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Prevalence of Mortality in Nigeria During and After COVID-19: The Role of Government and International Organisations

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Abstract
The population of Nigeria of 200 million people had tested samples of 3,142,971 COVID-19 cases, with a cumulative number of 208,797 confirmed cases, 2,769 deaths and with a fatality ratio of 1.3 percent. Demographic indicators showed that male gender were more affected when compared to female with the age bracket of 25-39 years mostly affected. Reports revealed that people within the age bracket 35-39 years constituted majority of the COVID-19 affected with the pandemic while those within the age bracket 25-29 years constituted a bulk of the female affected with the virus. The methodology used for this paper is in-depth review of scholarly papers and articles based on the general and specific objectives of the paper. The paper concluded that more action plan needs to be in place in preventing mortality and morbidity rates in Nigeria as proactive measures.

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I. Background

The United Nations report revealed that as at 16th October, 2021, the population of Nigeria of 200 million people had tested samples of 3,142,971 COVID-19 cases, with a cumulative number of 208,797 confirmed cases, 2,769 deaths and with a fatality ratio of 1.3 percent. Henshaw *et al.,* 2021, posited that after the COVID-19 pandemic was declared by the World Health Organisation, a handful of cases and deaths have been recorded globally which Nigeria is among. The occurrence of COVID-19 has resulted to loss of lives globally and had resulted to an inestimable obstacle to food security, public health, and economic development.

The negative effect of the pandemic on socio-economic development has been devastating as millions of people have been forced to living in extreme poverty and with about 3.3 billion of global workforce facing the risk of job loss. The implications of the scourge in public health have been in areas of blood transfusion services, disruption of chain in medical supply, management of chronic diseases and diagnosis. Border closures in Nigeria due to the pandemic had led to food shortages, affecting economic activities and accelerating poverty. Declining remittances and reduction in export demand are other negative effects of the pandemic on socio-economic activities in Nigeria due to outbreak of the pandemic.

According to Kelly *et al.,* 2022 COVID-19 mortality rate has not been formally assessed in Nigeria. Their study was aimed at addressing the gap and mortality risk factors during the first and second waves in Nigeria. They used retrospective analysis of national surveillance data from all 37 states in Nigeria between February 27, 2020 and April 3, 2022. Their outcome variable was mortality amongst persons who have been tested positive for SARS-CoV-2 by Reverse-Transcriptase Polymerase Chain Reaction.

The incidence rate of COVID-19 mortality was calculated by dividing the number of deaths by total person-time in days contributed by the entire study population and presented per 100,000 person-days with 95 percent Confidence Interval (95% CI). Adjusted negative binomial regression was used to identify factors associated with COVID-19 mortality and their findings revealed that the incidence of COVID-19 was higher in the first wave than the second wave and factors associated with the increased risk of the virus in the first wave were age (greater than 45 years), and gender, especially the male gender. They suggested clinical care and improvement in public health response.

1.1 Objectives of the Study

The objectives of this paper shall be in line with examining the prevalence of mortality in Nigeria during and after COVID-19 and assessing the role of government and international organisations in preventing the pandemic. The general objective shall be to ***examine the prevalence of mortality in Nigeria during and after COVID-19.*** The proximate objective shall be to assess the role of government and international organisations in preventing the pandemic in Nigeria. The specific objectives shall be to examine:

1. The Prevalence of Mortality in Nigeria during COVID-19

2. The Prevalence of Mortality in Nigeria after COVID-19

1.2 Prevalence of Mortality in Nigeria during COVID-19

Henshaw *et al.,* 2021 revealed that as at March 2021, Nigeria was the seventy seventh most affected country globally and the fifth most affected African country with COVID-19 with 162,593 cases of COVID-19 and 2,048 COVID-19 related deaths. Their study showed that COVID-19 has been reported in all 36 states including the Federal Capital Territory with Lagos remaining the epicentre of the pandemic accounting for about 35.4 percent of the pandemic in Nigeria. Trend showed prevalence of male affliction with age brackets 35-39 years. Attack rate was reported at 78.8 per 100,000 population while the cumulative death per 100,000 of the population was found to be 1.0. The case fatality rate was reported to be 1.30 with approximately 1,778,105 COVID-19 tests been performed and 923,623 doses of vaccine administered.

