring trends of COVID-19 transmission and risk assessments[19].

Following the Laboratory confirmation of the first 3 COVID-19 cases in the FCT March 20, 2020, a multi-sectoral COVID-19 Emergency Operations Centre (EOC) was activated on March 23, 2020. The EOC is made up of personnel from the FCT Health and Human Services Secretariat (HHSS), Nigeria Centre for Disease Control (NCDC), World Health Organization (WHO), African Field Epidemiology Network (AFENET), Medical and Dental Consultants Association of Nigeria (MDCAN), Private Health Practitioners and other partners who coordinate nine pillars (coordination, logistics, infection prevention and control, epidemiology/surveillance/point of entry, laboratory, risk communication, case management health and safety and research) of response activities as contained in the Incident Action Plan.

METHODS

Study area and population

The Federal Capital Territory (FCT), Abuja is the Capital of Nigeria and lies between latitude 8.25 and 9.20 north of the equator and longitude 6.45 and 7.39 east of Greenwich Meridian. It is geographically located in the centre of the country. The FCT is bordered by the states of Niger to the West and North, Kaduna to the northeast, Nasarawa to the east and south and Kogi to the southwest. The total population is close to five million and is sub-divided into 6 Area Councils (Abaji, Bwari, Gwagwalada, Kuje, Kwali and Municipal) which are equivalent to Local Government Areas (LGAs) in other states of Nigeria. The Municipal Area Council is the largest of all the area councils in the FCT accounting for over 55% of the total population. In addition, there are 62 political wards and 2,652 settlements. This study is however, confined to the rural slums which did not report any COVID-19 case but thought to have possibility of significant contacts with confirmed cases that were mainly from the urban locations of the FCT.

Brief Description of COVID-19 Outbreak Response in FCT, Abuja

The FCT reported its first case of COVID-19 on March 20th, 2020 and this was followed by setting up of a multisectoral COVID-19 Emergency Operations Centre (EOC) on March 23rd, 2020. Members were drawn from the FCT public health department, private health practitioners, medical associations, and partners (WHO, AFENET, NCDC). The main role of the COVID-19 EOC was to coordinate the response activities as enshrined in the incident action plan. The EOC had 9 pillars of response activities (coordination, logistics, infection prevention and control, epidemiology/surveillance/point of entry, laboratory, risk communication, case management health and safety and research). The Ministerial Expert Advisory Committee was inaugurated on March 26th, 2020. The surveillance for COVID-19 in the FCT was initially dependent on phone calls received by the EOC from suspected cases. Later, on April 13th, 2020 community active surveillance for COVID-19 was initiated followed by health facility active cases search. There were 45 three-member sample collection teams in the FCT. Collected samples from all suspected cases in FCT were analyzed at the Nigeria Centre for Disease Control (NCDC) Gaduwa Reference Laboratory and confirmed COVID-19 cases in the FCT were managed at one of the eight isolation centres in the FCT with collective bed capacity of over 1,000.

Data Collection and Analysis

Data sources for analysis were from the COVID-19 excel database of the Public Health Department of the FCT as well as the master list of FCT settlements at the WHO office in the FCT. We abstracted data from the start of the outbreak on March 20, to June 30, 2020. We conducted key analysis using Microsoft Office Excel 2010 to highlight the epidemiological characteristics of the disease and transmission patterns. We also used the SEIR model to estimate basic reproductive number (R).

RESULTS

A total of 1,870 confirmed COVID-19 cases were reported during the study period. Of these confirmed cases, a total of 1,198(64%) were males. The number of deaths among confirmed cases was 33 (CFR, 1.8%) of which 29(88%) were males. The male to female ratio of the confirmed cases was 3:1 and the most (56%) affected age group was 20-40 years with mean age of 36 years (range: 6 months to 87 years). The number of COVID-19 cases among health workers was 158. The number of suspected cases from whom samples were collected was 15,248. All the confirmed COVID-19 cases were reported from the six area councils with Municipal council accounting for 12,418(81%) of samples collected and 1,564(84%) of confirmed cases. The most affected communities were Mabushi, Maitama, Garki, Lugbe, Asokoro and Gwarimpa.

The number of contacts line listed was 3,358 out of which 3,266(97%) were followed up and 92(3%) were lost to follow up. The number of contacts that exited the mandatory 14 days follow up period was 2766(85%). The number of symptomatic contacts was 85(2.6%) and the number of contacts that are currently under follow up was 500(15%). The case to contact ratio was 1.8 and the number of contacts that were positive for COVID-19 was 85(2.6%). The basic reproductive number (R) based on the SEIR model ranged from 1.1-1.4.

DISCUSSION

As at the reporting period, the FCT had the highest testing rate per million (3,177) in the country. This was because of the intense community surveillance for COVID-19 embarked upon by the Department of Public Health[20]. This testing rate was still below the target of testing 1% of the population of almost five million in the FCT. Initially as with every region of the world, the first COVID-19 cases in the country and indeed the FCT came from exposure to international contacts—travel, trade, tourism, or business. These initial cases were mostly clustered in Maitama settlement in the Municipal Area Council. Subsequently, community transmission set in and cases spread to other area councils[21,22]. More COVID-19 testing (81%) was conducted in the municipal area council by virtue of its population (55%) and high-risk settings than in other area councils. This resulted into more (84%) confirmed COVID-19 cases compared to other area councils. The male to female ratio of COVID-19 cases in the FCT was high at 3:1. While some countries have similar pattern of sex ratios, in others no difference in the proportion of males and females with confirmed COVID-19 was observed[23]. If the proportion of people tested from each sex that are tested is not known, it will be difficult to

fully interpret these sex figures. In addition, many countries are yet to disaggregate their COVID-19 data by sex.

Of the 33 COVID-19 cases that died in the FCT, 29(88%) were males. While men and women may have the same prevalence, men with COVID-19 are more at risk for worse outcomes including need of intensive care and death, independent of age. The explanation for this observation may be genetic, hormonal, variation in the immune system, behavior (e.g. smoking) and prevalence of chronic diseases (e.g. heart disease, diabetes and cancer)[24,25].

