



Research Article

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Predicting the Demographic, Attitudinal and Environmental Factors in the Swift Spread of COVID-19 in Nigeria and Suggestions for its Containment

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Abstract

The coronavirus illness 2019 (COVID-19) has had a negative impact on several aspects of human life and society, including socio-cultural, economic, political, environmental, and health dimensions. The etiologic agent of COVID-19 is the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The first occurrence of this illness was seen as an epidemic in Wuhan, a metropolis in the Hubei province of China. However, it subsequently extended to several other provinces within China and eventually reached around 210 nations throughout the globe. As a result, the World Health Organisation (WHO) officially classified it as a pandemic on 11 March 2020. Nigeria, one of the three most affected nations in West Africa, documented its first verified case of COVID-19 in Nigeria on 28 February 2020 in Lagos State. According to data provided by the Nigeria Centre for Disease Control (NCDC), Nigeria has recorded a total of 43,151 cases of COVID-19 as of 31 July 2020. The rapid escalation of the epidemic in Nigeria raised serious concerns, particularly due to the lack of transparency on the causes contributing to its widespread transmission, which has not been disclosed to the Nigerian people. This research accurately forecasted the demographic, attitudinal, and environmental aspects that contributed to the rapid transmission of COVID-19 in Nigeria. Additionally, it proposed strategic procedures to control its spread.

Keywords: Spread of COVID-19, Nigeria, Suggestions for its Containment

1. Introduction

1.1 Background and COVID-19 Updates in Nigeria

The coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (WHO, 2020a), originated and first appeared as an epidemic disease in Wuhan city, Hubei province, China (Abdi, 2020; Wang et al., 2020; Zhu et al., 2020). On March 11, 2020, the World Health Organisation (WHO) declared the pandemic (Layne et al., 2020; Yang et al., 2020; WHO, 2020b). The disease spread quickly to other provinces in China (Abdi, 2020), as well as approximately 210 countries worldwide (Ali & Alharbi, 2020; Faridi et al., 2020). On March 13, 2020, the South China Morning Post reported that the first confirmed casualty was a 55-year-old man from the province of Hubei who developed illness on November 17, 2019 (Davidson, 2020; Ma, 2020). The recently identified virus known as SARS-CoV-2 has strong ties with SARS-CoV (Europa, 2020), pangolin coronaviruses (Wong et al., 2020), and bat coronaviruses (Perlman, 2020). The pandemic's worrisome rate, which was mostly caused by an unidentified pneumonia that was detected in Wuhan on December 31st, 2019 (WHO, 2020b), prompted an inquiry that connected the pandemic to the Huanan Seafood Wholesale Market, which also sells live animals. Accordingly, it is believed that the coronavirus originated in animals (Novel Coronavirus Pneumonia Emergency Response Epidemiology Team, 2020). Although the COVID-19 pandemic spread to every country in the globe, the rate of transmission differed depending on the country and area. China, Germany, Italy, Spain, USA, Iran, Brazil, UK, Mexico, and South Korea are among the nations where the epidemic has spread most rapidly (Elflein, 2020; Zhuang et al., 2020).

It takes between two and fourteen days after exposure for COVID-19 symptoms to appear (Centres for Disease Control and Prevention (CDCP), 2020; Rothan and Byrareddy, 2020). The primary means of transmission are proximity to infected individuals or contaminated planes, in addition to respiratory droplets released during coughing or sneezing (WHO, 2020c; European Centre for Disease Prevention and Control, 2020; CDCP, 2020). Common indications include tiredness, muscular pain, sneezing, sore throat, dry cough, high fever, headache, sputum production, anosmia (loss of smell), shortness of breath, nausea or vomiting, nasal congestion. The virus enters the body via the mouth, nose, and eyes (Transmission of Novel Coronavirus (2019-nCoV), 2020). The COVID-19 pandemic is more likely to affect children, the elderly, and those with chronic illnesses including cancer, diabetes, heart disease, or lung disease (Ali & Alharbi, 2020).

According to the CDCP (2020), symptomatic and supportive therapy is the primary course of treatment in the non-attendance of a known vaccine or specific antiviral medication. The recommended preventive measures include physical distancing, contact tracing, self-isolation, respiratory hygiene (using a tissue or bent elbow to cover one's mouth and nose while coughing or sneezing and then throwing away the tissue right after using it), hand hygiene or washing, and respiratory hygiene (WHO, 2020c; US CDCP, 2020). Similar measures to stop the spread of viruses include travel bans, curfews, quarantines, workplace safety measures, event adjournments and revocations, and facility closings (Shao, 2020; South China Morning Post, 2020; Marsh, 2020; Deerwester and Gilbertson, 2020; Nikel, 2020). When the coronavirus disease (COVID-19) was first confirmed to have killed someone on January 9, 2020 in Wuhan, on February 1, 2020 in the Philippines, and on February 14, 2020 in France, approximately 17106007 people had died worldwide (The New York Times, 2020; Ramzy & May, 2020; Holm & Moritsugu, 2020). As of July 31, 2020, 879 of these deaths had taken place in Nigeria (see Table 1; WHO, 2020d; NCDC, 2020).