They stressed further that COVID-19 was reported in all states in Nigeria including the Federal Capital Territory with many of the cases involving the male gender. The trend of the case revealed a bimodal form indicating a second wave occurrence. They concluded that Nigerian government has initiated combative measures as well as vaccine initiation in order to curb the scourge and its effects.

1.21 Origin and Incidence of COVID-19 Case in Nigeria

Nigeria recorded the first confirmed case of the pandemic with a 44 year old Italian Citizen that arrived the Murtala Mohammed International Airport, Lagos through a Turkish Airline on February 24, 2020 and ever since then, the transmission of the virus progressed to community transmission. Since the inception of the disease till March 28, 2021, the country recorded a total of 162,593 confirmed cases of COVID-19. Stratification by states, studies revealed that the Federal Capital Territory, Lagos-State, Plateau State, Oyo State, Rivers State and Kaduna State had the highest number of confirmed cases with Lagos State reported to have been the epicentre of the pandemic accounting for about 34.4 percent of the COVID-19 cases.

The table shows a summary of the epidemiological index of COVID-19 pandemic in Nigeria from week 9 (February 29, 2020) to week 12 (March 28, 2021)

Epidemiological Indices	**Frequency**
Cumulative confirmed cases	162,593
Cumulative recoveries	150,308
Cumulative deaths	2,048
Total active cases	10,237
Attack rate per 100,000 of population	78.8
Cumulative deaths per 100,000 of population	1.0
Case fatality rate	1.3
Total tests performed	1,778,105
PCR	1,608,186 (90.4%)
RDT	169,919 (9.6%)
Total dose of vaccines administered	923,623
Vaccine approved for use	AstraZeneca/Oxf vaccine

Source: PubMed Central (PMC)
PCR – Polymerase chain reaction
RDT – Rapid diagnostic test

From the table above, the total number deaths attributed to COVID-19 in Nigeria till March 2021 (cumulative deaths) was 2,048, number of recoveries until the specified date was 150,308 and cumulative confirmed cases until 2021 was 162,593 patients. The total number dose administered was 923,623. The case fatality rate from inception till 2021 also revealed 1.30 with 1,778,105 total tests performed. Attack rate per 100,000 of population was 78.8 while cumulative death per 100,000 of population was 1.0.

The Table below shows the stratification of COVID-19 data in Nigeria by states from week 9 (February 29, 2020) to week 12 (March 28, 2021)

States	No.ofCases	%of Cases	No.ofdeaths	%ofdeaths	CFR	No.of tests
Lagos	57,581	35.41	439	21.43	0.76	428,499
FCT	19,617	12.06	156	7.62	0.75	242,845
Plateau	9,024	5.55	57	2.78	0.63	66,908
Kaduna	8,914	5.48	65	3.17	0.73	77,538
Rivers	6, 909	4.25	100	4.88	1.45	160,199
Oyo	6, 838	4.20	123	6.00	1.80	56,286
Edo	4,875	3.00	185	9.03	3.79	33,739
Ogun	4,617	2.84	49	2.39	1.06	69,821
Kano	3,902	2.40	110	5.37	2.82	91,948
Ondo	3,168	1.95	62	3.03	1.96	23,684
Kwara	3,078	1.89	55	2.68	1.79	23,684
Delta	2,599	1.60	71	3.47	2.73	34,499
Osun	2,524	1.55	52	2.54	2.06	18,352
Nasarawa	2,318	1.42	13	0.63	0.56	22,546
Enugu	2,237	1.37	29	1.42	1.30	22,183
Katsina	2,083	1.28	34	1.66	1.63	37,909
Gombe	2,030	1.25	44	2.15	2.17	43,517
Ebonyi	2,007	1.23	32	1.56	1.59	14,959
Anambra	1,909	1.17	19	0.93	0.99	23,999
Akwaibom	1,762	1.08	14	0.68	0.79	16,708
Abia	1,665	1.02	21	1.02	1.26	21,141
Imo	1,642	1.01	37	1.85	2.25	33,517
Bauchi	1,521	0.93	17	0.83	1.12	24,498
Borno	1,327	0.82	38	1.85	2.86	19,760
Benue	1,188	0.73	22	1.07	1.85	16,639
Adamawa	1,051	0.64	32	1.56	3.04	18,255
Niger	930	0.57	17	0.83	1.83	17,505
Taraba	910	0.56	22	1.07	2.42	12,578
Ekiti	865	0.53	11	0.54	1.27	16,090
Bayelsa	852	0.53	26	1.27	3.05	16,735
Sokoto	774	0.48	28	1.37	3.62	18,749
Jigawa	518	0.32	16	0.78	3.09	8,987
Kebbi	442	0.27	16	0.78	3.62	14,878
C/Rivers	366	0.27	17	0.83	4.64	6,871
Yobe	313	0.19	9	0.44	2.87	10,410
Zamfara	232	0.14	8	0.39	3.45	7,392
Kogi	5	0.003	2	0.10	40.00	4,600