The FCT has relatively younger age group of COVID-19 cases. The most affected age group was 20-40 with a mean age of 36 years. This may have contributed to the observed relatively low case fatality (1.8%); but the economic impact may be significant considering the productivity of this age group. The low case to contact ratio of 1.8 was due to many factors including paucity of personnel and inadequate logistics. This situation was akin to what obtained in other middle and low income countries[26]. The basic reproductive number of 1.1-1.4 based on the SEIR statiscal model indicated the high transmissibility and explained the continuing expansion of the outbreak in the FCT. Another model (Bayesian framework and compartmental model) used to estimate the basic reproductive number for the country, estimated the R_0 to be between 2.37 and 2.47 and that the number has been above one since the second week of April, 2020[27].

Some of the key challenges of this study are inadequate personnel and logistics support for optimal contact tracing and inadequate testing in other area councils apart from the municipal. In addition, we encountered some data quality issues relating to missing variables of some suspected and confirmed COVID-19 cases in the database.

We conclude that COVID-19 burden in the FCT is high and community transmission is intense. Active case search for COVID-19 has significantly improved COVID-19 detection in the FCT and has demonstrated intense community transmission of the disease. The settlements most affected were Mabushi, Maitama, Garki, Lugbe, Asokoro and Gwarimpa.

There was skewing of COVID-19 testing to the disadvantage of other area councils other than the municipal.

With increasing community transmission of COVID-19, we recommend that the FCT adopts the four strategies of preparedness and response framework of prevention, detection, containing and treating COVID-19 cases. To achieve this, all the EOC pillars of response should be further strengthened. Particular attention should be given to expanded testing capacity (in communities and health facilities) in the five other area councils with low testing performance. Contact tracing should be accorded high priority through training of more personnel and provision of adequate logistics support.

Author Contributions

All authors have made significant contributions to the conception of the work, data collection and to literature search. They also contributed substantially to writing the manuscript, its critical review for quality, approved its final version, and agreed to its submission.

Conflict of Interest

The authors declare no conflict of interest, be it commercial, financial or sentimental.

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African Journal of Biology and Medical Research
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APPENDIX

Table 1: Distribution of COVID-19 sample collection and confirmed cases in the FCT as of June 30th, 2020

Area Council	Total population(%)	Total samples collected(%)	No. of confirmed COVID-19 cases(%)	% positivity rate	No. of tests/million popoulation
Abaji	202,965(4)	340(2)	50(3)	14.7	1,675
Bwari	789,080(16)	1295(9)	127(6)	9.8	1,641
Gwagwalada	547,907(11)	595(4)	51(3)	8.6	1,086
Kuje	338,138(7)	300(2)	41(2)	13.7	887
Kwali	298,096(6)	300(2)	37(2)	12.3	1,006
Municipal	2,703,823(56)	12418(81)	1564(84)	12.6	4,593
Total	**4,880,010(100)**	**15,248(100)**	**1870(100)**	**12.3**	**3,125**

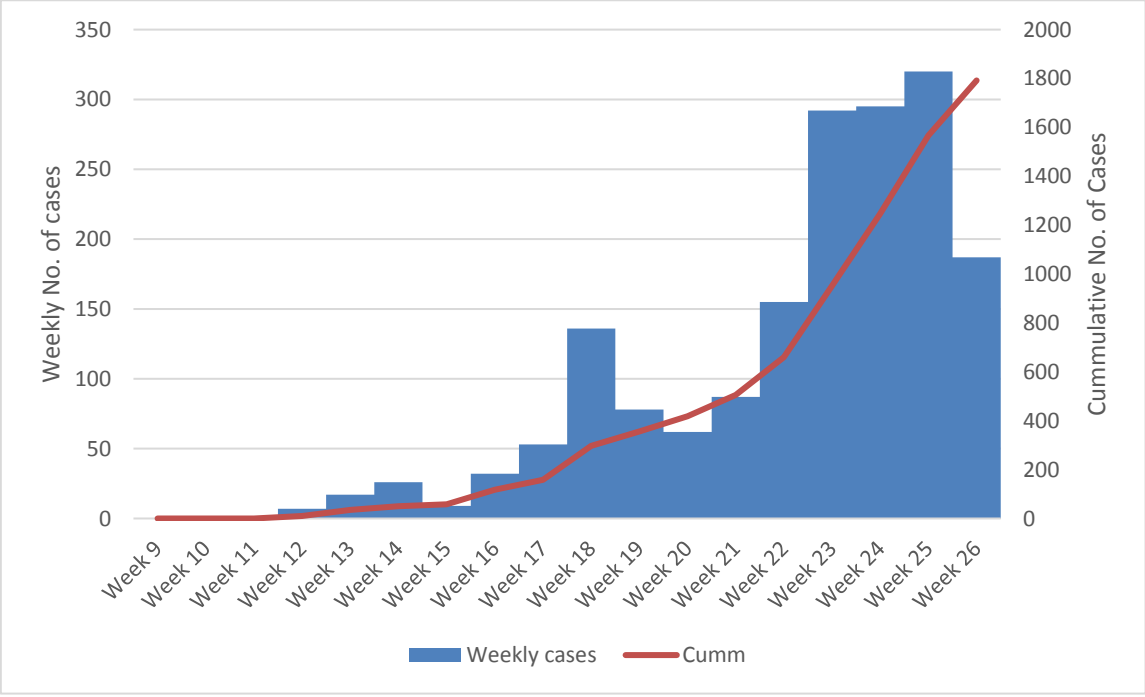

Figure 1: Epidemic curve of COVID-19 in the FCT as of June 30th, 2020

African Journal of Biology and Medical Research
ISSN: 2689-534X
Volume 3, Issue 2, 2020 (pp. 188-196)
www.abjournals.org

