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Strategic Lessons Learned from The Management of Covid-19 That Can Influence Better Management of Future Pandemics in Nigeria.Basiru, A.¹, Erhabor, O.¹, Erhabor, T.²Department of Haematology, Faculty of Medical Laboratory Science, Usmanu Danfodiyo University, Sokoto¹, Medical Laboratory Science Council of Nigeria².Author for Correspondence: +234-703-764-0276/ abubakarbasiru66@gmail.com. ORCID Number: 0000-0003-0738-6762/ <https://dx.doi.org/10.4314/sokjmls.v6i4.11>**Summary**

SARS-CoV-2 is the causative agent for COVID-19. The virus first identified in Wuhan, China in 2019. Nigeria was the first sub-Saharan African country to record a case of COVID-19 after an imported case from Italy was confirmed on February 27, 2020. Globally, as of 7:06 pm CET, 23 December 2021, there have been 276,436,619 confirmed cases of COVID-19, including 5,374,744 deaths, reported to WHO. As of 23 December 2021, 8,649,057,088 vaccine doses have been administered. In Nigeria, from 3 January 2020 to 7:06pm CET, 23 December 2021, there have been 231,413 confirmed cases of COVID-19 with 2,991 deaths, reported to WHO. As of 22 December 2021, 13,498,938 vaccine doses have been administered. It is a heartening news that the number of confirmed cases of Covid-19 and associated death rate has remained low. However, it is troubling that the number of vaccine doses so far administered has remained significantly low. The Nigerian government have tried to curb the spread of the virus by enacting enabling laws like the total lockdown, curfew, closure of schools, ban on religious, social gatherings, implementing the use facemask, social distancing, effective hand washing and sanitization. The government seems to be doing her best to manage the pandemic. There are however, a number of challenges and lessons learnt thus far that may need to be taken into consideration in the management of this evolving Covid-19 and future pandemics. The provision of palliatives in the face of lockdown imposed at the early stage of the pandemic could have been better managed and not politicized, there is need to build local

capacity to locally produce lifesaving PPE's and sanitizers, there is also the need to hold a significant stockpile of essential medicines and medical supplies that is recycled regularly, investment and integration of relevant technologies into the educational system as well as well as the promotion of remote teaching through online learning management systems such as Canvas, Zoom, Edmodo, Google Classroom and Microsoft Teams, WhatsApp and availability of universal internet coverage across the educational system; businesses need to develop capacity for their staff to work remotely from home, there is need to build capacity (human and material) for pandemic management, capacity to manage mental health challenges associated with lockdowns will need to be improved upon, effective risk communication is vital to allow for an efficient recovery through planning and awareness. There is need for collaboration among all stakeholders to develop a coordinated risk communication approach for all sectors to minimize COVID-19's impact on the economy and the socio-political domain. Community engagement is important to establish accountability of behavioral changes. There is need for the FGN to increase the funding for epidemic preparedness, enhance our surveillance and database system, upscale research and development, influence policies, motivate health workers, strengthen the public health emergency network, partnerships and support of innovations. The prices of food, cost of agricultural equipment, fertilizers and seed should be subsidized, agricultural loans and grants should be provided for farmers, the problem of insurgency and insecurity in

Northern Nigeria, and other parts of the nation should be aggressively dealt with, aggressive public health interventions and restrictions against mass gatherings should be sustained in the face of a ravaging pandemic like Covid-19 and other future epidemic, the Nigerian Central banks and commercial banks should do more in supporting businesses to enable them weather the storm created by the pandemic by providing liquidity support, borrower assistance, monetary easing for struggling businesses as well as extend banking services including cash dispensing ATM and online banking services and internet connectivity in rural settings across the nation, religious community need to work in partnership with government to ensure strict implementation of infection control measures (hand washing, use of sanitizers, social distancing, prompt testing for members at risk as well as vaccination advocacy) as well as develop a Standard Operation Procedure (SOP) regarding gatherings during times of infectious disease epidemics/pandemics, isolation centers must be fit for purpose and the environment should be conducive and enabling in terms of comfort and availability of equipment, staffing and protective equipment required. These issues will go a long way in helping us better manage this evolving Covid -19 and other future pandemics. It is public health and humanitarian imperative that vaccines are available to everyone across the globe. Vaccinating all populations in developed and developing countries seems the only logical way of bringing the world closer to the end of this deadly pandemic.

Keywords: *Strategic, Lessons Learnt, Management, Covid-19, Nigeria.*

1.0 Introduction

The novel coronavirus (SARS-CoV-2) is the causative agent for current global COVID-19 pandemic. The virus first identified in in Wuhan, China in 2019 causes a cluster of severe acute respiratory syndrome. On 30 January 2020, The World Health Organization declared it a Public Health Emergency of International Concern. The first case of COVID-19 was reported in Egypt on 14 February 2020 (West African Health Organization, 2020). On 27 February 2020, Nigeria reported the first official case of severe

acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in the West African region (West African Health Organization, 2020) while Burkina Faso reported the first death (Mennechet and Dzomo, 2020). Coronaviruses are a large family of RNA viruses that infect birds and many mammals including humans. These viruses cause illnesses that range from common cold to more severe respiratory diseases and rarely gastroenteritis. Coronavirus disease (COVID-19) is caused by an emerging strain of coronavirus (SARS-Cov-2) that has not been previously identified in humans belonging to the same family of viruses responsible for severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS), for which zoonotic and person- to-person transmission have been confirmed (NCDC, 2020). COVID-19 is caused by a new strain of coronavirus. The disease known as '2019 novel coronavirus' or '2019-nCoV.' is a member of viruses - Severe Acute Respiratory Syndrome (SARS) and some types of common cold. The signs are fever, flu (influenza) or the common cold, cough and shortness of breath, in severe cases; it may cause pneumonia or difficulties in breathing. For somebody to be pronounced COVID - 19 patient, a test is needed (NCDC, 2020). Individuals are infected by direct contact with respiratory droplets of an infected person who coughs and sneezes), touching surfaces contaminated with the virus and touching their face. The most vulnerable to this pandemic are older people and people with chronic medical conditions (such as diabetes and heart disease, appear to be more at risk of developing severe symptoms). Presently, there are relatively few cases of COVID-19 reported among children (NCDC, 2020). Several clinical trials are being conducted to evaluate potential therapeutics for COVID-19. To prevent the spread, preventive actions include: staying at home; covering mouth and nose with mask when coughing or sneezing and dispose of used mask immediately; hand washing with soap and water; use of hand sanitizer, and cleaning frequently touched surfaces and objects, and social distancing (IASC, 2020). The pandemic was first identified in Wuhan, China, in December 2019 (Huang *et al.*, 2020). On 11 March, 2020, The World Health Organization (WHO) declared the outbreak a pandemic (WHO 2020a). The impact

of the pandemic was serious on education (UNESCO, 2020), politics (Tumilty, 2020), environment and climate (Faust, 2020), economics (McLean *et al.*, 2020), culture (Burke, 2020), xenophobia and racism (ITV News, 2020), and other health issues globally.