Table 1: COVID-19 Situation in Numbers (by WHO Region)

Total (new cases in last 24 hours)		
Globally	17 106 007 cases (292 527)	668 910 deaths (6 812)
Africa	770 421 cases (16 031)	13 234 deaths (396)

Total (new cases in last 24 hours)		
Americas	9 152 173 cases (171 946)	351 121 deaths (4 567)
Eastern Mediterranean	1 533 357 cases (12 612)	39 661 deaths (458)
Europe	3 333 300 cases (25 241)	212 520 deaths (438)
South-East Asia	2 009 963 cases (60 113)	44 031 deaths (914)
Western Pacific	306 052 cases (6 584)	8 330 deaths (39)

Source: World Health Organisation (2020d). Coronavirus Disease (COVID-19) Situation Report – 193. Data as received by WHO from National Authorities by 10:00 CEST, 31 July 2020.

The most populous nation in Africa, Nigeria, reported its first COVID-19 case in Lagos on February 27, 2020, and its second case in Ewekoro, Ogun State, on March 9, 2020. An Italian resident living in Lagos and a Nigerian individual who interacted with the Italian citizen were the subjects of the first and second instances, respectively. The two had positive COVID-19 tests (Maclean & Dahir, 2020; NCDC, 2020a,b). COVID-19 is triggered by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Nigeria's federal government first gave its citizens assurances on January 28, 2020, that it was equipped to stage up surveillance at the country's five international airports: Enugu, Lagos, Rivers, Kano, and Abuja (Premium Times, 2020). That day, the NCDC publicised that it had established a coronavirus group to stop the virus's spread (Odunsi, 2020). The Nigerian federal government inaugurated a Coronavirus Preparedness Group on January 31, 2020, in response to the rapid development of the pandemic in China and other nations worldwide, with the aim of reducing the potential consequences of the virus should it make its way to Nigeria (Ifijeh, 2020). The World Health Organisation identified Nigeria as one of thirteen (13) high-risk African nations for the transmission of COVID-19 on the same day (Ezigbo & Ifijeh, 2020). President Muhammadu Buhari of Nigeria established a Presidential Task Force on March 9, 2020, to oversee COVID-19 throughout the nation (Agbakwuru, 2020; Daka, 2020).

Other reactions that were put up for the suppression of the spread of the virus in Nigeria were cancellation of international flights to the country (Famuyiwa, 2020); postponement of the 20th state-wide sports festival that would have held in Benin City, Edo State (Eludini, 2020); indefinite suspension of the National Youth Service Corps' 21 days orientation exercise for the 2020 Batch A (Stream One) (Awojulugbe, 2020); placing of travel ban on states with high risks or cases of COVID-19 (Ogundele, 2020); banning of religious meetings of over 50 believers for 30 days (Ojerinde, 2020; Olatunji, 2020); indeterminate closing of private and public schools (Alabi, 2020; Akinyemi, 2020; Ojerinde, 2020); suspension of all football activities (Oyeleke, 2020) and public gatherings (Okafor, 2020); banning of movie sets across the country (Anokam, 2020); closure of stores and markets except where food items, medicines, water and other crucial commodities were sold (The Nation Newspaper, 2020); banning of intra-state and inter-state movement of people and vehicles, exempt those conveying food items and other essential services (Isa, 2020); shutting down of all courts in the country from 24 March (Nnochiri, 2020); closure of all borders (Ogunyinka, 2020); indefinite suspension of Federal Executive Council (FEC) meetings (Royal, 2020); adjournment of plenary by the Senate, House of Representatives (Aborisade, 2020; Baiyewu, 2020) and State Houses of Assembly; and declaration of lockdowns and curfews and obligatory face masks use or coverings in open places (Adetayo, 2020; Olasupo, 2020).