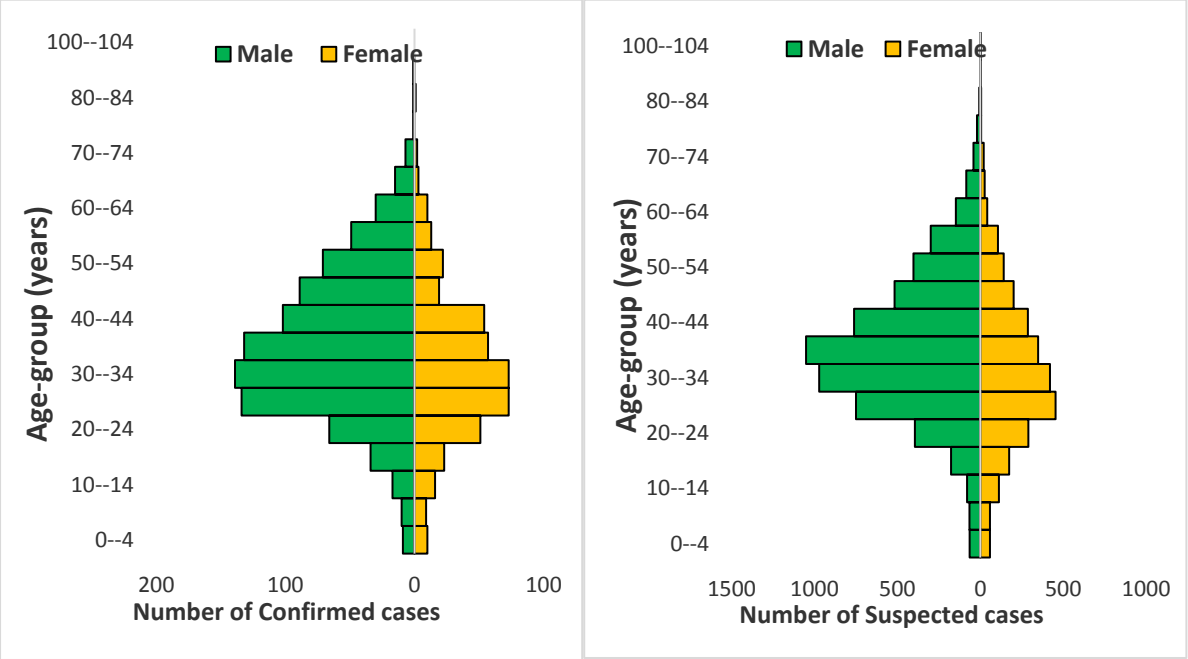

Figure 2: Age – Sex distribution of Suspected and confirmed COVID – 19 cases as of 30th June 2020

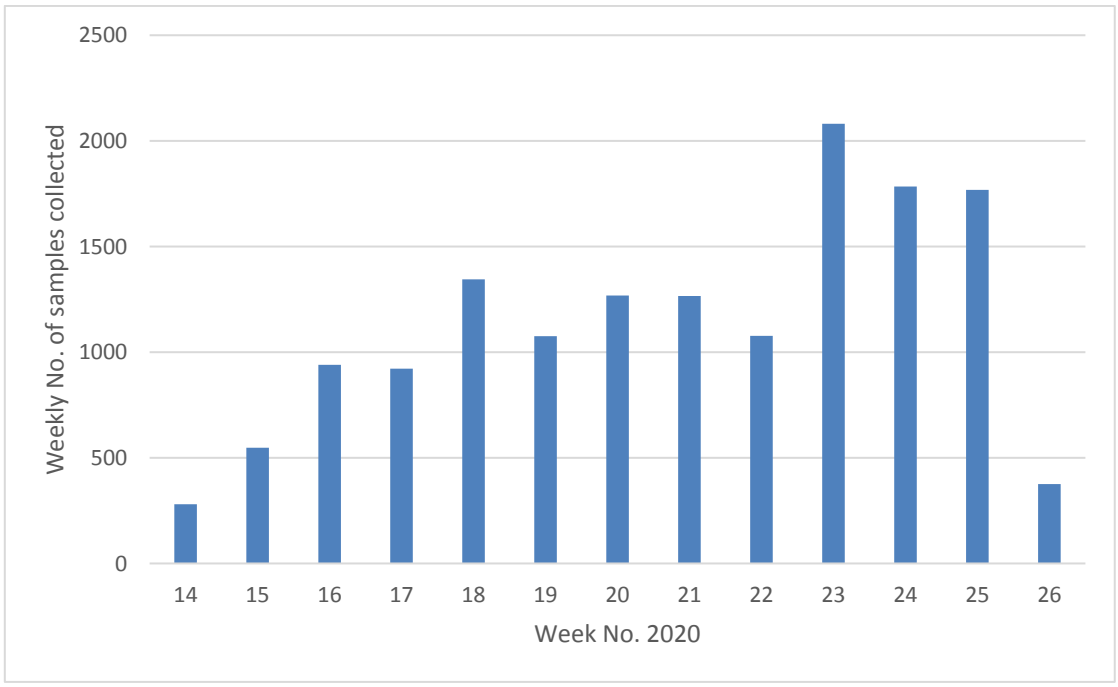

Fig 3. Weekly sample collection in the FCT as of 30th June 2020

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www.abjournals.org

DIMENSIONS OF THE COVID-19 PANDEMIC IN THE FEDERAL CAPITAL TERRITORY, ABUJA, NIGERIA

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ABSTRACT: *Background: Coronavirus disease (COVID-19) has become a global pandemic. Gender and health refer to the socially constructed differences and the power relations between women and men, as a determinant of health. Disease outbreaks aggravate gender inequalities for women and men. Women play important roles in curbing the current COVID-19 outbreak that put them at increased risk of exposure including working as frontline healthcare workers, caregivers at home, and as mobilizers in their communities. Other gender barriers that put women at risk include limited access to information, lack of Personal Protective Equipment (PPE) such as masks, and other socio-cultural practices. Treating women and men equally is the right and smart thing to do, is entrenched in human rights and is in keeping with the United Nations' System-Wide Action Plan for Gender Equality and the Empowerment of Women. Objective: The objective of this study is to highlight the significance and implications of COVID-19 gender analysis and sex-disaggregated data in the in the Federal Capital Territory (FCT), Abuja. Materials and Methods: We retrospectively reviewed the COVID-19 database in the Public Health Department of the Federal Capital Territory (FCT), Abuja with particular focus on the confirmed COVID-19 cases between the start of the outbreak on March 20, to May 31, 2020. We analyzed the data by age, sex, location, travel history and outcome. Results: The number of suspected and confirmed COVID-19 cases during the study period was 8,722 and 660, respectively. Of the 660 confirmed cases, 204 where females and 456 were males. The number of deaths was 10 out of which 9 were males. The mean age of all the confirmed COVID-19 cases was 35 years with a range of 6 months to 87 years. All the confirmed cases came from five (Municipal, Bwari, Abaji, Gwagwalada and Kuje) out of the six area councils of the FCT. A total of 70 of the confirmed cases had prior international travel history to areas affected by the COVID-19 outbreak. Of these 70 with travel history, 44 were women. Conclusion: Men and women have the same COVID-19 prevalence, but men are more at risk of severe form of the disease including dying from it.*

