

Environmental Health Aspect of The Novel Corona Virus Disease and Its Global Impact

Egbo Walamam Mansi*

**Research and Development Centre, Bayelsa State Polytechnic Aleibiri, Nigeria*

Abstract

Covid-19 is a severe acute respiratory syndrome (SARS) caused by a zoonotic virus in which bats have been identified as carriers. The disease outbreak was first reported on 1 December 2019, in Wuhan city in the Hubei province of China. It has infected more than eleven million persons worldwide and hundreds of thousands have died from the disease complications. It has spread across over 213 countries and territories globally. The global economic impact of the disease has been monumental. The impact cuts across global stock markets, aviation, tourism, entertainment and sports industries. Politics and governments have equally been impacted upon by the disease as legislative businesses have been suspended as a result of the disease. Many political leaders have tested positive and have got to undergo self quarantine and treatment. This paper have equally identified and itemized environmental health aspects of the disease which include: sneeze, cough, talk, touch and covid-19 control waste materials such as face mask, disposable hand glove, medical apron, used tissue papers. Conclusively, it is recommended that face mask should be produced with materials that will be comfortable to people in order to encourage the use. Disused materials should be disposing of properly and promptly.

© 2021 Author(s).

Keywords: Corona, virus, disease, environmental health and aspects, COVID-19.

1. Introduction

Global health systems are being over whelmed and human lives seriously threatened by the ravaging contagious and fast spreading corona virus disease. Corona viruses are a wide family of viruses that cause ill health that varies in severity. The first known case of severe ill health caused by corona virus emerged with severe acute respiratory syndrome (SARS) in Southern China in 2002 – 2003 [1]. The second outbreak of corona virus disease occurred in 2012 in Saudi Arabia in which the disease was described as the Middle East Respiratory Syndrome (MERS).

The novel Cov-2 corona virus disease ravaging the world first emerged on 1st December, 2019 in Wuhan city of Hubei province in China. It is reported to be caused by a strain of Severe Acute Respiratory Syndrome (SARS) virus

* Corresponding author.

E-mail address: egbomansi@yahoo.com (Egbo Walamam Mansi)

called Cov-2. Because the disease emerged in 2019, it is otherwise called COVID -19 an acronym of Corona Virus Disease, 2019.

Early studies suggested that the virus emanated from bat which is the host and was transmitted to humans through an intermediate animal called pangolin. The corona virus disease (COVID – 19) is highly contagious and many people infected by the disease experience mild to moderate respiratory illness. The disease which started in China was officially reported to the World Health Organization (WHO) by the Chinese authority on 31st December 2019, that there is an outbreak of a novel strain of corona virus causing severe illness which was subsequently named SARS-COV-2. On 30th January 2020, the World Health Organisation (WHO) declared the disease outbreak a public health Emergency of International Concern and subsequently declared it a global pandemic on the 11th March 2020 considering the spread [2]. As at 20th February 2020, nearly 167,500 COVID-19 cases and 6,600 deaths were reported in the world. There were speculations that many more mild cases of the disease have likely gone undiagnosed.

In March 2020, WHO reported that older people and those with underlying medical conditions such as cardiovascular disease, diabetics, chronic respiratory diseases and cancer are likely to develop serious ill health when they contact the virus [3]. The virus is said to be transient as it stays only for hours on objects, nonliving things and on human skin. However mode of transmission from person to person is through oral and nasal droplets from coughing, talking and sneezing. Other modes of transmission include body contact such as hand shaking with an infected person, contact with contaminated objects such as electronic remote, sharing of personal effects such as towels and clothing, indiscriminate disposal of face mask, tissue paper used during sneezing or coughing, disposable hand gloves and cover all.

The nature of the COVID-19 has significant environmental health aspect. Environmental health is an aspect of human health that is determined by physical, biological, chemical psychological and social factors or conditions within the environment [4]. The objectives of this paper is to examine the environmental health aspect of COVID-19 with view to proffering appropriate recommendations to protect public health.