Since Lagos was the site of the nation's first COVID-19 case on February 28, 2020, Lagos also became the country's top location for COVID-19 cases. Therefore, starting at 11 p.m. on Monday, March 30, 2020, President Muhammadu Buhari issued a first 14-day total lockdown declaration for Lagos and the Federal Capital Territory (Abuja). A nationwide curfew was imposed by the President from 8 p.m. to 6 p.m. throughout the two-week lockdown period. Lockdowns were also proclaimed in other states by their governors. The president implemented lockdowns and curfews as a way to relax the spread of COVID-19 across the nation. On May 2, 2020, at 9 a.m., lockdown measures in Lagos, the Federal Capital Territory (Abuja), and Ogun State were gradually lifted, according to the

President's proclamation (Oyekanmi, 2020). Lockdowns in other states also began to be phased out or loosened.

The third case of COVID-19 that was verified occurred in Lagos State on March 17, 2020, involving a Nigerian woman, age 30, who had come back from the United Kingdom on March 13, 2020 (Olatunji, 2020). Five new COVID-19 cases (four in Lagos State and one in Ekiti State) were reported on March 18, 2020 (Toromade, 2020). On March 19, 2020, four more COVID-19 cases were confirmed in Lagos State (Royal, 2020), and on March 21, 2020, ten further cases (7 in Lagos State and 3 in the Federal Capital Territory) were verified (Emorinken, 2020). Since 18 March 2020, there was a swift escalation of the virus in Nigeria, as all the states were affected as of 31 July 2020. In fact, Nigeria became the third African country, after South Africa and Egypt, to record over ten thousand (10000) cases of COVID-19. This occurred on 31 May 2020 when the country's COVID-19 cases got to 10,162 as a result of 307 new cases (Shaban, 2020).

Based on statistics made available by the NCDC, Nigeria had witnessed an astronomical rise in COVID-19 cases and deaths in recent times. The country's number of confirmed cases rose astronomically from 10162 as of 31 May 2020 to 10578 as of June 1, 2020; 10819 as of June 2, 2020; 12233 as of June 6, 2020; 12486 as of June 7, 2020; 12801 as of June 8, 2020; 13,464 as of June 9, 2020; 13873 as of June 10, 2020; 14554 as of June 11, 2020; 15181 as of June 12, 2020; 16085 as of June 14, 2020; 16658 as of June 15, 2020; 19147 as of June 19, 2020; 26484 as of July 1, 2020, 34259 as of July 15, 2020; and 43151 as of July 31, 2020 (See NCDC, 2020; Oyekanmi, 2020; Table 2; Figures 1). Lagos State, FCT (Abuja) and Oyo State had the highest number of COVID-19 cases, Kogi State had the least number of cases (only 5 cases), and Taraba was the only state in the federation that did not record any death from the COVID-19 (see Table 3). The astronomical rise of the pandemic in Nigeria was worrisome, especially as the factors responsible for the rise were not been made public to Nigerians. As a result, this paper attempted to predict the swift spread of COVID-19 in Nigeria and suggest strategic options for its containment.

Table 2: COVID-19 Update in Nigeria (February 2020 – July 2020)

Date	Confirmed cases	New cases	Total deaths	New deaths	Total recovery	Active cases	Critical cases
July 31, 2020	43151	462	879	1	19565	22707	7
July 24, 2020	39539	591	845	12	16559	22135	7
July 17, 2020	35454	600	772	3	14633	20049	7
July 10, 2020	31323	575	709	20	12795	17819	7
July 3, 2020	27564	454	628	12	11069	15867	7
June 26, 2020	23298	684	554	5	8253	14491	7
June 19, 2020	19147	667	487	12	6581	12616	7
June 12, 2020	15181	627	399	12	4891	9891	7
June 5, 2020	11844	328	333	10	3696	7815	7
May 29, 2020	9302	387	261	2	2697	6344	7
May 22, 2020	7261	245	221	10	2007	5033	7
May 15, 2020	5445	288	171	3	1320	3954	4
May 8, 2020	3912	386	118	10	679	3115	4
May 1, 2020	2170	238	69	10	351	1751	2
April 24, 2020	1095	114	33	1	208	855	2
April 17, 2020	493	51	18	4	159	317	2
April 10, 2020	305	17	7	0	58	240	2
April 3, 2020	209	25	4	2	25	180	0
March 27, 2020	70	5	1	0	3	66	0
March 20, 2020	12	4	0	0	1	11	0
March 13, 2020	2	0	0	0	0	2	0
March 6, 2020	1	0	0	0	0	1	0
February 28, 2020	1	1	0	0	0	1	0

Source: Oyekanmi, S. (2020). COVID-19 Update in Nigeria. Retrieved on 1 August, 2020. Available on <https://nairametrics.com/2020/08/1/covid-19-update-in-nigeria/>.