Source: PubMed Central (PMC)

From the table above, mortality by states showed that Rivers State, Kano State, Oyo-State, FCT, Edo State and Lagos State recorded the most affected cases with the pandemic related to deaths with 4.88%, 5.37%, 6.00%, 7.62%, 9.03% and 21.43% respectively. Result revealed Cross River, Kogi, Kebbi, Zamfara, Jigawa and Edo States as top six case fatality rates across states.

1.22 Number of COVID-19 Cases in Nigeria

Lagos State, been one of the states with highest population in Nigeria has been an epicentre for COVID-19 and the state has most of the times recorded the prevalence rate in epidemiological diseases including COVID-19. Lagos State has the highest number of COVID-19 cases with 57,581 cases followed by the Federal Capital Territory with 19,617 cases. This corresponds to 35.41 and 12.06 percents respectively of the total amount of COVID-19 cases recorded in Nigeria. With Lagos State alone having 35.41 percent of all cases, this shows the high prevalence of the pandemic in the State. In contrast, Zamfara and Kogi States had the lowest prevalence of COVID-19 with only 232 and 5 cases of COVID-19 corresponding to 0.14 and 0.003 percents respectively of all cases of COVID-19 recorded in Nigeria.

1.23 Number of Deaths Attributed to COVID-19

Lagos State and Edo State recorded the highest number of deaths attributed to COVID-19 with 439 and 185 deaths corresponding to 21.43 and 9.03 percents respectively of the total deaths attributed to COVID-19 in Nigeria. Even though the Federal Capital Territory was second largest in terms of COVID-19 cases with 19,617 cases, Edo State had the second highest number of deaths attributed to the pandemic. This can be attributed to treatment factor. For example, the Federal Capital Territory had 242,845 number of tests when compared to Edo State that had only 33,739 tests. In contrast, Zamfara and Kogi States had the lowest number of deaths attributed to COVID-19 with 8 and 2 casualties corresponding to 0.39 and 0.10 percents respectively of the total number of deaths in Nigeria attributed to COVID-19.

1.24 Demographics of the Pandemic

Demographic indicators showed that male gender were more affected when compared to female with the age bracket of 25-39 years mostly affected. Reports revealed that people within the age bracket 35-39 years constituted majority of the COVID-19 affected with the pandemic while those within the age bracket 25-29 years constituted a bulk of the female affected with the virus. Demographic stratification revealed that male gender was more vulnerable to death due to COVID-19 within the age range 45 years and above.

1.3 The Prevalence of Mortality in Nigeria after COVID-19

According to the World Health Organisation report; (2020), sub-Sahara African countries have the highest maternal mortality rate with 533 maternal deaths per 100,000 live births, yearly, they estimated 200,000 maternal deaths yearly which is over two-thirds; that is about 68 percent of all maternal deaths in the globe. Maternal Mortality Ratio was reported to be high in sub-Saharan Africa and other developing countries, with India and Nigeria alone accounting for about 34 percent of maternal deaths in the world. The World Health Organisation (WHO) also estimated Maternal Mortality Ratio in Nigeria at 814 per 100,000 live births.

Over the past five years, under-five mortality rate and infant mortality have remained steadily high in Nigeria with 117 deaths per 1000 live births and 74 deaths per 1000 live births respectively. As at 2023, the infant mortality rate in Nigeria is estimated at 54.740 deaths per 1000 live births which represent a 2.63 percent decline from that of 2022. Maternal mortality is an aspect of mortality that deals with number of women that die from pregnancy-related causes. In this case the age-sex selectivity is with women of reproductive age within 15-49 years. Maternal mortality can be defined as number of deaths attributed to complications arising from childbirths and pregnancy.