2. Overview of Covid-19

The virus that causes the novel coronavirus disease, 2019 (COVID-19) otherwise known as SARS-NCOV2 is an enveloped, positive sense single stranded microbe of animal origin and measuring between 80 to 160 nm in length [5]. Structurally, the virus has been described as having a strong binding site that makes human cells very susceptible to attachment. A comparison of Alpha and Beta strains of the virus by Kristian et al [6] revealed that there are two notable genomic features of the SARS COV2 virus. The report of the study revealed that the virus genome structure has a receptor binding domain (RBD) that binds with high affinity Angiotensin Converting Enzyme-2 (ACE2) from humans, ferret, cats and other species with high receptor homology (ACE2). Fig 1 are SARS COV2 and entry point into human cell. The red portions on Fig. 2 represents the virus particles attached to ACE2 of human cell represented by the blue portion.

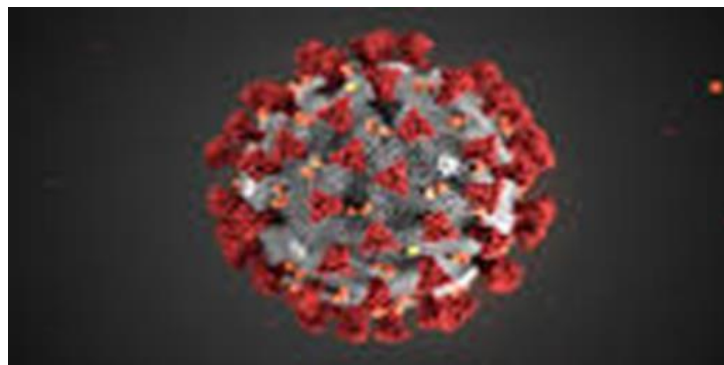


Fig 1. Image of SARS COV2 and entry point into human cell (Courtesy Newscientist.com)

The researchers went further to conclude that snakes are the intermediate host of the virus between bats and humans. Krishna, Paul and Rohit [7] described ACE2 as a protein that provides the entry point for the coronavirus to link into and infect many different kinds of human cells. A metagenomic study by Chengxin *et al* [8] however disproved the snakes intermediate host theory of Kristian *et al* [7] by reporting that an animal called pangolin is rather the missing link in the transmission of the virus from bats to humans but not snakes.

The corona virus disease has been described as a disease that knows no geographical boundaries and recognizes no sovereignty [9]. This view is a statement of fact when considered against the background of the global spread of the disease within a few months of its emergence. Both technologically developed and developing nations are not spared by the ravaging corona virus pandemic. The world health organization estimated the transmissibility rate of the coronavirus disease to be 1.4, which means on the average, a single infected person can transmit the virus to another four people [10]. Preliminary studies had estimated transmissibility rate between 1.5 and 3.5 [11]. However some other studies estimated the transmissibility rate between 3.6 and 4.0 and between 2.24 to 3.58 [12].

The pandemic has spread across 213 countries and territories of the world. As at 3 July, 2020, about eleven million, one hundred and twenty two thousand, three hundred and seventy (11, 122, 370) persons have been infected with the virus worldwide. Out of the total global confirmed cases, six million, two hundred and twenty eight thousand and seventy (6,228,070) persons have recovered from the virus infection while five hundred and twenty six thousand, nine hundred and ninety four (526,994) persons have so far died from the virus complications globally [13].

In Asia where the coronavirus diseases emerged, it started in Wuhan city in the Hubei province of China on 1 December, 2019. Wuhan is the largest city in central China with a population of about eleven million persons. It had currently spread across 49 territories of the continent.

In Africa, the outbreak was first recorded on the 14th of February 2020, in Cairo, Egypt and had since spread across 54 territories of the continent [14]. As at 7 May 2020, World Health Organisation had estimated that about 190,000 persons could die of COVID-19 in the continent if appropriate control measures are not taken.

In Australia, the outbreak was first recorded on the 25 January, 2020, in Melbourne, Victoria, Australia. The continent had recorded a fatality rate of 1.2% since the disease emerged. The Australia borders were forced to be closed to all non-residents on the 20th March, 2020 to curtail the spread of the disease [15].