The first official case of COVID-19 in Nigeria was pronounced on the February 27, 2020. This was traced to an Italian who came into Nigeria and a Nigerian from Ogun State who contacted the virus from the Italian. Since then, the situation became worse. In bid to curtail the spread, the federal government of Nigeria (FGN) enforced an initial 2-week lockdown on March 30, 2020, for three of 36 states (Lagos, Ogun, and Abuja) and, on April 13, extended it another 2 weeks (Kalu, 2020). Like other countries of the world, the FGN compelled the citizens to observe hand washing, social distancing, and staying at home. As at 10th June, 2020, WHO recorded over 7 million confirmed cases and 4 thousand deaths worldwide with the following breakdowns: Americas (3, 415, 174), Europe (2, 321, 147), Eastern Mediterranean (677, 338), South-East Asia (392, 674), Western Pacific (193, 178), and Africa (145, 287) (WHO, 2020b). While the incidence is reducing in some countries, the trend is increasing in many others. During the peak of the virus in the countries, preventive measures were put in place like, self-isolation, general isolation, conversion of hotels, schools, and other edifices, lockdown, social distancing, use of nose mask, hand washing and sanitizing to mention just a few. The FGN enforced an initial 2-week lockdown on March 30, 2020, for three of 36 states (Lagos, Ogun, and Abuja) and, on April 13, extended it another 2 weeks (Kalu, 2020). Markets, schools, religious and social gatherings, international and national movements and non-essential services were closed down completely (no movements). However, the essential services were exempted for the ban. Examples are: Hospitals and all related medical establishments as well as organizations in healthcare-related manufacturing and distribution, Food processing, distribution, and retail companies, Petroleum distribution and retail entities, Power generation, transmission and distribution companies, Private security companies, workers

in telecommunication companies, broadcasters, print and electronic media staff who can prove they are unable to work from home (Kalu, 2020).

1.1 Records of Covid-19 Cases

Although the novel coronavirus is threatening the population size and economic activities particularly in western nations. Despite the high poverty rate, suboptimal healthcare infrastructure, inadequate medical staff and poor technology, Africa has been quite lucky despite the prediction that Africa will be torn to shreds by COVID-19. As at 30th May, 2020, the number of cases in Nigeria was on the increase from the figure, 6344 active cases out of which 2697 were discharged, while over 260 death cases were recorded. Although the numbers from Nigeria were low compared to the US figures, while that of the US figures of death cases were decreasing, Nigeria's case is increasing. To curb this, the federal and state government put up concerted efforts with regards to the pandemic. Lagos, Kano, and Borno States recorded high number of deaths 47, 41, and 25 respectively. Others were below 15 deaths (NCDC, 2020). A previous report examined the survival rate of COVID-19 patients in Nigeria using the Autoregressive Integrated Moving Average (ARIMA) forecasting approach. Secondary data obtained from the daily publication/report of the Nigeria Centre for Disease Control (NCDC) from 28th February 2020 to 30th June 2020 was used. The mean daily survival rate of COVID-19 patients was found to be 27.5% with a median survival rate of 25.4%, which is below 50%. Authors recommended that local manufacturing of Personal Protective Equipment (PPE) be implemented to prevent frontline healthcare workers from being infected (Aronu *et al.*, 2021). A recent report indicated that one way to continue to keep the COVID-19 infection rate low is for community members to continue to adhere to preventive measures as well as for those infected to care early to reduce the risk of mortality (Mbagwu *et al.*, 2021). It is only by improving the health system and aggressive vaccination of the citizens that Nigeria and other African countries should effectively control COVID-19 (Mouhamadou *et al.*, 2021).

1.2 Enforcement of Safety Measures Against Covid-19

To curb the further spread of the virus, the FGN and each state government directed the simple use of facemask, hand-washing and sanitizing, and social distance. It is unfortunate that those (security agents and task force on COVID-19) who were supposed to enforce the measures did not because of their highhandedness in the enforcement of lockdown order. A previous report investigated the strategies for implementation of safety measures against the transmission of Covid-19 in Nigeria as the heart of Africa and Jordan as the nexus of Arab world. There was an imposition total lockdown in major citizens like Lagos & Abuja in Nigeria and Irbid in Jordan. Also, both countries tried to comply with the safety measures provided by WHO against Covid-19 (use of facemask, social distancing, hand sanitizers and suspension of school activities. However, there was no specific fine against the violators of precautionary measures in Nigeria as compared to what was obtainable in Jordan where fines of Jordanian Dinars of 20-50 was imposed (Al-Shattarat and Amuda, 2021).

1.3 The Conversion of Deserted Roads to Sport Ground

During the pandemic period most roads, especially highway was deserted because none or few vehicles plied the roads. A number of youths later turned the roads into football playing fields. The playing periods were between 7 to 9 am and 4 to 6 pm. In some parts of the nation, five aside leagues were planned within these times with duration of twenty minutes each. To one's surprise, there were supporters who came to cheer their favorite teams. Also in some parts of the nation, people have turned the streets into doing workouts (exercise). They claimed that they were bored at home, doing nothing, no work, and no food instead of staying at home to get fat, they resulted in doing aerobics and other exercises in a group (Achirga, 2020). Being physically active during the coronavirus (COVID-19) outbreak is vital to maintain ones physical and mental health as well as to improve mood and reduce boredom (Ginoux *et al.*, 2021). Walking, jogging, cycling are ways to be active and get some fresh air and sunlight. It is however

critical that 2-meter physical distancing and follow strict hygiene guidance (washing your hands as soon as you return home). It is vital that government in planning a public health response to a pandemic and associated lockdown by addressing not only on the risk of infection but also people's psychological and physical wellbeing (Avsec *et al.*, 2021). Impairment in well-being during lockdown, associated with anxiety, lack of physical activity and sleep disruptions are crucial factors to be considered in the process of developing public policies aimed at improving the well-being of the population in order to effectively combat the spread of COVID-19 (Chouchou *et al.*, 2021).