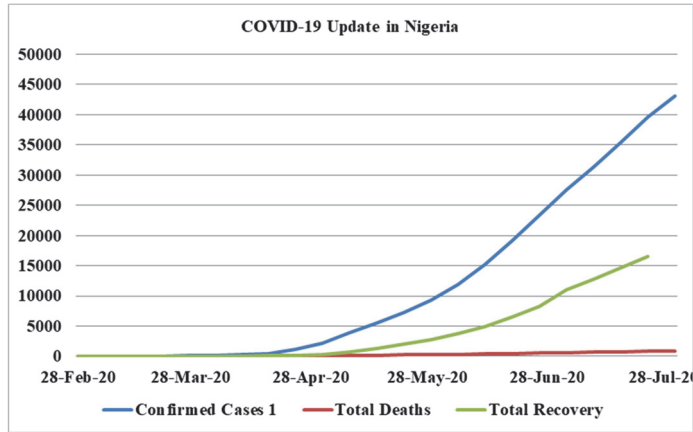


Figure 1: COVID-19 Update in Nigeria (28 Feb.-31 July 2020)

Table 3: Confirmed Cases of COVID-19 in Nigeria (State by State)

States Affected	No. of Cases (Lab Confirmed)	No. of Cases (on admission)	No. Discharged	No. of Deaths
Lagos	15,121	12,781	2,148	192
FCT	3,803	2,639	1,122	42
Oyo	2,760	1,447	1,286	27
Edo	2,292	410	1,800	82
Rivers	1,791	301	1,438	52
Kano	1,597	286	1,258	53
Delta	1,510	108	1,359	43
Kaduna	1,457	269	1,176	12
Ogun	1,394	276	1,095	23
Plateau	1,188	650	519	19
Ondo	1,155	583	548	24
Enugu	807	364	425	18
Ebonyi	785	165	596	24
Kwara	753	521	213	19
Katsina	742	262	457	23
Borno	613	9	569	35
Gombe	607	60	524	23
Bauchi	560	27	520	13
Abia	545	114	426	5
Osun	524	246	266	12
Imo	468	340	119	9
Benue	346	282	58	6
Bayelsa	328	28	279	21
Jigawa	322	3	308	11
Nasarawa	317	86	223	8
Niger	223	78	133	12
Akwalbom	221	93	121	7
Adamawa	163	69	85	9

States Affected	No. of Cases (Lab Confirmed)	No. of Cases (on admission)	No. Discharged	No. of Deaths
Sokoto	154	1	137	16
Anambra	135	48	75	12
Ekiti	132	75	55	2
Kebbi	90	4	79	7
Zamfara	77	1	71	5
Yobe	67	5	54	8
Taraba	54	43	11	-
Cross River	45	33	9	3
Kogi	5	-	3	2
Total	43,151	22,707	19,565	879

Source: NCDC, 2020.NCDC Covid-19 Page. NCDC. Retrieved 31 July 2020. Available on <https://covid19.ncdc.gov.ng/>.

2. Prediction for the Swift Spread of COVID-19 in Nigeria

This study forecasts the rapid development of the COVID-19 pandemic in Nigeria due to environmental, behavioural, and demographic variables (such as overcrowding and other population-related problems). Although the Novel Coronavirus Pneumonia Emergency Response Epidemiology Team (2020) believes that COVID-19 originated in animals, it is believed to have spread quickly by direct contact and respiratory droplets with people (Chan et al., 2020; Li et al., 2020; Wang, Horby, Hayden, & Gao, 2020). Accordingly, new research revealed a connection between overcrowding and the COVID-19 pandemic (Saadat, Rawtani, & Hussain, 2020; Şahin, 2020).

Şahin (2020) considered the human population (mobility and crowd) a potentially significant factor in the spread of the pandemic. Similarly, Saadat, Rawtani, & Hussain (2020) identified population density, household size, and level of social distancing as some of the factors that increase the risk of contracting COVID-19; and also submitted that the new virus spreads faster in urban areas more than in rural areas due largely to higher close contact in the former than in the latter. Thus, the pandemic is expected to spread more in Nigeria's urban areas, such as Lagos, Kano, and Abuja, because of overcrowding in public places. Though Saadat et al. (2020) avers that the level of social distancing operable in any society determines the extent to which COVID-19 spreads in such a society (Saadat, Rawtani, & Hussain, 2020), most Nigerians care less about social distancing since they did not receive any substantial palliatives from the government and cannot risk dying of hunger. Thus, people were seen in large numbers gathering in the markets, banks, churches, and mosques, among others, even without wearing any face mask. The level of social distancing in Nigeria is lamentably low and thus becomes the impetus for the swift spread of COVID-19 (and even other pandemics) in the country. With low technological development and poverty, working remotely in Nigeria is likely not attainable now.