It can also be defined as the number of annual female deaths attributed or aggravated by pregnancy or its management; excluding incidental or accidental causes within 42 days of termination of pregnancy or during pregnancy and childbirth irrespective of site of pregnancy or duration. The death of a woman after delivery or at delivery poses a tragedy for her family and society at large.

Regionally, maternal mortality is high in all regions including south east. As at 2020, it was reported that in south-east Nigeria, the maternal mortality ratio was 902.7 per 100,000 live births and Ebonyi state was among the leading states of high maternal mortality rate recording over 7,014 deaths in just 40 health facilities. In northern Nigeria, there is high level of maternal mortality which was estimated between 1,152-1,445 per 100,000 live births which is also very high. The major cause of this high rate in northern Nigeria can be attributed to low access to reproductive health care services coupled with low level of women education and early age of entry into reproduction.

There are several leading factors to maternal deaths in Nigeria. These factors include such as unsafe abortion, inadequate human resources in various health centres, obstructed labour, delay in seeking health services by women, haemorrhage infection, inadequate equipments in many Nigerian clinics, delay in referrals services, inadequate ambulance services for transportation, and hypertensive diseases; most especially complications of unsafe abortion. Underutilisation of efficient and effective reproductive healthcare services and poor access to health care facilities have also been identified as other causes of high maternal mortality rate in Nigeria.

Community-based organisations need to rise up towards this challenge through advocacies and awareness programmes by educating mothers and public in general on maternal health and causes of maternal mortality, encouraging birth spacing and family planning, discussing and recognising potential signs that may necessitate emergency intervention.

1.31 Factors Responsible for High Mortality Rates in Nigeria

According to Henshaw & Kingsley *et al.,* (2020), data on mortality and morbidity are very essential in disease assessment, monitoring and evaluation of health policies in Nigeria. They conducted a study causes and mortality and morbidity among patients of tertiary hospitals in southern Nigeria; assessing 6 years with the aim of describing the causes mortality and mortality in various wards of University of Calabar Teaching Hospital. They utilized data on patients admitted into the University Teaching Hospital in the last 6 years which was a retrospective data. They discovered that most leading causes of death were parasitic disease, infectious disease and disease of the circulatory system which is often referred to as cardiovascular diseases which accounted for about 13.7 percent mortality rate.

They stressed further that infectious diseases were the main cause of mortality among adults while issues pertaining to perinatal period were the major cause of disease among children. They also identified some other causes of death among children such as stroke, liver diseases, diabetics, tuberculosis, HIV/AIDs, and malaria among others as some of the leading causes of mortality in the region. They recommended that most causes of mortality in the region can be prevented highlighting non-communicable diseases and communicable diseases as the two main burdens of morbidity in the region.

Dawud (2016), in a study of socio-economic determinants affecting maternal mortality in rural communities of Oyo-State, he examined proximity to health care facilities as one of the determining factors of maternal mortality; proximity to health facilities, which was significant. He concluded that level of income, educational status of women, purchasing power and low access to health facilities determined maternal mortality in rural areas in Oyo State. he suggested that awareness campaign and intensive maternal health care need to be embarked with the intent of reducing maternal mortality in rural communities and the state at whole. He also recommended that efforts need to be intensified towards adopting modern health practices, geared towards reducing maternal mortality in the state and Nigeria at large.

Aliyu, Prince & Uzoma (2020) asserted that maternal health seeking behaviour is still poor in northern Nigeria in spite of efficient distribution of primary healthcare centres (PHCs) all over the grassroots of the region. They stressed that there is need for proper understanding of why maternal health is still poor despite the availability of primary health care centres across the region thereby militating against the achievement of global health goals. Their study investigated on the factors that have affected the utilization of primary health care services by women of reproductive age in Niger-east senatorial zone, Niger State and discovered maternal mortality in the study area was bound by the disparity between availability and utilization of maternal health services offered by the primary healthcare in various locations of the study area.