KEYWORDS: COVID-19, Gender, Outbreak, Federal Capital Territory, Abuja, Nigeria

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Volume 3, Issue 2, 2020 (pp. 197-203)

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INTRODUCTION

Coronavirus disease (COVID-19) started in Wuhan, capital of Central China's Hubei province in late December 2019 and by 30 January 2020, the disease was declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organization and subsequently a global pandemic[1,2]. COVID-19 is the sixth disease to be declared as a PHEIC since 2005 when the new International Health Regulation (IHR) came into force[3]. According to the IHR(2005), SARS, Smallpox, wild type poliomyelitis, and any new subtype of human influenza are automatically PHEICs and thus do not require an IHR decision to declare them as such[4].

Gender and health refer to the socially constructed differences and the power relations between women and men, as a determinant of health[5].The health of both sexes is influenced by biological factors as well as other socio-cultural factors which determine risk factors, access and utilization of health care services and products as well as interaction with healthcare providers. In addition, health problems in men and women is also influenced by socio-economic status, ethnicity and geolocation[6,7]. All these factors intertwine to influence the course of the disease and its outcome. In gender inequality, one group is systematically empowered over another leading to inequities between men and women in health status and provision of appropriate health services. Communities with high gender inequality have been found to be unhealthy for both men and women[8].

Disease outbreaks aggravate gender inequalities for women and men. Women play important roles in curbing the current COVID-19 outbreak that put them at increased risk of exposure including working as frontline healthcare workers, caregivers at home, and as mobilizers in their communities[9]. Other gender barriers that put women at risk include limited access to information, lack of Personal Protective Equipment (PPE) such as masks; and other socio-cultural practices[10]. Treating women and men equally is the right and smart thing to do, is entrenched in human rights and is in keeping with the United Nations' System-Wide Action Plan for Gender Equality and the Empowerment of Women[11].

METHODS

Study area and population

The Federal Capital Territory (FCT), Abuja is the Capital of Nigeria and lies between latitude 8.25 and 9.20 north of the equator and longitude 6.45 and 7.39 east of Greenwich Meridian. It is geographically located in the centre of the country. The FCT is bordered by the states of Niger to the West and North, Kaduna to the northeast, Nasarawa to the east and south and Kogi to the southwest. The total population is close to five million and is sub-divided into 6 Area Councils (Abaji, Bwari, Gwagwalada, Kuje, Kwali and Municipal) which are equivalent to Local Government Areas (LGAs) in other states of Nigeria. The Municipal Area Council is the largest of all the area councils in the FCT accounting for over 55% of the total population. In addition, there are 62 political wards and 2,652 settlements.

African Journal of Biology and Medical Research
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www.abjournals.org

Brief Description of COVID-19 Surveillance Including Community Active Surveillance in FCT, Abuja

At the start of COVID-19 outbreak in the FCT, the initial strategy of detecting suspected cases was through receipt of alerts/calls from suspected cases or their proxies (e.g. relations, neighbors or clinicians) by designated members of the EOC who in turn verified that the suspected case satisfied the COVID-19 case definition before arranging for sample collection either in the homes of suspected cases or in a designated area near the International Conference Centre (ICC), Abuja. An additional strategy, the community active surveillance was added on the 13th April 2020. This strategy entailed advocacy to traditional leaders, community mobilization in high risk areas and provision of sample collection centres in these high-risk communities. Through these combined strategies, a total of 8,722 samples were collected from all the area councils as at 31st May 2020. Samples were tested at the National Reference Laboratory, Gaduwa, Abuja. Confirmed COVID-19 cases were isolated in designated health facilities by the FCT administration.

Data Collection AND Analysis

Data sources for analysis were from the COVID-19 excel database of the Public Health Department of the FCT as well as the master list of FCT settlements at the WHO office in the FCT. We abstracted data from the start of the outbreak on March 20, to May 31, 2020. We conducted gender analysis based on sex disaggregated data using Microsoft Office Excel 2010.

RESULTS

The total number of samples collected as at May 31, 2020 was 8,722 (Table 1) out of which 660(7.6%) was confirmed. Of the 8,722 samples collected, 5,899(68%) and 2,823(32%) were collected from men and women, respectively. The total number of COVID-19 positive cases among men and women was 456(69%) and 204(31%) respectively. The Municipal area council accounted for 7,054(81%) of all samples collected and 604(92%) of all the COVID-19 positive cases. The mean age of the COVID-19 cases was 35 years (range: 6 months to 87 years). The number of COVID-19 cases that died was 10 out of which 9(90%) deaths were among men. The number of deaths with comorbidity was 6(60%). The mean age of those that died of the disease was 50 years (range: 32 to 68 years). Of the 660 COVID-19 positive cases, a total of 70(10.6%) had history of international travel to countries affected by the pandemic. The number of confirmed men and women with international travel history was 26(37%) and 44(63%) respectively. A total of 68(97%) of those with history of international travel came from the Municipal council.

DISCUSSION

Initially as with every region of the world, the first COVID-19 cases in the country and indeed the FCT came from exposure to international contacts—travel, trade, tourism, or business. These initial cases were mostly clustered in Municipal area council and so was the community active surveillance. Of the 70 confirmed cases with international travel history, 40(57%) came back from Saudi Arabia and 14(20%) from the United Kingdom. These countries had their first

COVID-19 cases before Nigeria and are among the most frequented countries by Nigerians. The rising new COVID-19 cases where there is no recent history of travel to infected areas or recent contact with confirmed cases was strongly suggestive of community transmission.