The likelihood of swift spread of COVID-19 pandemic in Nigeria and other African societies is tied to overcrowding in the house, prisons, schools, markets, religious places, burials, banks, and other public places. Lamentably, some of these public places have only made little or no efforts at containing the spread of the pandemic. Overcrowding is a major housing problem in rural and urban areas in Nigeria (Lanrewaju, 2012; Igwe, Okeke, Onwurah, Nwafor, & Umeh, 2017; Enisan, 2019). Cities in Nigeria face serious housing problems, especially as available houses suffer from a lack of maintenance (Oyeleye, 2013; Efobi & Anierobi, 2014). Other causes of housing problems in Nigeria include poverty, high cost of land, corruption, high rate of urbanization, high cost of building materials, and increase in population (Abimaje, Akingbohngbe, & Baba, 2014; Aluko, 2012; Ezeigwe, 2015; Faith, 2014; Ibimilua & Ibitoye, 2015; Okafor, 2016).

The continent's population expansion is mostly attributable to the extended family structure,

which is prevalent across Africa and especially in Nigeria. Nuclear units that are expanded are extended families (Haralambos and Holborn, 2008). An extended family is appropriately defined as a social unit consisting of three or more generations who are linked by blood, marriage, adoption, or descent and who live together or closely. These are grandparents, parents, children, aunts, uncles, nephews, and nieces (Kottak, 2004; Knuttila, 2005). Even in the coronavirus period, families still appreciated living together with their relatives, irrespective of where they are coming from. This practice helped them emotionally to survive the threats of the pandemic, but constituted a common avenue for the spread of the COVID-19 pandemic in Nigeria and other African countries. Extended families or large households have a higher chance of contracting and spreading the virus than nuclear families or small households. This is evidenced in the cases of Sweden and Italy. The former, known for its high proportion of single-person households, had a lower rate of COVID-19 infection, and the latter, with its multi-generational homes, had a high rate of COVID-19 (Saadat, Rawtani, & Hussain, 2020). Thus, in addition to overcrowding, the extended family system is also associated with the swift spread of COVID-19 pandemic.

The likelihood of a swift spread of the COVID-19 pandemic in Nigeria is also tied to the existence of congested prisons. That Nigerian prisons are overcrowded or congested has been reported by several scholars and organizations (see Crystal, 2004; Aduba, 2005, 2012; Ayade, 2010; Alabi & Alabi, 2011; Obioha, 2011; Amnesty International, 2008, 2012; Ogundipe, 2012; Achu, Owan, & Ekok, 2013; Ayuk, Emeka & Omono, 2013; Otu, Out & Eteng, 2013; Awopetu, 2014; Nnam, 2016; Opafunso & Adepoju, 2016). Prison congestion arises when the jail's capacity is exceeded by the number of convicts, endangering their physical, physiological, psychological, and behavioural well-being (Crystal, 2004; Awopetu, 2014). A 12-member Presidential Committee on Prison Decongestion (PCPD) reported that, due to about 150 convicts occupying rooms intended for 50 inmates, 29,372 of the 41,524 detainees were awaiting trial (Aduba, 2012). According to a 2008 study by Amnesty International, at least 65% of Nigerian prisoners are awaiting trial without the financial means to hire an attorney, and many have never been found guilty of a crime. Accordingly, Onike (2010) submitted that the rising number of awaiting trial people (ATPs) in Nigeria is increasingly alarming.

As a result of congestion, prisons which are meant for correction, rehabilitation, and reformation (Okeke, 2010) rather turn to hell (Ayuk, Emeka & Omono, 2013). In addition to the congestion, Nigerian prisons are characterized by inadequate rooms and accommodation for prisoners to sleep and be kept; inadequate provision of food and health care services; and inadequate staffing, among others (Awopetu, 2014). The main causes of prison overcrowding in Nigeria include poverty or the inability to afford legal representation (Amnesty International, 2008), court system delays (Awopetu, 2014), systemic corruption, and other bureaucratic procedures (Okwendi & Nwankwoala, 2014). As to the Amnesty International Report (2012), out of all the prisoners, 20% are convicted of a crime, while the remaining 80% are awaiting trial because of the aforementioned reasons. Given that COVID-19 is spread by human-to-human contact, overcrowding in Nigerian prisons is expected to serve as a hub for the spread of the virus and other viruses. According to the National Assembly Legislative Digest (2010), overcrowding in prisons inevitably exposes convicts to unfavourable health circumstances, which in turn contributes to the development of diseases including diabetes, HIV/AIDS, and TB. Congested prisons have been shown to expose convicts to the COVID-19 epidemic in recent years.