They identified some factors that might have militated the use of such facilities such as lack of support networks, culture, economic challenges, attitude of health workers and equipment gaps. They recommended that social workers need to be engaged towards blending the upstream, midstream and downstream public health interventions geared towards addressing the influential factors in achieving positive maternal health outcomes in Nigeria.

According to Salima, Adaugo & Macide (2019), issues relating to maternal mortality in developing countries remain a major concern for policy makers, and health planners. They conducted a systematic review with a view of identifying the Major indirect and direct causes of high maternal mortality rate in Nigeria so as to identify the gap of what is already on ground and what ought to be. They identified pre-eclampsia, hemorrhage and eclampsia as most possible cause of maternal mortality; all of which can be prevented by early detection, regular antenatal check-ups, easy access to health care facilities and presence of trained birth attendants to assist during delivery.

They recommended that utilization of antenatal care services need to be increased through improving the number of booked patients, safe blood transfusions and ensuring that provision of essential medicines geared towards reducing the current high mortality rates in Nigeria.

Dele & Ibrahim *et al.,* (2015) conducted a research on quality of obstetric care services; availability, utilization in Bauchi State with the objective of reporting on the availability, utilization and assessing the quality of emergence obstetric services in Bauchi State. They discovered that only 6 out of 59 of health facilities met the United Nations requirements of Emergency Obstetric Centre. They stressed that none of the three senatorial zones in the state had the minimum acceptable number of facilities required for emergency obstetric care.

They went further that only 1,416 of expected 35,990 obstetric complications were managed in emergency obstetric clinics and in all, 10,517 corresponding to only 4.4 percent of estimated 239,930 annual births took place in emergency obstetric centres with about 379 maternal deaths out of which 317 were attributable to major obstetric complications. They concluded that quality emergency obstetric services need to be available for utilization which are not optimal. They also recommended health systems need to be properly managed to sustain its capacity in handling obstetrics complications.

1.32 Morbidity as Determining Factor of High Mortality Rates in Nigeria

According to Garba & Muhammad *et al.,* (2014) in a study on pattern of medical childhood mortality and morbidity using data of a specialist hospital in Gusau, northern Nigeria acknowledged that medical childhood mortality and morbidity in developing countries such as Nigeria is very high. Using data regarding paediatric admissions at Yariman Bakura Specialist Hospital, Gusau to evaluate patterns of mortality and morbidity in the state within April 1, 2013 and March 31, 2014; they discovered that the common diagnosis regarding morbidity was infectious diseases such as diarrhoea, malaria, sepsis and pneumonia which accounted for a mortality rate of about 11.2 percent.

They asserted that diarrhoea, malaria, sepsis and seizure disorder were the most common causes of death among under-five children. Their results showed that under-five children were most likely to die compared to over five years. They concluded that patterns on mortality and morbidity of children in Gusau are similar to what has been reported in other studies. They recommended that synergy of efforts from all stakeholders in the health sector towards provision of drugs and ensuring adequate vaccination of children geared towards improving the health conditions of children in the state.

Eregie & Unadike (2010) in a similar study using University of Benin Teaching Hospital morbidity and mortality records asserted that diabetics mellitus as a cause of morbidity and mortality worldwide and Nigeria is not an exemption. They assessed morbidity and mortality patients admitted through retrospective examination of

records; most especially admissions and death certificate records from various medical wards in the hospital and data was analysed using chi-square. They discovered that the overall mortality rate with medical admissions was 21.8 percent with diabetics accounting for over 6.7 percent deaths. They also went further that within the diabetics cohort, mortality was 15.9 percent which is significantly high most especially with aged 65 years and above.

They asserted that the most common causes of mortality in diabetic cases in the region was complications associated with foot syndrome and Cerebrovascular disease. They also identified some other morbidity cases associated with high death rate of patients within the hospital such as Carcinoma of the Cervix, Hepatic Encephalopathy and Malaria. They recommended adequate health education as a critical factor that need to be embarked upon in order to reduce mortality and morbidity in the region.

This is also in consonance with similar study of Emmanuel & Alfred *et al.,* (2010) in a study conducted on possible causes of mortality among elderly in tertiary hospitals. The main objective of their study was to examine the possible causes and pattern of deaths among the elderly patients in tertiary hospitals in Nigeria. They concluded that old age is also an important determinant of increased risk of dying in hospitals.