1.4 Attitude of Those in Isolation Centers

The patients who tested positive to the virus were admitted into isolation centers for surveillance and treatment. Unfortunately, in some centers, especially one isolation Center in Kwadon, Gombe State the patients complained of neglect - no feeding, no official and medical personnel attended to them, and no drugs were made available to the extent of self-medicating by visiting nearby patent medicine shops to procure tablets for their treatment. The families of the corona virus patients and others, who were not happy with the development, took to the streets protesting the nonchalant attitude of the government to those in the isolation center. In Anambra State, the government declared a motor mechanic wanted because he tested positive to coronavirus and ran away from the isolation center in Aba. All his family members left their house for the fear of being arrested by the police (Ukwu, 2020). The Federal and State government must ensure that isolation centres are fit for purpose and that the environment is conducive and enabling in terms of comfort and availability of equipment, staffing and protective equipment required. Admission in an isolation facility put a lot of pressure, fear and suffering for both patients and their loved ones. Although isolation of individuals is inevitable in the management of risk of transmissibility in outbreak and emergency response for a pandemic like Covid-19. However, government are morally bound to ensure that these patients are treated with dignity and that the isolation policies are humane and does not undermine the

public health goals of limiting disease spread and minimization of mortality and morbidity (Gardner and Moallem, 2015). Such policies can also potentially impose serious psychological adverse effects on patients, families and healthcare providers (Voo *et al.*, 2020). It is also very important that the Federal and State government realizes that they are under moral obligation to provide certain benefits to those quarantined or isolated particularly if they are being placed under isolation or quarantine for public health reasons (Giubilini *et al.*, 2018).

1.5 Effect of Covid-19 on Economy

To prevent further spread of the virus, the Federal and State governments put up preventive measures by locking down the entire federation. All schools, religious centers, markets, and transporters were barred from their activities, and social gatherings, essential services (banks, hospitals, para military, and others) were allowed easy movements to discharge their duties. To cushion the effects of this lockdown, the federal and state governments distributed foods and other materials to the lucky ones who were able to be available during distributions. Many people were not happy with the distributions because it did not cut across the citizens. Non-governmental organizations (NGOs), organizations, philanthropists, religious institutions, and private individuals also contributed their quotas. Among the palliatives were hospital equipment, nose masks, sanitizers, foodstuffs, vehicles, cash donations, and other useful materials. According to Eludini (2020), Kelechi Anuna a member of Nigeria's national basketball team, donated COVID-19 relief materials to some residents in his hometown, Mbieri, in Imo State. In addition, John Obi Mikel donated 1,800 crates of eggs to residents located near his farm. It is on note that the Military Hospital, Abuja assisted residents with free hand-sanitizers (Ukwu, 2020). Covid-19 has had a negative socio-economic impact on family well-being (physical and mental), health, schooling, poverty, food security, livelihood, infrastructure and social services. The COVID-19 pandemic has had a huge impact on the health of both people and economies, with developing countries hit the hardest (OECD, 2021). The economic impacts of COVID-19 have been

severe particularly for developing countries. There has been a significant increase in job losses, economic contraction, falling investments and exports, and declining tourism dollars for countries whose main economic backbone is tourism (Kharas and Dooley, 2021). The need for social protection programs and economic bailout to support the most vulnerable business and individuals cannot be overemphasized. The Covid-19 pandemic and its restrictions imposed by most national governments have put businesses under severe strain across the world. Many businesses have been forced to close, downsize and lay a significant number of workers off. Most responsible government have had no option than to roll out various policies to provide support for businesses. The Nigerian government will need to learn from evidenced-based practice from Europe that pledged a €1.7tn rescue package in an attempt to dampen the economic effects of COVID-19 on the Eurozone with contributions from all member states, the UK, as well as countries in the area which do not form part of the European Union (The Guardian, 2020). Similarly, the UK Chancellor Rishi Sunak announced a £330bn package of emergency loan guarantees to help those in financial difficulty and a further £20bn fiscal support in attempts to save UK businesses (BBC, 2020). In the same vein, France, Spain and Italy also promised €345bn, €200bn and €25bn respectively, to help support businesses (The Guardian, 2020). The US Federal Reserve in a bid to soften the blow of the virus on the US Economy had taken a number of remedial steps; decreased interest rates by 0.5%, aided the market by purchasing \$125bn in bonds, offered a \$300bn lending programme for Main Street businesses as well as ensure that Asset Backed Loan facility were restarted secured a \$2 trillion 'virus-aid package under the CARES Act to support the economy through these challenging times (Daily, 2020; Smialek, 2020; Visual Capitalist, 2020).

1.6 Effect of Covid-19 On the Educational System

The effect of COVID - 19 on the education sector is devastating because students at all levels have lost almost a year of learning activities. The solace is that after 2 months of non-educational

activities few private institutions have resulted into the use of E-learning. Conferences, workshops, and seminars were affected. Due to the pandemic, most of these were postponed indefinitely. Few institutions saw the need to use virtual methods for their programs. The use of video conferencing and webinar were made use of. The disadvantage of these is that many Nigerians are not conversant with the use of these types of virtual learning methods. The pandemic has compelled the academia and researchers to find the solace in presenting their international and national papers in conferences and lectures to the students. Largely, there are many disadvantages concerning e-learning in Nigeria. For example, the electricity in Nigeria is epileptic and the cost of providing alternatives is high. It is costly to run a petrol and solar powered generators, not many houses can afford it. The cost of data for the internet is high too, not all places will have an access to internet or fast internet services. Over 70% of students do not have access to laptops and computers (Achirga, 2020). There is no doubt that the Federal and many States did not seem to have lived to their responsibility in the rolling out of palliative measures for targeted groups. The process of distribution of palliatives seemed to have been significantly politicized (Eranga, 2020). The COVID-19 pandemic brought about a disruption in the educational system globally. Developing countries was worst hit because of lack of enabling environment and the relevant technology to support remote teaching and learning (Amir *et al.*, 2020). There is also the lack of appropriate infrastructure, skills, and experience with remote teaching and learning (Persike and Friedrich, 2016). E-learning involves the use of Information and Communication Technologies (ICTs). Over the years Nigeria has not developed the relevant technological resources and innovative education strategies to facilitate remote teaching and learning. Previous reports indicate that various e-learning and online learning tools are effective for teaching and learning in several fields of human endeavor (Sáiz-Manzanares *et al.*, 2020; Donkin *et al.*, 2019; Soltanimehr *et al.*, 2019). It is becoming glaringly clear that the suspension of face-to-face instruction in schools during the COVID-19 pandemic in Nigeria has

led to concerns about consequences for students' learning. A significant number of students across the Nigerian nation made little or no progress while learning from home particularly in the presence of weaker infrastructure to facilitate remote learning (Kuhfeld *et al.*, 2020). Schools and teachers have also had challenges with adapting to online-based solutions for instruction assessment and accountability. There is the urgent need for the Nigerian government to invest and integrate relevant technologies into the educational system. Remote teaching through online learning management systems such as Canvas, Zoom, Edmodo, Google Classroom and Microsoft Teams, WhatsApp and availability of universal internet coverage need to be implemented across the educational system to deal with the disruption Covid -19 has had on our educational system (Ebohon *et al.*, 2021).