Sanitation and waste management concerns play a multifaceted role in both the pandemic's transmission and control. The COVID-19 pandemic has resulted in an increase in waste, particularly from masks and gloves and other personal protective equipment (Calma, 2020). Developed nations have made significant progress in waste management systems, but underdeveloped nations continue to lag behind. In actuality, the majority of Nigerians struggle with garbage management. The practice of putting on and discarding hand gloves and face masks carelessly might contribute to the COVID-19 pandemic's spread in Nigeria. After all, researchers have claimed that the production and handling of organic and inorganic waste is closely related to environmental problems such as soil erosion, deforestation, and air and water pollution (Mourad, 2016; Schanes et al., 2018). The concern by

authorities that recycling centers can be a major source of spreading COVID-19 pandemic in developed countries has led to the discontinuation of recycling programs in some developed countries, especially the USA and Italy (Zambrano-Monserrate, Ruano, & Sanchez-Alcalde, 2020). Thus, waste recycling is increasingly indicted as an environmental problem in the face of the pandemic (Liu et al., 2020).

Poor sanitation and waste disposal/management are not solely the attributes of rural areas; they also apply to cities in Nigeria. As the population of people increases astronomically in Nigerian cities, housing, water supply, and sanitation problems also increase and affect the health of the people (Aliyu & Amadu, 2017). The urban poor, who occupy such areas as slums, squatters, and peri-urban, still exhibit their rural habits by urinating and defecating in open spaces and thus endanger the health of others in the urban areas (Enweze, 2000). Also, sanitation is worsened by rapid urban population growth (Oloruntoba, Folarin, & Ayede, 2014). Waste generation, disposal, and management in most Nigerian cities are a gory sight, as waste is commonly disposed of, dumped or burnt in major streets and roads, thereby causing environmental hazards, blocking traffic (Ogwueleka, 2009), and spreading of infectious diseases, among others (Aliyu & Amadu, 2017). In these attitudes of poor sanitation and waste disposal and management lies the swift spread of COVID-19 pandemic and other pandemics or diseases in rural and urban areas of Nigeria.

Hand shaking and hugging are common forms of greeting in most societies of the world. In Nigeria and other African societies, they constitute acceptable traditional values and practices, and thus integrated into the culture of the people. In particular, hand shaking is the most cherished form of greetings among the Igbo (Nwoye, 1993). Hand shaking and hugging constitute expressions of happiness and acceptance towards relatives, friends, strangers, and loved ones. Given the continuous spread of coronavirus disease across the world, people are conscious of how they shake hands with others or allow others to shake hands with them, give others pecks on the cheek or allow others do same to them, and hug others or allow others to hug them to minimize the risk of contracting or spreading the virus. Solomon Ayado reported on March 17, 2020, that the Federal Government of Nigeria was advised by Nigeria's Senate to warn Nigerians to desist from shaking hands with themselves and foreigners to curtail the spread of the disease (Ayado, 2020). Some Nigerians, however, do not think that coronavirus exists and thus continues to check hands, peck people on the cheek, and hug people even amorously. This attitude lies in the spread of the virus in the country.

The spread of COVID-19 pandemic was likely to increase in Nigeria because most Nigerians do not take the COVID-19 pandemic guidelines seriously. This is in line with the observation of Ali & Alharbi (2020) that the disease spread among those who did not take it seriously and did not follow the directions of the World Health Organisation and their local governments. The reason Nigerians did not take the pandemic seriously is that the issue was seemingly over-politicized by Nigerian politicians and even the government did not take it seriously apart from politicizing it and apparently sharing the money earmarked for the pandemic among themselves and their cronies. The government had to wait for their relatives and associates to return to Nigeria before closing the borders. It also showed total disobedience to social distancing regulation, especially during the burial of Mr. Abba Kyari, the late Chief of Staff to President Buhari (Ogundipe, 2020). The same government at federal, state, and local government levels declared lockdown and curfews and did not give the supposed palliatives to the people. As of 19 June 2020, some states in Nigeria were still deceptively collecting names of people to be given palliatives without actually giving them the palliatives. If some of the billions of naira spent on the fight against COVID-19 pandemic was given to the people as palliatives during the lockdown, the people would have comfortably stayed at home and be assured of their daily bread for some times. As many Nigerians are increasingly poor, it became difficult for Nigerians to be hungry and observe lockdown at the same time.

In the face of the lockdown without commensurate palliatives, hunger killed more Nigerians than the pandemic. So, the people reasoned, it was better to defy the lockdown and curfew orders and fend for their daily living than die in hunger. It became a choice between the COVID-19 pandemic and hunger! With low compliance on social distancing directives and flagrant disregard for

COVID-19 pandemic guidelines by most Nigerians in the motor parks, markets, Churches, Mosques, banks, and other public places, the pandemic was bound to swiftly spread in the country. The government's inability to fully implement the social distancing directives and other COVID-19 pandemic guidelines worsened the matter. The extent to which the government adequately provided facilities for the containment of COVID-19 pandemic at the public places was also questionable.