1.4 Prevention of Mortality in Nigeria

Prevention of exposure to infectious agents that are known to cause mortality through re-orientation, education, provision of necessary medical amenities and improving on sanitary habits will go a long way reducing mortality of all ages in Nigeria. In order to reduce maternal deaths in Nigeria, it is very important to prevent unintended pregnancies and ensure that all adolescents and women have access to safe-abortion services, contraceptive devices and quality post-abortion care services. Several studies have identified some major causes of maternal mortality, estimating that about 70 percent of maternal mortality in Nigeria can be attributed to infection, haemorrhage, unsafe abortion, and hypertensive diseases associated with pregnancy such as eclampsia and obstructive labour.

Presently, Nigeria has more than 34,000 Primary Health Care (PHC) centres that are at the entry point level covering all hard-to-reach communities and health wards. With this backdrop, improving on the affordability, accessibility, availability of health care services most especially ensuring quality primary health care services will go a long way in reducing high rate of maternal and neonatal mortality in Nigeria. Maternal and Infant mortality can be reduced in Nigeria through provision of information on breastfeeding, baby-care and its benefits, vaccination of newborns at age-appropriate times, warning parents on dangers associated with exposing infants to second hand smoke, and counselling parents on placing infants sleeping on their backs.

There is also need by successive governments to have policies and programmes in preventing mortality and morbidity in Nigeria. Policies and programmes in preventing various types od diseases, epidemics such as COVID-19 need to be in place at various tiers of government as pro-active measures towards preventing deaths in Nigeria. Various acts such as the maternal deaths Act enacted by the government was with the view of supporting states in their duties towards saving and sustaining health care services such as maternal health during postpartum period, pregnancy and child birth with the goal of eliminating disparities in maternal health outcomes on deaths associated with pregnancy and identifying solutions towards improving quality of health care in Nigeria.

Government policies on morbidity and mortality in Nigeria over years have been directed towards reducing maternal and child mortality in accordance with achieving the Millennium Development Goals (MDGs). However, there is need for continuous review and implementation of those programmes and policies with the intent of ensuring proper health care services, proactive measures towards reducing morbidity and epidemics with the intent of improving the standard of living of Nigerians.

1.5 The Role of Government and International Organisations in Preventing COVID-19 and other Epidemics in Nigeria.

Nigerian Government through the Ministry of Health and with support from other foreign agencies such as the World Bank implemented the Nigerian COVID-19 Preparedness and Response Project (CoREP) which was referred to as parent project. The project was with the view of addressing the immediate critical needs of the country for preparedness and response for COVID-19 in Nigeria. The National Action Plan (NAP) against COVID-19 was with the intention of providing a national strategy that prescribes guidelines on how to prevent and curtail the spread and eliminating the threat of the virus. The Nigerian government was also proactive with urgent need in ensuring that children are protected against diseases through vaccination. The outbreak of the COVID-19 pandemic in Nigeria hindered vaccination activities in Nigeria and other sub-Saharan African countries which has also threatened the surveillance of vaccine-preventable diseases.

Even though most countries in Africa and sub-Saharan such as Nigeria have been facing serous challenges in battling with the disease such as lack of technical expertise, lack of material resources, high population density, lack of proper awareness, Nigerian government still put in place measures towards

addressing the scourge in Nigeria. Some of the measures of the Nigerian government in responding to COVID-19 pandemic was the implementation of the anti-COVID-19 mitigation strategies in social distancing, travel restrictions, source control, self-isolation, contact tracing, clinical interventions and quarantine to mention a few. Some of the possible contributions in the control and prevention measures of COVID-19 put in Nigeria was the avoidance of close contact with people that are sick, minimising touching of the eyes, mouth and nose, staying at home of the sick, covering of cough and sneeze with tissue and throwing the tissue in the trash.

The Nigerian government also has policies in preventing mortality in Nigeria. Policies on preventing maternal deaths in Nigeria such as the maternal deaths Act is with the view of supporting states in their duties towards saving and sustaining maternal health during postpartum period, pregnancy and child birth with the goal of eliminating disparities in maternal health outcomes on deaths associated with pregnancy and identifying solutions towards improving quality of health care in Nigeria. Mortality policies in Nigeria over years have been directed towards reducing maternal and child mortality in accordance with achieving the Millennium Development Goals (MDGs) of maternal and child health and Sustainable Development Goals (SDGs) on maternal and newborn health (MNH) in Nigeria by 2030.