In Europe, the first outbreak was recorded on the 21 January, 2020, in Bordeaux, France and had since spread across 57 territories of the continent. In North America, the disease was first recorded on 21 January, 2020, in Snohomish County, Washington, United States of America and had currently spread across 43 territories as at 2 July, 2020.

In South America, the disease outbreak was first recorded on the 26 February, 2020, in Soa Paulo, Brazil and had spread across 14 territories [2]. Fig. 3 – fig. 8 are graphical representation of seven most infected countries /territories in each continent.

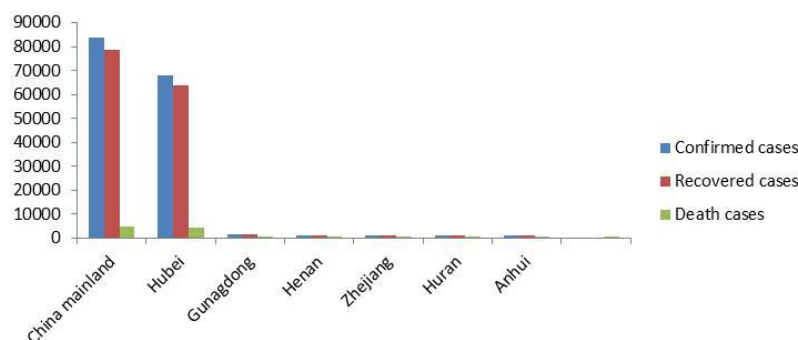


Fig 3. Graphical presentation of covid-19 cases in the seven most infected province in China.

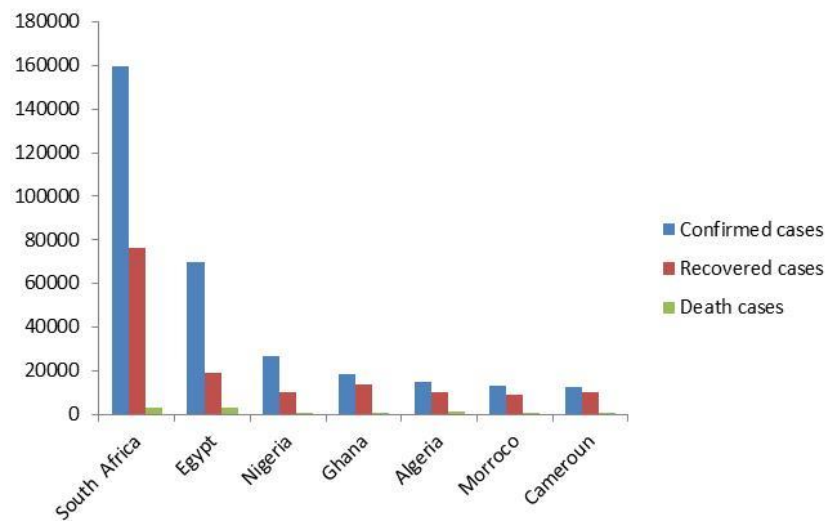


Fig 4. Graphical presentation of covid-19 cases in the seven most infected countries in Africa.

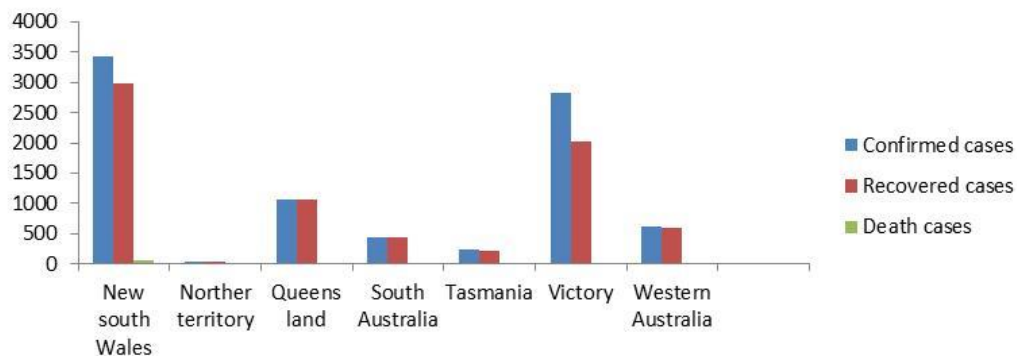


Fig 5. Graphical presentation of covid-19 cases in the seven most infected States in Australia.