Chakraborty & Maity (2020) submitted that investing billions of dollars on COVID-19 treatment and medicine while neglecting forestation and respect for wildlife habitats is dangerous in the fight against the pandemic. This is because birds- or bat-borne viral outbreaks are linked to deforestation (Afelt, Frutos, & Devaux, 2018; Olivero et al., 2017) and COVID-19 is a bat-related epidemic (Chakraborty & Maity, 2020; Fan, Zhao, Shi, et al., 2019). Birds (including bats) and other animals can inflict the human population with infections, even COVID-19, when their natural habitat is destroyed (Transmission of Novel Coronavirus (2019-nCoV), 2020; Ali & Alharbi, 2020). A way out is for Nigeria (and Africa) to preserve their forests and stop deforestation. However, it is difficult for any developing society that still promotes senseless growth in the human population to stop deforestation and encourage afforestation because of the pressure such increased population mounts on the environment. As much as man continues to mount undue pressure on the environment for its agricultural activities and industrial products, the ecosystem and human health will continually be in jeopardy. Thus, it is not surprising that deforestation breeds bird-borne diseases while afforestation curtails their spread to humans. It is therefore essential for the Nigerian government to consciously and effectively control its population growth and rather focus on developing its human capital efficiently.

A number of recent studies have shown that climatic or meteorological factors, when combined with human population (demographic) parameters and attitudinal factors, are important factors in the viability, transmission, and spread of COVID-19 and other related viruses (Bi, Wang, & Hiller, 2007; Bloom-Feshbach et al., 2013; Bukhari & Jameel, 2020; Casanova et al., 2010; Chan et al., 2011; Chen et al., 2020; Dalziel et al., 2018; Gupta, Raghuvanshi, & Chanda, 2020; Jahangiri, Jahangiri, & Najafghol Like SARS CoV-1 and MERS CoV (viruses from the Coronaviridae family) and seasonal respiratory flu viruses (Casanova et al., 2010; Bloom-Feshbach et al., 2013), the SARS CoV-2, which causes COVID-19, grows and spreads quickly in a cold and temperate climate (Bukhari and Jameel, 2020; van Doremalen et al., 2020).

According to Şahin (2020), cold temperatures, greater average wind speeds, and overcrowding (an increase in human population) all contributed to a surge in COVID-19 instances in Turkey. Similarly, Tosepu et al. (2020) exposed a link between Indonesia's COVID-19 epidemic and low temperatures. In China, Zhu and Xie (2020) discovered a link between COVID-19 infection and temperature. A previous research conducted in Beijing and Hong Kong during the 2003 pandemic by Bi, Wang, and Hiller (2007) discovered a link between the weather and the spate of severe acute respiratory syndrome (SARS). In a similar vein, Chan et al. (2011) reported in another investigation that elevated temperatures and related humidity (e.g., 38 °C and N95%) destroy viral viability. Furthermore, smoking (Taghizadeh-Hesary & Akbari, 2020), air pollution (Wu et al., 2020), and environmental factors (Wang et al., 2020) all lead to the ruthlessness and spread of COVID-19.

Environmental or climatic factors, such as temperature, wind speed, and relative humidity, are important in the outburst of contagious diseases and are among the best indicators of coronavirus infections (Chen et al., 2020; Dalziel, Kissler et al., 2018). (Yuan et al., 2006). According to Anderson, Heesterbeek, Klinkenberg, and Hollingsworth (2020), the pandemic rapidly expanded across China and the other twenty-four nations that are located in the geographic region between 42.937084° N and -75.6107° E. It is predicted here that COVID-19 cases would rise astronomically in Nigeria during the rainy season, which occurs around April and September, rather than in the dry season, which occurs around October and March, as existing literature demonstrates that humidity and temperature play a momentous role in the periodic breakout of COVID-19 and other respiratory flu viruses (see Table 2 and Figure 1). Nonetheless, adhering to certain laws and preventative measures, such as social distance, lockdowns, quarantines, hand and respiratory cleanliness, might be beneficial.