The FCT had one of the highest number of samples taken per million of population (>2,500) in the country. This was due to the intensive community active surveillance instituted in order to improve access to COVID-19 testing to population with poor knowledge of COVID-19 in addition to digitally marginalized population who do not have access to COVID-19 testing information, do not have phones or credit in their phones due to poverty. There was more than twice the number (5,899) of men tested as women (2,823). This sex difference may be artificial especially in our society where female movements in some communities are restricted due to cultural practices and hence their access to COVID-19 testing is limited[12]. Indeed, Women have been shown to utilize screening tests more than their male counterparts by a large margin in primary care and in the greater use of additional diagnostic procedures[13]. The sex difference in testing may also have accounted for the difference in the confirmed cases among men (456) and women (204) by almost the same margin.

The FCT has relatively younger age group of COVID-19 cases. The most affected age group was 15-34 with a mean age of 35 years. This may have contributed to the observed relatively low case fatality (1.5%); but the economic impact may be significant considering the productivity of this age group. Six (60%) of the 10 confirmed COVID-19 cases that died in the FCT were over 50 years and had comorbidities (mostly hypertension and diabetes). Older population (>50 years) are more vulnerable to the disease and more likely to have the severe form of the disease given that they tend to have weaker immune system and are likely to have underlying chronic illnesses[14-16].

Of the 10 COVID-19 cases that died in the FCT, 9(90%) were males. While men and women may have the same prevalence, it is almost unanimous that men with COVID-19 are more at risk for worse outcomes including need of intensive care and death independent of age[17]. Although the mean age of all the COVID-19 cases was 35 years, the mean age of those that died was 50 years. Many postulates tried to explain this observation as caused by the genes, hormones, the immune system, high risk behavior (e.g. smoking) and prevalence of chronic diseases (e.g. heart disease, diabetes and cancer)[18]. This gender role in mortality has also been observed in SARS patients where the percentage of males who died was higher than in women (P =0.015)19.

While the disease itself may be subtle on women, especially in terms of case fatality, its larger extended impact on women and girls is enormous. Many women were trapped at home during lockdowns with their abusers while being cut off from normal support services20. Spikes in domestic violence, rape and teen pregnancies were reported21,22. The death of men breadwinners and lockdowns with attendant loss of jobs and earnings meant additional economic hardship to women and girls in a family. In addition, meagre family resources may be redirected to cater for the needs of boys over girls.

We conclude that Men and women have the same COVID-19 prevalence, but men are more at risk of severe form of the disease including dying from it. We also recommend that COVID-19 gender analysis and sex-disaggregated data at all levels be available to guide policies and actions. The current COVID-19 palliatives being distributed by the Governments should prioritize women and girls. Key health services for women and girls in the health facilities,

such as reproductive and sexual health services should be preserved. Investment in girl child education should be made to prevent dropout.

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African Journal of Biology and Medical Research
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Volume 3, Issue 2, 2020 (pp. 197-203)
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APPENDIX

Table 1: Distribution of COVID-19 tests conducted and confirmed cases by Area Councils in the FCT, Abuja, March-May 2020

	No(%) tested		No(%) positive		Total	
Area Council	Male	Female	Male	Female	No(%) tested	No(%) positive
Municipal	4847(56)	2207(25)	434(66)	170(26)	7054(81)	604(92)
Bwari	634(7)	319(4)	11(2)	15(2)	953(11)	26(4)
Abaji	195(2)	114(1)	6(1)	9(1)	309(3)	15(2)
Kuje	110(1)	87(1)	3(0)	4(1)	197(2)	7(1)
Kwali	57(1)	78(1)	0(0)	0(0)	135(2)	0(0)
Gwagwalada	56(1)	18(0)	2(0)	6(1)	74(1)	8(1)
Total	**5899(68)**	**2823(32)**	**456(69)**	**204(31)**	**8722(100)**	**660(100)**

Table 2: Age/Sex distribution of confirmed COVID-19 cases in the FCT, March-May 2020

	Male		Female		Total	
Age group	No.	%	No.	%	No.	%
<15 years	14	2	15	2	29	4
15-34 years	206	31	115	18	321	49
35-54 years	186	28	65	10	251	38
55-74 years	48	7	9	1	57	9
75+ years	2	1	0	0	2	0
Total	**456**	**69**	**204**	**31**	**660**	**100**

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SOCIO-POLITICAL IMPACTS OF THE COVID-19 PANDEMIC ON HUMAN EXISTENCE AND SOCIETY: A CRITICAL ANALYSIS[1]

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ABSTRACT: *The paper delves into the socio-political impact of the COVID-19 pandemic on human existence and analyses the dynamics of human society during the hey days of the virus attack on global community. Using descriptive research, findings show that the COVID-19 pandemic has posed a great impact on the political and social aspect of human race worldwide. It has succeeded in changing policy formulation process, political meetings, public relations, educational institutions, human relations and community life among others. The paper concludes that, if the COVID-19 is not aggressively fought and conditions adhered to, the unfavorable changes that have occurred due to the pandemic have come to stay and may continue to affect humanity in the long run. The paper recommends alternative research strategies on how to deal with the virus and how to eliminate it permanently for better human society, political development and social interactions among other things.*

KEYWORDS: Socio-Political, Impact, Covid-19, Pandemic, Human, Existence

INTRODUCTION

The Corona Virus pandemic is said to have originated from the People's Republic of China in the first quarter of 2020 in Wuhan, a capital city of Hubei, part of Central China. Coronavirus is one out of many viruses of its kind, such as the Spanish flu, H1N1 flu, Ebola, Lassa virus etc. Coronavirus disease (COVID-19) according to the World Health Organization (2020) is an infectious disease caused by a newly discovered coronavirus. Coronaviruses are a large family of viruses that are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS). Prior to 2020 spread of the pandemic, the novel coronavirus (COVID-19) was identified in 2019 in Wuhan, China. This is a new coronavirus that has not been previously identified in humans.

It has been argued that people infected with the virus might not easily know that they are carrying the virus, until a fortnight before it begins to manifest. According to the WHO (2020) most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people, and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illness. It is easily transmitted among humans especially through droplets of saliva or discharge from the nose when an infected person coughs or sneezes around people (WHO, 2020).

[1] Paper presented at the International E-Conference on COVID-19 Global Impacts, 20-21 July, 2020.

The world has not been able to come up with an exact or specific vaccines or treatments for COVID-19, but there are many ongoing clinical trials evaluating potential treatments. Many countries are coming up with new discoveries about the antidote and the world is waiting to accept the most universally accepted, tested and trusted vaccines.