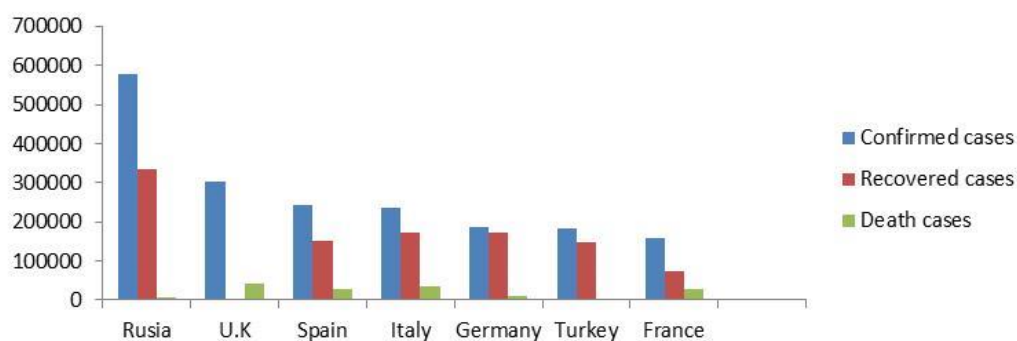


Fig 6. Graphical presentation of covid-19 cases in the seven most infected countries in Europe

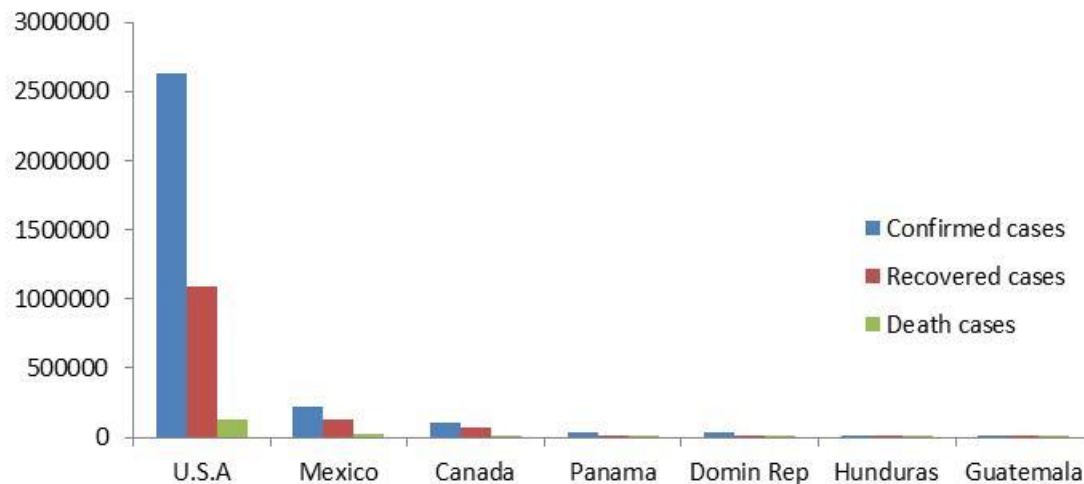


Fig. 7. Graphical presentation of covid-19 cases in the seven most infected countries in North America.