1.7 National and International Travels

The Federal Government of Nigeria (FGN) on March announced the restrictions of entry into the country for travelers from 13 countries tagged 'high-risk Covid-19' countries (China, Italy, Iran, South Korea, Spain, Japan, France, Germany, United States of America, Norway, United Kingdom, Netherlands and Switzerland). The reason was that each of these countries have over 1000 COVID - 19 cases. This directive was after the ban on foreign travels for public officials in the country (Owoseye, 2020). In bid to curbing the spread of the virus, the FGN suspended the issuance of visas and all persons arriving Nigeria from the 'high-risk Covid-19' countries, were subjected to supervised self-isolation and testing for 14 days on arrival. The Nigerian government on Sunday seized a plane belonging to a UK company for what it said was a violation of regulations aimed at containing the spread of the coronavirus. According to the Nigerian Minister for Aviation approval was given for humanitarian operations but the incriminated carrier was caught conducting commercial flights. It is now glaringly clear that travel measures played an important role in influencing the early transmission dynamics of the COVID-19 pandemic. However, how effective it is, depends on the early evidenced –based aggressive implementation (Grepin *et al.*, 2021; Zhong *et al.*, 2021). Evidence from

previous pandemics and the current Covid -19 pandemic has shown that human mobility provides perfect conditions for an epidemic to spread (Dalziel *et al.*, 2013). Nigerian government will need to learn from evidenced-based best practices of limiting international importation of COVID-19 and any future pandemics by imposing radical travel restrictions (travel bans and lockdowns) particularly in the early stage of the pandemic (Anderson *et al.*, 2020; Karatayev *et al.*, 2020; Economist, 2020).

1.8 Effect of Covid-19 On Religious Activities

COVID-19 is rapidly spreading globally, and religion seems to have contributed to outbreaks and community transmissions. There are several potential factors that can drive the spread of Covid-19 among religious communities (gathering of large number of people in sometimes overcrowded spaces as well as religious beliefs/disbeliefs and misconception about COVID-19. Previous report indicates that religion and infectious diseases have historically been deeply entangled (Idler, 2014). In the history of epidemics, religious communities seem to have played an intimate role in shaping collective beliefs or theological systems which inform responses to health crises. Some religious practices and rituals particularly those that involve sharing of materials can potential pose a risk for infection and have put people within the religious communities particularly at risk of contracting Covid-19 and other infectious diseases (Jaja *et al.*, 2020). Throughout the Nigerian nation, religious activities and gatherings were significantly affected by Covid-19. Most religious centers turned 'ghost centers'. The government both State and Federal made announcements during the lockdown that no religious activities or gathering above twenty members are allowed and each gathering must comply with the use of nose mask, washing of hands with soap and water, and the use of hand sanitizer. Some churches and mosques complied, but those that went against this rule were sanctioned, arrested, and duly punished by the task force set to monitor religious activities. There was a case in Borno State while the restriction order was still in force, three Imams of a weekly Friday mosque went ahead and

encouraged worshiper to congregate for the Friday service, the consequence was that they were arrested and sanctioned (Haruna, 2020a). In Lagos State, during a church service, the pastor of the church and four others were arrested for violating the COVID - 19 regulation (Alabi, 2020). The noticeable experience was that members refused to attend services for the fear of being contacted. For example, in Bauchi State, due to COVID-19 the Governor placed major restrictions on markets and places of worship. The residents were banned from conducting the weekly Friday prayers as well as Sunday church services (Haruna, 2020b). In furtherance of religious activities during the COVID - 19 pandemic, many churches resulted into live streaming of the normal church services on the cable TV. Religious communities can also be places where misinformation about the infection proliferated thus building mistrust towards science and health (Kim *et al.*, 2020). Collaborative approach among religious communities, health science, and government is advocated to combat COVID-19 crisis and future pandemics/epidemics (Lee *et al.*, 2021). Recent experience from Iran and India brings to light the role religious gathering can potentially play in the spread of Covid-19 within the community and the need for these religious groups to take responsibility by protecting their members. The first Covid- related deaths were reported from the Shiite city of Qom on February 19, 2020, the disease having started two to three weeks earlier. The head of the main shrine in Qom despite the associated risk of spread of the disease appealed to the pilgrims to keep coming to the shrine and called it a place of healing. This seemingly led to the unabated spread of the disease, not only within Iran, but around a significant number of neighboring countries (Wright, 2020). Also, the three *Tablighi Jamaat* meetings in Malaysia, Pakistan, and India became COVID-19 hotspots. An estimated 1,545 COVID-19 cases in Malaysia were linked to the assembly of *Tablighi Jamaat* in Kuala Lumpur (Daim, 2020). Attendees who became infected in the Malaysian assembly who attended the Lahore Pakistan and Indian gatherings became potential sources of the infection (Ur-Rahman *et al.*, 2020). As many as 1023 people linked to this *Tablighi Jamaat*

congregation in India tested positive across the country (Kumar, 2020). In the UK Muslims were reported to have been severely affected possibly due to history of large extended families, handshaking and mosque attendance (Hussain, 2020). Similarly, in Korea, an estimated 5209 members of the Shincheonji Church of Jesus were found positive up to April 8, 2020 (Statista, 2020). This was traced to an infected patient attending the Shincheonji Church of Jesus. This Cult believes that illness is a sin, and the sufferer must attend prayers to atone for the sin (Park, 2020). This belief motivated its followers to avoid testing, and some secretly continued to attend church meetings even when they know they were potentially infected and capable of infecting others. A large number of the Cult's followers were tested, and 5,209 were found positive up to April 8, 2020 (Statista 2020). COVID-19 infection rates among the ultra-orthodox Jews of Israel were found to be disproportionately higher compared to other Israelis. Reasons were attributed to big families and crowded living, continued massive attendance particularly during the Jewish holiday of *Purim* on March 9, 2020 against advice from the authorities (Tarnopolsky, 2020). A 70-year-old Sikh priest in the Northwestern Indian state of Punjab, returned from Italy and Germany possibly infected but refused to abide by government rule to self-isolate but rather defiantly went to attend several religious meetings including a Sikh festival that attracts 300,000 people every day. He gave in to COVID-19 infection after infecting many of his close contacts (Naib, 2020). In London, twenty-one ISKCON devotees who attended a funeral at its temple in Soho, London, on March 21, 2020 tested positive, at least five died, and several are reportedly critical ill (Tandon, 2020). There is need for religious community to work in partnership with government to ensure strict implementation of infection control measures (hand washing, use of sanitizers, social distancing, prompt testing for members at risk and vaccination advocacy. Religious leaders in Nigerian must learn from mistakes in other countries and implement best practices. They must realize that they have a duty of care to ensure that their members in particular and the community in general are safe by applying

wisdom and adopting a rational approach to disease prevention within their groups. There is need for government to work with religious leaders in developing a Standard Operation Procedure (SOP) regarding gatherings during times of infectious disease epidemics/pandemics.