One intriguing question that people ask is the original source of this virus and people believe it is a natural occurrence while another set of people hold the belief that it is a man-made virus. Whichever the case, the world is in a period of economic uncertainties, insecurity and competitiveness, where states and nations strive to survive economically even at the detriment of others. This was manifest in imperialism, colonialism and neo-colonialism, where stronger nations have resorted to dominating the weaker ones at the expense of the weaker economies.

The era of cold war was also an epitome of bipolarism, containment and one against one (the United States and the Soviet Union). These two nations emerged victorious in the aftermath of the second world war, better than the European nations whose economies and infrastructure have been severely devastated. The competition between the united states and the Soviet Union was all encompassing touching political, economic and military confrontations. It was a cold war because it was not a physical military combat but a silent war, which saw military build-up, armament and ideological confrontation.

With the collapse of the Soviet Union and the emergence of unipolar order, the united states has virtually enjoyed a significant level of power over the global system in all ramifications, which lured a Japanese America (Francis Fukuyama) to infer that the consolidation of American civilization in the world marked the "end of history." Having the world being dynamic, the American empire began to decline especially after its engagement with Iraq, Afghanistan and high level of military spending and aid to allies around the world. The era of gradual multilateralism or in the parlance, multipolar order began to surface within the global polity, which saw the re-emergence of Russia, new powers such as China, India, Brazil and the Asian tigers with significant share of the global economy. The rise of China is seen as a great threat by the united states and china is aggressively rising to catch up with the united states after emerging as the second largest economy of the world.

Economic rivalry between the two (United states and china) is glaring from the U.S.-China trade war and Trump's perpetual blame of China especially on the COVOD-19 pandemic. The question is who created the coronavirus? Neither the United states nor China has openly claimed (albeit never), but if the conspiracy theory could be applied, one between the two, must be blamed. Consequently, some nations began to sue China for not giving early warning of the outbreak and the United States continue to blame China for that. The major objective of this paper is to investigate the socio-political impact of the COVID-19 and look for ways to ameliorate such impacts on humanity.

LITERATURE REVIEW

According to UNDP (2020), the coronavirus COVID-19 pandemic is the defining global health crisis of our time and the greatest challenge we have faced since World War Two. Since its emergence in Asia late last year, the virus has spread to every continent except Antarctica. But the pandemic is much more than a health crisis, it's also an unprecedented

socio-economic crisis. Stressing every one of the countries it touches, it has the potential to create devastating social, economic and political effects that will leave deep and longstanding scars.

In the writings of UNDP (2020), the coronavirus is causing another global crisis which is economical in nature and social in the long-run. It is economical in the sense that the World Bank projects a US$110 billion decline in remittances this year, which could mean 800 million people will not be able to meet their basic needs.it is social because every day, people are losing jobs and income, with no way of knowing when normality will return. The International Labor Organization estimates that 195 million jobs could be lost.

Every country according to UNDP (2020) needs to act immediately to prepare, respond, and recover. United Nations Secretary-General António Guterres has launched a US$2 billion global humanitarian response plan in the most vulnerable. Developing countries could lose at least US$220 billion in income, and the United Nations Conference on Trade and Development has called for US$2.5 trillion to support them. Drawing on our experience with other outbreaks such as Ebola, HIV, SARS, TB and malaria, as well as our long history of working with the private and public sector, UNDP will help countries to urgently and effectively respond to COVID-19 as part of its mission to eradicate poverty, reduce inequalities and build resilience to crises and shocks.

The next phase of UNDP's COVID-19 crisis response is designed to help decision-makers look beyond recovery, towards 2030, making choices and managing complexity and uncertainty in four main areas: governance, social protection, green economy, and digital disruption. It encompasses the role in technically leading the UN's socio-economic response.

According to the World Bank (2020) the world economy would be on the brink as many economies would experience recession with contraction in per capita income. Advanced economies are projected to shrink 7 percent. That weakness will spill over to the outlook for emerging market and developing economies, who are forecast to contract by 2.5 percent as they cope with their own domestic outbreaks of the virus. This would represent the weakest showing by this group of economies in at least sixty years.

Theoretical Framework

The theoretical framework adopted in this paper is the system theory. It explains how the political environment works and responds to the needs of the society. The system theory was developed by David Easton and was originally from pure science, particularly from biology and later used and developed in sociology by Herbert Spencer and Gabriel Almond among others (Verma, 1985). A system is comprised of an environment, input, conversion and output. As observed by Nnoli (1978). A system is an entry in which everything relates to everything else. In the parlance, systems are compressed components that work together for the objectives of whole and the system approach is merely a way of thinking about these components and their relationships. The basic features of the system approach are as a follow:

1. The Environment which consists of various subsystems-social, political, economic subsystems. these subsystems influence the administrative system which in turn influences them.

2. Input: consists of wishes, yearnings and aspirations of the masses which are demand from the administrative system.

3. Conversion: process refers to stage where inputs are processed i.e. the journalists, conveying the wishes and aspirations of the masses to the legislators for deliberations and processing of such yearnings of the masses.

4. Output: this process the administrative decisions, policies constitutions from the National Assembly by our legislators through the conversion process to the masses (environment).

The system theory is referred to as Estonian theory which is made of different component parts working differently but interdependently and interrelated to achieve the desired goal of the masses which will be conveyed to the legislators through the conversion process (Nnoli, 1978). The legislators will deliberate on the demands and aspirations of the masses as presented by the press men. If the deliberation is favorable, the masses will applause it and accept the legislative outcome (policies, constitution), but if the outcome is not favorable it will bring about uprising from the masses as witnessed in present day Nigeria (Samuel, 1978).

The relationship between the system theory and the topic under study is that, with the emergence of the COVID-19 pandemic, there is a push and pull syndrome between the government and the governed. the masses are making more demands through the input device such as the provision of palliatives, regular payment of salaries, making available the test kits, easing the lockdown for people to get food stuffs among others. Governments that responded quickly and favorably to the yearnings of the people would get a favorable feedback such as praises and support from the masses. Those governments who did otherwise would have nothing other than criticisms, abuse and withdrawal of support from the masses.

The social aspect of the system theory is that, the masses might begin to loot both public and private stores and properties, increase security threats to the elites and average citizens, venture into theft, kidnapping, armed robbery and banditry among others, due to government failure to provide for the masses.