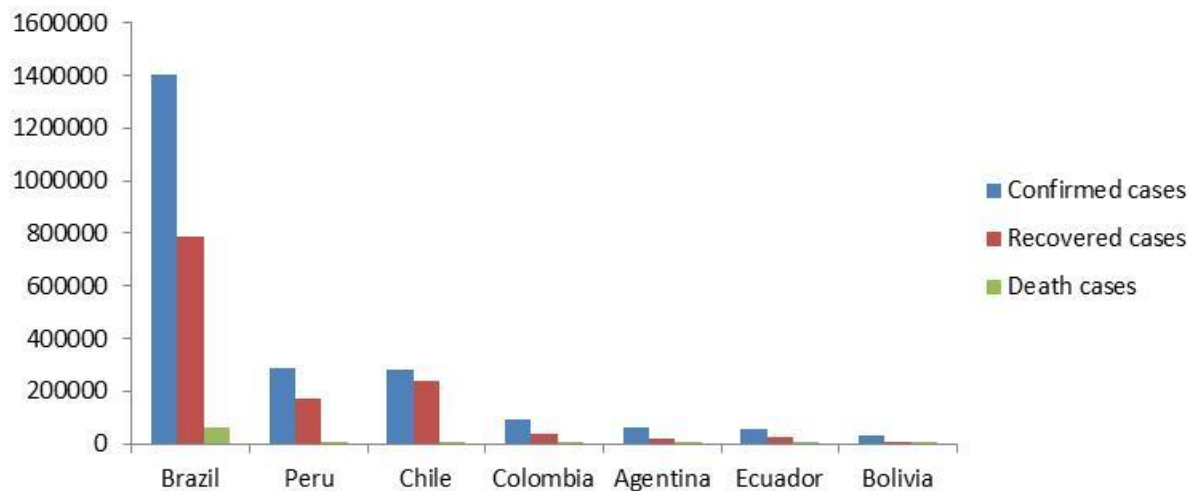


Fig. 8. Graphical presentation of covid-19 cases in the seven most infected countries in South America.

3. Environmental Health Aspect of Covid-19

Environmental aspect is the element of our activities, services or products which can interact with the environment and have the potential to impact on it. (ISPON, 2019). The environmental aspect of industrial system include waste, emission to air, discharge to land and water, noise, odour, heat and energy use. These elements of industrial set up have ways of interfering with environmental quality that make it dangerous. Therefore the environmental health aspects of the novel corona virus disease (COVID-19) are those elements of our lives and the covid-19 control measures that can interact with the environment and further leads to the transmission of the virus to members of the public or household. The environmental health aspects of the Covid-19 include Sneeze, cough, talk, touch, COVID-19 control wastes.

3.1. Sneeze

Sneezing is a human physiological involuntary action that involves the forceful expulsion of dirt and microbes along with fluid from the throat or nose and mouth. It is often triggered by inflammation of the mucus membrane of the

respiratory system due cold, reaction to the presence of foreign particles in the air, allergic reaction to strong smell from perfume, creams, kitchen activities such as frying, slicing or pounding of hot pepper, onions or ginger. It could also be triggered by body response to pathogenic activities in the respiratory system.

Sneezing is a potential vehicle for the transmission of the novel corona virus from an infected person(s) into the surrounding air or on individuals within the vicinity. This is so because during sneezing, the virus droplets could be forcefully discharge into the air, on human face or on object(s) surface(s) and subsequently infect unsuspected person(s)

3.2. Cough

Cough is a reflex action to clear the human airways of mucus and irritants such as dust or smoke [16]. Common causes of cough are upper respiratory tract infections such as whooping cough, sinusitis, flu, laryngitis and cold which affect the throat, windpipe, or sinuses. Lower respiratory tract infections such as bronchitis or pneumonia which affect the lungs or lower airways. Cough could also be as result of trigger up of chronic health condition such as asthma, bronchitis or chronic obstructive pulmonary disease (COPD) or allergic reaction to environmental condition.

Virus stimulated cough can produce germly mucus from the lungs [17]. During coughing, corona virus droplets can be discharged into the air from an infected person(s) as respiratory mucus is expelled from the lungs or airways. In extreme cases, the fluid expell during coughing can fall directly on individual face if not control. Hence, cough is a potential path of COVID-19 transmission.

3.3. Talk

Verbal communication is one unique attribute of human beings. Life will be meaningless without talking. However, many individuals while they talk, saliva is usually discharge from their mouth into the surrounding. Quite often, saliva from speakers falls directly on their listeners face and even the mouth. If they are using micro phone, the mic is usually bathed with saliva. Therefore, for a COVID-19 infected person, this phenomenon portends great risk to their immediate neighbours because as they talk, the fluid that emanate from their mouth could contaminate the air or the micro phone in public functions and those who share the same microphone with such individuals stand the risk of being infected. This is the reason why the use of face mask and social distancing are recommended as part of the control measure for COVID-19. Meetings have been suspended and very important national and international leaders meetings are held visually to avoid face to face interactions.