1.9 Violation of Covid-19 Guidelines and Laws

In the bid to curtail the spread of coronavirus throughout the Nation, the federal and state governments took proactive steps to curb the spread of COVID-19 by restricting airport and inter-state travel, curfew, open markets were closed or allowed to open at specific hours, banning of vehicular movements except those on essential duties, social distancing, no social gathering, just to mention a few. It was clearly stated that any violator would be tried and punished at the special (mobile) courts put in place. It is sad that many violators were apprehended and sanctioned appropriately. For example, a mobile court sitting in Benin City convicted 16 persons for violating the State Dangerous Infectious Diseases Prevention Regulations. Their punishment depending on the offence were payment of fines (N2000 to N5000) or clearing of grasses (The Vanguard, 2020). In Cross River State, the law enforcement agents flogged violators of the curfew in the state. In Rivers State, two hotels were demolished for violating government order; the offence was opening for commercial activities. Again, in the state especially Port-Harcourt, over 200 violators were arrested on the first day of the lockdown, 170 of them were convicted and fined appropriately (up to 50,000 Naira) (Orjinmo, 2020). Despite the lockdown the commercial activities at the neighborhood markets in Kaduna persisted. Attempt to enforce the stay-at-home order at one of the markets resulted in the killing of four youths by law enforcement agents (Sadiq, 2020). In a market in Enugu State, where people were doing normal commercial activity, the government ordered the men of the state fire service to use water to disperse the crowd, while the police officer manned the main gates to the market (Adibe, 2020). The case of Lagos State was not different; it was reported that the police arrested 39 persons in a hotel for night clubbing.

Over 95 interstate travelers were arrested and their vehicles impounded. The drivers and passengers were charged to mobile courts and fined accordingly (Adediran, 2020). In Lagos State, over 2000 violators, 200 joggers, and 60 people holding parties were arrested, while over 600 vehicles were impounded.

1.10 Effect of Covid-19 On Social Function

Due to the lockdown in the states, there was a drastic reduction in public and social gatherings. The affected activities included; marriages, burial ceremonies, night clubbing, workshops and conferences. According to Peter (2020), the usual watching of live matches on the television suddenly disappeared on the TV screen. The "Aso-ebis", slay mamas and Yoruba outings that are usually slated for every weekend became unattended to. Flamboyant marriages and burial ceremonies were either postponed or celebrated in a low-key fashion due to social distancing. The ceremonies were aired on the Facebook and other social media for people who cannot be present physically. There was sharp decrease in the quality of true and real human relationship because there is the likelihood of somebody finding quick solace, hope, trust, and friendship in people over virtual connections. In bid to prevent boredom, someone may use the period as an opportunity to visit some unprofitable relationships they once had in the past like connecting with a long-time ex to just prevent boredom. The presence of all the family members (father, mother, children, and others at home could cause increased pressure, especially to the father who is always busy at work or elsewhere. Generally, the home maybe noisy especially where the children are still young. Men who shack their responsibilities at home before the lockdown had no alternatives than to assist in the house as husband and father. During a pandemic like Covid-19, there is the possibility of people developing mental and physical fatigue due to lesser activities. This may lead to ill health and mental health challenges. If care is not taken the mind set may change towards inappropriate sexual conduct (especially husband and wife which may lead to unwanted children), alcoholism and smoking. The Lagos beach on a normal day is a relaxation ground always full of people who use the place to while

away their time. The presence of the pandemic in the nation was felt here too. The beach was scanty with little or no activities.

1.11 Effect of Covid-19 on Banking Activities

The banking sector was one of the essential services allowed to operate during the COVID-19 pandemic, but with conditions. No bank was allowed to have more than twenty people in the banking hall. The simple rules of cleanliness (washing of hands, use of hand sanitizer, and use of nose mask) must be strictly adhered with. Social distancing was also enforced. To abide by the rules, the bank managements provided canopies and chairs outside the entrance to the gates for the customer's relaxation before being allowed into the banking hall. In addition to the simple rules, the temperature of the customers was taken and any person with temperature above 38°C was not permitted into the banking hall. Adequate money was dispensed into the ATM machines and social distancing was applied on the queues. There is no doubt that the banking sector particularly in the developed economies of the world played a significant role in moderating the adverse impact of the COVID-19 by effective policy interventions including liquidity support, borrower assistance, and monetary easing (Siregar *et al.*, 2021; Baicu *et al.*, 2020; Demirguc-Kunt, 2020). The Nigerian Central banks and commercial banks needs to do more in supporting businesses to enable them weather the storm created by the pandemic by providing liquidity support, borrower assistance, and monetary easing for struggling businesses. There is also the need to extend banking services including cash dispensing ATM and online banking services in rural settings across the nation. There is also the need for the government to ensure that internet connectivity is assessable in rural settings.

1.12 Effect of Covid-19 on Sporting Activities

The pandemic has had a significant impact on sporting activities. All competitions were either cancelled or postponed. The preparations and hosting of the 20th National Sports Festival (NSF) tagged 'Edo 2020' billed to hold during the period was postponed in Nigeria due to the fear of the pandemic. All preparations and efforts geared towards the Olympic Games by Nigerian

athletes became 'fruitless efforts' because of the postponement of the games. According to IOC (2020), due to the Covid-19 pandemic, the Olympic Games tagged 'Tokyo 2020' were postponed till 23 July 2021 at the same venue. This is the first time in the history of modern Olympic Games which were held in Athens, Greece, in 1896. The African Nations Championship, Africa Cup of Nations, 2022 World cup qualifiers in football for men and women, the CAF Champions league and Confederation cup were all shifted to later dates or postponed till next year (Dominic, 2020). The Nigerian Basketball Association (NBA) officially announced that Nigeria Team will not be able to participate in the inaugural Basketball Africa League (BAL) season which was postponed due to the increasing spread of coronavirus (Busybuddies, 2020). The Champions national leagues in six countries (Angola, Egypt, Morocco, Nigeria, Senegal and Tunisia) already qualified for the competition was not spared. In Nigeria, there are viewing centers where live matches/sports are watched on the television screens. Viewers pay to watch live matches (Premier, Europa, champion, Bundesliga leagues and others). During the pandemic, the centers are forcefully shut down by the government. According to a frequent visitor to viewing centers, said, he is witnessing one of his more boring weekends, everything is suspended. Also, owners of the centers complained bitterly about closing of the center and the financial losses (Lere, 2020). Despite the financial losses associated with ban on mass gathering, previous report recommended that aggressive public health interventions and restrictions against mass gatherings should be sustained in the face of a ravaging pandemic like Covid-19 (Odukoya *et al.*, 2020).