FINDINGS AND DISCUSSION

The political and social environment of every society is being shaped and condition by the economic environment. This is largely because the economic environment allows for the political environment to function effectively with economic supports to deliver to the citizenry and in the area of law making, adjudication and execution. The social environment is also determined by the economic influence where the economy determines social interaction, class and class system, education, sporting activities, respect in human relations, good living and socialization. This section discusses the socio-political impact of the COVID-19, but starts by introducing the economic impacts which determine the other two.

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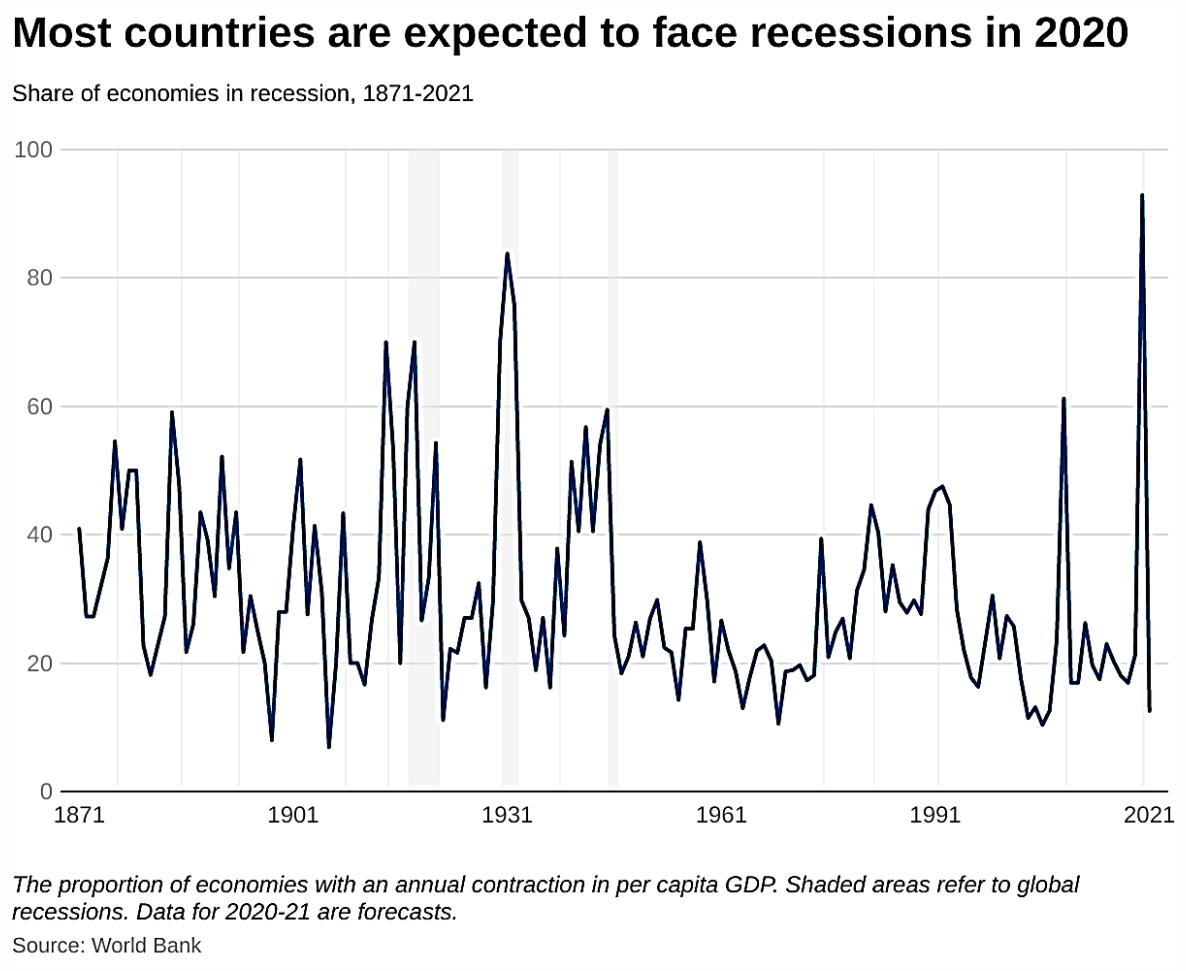
Economic Impact

The COVID-19 pandemic has affects employment, productivity, supply chains, imports, exports and other trading activities at domestic and international levels. This means that massive unemployment imminent, rise in the prices of commodities would be experienced, poverty and malnutrition would be on the rise and economies would flinch and global recession becomes inevitable. From the foregoing, it should also be understood that it is this economic suffering that will spill-over to other areas of human existence, to have political, social, cultural and religious impacts. Gross Domestic Products (GDPs) would decrease, inflation will affect many countries in the world and in the long-run create other social problems.



It can be seen from the above illustration that the share of countries to experience recession in the year 2021 is the highest ever since 1871. It shows how the world experienced a greater recession in 1931, but significantly illustrate that the 2021 recession would be more severe. It is also in line with the above that the World Bank (2020) made

the forecast that every region is subject to substantial growth downgrades. East Asia and the Pacific will grow by a scant 0.5%. South Asia will contract by 2.7%, Sub-Saharan Africa by 2.8%, Middle East and North Africa by 4.2%, Europe and Central Asia by 4.7%, and Latin America by 7.2%. These downturns are expected to reverse years of progress toward development goals and tip tens of millions of people back into extreme poverty.

Emerging markets and developing economies as discovered by the World Bank (2020) will be buffeted by economic headwinds from multiple quarters: pressure on weak health care systems, loss of trade and tourism, dwindling remittances, subdued capital flows, and tight financial conditions amid mounting debt. Exporters of energy or industrial commodities will be particularly hard hit. Another important feature of the current landscape is the historic collapse in oil demand and oil prices. Low oil prices are likely to provide, at best, temporary initial support to growth once restrictions to economic activity are lifted. However, even after demand recovers, adverse impacts on energy exporters may outweigh any benefits to activity in energy importers.