3.4. Touch

The novel SARS COV2 that causes COVID-19 can attach to particles and remain there for sufficient period of time. The life span of the virus depends on various factors such as surrounding temperature, humidity and type of surface. A study published on Tuesday in New England journal of Medicine suggests the virus can live up to 4 hours on copper, 24 hours on cardboard, up 72 hours (3 days) on plastics and steel. Hence the touching of objects with the virus contaminated palms has the potential to further contaminate the objects where unsuspecting person or persons can easily contact the deadly virus. Common objects in use that are likely to be contaminated with SARS COV2 infested palms are electronics remote, rails of upstairs steps and stair case, table surfaces, currency notes and microphones etc.

Just touching contaminated object may not be an issue but it becomes a major health issue when after touching a contaminated object or surface and that hand is use to touch the face which can lead to transmitting the virus into the body through the eyes, nose or mouth. It is in recognition of this fact that wearing of hand glove and regular washing of hands with running water and soap or use of alcohol base hand sanitizer are recommended as control measures. The World Health Organisation also warns against robbing of face or touching of eyes, nose and mouth to control infection.

3.5. COVID-19 Control waste.

Waste generated from the control of covid-19, such as used face mask, hand glove/ apron used by medical personal, tissues used for coughing or sneezing by infected person(s) constitute significant environmental health aspect of COVID-19. These categories of waste require careful management as they can serve as a reservoir of the virus for further transmission to uninfected persons through air born particles. It is for this reason that disused face mask, hand glove, apron and tissues used for coughing or sneezing are advised to be disposed into waste bin with cover or incinerate immediately.

4. Global Impact of Covid-19

The outbreak of the novel coronavirus disease (COVID-19) and its subsequent spread across the globe has negatively impacted political, social, economic, religious, financial and sporting sectors of the world. To control the spread of the disease, many countries responded by imposing movement and business restrictions (lockdown). The effect of the lockdown is either partial or total closure of many manufacturing companies and small businesses, reduction in sales, drop in consumption of goods and services.

The world top economies such as U.S.A, China, United Kingdom, Germany, France, Italy, Japan and a lot of other industrialized countries are collapsing. The effect of the COVID-19 pandemic on global economy is said to be worse than the financial economic recession that the world experience in 2007 – 2008. In China, over 95 percent of 299 large manufacturing companies in the country experienced revenue drop caused by drop in consumption when compared to 2019. Retail sales in January and February reduced by 20.5 percent [18].

Global stock markets have gone down significantly and oil price went down as low as \$26 per barrel between the month of February and March. The United States stock market is reported to be down by thirty percent [19]. About \$83 billion has been withdrawn from the stock market by investors from multiple businesses. The Organization for Economic Cooperation and Development (OECD) have predicted that global economic growth could be reduced by half to 1.5% in 2020 if the spread of the COVID-19 continues. The United Nations Trade and Development Agency (UNCTAD) estimated the economic cost of the COVID-19 pandemic at about two trillion U.S Dollars in 2020. The economies of the Eurozone nations are not spared by the impact of the ravaging coronavirus disease. The economies of countries such as Spain, France, Italy and Germany have slowdown due to lock down African countries are not spared either as some countries in the continent have resorted to borrowing to finance their national budget for the year 2020.

The global impact of the coronavirus disease cut across various sectors of international economies such as aviation, tourism, entertainment and sports. The aviation sector of the global economy was completely grounded for months since nations closed their air ports to both international and local flights. This has caused loss of revenue to airlines. There has been job loses as well in the industry. Government of many countries across the world cancelled visas of foreign nationals and lockdown areas affected by the disease. The impact of the disease in aviation industry cuts across passenger airlines, cargo airlines, air craft manufacturing companies, airport management companies and catering and other airport service providing companies [20].