1.13 Effect of Covid-19 On The Price of Food

The increase in prices of food stuffs, beverages, vegetable and palm oil were noticeable during the Covid-19 pandemic. The simple fact was that there were limited transportation of food from the farm and the closing of markets really affected the prices. The National Bureau of Statistics (NBS) reported that the average price of some selected food items in the country increased in April 2020. In the survey conducted

by The NBS with over 10,000 respondents from the 774 local governments across all states and the FCT. The results revealed that average price of one dozen of 'agric' medium sized eggs increased by 3.38 per cent to N476.72, from N461.15 in March. The average price of one kilogram of rice (imported high quality) increased by 7.56 per cent to N471.84 in April from N438.66 in March. The price of 1kg of tomato also increased by 8.49 per cent to N277.00 in the same month as against N255.33 in March. In a similar manner, the average price of 1kg of yam tubers increased by 11.63 per cent to N230.09 in April from N206.12 in March (Mojeed, 2020). NBS made it clear that increase in food prices had an incremental rise in inflation. COVID-19 has disrupted significantly the global economies, with restrictions in the movement of people and goods, both domestic and international, leading to large changes in unemployment, disruptions in food supply chains, availability and cost of food and gross domestic product (GDP). This has brought about an increase in the number of food-insecure people in 2020 of 211 million (a 27.8 per cent increase) (Beckman *et al.*, 2021). In China, the outbreak of Covid-19 may have had a relatively large impact on pork and cabbage prices, which may have resulted from social panic, while the magnitude of the impact of severity is relatively small, and some are negative, perhaps due to more reduced demand during the quarantine (Yu *et al.*, 2020). Several factors ranging from supply chain disruptions, increase transport and transaction costs due to additional inspections, reduced hours of operation, road and border closures have all complicated food security (food availability, food accessibility, and food utilization) in most countries (Maliszewska *et al.*, 2020). The number of food-insecure people is anticipated to increase due to COVID-19 by almost 68 million and reach almost 458 million in 2020 in SSA (Central Africa, East Africa, Southern Africa, and West Africa). Low-income countries are worst hit by the rise in international food prices. In many of these countries, food accounts for about half of consumption baskets and 20% of imports. Rising agricultural commodity prices in world markets has had a significant impact on domestic food price inflation. This is further complicated by the fact

that SSA countries were disproportionately affected compared to developed economies by the global recession during 2020 with attendant negative effect on demand for their exports resulting in limited contingency finance, exchange rate depreciation and increase in cost of imported food (Gustafson *et al.*, 2021). The food insecurity in Nigeria arising from Covid-19 is further complicated by the clashes between farmers and herdsmen as well as insurgency in the significantly food producing states of Benue, Taraba, Nasarawa and Plateau in the North Central region as well as Zamfara and Kaduna States in the North West. These challenges have led to a significant loss of lives and have adversely affected farming activities in these states. Many farmers in these States have abandoned farms for fear of being attacked. There is need for the implementation of a social protection system in Nigeria (Eme *et al.*, 2014) ensuring that the vulnerable in society are protected from the risks and shocks resulting from the pandemic. Government should subsidize the cost of agricultural equipment, fertilizers and seeds as well as provide agricultural loans and grants to farmers. The food supply chain should be more robust and be able to absorb shocks resulting from the ongoing Covid-19 and any future disease outbreaks. Government should as a matter of urgency tackle the problem of insurgency and insecurity in the food basket of the nation heads on.

2.0 Innovations During Covid-19 Pandemic

The COVID - 19 pandemic may be a blessing in disguise in parts among Nigerians because it has brought out or showcase the hidden talents in the citizens. If not for this pandemic, many of the locally developed precautionary methods employed would have been ordinarily imported into the country. The hand sanitizers were produced by common people with the mixture of glycerol and methylated spirit or alcohol. Since the production was common, the price dropped drastically in the early days of the pandemic. In addition, the nose mask was produced too by local tailors who could afford just few yards of Ankara fabrics and rubber bands. In a related event, some of the state governors contracted the production of nose mask to the National Tailors' Association. They were given the mandate to

sew the nose masks running to millions of Naira. The produced masks were distributed to the citizens of each state. Several institutions, research centers, engineering construction companies, NYSC members, and others developed and fabricated disinfection chambers and hand sanitizers with local materials. This is kudos to local indigenous engineers. The NYSC members in Akwa Ibom State constructed disinfection chamber which was donated to Akwa Ibom State Government (Akpan-Nsoh, 2020). The National Institute of Pharmaceutical Research and Development (NIPRD), Abuja produced hand sanitizers (The Vanguard, 2020), The Federal Polytechnic, Oko manufactured solar-powered hand washing machine (Onyeukwu, 2020), Kano University of Science and Technology (KUST), Wudil constructed a solar powered infrared temperature monitor and automated sanitizers (Adewale, 2020), A Nigerian Engineer Fabricates Foot Controlled Hand Washing system (Solohtolz, 2020), and a team of engineers from the Ahmadu Bello University (ABU) Zaria, Kaduna State, also fabricated an Automatic 4-in-1 Sanitizing Machine and an intensive care ventilator (Public Relation Nigeria, 2020).

2.1 Isolation Centers

Worldwide isolated stadia were turned into emergency hospitals because of the rise of the coronavirus pandemic (BBC Sport, 2020). On this note, Onikan stadium, Lagos, Nigeria was converted into an emergency isolation center. The center had 110 beds which was constructed by the Lagos state Government in partnership with a commercial bank so as to ease the pressure on the infectious disease center at Yaba, Lagos. As at April, 2020, the minister of Health - Dr. Osagie Ehanire made it clear that the federal government has 12 functional COVID- 19 testing laboratories, with a capacity to test 1,500 samples daily. He said, to ensure maximum utilization of increased testing capacity, the case definition and testing criteria had been expanded to include not only contacts of confirmed COVID-19 cases with fever and respiratory tract symptoms, but also persons with fever and respiratory tract symptoms of unknown cause (APO Group, 2020). To complement this, the state governments also created isolation centers

in the State Specialist and Teaching Hospitals. All these hospitals were well equipped with facilities and drugs for testing and treatments. The Federal Capital Territory Administration (FCTA) converted the Karu and Asokoro General Hospitals into isolation centres for COVID-19 patients. The hospitals were upgraded and well furnished (Abdulaziz, 2020). Nigeria currently has over 112 treatment and isolation centers in the 35 states and FCT with over 5,000 beds, however, not all states have up to the 300 beds prescribed for isolation and treatment. In event of overflow, the hotels and school dormitories will be prepared for level 1 (Quarantine) and level 2 Isolation (of COVID-19 positive with zero or mild symptoms). It is also being considered home-care treatment for COVID-19 patients (Adebowale, 2020).