In another related literature, the Congressional Research Service (2020) also admitted that Since the COVID-19 outbreak was first diagnosed, it has spread to over 200 countries and all U.S. states. The pandemic is negatively affecting global economic growth beyond anything experienced in nearly a century. Estimates so far indicate the virus could trim global economic growth by 3.0% to 6.0% in 2020. The human costs in terms of lives lost will permanently affect global economic growth in addition to the cost of rising levels of poverty, lives upended, careers derailed, and increased social unrest. Global trade could also fall by 13% to 32%, depending on the depth and extent of the global economic downturn, exacting an especially heavy economic toll on trade-dependent developing and emerging economies. The full impact will not be known until the effects of the pandemic peak.

According to the Congressional Research Service (2020), the World Health Organization (WHO) first declared COVID-19 a world health emergency in January 2020. Since then, the emergency has evolved into a global public health and economic crisis that has affected the $90 trillion global economy beyond anything experienced in nearly a century. Governments are attempting to balance often-competing policy objectives between addressing the public health crisis and economic considerations that include, but are not limited to these (Congressional Research Service, 2020):

i. Confronting ballooning budget deficits weighed against increasing spending to support unemployed workers and social safety nets.

ii. Providing financial support for national health systems that are under pressure to develop vaccines while also funding efforts to care for and safeguard citizens.

iii. Implementing monetary and fiscal policies that support credit markets and sustain economic activity, while also assisting businesses under financial distress.

iv. Implementing fiscal policies to stimulate economic activity, while consumers in developed economies sharply increase their savings as households face limited spending opportunities, or a form of involuntary saving, and concerns over their jobs, incomes, and the course of their economies, or precautionary saving.

v. Intervention by central banks and monetary authorities generally in sovereign debt and corporate bond markets to stabilize markets and ensure liquidity are raising concerns among some analysts that this activity is compromising the ability of the markets to perform their traditional functions of pricing risk and allocating capital.

vi. Fiscal and monetary policies that have been adopted to date to address the immediate impact of the health crisis compared with the mix of such policies between assisting households, firms, or state and local governments that may be needed going forward should the health and economic crises persist.

Political Impacts

The COVID-19 pandemic has caused a lot of political crises around the world especially as it relates to intra and inter-party debacles. For example, as written by Yu (2020), the COVID-19 has a great impact on the political landscape of China especially with the dismissal of some provincial political leaders in handling the spread of the virus. In Nigeria, petitions are being written against the officials assigned to deal with the distribution of palliatives among the divergent citizens who are in need. The pandemic has caused political leaders to lie and mislead their governed especially when they failed to protect the citizenry. Burns (2020) believed that the way and manner President Trump kept misleading people and blaming other people and governments about the virus has caused him low rating in the American political opinion polls. This may also affect his re-election comes November 2020. According to agencies (2020), in Iran, the virus has caused the death of many political office holders and difficult political decisions for the leadership in 2020.

Other political impacts of the COVID-19 may include, but not limited to the following:

a. Governments could not attend regular international summits and conferences;

b. Governments do not hold meetings with cabinet as usual;

c. Governments face challenges of feeding the masses through palliatives under the lockdown;

d. The virus has remained an avenue for testing the responsiveness and responsibilities of government at different levels;

e. Some governments have received supports while some have been condemned by the masses;

f. Low national income, which also affects political and governmental programs and functions;

g. It has increased the level of corruption with political office holders and government officials.

Social Impacts

The pandemic has affected educational systems worldwide, leading to the widespread closures of schools and universities. According to data released by UNESCO on 25 March, school and university closures due to COVID-19 were implemented nationwide in 165

countries. Including localized closures, this affects over 1.5 billion students worldwide, accounting for 87% of enrolled learners (UNESCO, 2020).

According to Godbole (2020) and Johnson (2020) on domestic violence as a social problem created by the pandemic, many countries have reported an increase in domestic violence and intimate partner violence attributed to lockdowns amid the COVID-19 pandemic. Financial insecurity, stress, and uncertainty have led to increased aggression at home, with abusers able to control large amounts of their victims' daily life. Consequently, the United Nations Secretary-General António Guterres called for a domestic violence "ceasefire."

In the analysis of Baker (2020), Hassan (2020) and Ryan (2020), social gatherings have been severely affected, which affect the normal social live people lived prior to the outbreak of the Coronavirus. Social clubs, sporting activities, village squares, and many other social meetings and get together have been inhibited by the pandemic.

Baker (2020) argues that, apart from social gatherings, one dangerous trend that continued to be experienced by people worldwide is the rate at which suicide is being committed on daily basis. The level of suicide has been increased by the pandemic, when people become despondent and extremely poor without income without certainty on achieving what they have planned to achieve and their expectations met by a sheer fiasco, they discovered suicide as the last resort.

Sheya (2020) and Solovy (2020) have argued that, the pandemic has affected religious activities around the world. People no longer enjoy spiritual affiliations as mosques, churches and other prayer houses have been closed. Religious gatherings have been suspended. One implication is that despite the restrictions on religious gathering, some people did not see the pandemic as something to deprive them of such spiritual engagement. People in many places around the world have defiled such orders. Apart from the impacts identifies above, the COVID-19 has created more impacts as listed, but not limited to them below:

a. Familial distancing
b. School closure
c. Suspension of sporting activities
d. Religious activities stopped
e. Divorce
f. Theft
g. Armed robbery
h. Prostitution
i. delinquency

CONCLUSION

It is apparent that prepared or unprepared, the COVID-19 has emerged as one of the deadliest viruses that affect the entire humanity and all ramifications of human existence. It is unequivocal that if the COVID-19 is not aggressively fought and conditions of dealing with it adhered to, the unfavorable changes that have occurred due to the pandemic have come to stay and may continue to affect humanity in the long run.

RECOMMENDATIONS

The paper recommends the following as part of the strategies to curb the menace and spread of the COVID-19:

There should be a drastic alternative research strategy on how to deal with the virus and how to eliminate it permanently for the betterment of the human society, political development and social interactions among other things.

Government must continue to provide supports to the governed in the difficult time in which they deal with the virus. Suh support should include food stuff, medicine, and perpetual orientation of the people.

Governments must tighten security system to deal with the social consequences of the pandemic such as social vices, including armed robbery, kidnapping, theft and banditry.

Governments should also try to open schools, as school closure may not serve as panacea to the COVID-19 pandemic.

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