The impact of the COVID-19 on the global tourism industry has been monumental due to the travel restrictions imposed by governments across the globe as well as decline in demand among travellers, especially foreign travels. The United Nations World Tourism Organization Has estimated that global tourist arrivals may decline by 20 to 30 percent in 2020 which will subsequently lead to \$30 - \$50 billion U.S dollars loss due to the corona virus pandemic [21].

Global sports were put at a halt. In football, many national leagues were suspended. The global sports fiesta such as the Olympics was postponed. The summer Olympics was originally scheduled to take place on 24 July, 2020 in Tokyo Japan but has been postponed to 23 July 2021. The world games was originally scheduled to hold in July 2021

but has been rescheduled to hold in 2022. In Nigeria the national sports festival was scheduled to hold at Benin in the month of June but was postponed indefinitely due to the covid-19.

The covid-19 has equally affected global political systems. It has caused suspension of legislative activities, isolation and death of notable politicians and rescheduling of elections due to fear of the pandemic. For instance, in Nigeria the Benue state house of assembly had to suspend plenary sitting to allow members to undergo coronavirus disease testing to ascertain their COVID-19 status. Many notable world leaders have had cause to self isolate or undergo treatment for COVID-19. For example, the Brazilian president Jair Bolsonaro tested positive of covid-19. Boris Johnson, UK prime minister tested positive of COVID-19. Russian prime minister Mikhail Mishustin tested positive on April 30. Prince Charles, crown prince of United Kingdom tested positive on March 25. Israel minister of health, Yaakov Litzman tested positive in April. Iran ministerial vice president, Maoumeh Ebtekar tested positive, Australian home affairs minister, Peter Dutton was admitted on March 13 for covid-19 ailment (Indian express.com). In Nigeria, the immediate past governor of Oyo state and national vice chairman of the all progressive congress (APC) chief Abiola Ajimobi died of covid-19, Ondo state commissioner of health (Wahad Adegbenro) died of covid-19. Senator representing Lagos senatorial district (Tunde Braimoh) died of covid-19. Not less than five sitting governors in Nigeria have tested positive of covid-19. Elsewhere in Africa, Burundi's president, Pierre Nkurunziza died of COVID-19.

5. Conclusion

The novel coronavirus disease (covid-19) has put global population in danger as people are dying in their hundreds and thousands in various countries across the globe. There are many environmental health aspect of the disease that have examined in this paper. The global economic impact of the disease has been overwhelming and it cut across stock market, manufacturing, retail businesses, aviation, tourism, social and sports industries. Global Politics and leadership has equally been negatively impacted by the coronavirus disease.

6. Recommendation

Face mask should be produced with materials that can facilitate breathing and as well provide effective barrier to the transmission of the corona virus in order to encourage people to use face mask.

All disuse materials such as hand gloves, tissue paper, face mask, cover all used in the control of corona virus disease should be incinerated as soon as possible to reduce the chances of transmitting the virus into the air.

Considering the fact that one of the easiest ways of contacting the virus is through handling of contaminated objects, individuals should sanitize their hands as frequently as possible.

Federal and state governments should provide necessary requirements such as automatic body spray sanitizers and other essentials for schools and institutions prior to reopening of schools.

Churches should cooperate with government in the control of the spread COVID-19 by following and obeying safety protocols and guideline put in place by federal and state governments.

Opening of viewing Centres should be kept hold for now considering the increasing cases of the disease in many countries of the world.

References

- [1] Kahn, J.S. and McIntosh, K., 2005. History and recent advances in coronavirus discovery. *The Pediatric infectious disease journal*, 24(11), pp.S223-S227.