2.2 Immunization/Vaccination

Immunization, or immunization, is the process by which an individual's immune system becomes fortified against an infectious agent (known as the immunogen). When this system is exposed to molecules that are foreign to the body, called non-self, it will orchestrate an immune response, and it will also develop the ability to quickly respond to a subsequent encounter because of immunological memory. This is a function of the adaptive immune system. Therefore, by exposing a human, or an animal, to an immunogen in a controlled way, its body can learn to protect itself: this is called active immunization (Cohen, 2003). The most important elements of the immune system that are improved by immunization are the T cells, B cells, and the antibodies B cells produce. Memory B cells and memory T cells are responsible for a swift response to a second encounter with a foreign molecule. Passive immunization is direct introduction of these elements into the body, instead of production of these elements by the body itself. Immunization is done through various techniques, most commonly vaccination. (Medlineplus.gov). Vaccines against microorganisms that causes diseases can prepare the body's immune system, thus helping to fight or prevent an infection. The fact that mutations can cause cancer cells to produce proteins or other molecules that are known to the body forms the theoretical basis for

therapeutic cancer vaccines (Cohen, 2003). Immunizations are often widely stated as less risky and an easier way to become immune to a particular disease than risking a milder form of the disease itself. They are important for both adults and children in that they can protect us from the many diseases out there. Immunization not only protects children against deadly diseases but also helps in developing children's immune systems (Vaxins, 2016). Through the use of immunizations, some infections and diseases have almost completely been eradicated throughout the World. Polio is still found in other parts of the world so certain people could still be at risk of getting it. This includes those people who have never had the vaccine, those who didn't receive all doses of the vaccine, or those traveling to areas of the world where polio is still prevalent (Silverstein, 2009). Active immunization/vaccination has been named one of the "Ten Great Public Health Achievements in the 20th Century" (CDC, 2016).

2.3 Active and Passive Immunization

Immunization can be achieved in an active or passive manner: vaccination is an active form of immunization. Active immunization can occur naturally when a person comes in contact with, for example, a microbe. The immune system will eventually create antibodies and other defenses against the microbe. The next time, the immune encounters the same antigen, the response against this microbe can be very efficient; this is the case in many of the childhood infections that a person only contracts once and develops immunity (Cohen, 2003). Artificial active immunization is where the microbe, or parts of it, are injected into the person before they are exposed to it naturally. If whole microbes are used, they are pre-treated. The importance of immunization is so great that the American Centers for Disease Control and Prevention has named it one of the "Ten Great Public Health Achievements in the 20th Century". (CDC, 2016). Live attenuated vaccines have decreased pathogenicity of many infective agents. Their effectiveness depends on the immune system's ability to replicate and elicits a response similar to natural infection. It is usually effective with a single dose. Examples of live, attenuated vaccines include measles, mumps, rubella,

MMR, yellow fever, varicella, rotavirus, and influenza (LAIV). Passive immunization is where pre-synthesized elements of the immune system are transferred to a person so that the body does not need to produce these elements itself. Currently, antibodies can be used to enhance passive immunization. This method of immunization begins to work very quickly, but it is short lasting, because the antibodies are naturally broken down, and if there are no B cells to produce more antibodies, they will disappear. Passive immunization occurs physiologically, when antibodies are transferred from mother to foetus during pregnancy, to protect the foetus before and shortly after birth (Liu, 2021). Artificial passive immunization is normally administered by injection and is used if there has been a recent outbreak of a particular disease or as an emergency treatment for toxicity, as in for tetanus. The antibodies can be produced in animals, called "serum therapy," although there is a high chance of anaphylactic shock because of immunity against animal serum itself. Thus, humanized antibodies produced in vitro by cell culture are used instead if available (Liu, 2021).

2.4 Covid-19 Vaccine “The Gold Standard So Far”

Nigeria records another milestone, launches second phase of COVID-19 vaccination. The Federal Government has launched the second phase of the COVID-19 vaccination on 16 August 2021 in Abuja; a continuous effort towards curbing the spread of the disease in the country. At a symbolic event to flag-off the second phase at the Federal Medical Centre (FMC), Abuja, the Chairman of the Presidential Steering Committee (PSC) on Covid-19, Boss Mustapha said the arrival of Moderna, and Janssen (Johnson and Johnson) vaccines will enhance the government's effort to get more Nigerians vaccinated to achieve herd immunity against the disease. “Achieving herd immunity is a collective responsibility of everyone and so we need to advice everyone to receive the vaccine. We have the responsibility to safeguard the health of the people and the government will ensure the availability of vaccines. The vaccines are safe and efficacious, (Osagie,2021). Nigeria had received over 4 million doses of Moderna vaccine donated by the United States (US)

government through COVAX facility and 117, 600 doses of Johnson and Johnson vaccine through the African Union and Afrexim Bank as initial supplies. The country expects additional 42.5m doses of different vaccine products from the COVAX facility, African Union, and donations from the US Government, United Kingdom (UK) Government and other countries to be used for the second phase of the vaccination program with different cold chain requirements. This would be adequate for 35,835,970 persons (additional 32.9% of eligible population) in line with the National Deployment Vaccination Plan. In his remarks at the launch on behalf of partners, the WHO country Representative (WR), Dr. Walter Kazadi Mulombo mentioned that, “The introduction of these vaccines comes with a huge logistical preparation for the storage of Moderna vaccine. Partners are very happy with the Federal Government huge investment in the procurement and the installation of Ultra Cold Chain equipment at the National Strategic Cold Store and the State Cold Stores. This is good sign of a committed government leadership at national and state level to have it citizens vaccinated against the disease.” The WR stressed that while, “These vaccines are safe and effective and will be the game- changer: but for the foreseeable future, we must continue wearing masks, maintain physical distancing and avoid crowds. Earlier, the Minister of Health, Osagie Ehanire launched the National CoVID-19 Field guide to provide direction for adequate planning, equitable distribution, demand generation and judicious utilization of the vaccines across the different States and the Federal Capital Territory (FCT) specifically as the country plans to adopt the family centered integrated Primary Health Care (PHC) approach; which translates the National Primary Health Care Development Agency (NPHCDA's) strategy of improving access to basic health services. In separate remarks the Executive Director of NPHCDA, Directors General of the National Agency for Food and Drug Administration and Control (NAFDAC) and Nigeria Centre for Disease Control (NCDC) commended health workers for the professionalism, dedication and resilience they have continued to show by staying on course to deliver COVID-19 vaccines to eligible persons. Other dignitaries that witnessed the

event included, leadership and members of the National Assembly, President and Chairman of the Board of Directors, the African Export-Import Bank, representatives of the US Centers for Disease Control and Prevention (CDC) and Rotary International among others. Recall that on 02 March 2021 Nigeria received 3.92 million doses of the COVID-19 vaccine, through the COVAX Facility, a partnership between CEPI, Gavi, UNICEF and WHO. The arrival marked a historic step towards the goal of ensuring equitable distribution of COVID-19 vaccines globally, in what will be the largest vaccine procurement and supply operation in history. For the first phase of COVID-19 vaccine roll-out which mainly targeted frontline workers, 98.9% (3,980,600 doses) of first tranche of AstraZeneca vaccines was used in first phase with over 2.5 million persons having received 1st dose of the vaccines out of which over 1.4 million persons have received the 2nd dose, reaching 2.3% of eligible population (NPHCDA, 2020).