II. Mortality Theory

2.1 Epidemiological Transition Theory

Epidemiological transition is the process of transforming the pattern of diseases and mortality which is high among children and infants but are natural or transforming the patterns of diseases and mortality affecting all age groups to human made diseases such as smoking. The transition from that of natural to human made diseases and mortality is often attributed to complexities in the society due to development such as car accident, plane crash, HIV/AIDs and even the COVID 19 disease and its mutations are attributed to human manipulation of its environment and associated development in science and medicine. The theory was first pronounced by Abdel R. Omran in 1971 in a paper published on theory of epidemiological transition in mid 1990s which was understood as a theoretical statement of shift from infectious diseases to chronic diseases that are supportably attributed to modernisation.

In medical geography and demography, epidemiological transition is a theory that describes changes in population patterns in terms of life expectancy, fertility, mortality and leading causes of death due to modernisation. It is usually a transformation from phase of primitive society to phase of development which is attributed to improved food, agriculture, population growth rates and its associated effects in terms of diseases and mortality. The theory follows that the phase of development associated with increase in population growth rate due to innovations in public health, medicine and food security will eventually usher in decline in fertility since there is an inverse relationship between fertility and development. The transition will eventually usher in the replacement of infectious diseases with chronic diseases due to increased life span of people attributed to disease prevention, improved health care and so forth.

According to this theory, there are three possible factors that are possible of reducing fertility rates:

1. Bio-physiologic factors which are which are often associated with reduced infant mortality and increasing the life expectancy of parents
2. Socioeconomic factors which are often associated with improving childhood survival and economic challenges of large family size and
3. Emotional or Psychological factors which are often associated with a situation where a society as whole changes its opinion and rationale on family size and parental energies are thereby redirected to qualitative aspect of child-raising.

The theory is usually divided into three (3) phases with the last stage of chronic diseases replacing infectious diseases as the primary cause of death. The three phases are:

Phase 1: Age of Pestilence and Famine

In this stage, mortality is high with low life expectancy within 20 and 40 years. This stage is also characterised with malnutrition, increase in infectious diseases and famine. Some of the professions of this age are hunting, gathering, faming and so forth. This life setting is characterised with dispersed population, seasonal and unreliable food sources thereby putting the community at risk of malnutrition.

Phase 2: Age of Receding Pandemics

In this stage, mortality declines progressively with the rate of decline accelerating and epidemic peaks decreasing in frequency. In this stage, average life expectancy steadily increases to the range of 30 to 50 years. This stage is also characterised with exponential population growth rate.

Phase 3: Age of Degenerative and Man Made Diseases

At this stage, mortality continues to decline and will continue until mortality eventually reaches a stability level, a relatively low level. In this stage, mortality is related to cardiovascular diseases, cancer, substance abuse, violence, accidents and so forth which are degenerative. Most of these diseases are attributed to behavioural

attitudes such as smoking. The average life expectancy at this stage rises, exceeding 50 years. At this stage, fertility becomes the crucial factor in population growth.

In this final stage, there is inequality and diseases are largely controlled through access to health care facilities, education. Also cardiovascular diseases decreases due to changes in lifestyle, diet, culture and the prevalence rate of diseases associated with aging increases tremendously. Epidemiological transition occurs when a country undergoes transformational process, transiting from developing nation to developed nation.

The development of medicine such as antibiotics and improvement in modern health care reduces infant mortality rates drastically and extends average life expectancy. The increased life expectancy coupled with decline in fertility rates will usher in the transition to chronic and degenerative diseases as major causes of death. The theory uses health and diseases patterns as well as economic, demographic and sociological determinants and associated outcomes as frame work for its explanations.

2.11 Economic Impact on the Theory

The transition can also be associated with demographic movements – movement to urban areas, shift from labour based production output and agriculture to technological and service sector based economies. Developing countries are presently undergoing shift to diseases and demographic profiles when compared to the developed countries where the transition is based on socio-political and geographical factors. The transition in developed countries are attributed to socio-economic improvements, improvement in public health programmes; which are also happening in many developing countries, decrease in infectious diseases and mortality, increase in economic productivity through increase in participation of adults in the labour force; that is, employment and through increase in the proportion of children that are surviving to maturity as productive members in the society.