3. Strategic Options for Containing and Controlling the Spread of COVID-19 in Nigeria

Reports and suggestions have been presented by a number of presidential committees and commissions that were tasked with reviewing Nigeria's jail overcrowding. Amnesty International (2008) lists these as the following: the Inter-Ministerial Summit on the State of Remand Inmates in Nigeria's Prisons established in 2005; the Presidential Committee on Prison Reform and Rehabilitation established in 2006; the Presidential Commission on the Reform of the Administration of Justice (PCRAJ) established in 2006; and the Committee on the Harmonisation of Reports of Presidential Committees Working on Justice Sector Reform (2007), among others. The National Working Group on Prison Reform and Decongestion submitted its report in 2005. Unfortunately, these suggestions for improving the conditions in Nigerian jails have not come to pass. It is past time to put these suggestions into practice. The supply of sufficient funding for prison administration, sufficient amenities for the wellbeing of the convicts, and effective oversight by the Minister of Interiors are the answers suggested by Opafunso and Adepoju (2016). Good administration has a major role in the decongestion of Nigerian prisons (Adegbami & Uche, 2015). Our jails will remain overcrowded and a breeding ground for hardened criminals rather than rehabilitated and reformed people until the nation had responsive and good governance.

Because it is best for individuals to stay in well-ventilated spaces with ideal temperatures and exercise often or maintain physical fitness (Rushd, 1987; Razi, 2008), Nigerians should make it a habit to avoid chilly locations and/or extreme temperatures and to exercise frequently during epidemics. Additionally, during epidemics, it has been recommended that people should consume less meat, sweets, and fruits high in water content and instead increase their intake of citrus and sour fruits like grapes, apples, and lemons (Rushd, 1987). They have also been advised to avoid overeating, undereating, and staying thirsty (Sina, 1878, cited in Nikhat & Fazil, 2020). In the COVID-19 era, Nigerians need to be made aware of the appropriate dietary adjustments. Additionally, as "cleanliness is equal to godliness", maintaining a clean environment and practicing excellent waste management are useful strategies for halting the COVID-19 virus's proliferation. As a result, people should properly dispose of their garbage and maintain clean homes and surroundings. As emphasised by Nikhat & Fazil (2020), environmental sanitization should always come first in order to stop or limit the virus's transmission.

The reproductive number (R_0) of the COVID-19 pandemic indicates the usual number of individuals to whom a single infested individual will transfer the virus. As of January 23, 2020, the WHO estimated that the attack rate (also known as transmissibility) of the virus was between 1.4 and 2.5 (WHO, 2020), between 1.5 and 3.5 (Imai et al., 2020; Read, Bridgen, Cummings, Ho, & Jewell, 2020), between 3.6 and 4.0, and between 2.24 and 3.58 (Zhao et al, 2020). According to the findings mentioned above, any epidemic with a R_0 of less than 1 would eventually fade away. Therefore, it is rational to conclude that the COVID-19 epidemic will not vanish from the face of the planet or be readily subdued by humans. This implies that unless a long-term treatment or other remedy is found, people will have to absorb to accommodate the virus for a while.

Instead of attending to tales that could make them feel tenser, Nigerians should check the NCDC website, social media accounts, the World Health Organisation (WHO) website, and the platforms of local health authorities for statistics updates and helpful advice at precise times of the day (Ofonagoro, 2020). While incorrect knowledge may be deadly and toxic, accurate information is a powerful tool. Nigerians may probably get accurate and pertinent information on the COVID-19 pandemic from the NCDC and WHO, among other relevant organisations.

The World Health Organisation has advised certain protective measures for the control of COVID-19 transmission, including social distancing and self-isolation, respiratory hygiene (keeping cough etiquette), hand hygiene (hands washing with water and soap or hand sanitizer), and others, based on prior acquaintance of MERS and SARS infections (Chakraborty & Maity, 2020). The widespread typhus outbreak that struck the Warsaw Ghetto in 1941 was thought to have been effectively controlled by social separation, quarantines, personal cleanliness (particularly hand

hygiene), and grassroots public education (Stix, 2020). Nigerians and their governments should take these preventative measures and initiatives seriously as they can also be effectively applied to COVID-19. For Nigeria to succeed in the battle touching COVID-19, large-scale gatherings in public and religious spaces must also be carefully monitored or restricted.

4. Conclusion

The rapid development of the COVID-19 pandemic in Nigeria has been predicted due to a number of factors, including population growth and overcrowding, governmental and public attitudes, and temperature changes. Effective COVID-19 control, prevention, and management in the country will need the combined efforts of the people and the government. People may contribute to the government's efforts in the battle, and the government must be honest and open about the strategies it has chosen to limit the epidemic. Individuals should, as a necessity, obey the guidelines for the control of the pandemic released by the government, which include guidelines on hand hygiene, respiratory hygiene, social distancing, self-isolation, lockdown, and travel bans, among others. The government, on the other hand, should provide an enabling environment and support for the citizens to observe the WHO's guidelines, including provision of equipment and palliatives.

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