2.5 Vaccination Programme Roll Out in Nigeria

The Federal Ministry of Health (FMOH) through the National Primary Health Care Development Agency (NPHCDA), National Centre for Disease Control (NCDC), NAFDAC and developmental partners is planning to procure and ensure timely vaccination of Nigerians at risk of the COVID-19 disease. The main objective of the proposed COVID19 vaccine introduction is to slowdown and interrupt transmission of COVID-19 outbreak in all parts of the country COVAX AMC is a financing instrument within the COVAX Facility (through Gavi) focused on securing COVID-19 vaccine access for low- and middle-income countries like Nigeria: The COVAX AMC aims to improve access of affordable supply and programmatic support for procurement and campaigns to Gavi eligible countries. The FGON has formally communicated its interest for Gavi to participate in the COVAX Facility (Pfizer, Moderna, AstraZeneca (AZ) and other viral vector vaccines etc.), there are also other non-COVAX Facility COVID-19 vaccines (e.g. Sputnik V, Asian vaccines etc.). FMOH has commenced bilateral conversations with the manufacturers of

the alternative non-COVAX Facility vaccines to be able to meet up with the targeted population for the COVID19 vaccine introduction (NPHCDA, 2020). There are several factors militating against Covid-19 vaccination in developing countries; poor access to vaccines, logistical challenges of getting the vaccine to remote communities who often do not have specialized equipment and reliable power supply required for ultra-cold temperatures required for optimal storage and transport storage of the vaccines, lack of trained personnel to offer the vaccination, poor uptake of vaccines due to several unconfirmed fears and misconceptions (Sheikh *et al.*, 2021). The mRNA vaccines like Moderna require -20 °C for storage up to 6 months, and its stability drops to 30 days in cases of temperatures of 2 to 8 °C, and even lower at room temperature to 12 h. Also, the Pfizer vaccine require even lower temperatures of -80 to -60 °C for storage up to 6 months. The Oxford–AstraZeneca vaccine which can be stored at 2 to 8 °C seems the only viable options for vaccination in more remote rural communities with limited access to uninterrupted power supply required to maintain ultra-cold storage. There is need for Nigeria and other African countries to invest on local vaccine production as well as have a strategy for self-sufficiency instead of going to beg the developed economies for vaccines (Robbins and Arita, 1994). The Covax initiative is supposed to facilitate the access to Covid-19 for low income developing countries. Its objective of delivering 2 billion doses of Covid-19 vaccines to lower-income countries by the end of 2021 although ambitious may be a mirage and a mere dream. The pledge by wealthy developing countries to provide funding for Covax seems a mere lip service. Suboptimal funding and lack of local production capacity in low-income countries is preventing Covax from competing with wealthier nations' self-interest (King, 2021). With one hand the developed economies seem to be offering a help and with another they are busy confiscating and stockpiling almost all planned vaccine intended for production for the year. The developed world must realize that it is public health and humanitarian imperative that vaccines is available to everyone across the globe. To do anything short of this is unethical and potentially

put the world at risk of variant strains developing from under vaccinated countries. Vaccinating all populations in developed and developing countries seems the only logical way of bringing the world closer to the end of this deadly pandemic.

3.0 Conclusion and Recommendations

Effective risk communication is key to efficient recovery through planning and awareness. It makes the truth more accessible and governments more accountable. There is need for collaboration among all stakeholders to develop a coordinated risk communication approach for all sectors to minimize COVID-19's impact on the economy and the socio-political domain. Community engagement is important to establish accountability of behavioral changes, and it must be complemented with last mile access and local contextualization. There is a need to communicate verified information in a way that is relevant and comprehensible to different stakeholders and inclusive of all social groups. Risk communication must provide reassurance and counter misinformation through scientifically backed facts and in a timely manner. Local authorities must establish trust in their information through transparent data sharing and acknowledgment of uncertainties. The public perception of risk is to be gauged and monitored regularly to avoid panic (WHO, 2019). No doubt, COVID - 19 pandemic is real in Nigeria due to the fact of the daily increase in the record of cases and death. The FGN and the state governments have tried to curb the spread of the virus by enacting enabling laws like the total lockdown, curfew, closure of schools, ban on religious, social gatherings. Also, the citizens were forced to use face mask, washing and sanitizing and the rest. From the information gathered, there were violators of the laws, they were charged to mobile courts, and those found guilty were sanctioned appropriately. It is on note that researchers and engineers in Nigeria proved their worth by the designs, constructions, and production of hand sanitizer, solar-powered hand washing machine, solar powered infrared temperature monitor and automated sanitizer, foot-controlled hand washing system, an automatic 4-in-1 sanitizing machine and an intensive care ventilator. The prices of food items increased but their effects were cushioned by the

provision of suboptimal palliatives (foods, monies, sanitizers, face masks) donated by the FGN, state governments, companies, individuals, military, religious and non-governmental organizations. However, number of isolation centers increase due to the conversion and upgrading of existing structures and hospitals. Finally, FGN should increase funding for epidemic preparedness and enhancement of surveillance and database system, upscale research and development, influence policies and motivate health workers, strengthen the public health emergency network, partnerships and support of innovations. There is need for Nigeria and other African countries to invest on local vaccine production as well as have a strategy for self-sufficiency. Government should subsidize the cost of agricultural equipment, fertilizers and seeds as well as provide agricultural loans and grants to farmers. The food supply chain should be more robust and be able to absorb shocks resulting from the ongoing Covid-19 and any future disease outbreaks. Government should as a matter of urgency tackle the problem of insurgency and insecurity in the food basket of the nation. Aggressive public health interventions and restrictions against mass gatherings should be sustained in the face of a ravaging pandemic like Covid-19 and other future epidemic by an infectious agent. The Nigerian Central banks and commercial banks needs to do more in supporting businesses to enable them weather the storm created by the pandemic by providing liquidity support, borrower assistance, and monetary easing for struggling businesses. There is also the need to extend banking services including cash dispensing ATM and online banking services in rural settings across the nation. There is also the need for the government to ensure that internet connectivity is assessable in rural settings. Religious community need to work in partnership with government to ensure strict implementation of infection control measures (hand washing, use of sanitizers, social distancing, prompt testing for members at risk and vaccination advocacy. There is need for government to work with religious leaders in developing a Standard Operation Procedure (SOP) regarding gatherings during times of infectious disease epidemics/pandemics. The Federal and State government must ensure that isolation centers are fit for purpose and that the

environment is conducive and enabling in terms of comfort and availability of equipment, staffing and protective equipment required. There is the urgent need for the Nigerian government to invest and integrate relevant technologies into the educational system. Remote teaching through online learning management systems such as Canvas, Zoom, Edmodo, Google Classroom and Microsoft Teams, WhatsApp and availability of universal internet coverage need to be implemented across the educational system to deal with the disruption Covid -19 has had on our educational system.

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