- [2] Wikipedia. Public Health Emergency of International Concern. Retrieved: https://en.wikipedia.org/wiki/Public_Health_Emergency_of_International_Concern [Accessed, 2 July, 2020]
- [3] WHO, 2020. Statement on the meeting of the International Health Regulations (2005) Emergency Committee regarding the outbreak of novel coronavirus (2019-nCoV) - WHO, January 23, 2020.
- [4] WHO, 1999. Making a difference. The world health Report 1999 press kit.
- [5] Anupama, S., 2020. Structure and genome of SARS-COV-2 (COVID-19). Retrieved: <https://microbenotes.com/structure-and-genome-of-sars-cov-2/> [Accessed 5 July, 2020].
- [6] Andersen, K.G., Rambaut, A., Lipkin, W.I., Holmes, E.C. and Garry, R.F., 2020. The proximal origin of SARS-CoV-2. *Nature medicine*, 26(4), pp.450-452.
- [7] Sriram, K., Insel, P., and Loomba, R. 2020. What is the ACE2 receptor, how is it connected to coronavirus and why might it be key to treating COVID-19? The experts explain. Retrieved: <https://theconversation.com/what-is-the-ace2-receptor-how-is-it-connected-to-coronavirus-and-why-might-it-be-key-to-treating-covid-19-the-experts-explain-136928> [Accessed 5, July, 2020].
- [8] Zhang, C., Zheng, W., Huang, X., Bell, E.W., Zhou, X. and Zhang, Y., 2020. Protein structure and sequence reanalysis of 2019-nCoV genome refutes snakes as its intermediate host and the unique similarity between its spike protein insertions and HIV-1. *Journal of proteome research*, 19(4), pp.1351-1360.
- [9] Cyril Ramaphosa, 2020. Virtual extraordinary China-Africa Summit on solidarity against COVID-19 Coronavirus. Retrieved: <https://www.gov.za/speeches/president-cyril-ramaphosa-virtual-extraordinary-china-africa-summit-solidarity-against>, 2020.
- [10] WHO, 2020. New WHO estimates: Up to 190 000 people could die of COVID-19 in Africa if not controlled. Retrieved: <https://www.afro.who.int/news/new-who-estimates-190-000-people-could-die-covid-19-africa-if-not-controlled> [Accessed 7 May 2020].
- [11] U.S. CDC, 2020. CDC Confirms Person-to-Person Spread of New Coronavirus in the United States, Retrieved: <https://www.cdc.gov/media/releases/2020/p0130-coronavirus-spread.html> [Accessed Jan. 30, 2020]
- [12] Cao, Z., Zhang, Q., Lu, X., Pfeiffer, D., Jia, Z., Song, H. and Zeng, D.D., 2020. Estimating the effective reproduction number of the 2019-nCoV in China. *MedRxiv*.
- [13] Worldmeter, 2020. Covid-19 Coronavirus Pandemic. Retrieved: <https://www.worldometers.info/coronavirus/> [Accessed 3 July, 2020].
- [14] CNN, \2020. Here in African countries with confirmed coronaviruses. CNN. [Accessed, 24 March, 2020].
- [15] Department of Health Australia, 2020. Coronavirus (COVID-19) health alert , Retrieved: <http://www.health.gov.au/covid-19> [Accessed, 6 July, 2020].
- [16] NHS Inform, 2020. Cough. Retrieved: <https://www.nhsinform.scot/illnesses-and-conditions/lungs-and-airways/cough> [Accessed, 9 July, 2020].
- [17] WebMD, 2020. Why You Cough. Retrieved: <https://www.webmd.com/cold-and-flu/overview> [Accessed, 9 July, 2019].
- [18] Jurczenko, E., 2020. What is the Impact of COVID-19 on Global Economy? Retrieved: <https://www.hospitalitynet.org/opinion/4098208.html>
- [19] Mahar, I., 2020. Impact of Covid-19 on Global Economy Structure. Retrieved: <https://moderndiplomacy.eu/2020/04/22/impact-of-covid-19-on-global-economy-structure/>
- [20] Business wire, 2020. Impact of COVID-19 on the Aviation Industry, 2020: Historical Market Growth Estimations, and Deviations in the Growth Rate Post-COVID-19 Pandemic. Retrieved: <https://www.businesswire.com/news/home/20200422005684/en/Impact-COVID-19-Aviation-Industry-2020-Historical-Market>
- [21] UNWTO. Tourism and COVID-19. Retrieved: <https://www.unwto.org/tourism-covid-19> [Accessed 10 July 2020].