III. Methodology

Methodology is the blue print about how the research or study will be conducted. The methodology used for this paper is in-depth review of scholarly papers and articles based on the general and specific objectives of the paper. The search engine used for this paper is the google scholar. The key words used for the electronic search are in accordance with the specific objectives of the study. Some of the literatures found in the google scholar were also in the Pubmed and other academic search data bases. Meaning and definition of concepts relating to: mortality levels, trends and causes were accessed from the internet and Nigeria Demography and Health Survey, (NDHS). The COVID-19 levels and trends in Nigeria were accessed from current publications and internet.

The specific objective: The Prevalence of Mortality in Nigeria during COVID-19 was accessed in the google scholar by imputing the key words: Prevalence of Mortality in Nigeria during COVID-19 in the search box of the google scholarly articles. Thereafter, various articles on this topic and similar articles were provided. Articles relating to this specific objective were reviewed and summarized for the literature review. The specific objective: The Prevalence of Mortality in Nigeria after COVID-19 was accessed in the google scholar by imputing the key words: Prevalence of Mortality in Nigeria after COVID-19 in the search box of the google scholarly articles. Thereafter, various articles on this topic and similar articles were provided. Articles relating to this specific objective were reviewed and summarized for the literature review.

Mortality Theories, Strategies and National Population Policies are supporting documents for this paper. Mortality theories were sourced from the internet and the various mortality strategies most especially as it relates with the National Population Policy were sourced from the document and other related documents. Most of the strategies were also on the internet. The summarization of results will be deduced from the literatures and discussions made so far and this will form the chapter four of this paper while the last chapter, (chapter five) will be the author's personal conclusion.

IV. Results and Discussion

Result revealed that Nigeria was the Seventy-seventh most affected country globally and the fifth most affected African country with COVID-19 with 162,593 cases of COVID-19 and 2,048 COVID-19 related deaths. Their study showed that COVID-19 has been reported in all 36 states including the Federal Capital Territory with Lagos remaining the epicentre of the pandemic accounting for about 35.4 percent of the pandemic in Nigeria. Trend showed prevalence of male affliction with age brackets 35-39 years. Attack rate was reported at 78.8 per 100,000 population while the cumulative death per 100,000 of the population was found to be 1.0. The case fatality rate was reported to be 1.30 with approximately 1,778,105 COVID-19 tests been performed and 923,623 doses of vaccine administered.

Nigeria recorded the first confirmed case of the pandemic with a 44 year old Italian Citizen that arrived the Murtala Mohammed International Airport, Lagos through a Turkish Airline on February 24, 2020 and ever since then, the transmission of the virus progressed to community transmission. Since the inception of the

disease till March 28, 2021, the country recorded a total of 162,593 confirmed cases of COVID-19. Stratification by states, studies revealed that the Federal Capital Territory, Lagos-State, Plateau State, Oyo State, Rivers State and Kaduna State had the highest number of confirmed cases with Lagos State reported to have been the epicentre of the pandemic accounting for about 34.4 percent of the COVID-19 cases.

Lagos State, been one of the states with highest population in Nigeria has been an epicentre for COVID-19 and the state has most of the times recorded the prevalence rate in epidemiological diseases including COVID-19. Lagos State has the highest number of COVID-19 cases with 57,581 cases followed by the Federal Capital Territory with 19,617 cases. This corresponds to 35.41 and 12.06 percents respectively of the total amount of COVID-19 cases recorded in Nigeria. With Lagos State alone having 35.41 percent of all cases, this shows the high prevalence of the pandemic in the State. In contrast, Zamfara and Kogi States had the lowest prevalence of COVID-19 with only 232 and 5 cases of COVID-19 corresponding to 0.14 and 0.003 percents respectively of all cases of COVID-19 recorded in Nigeria.

Result also showed that Lagos State and Edo State recorded the highest number of deaths attributed to COVID-19 with 439 and 185 deaths corresponding to 21.43 and 9.03 percents respectively of the total deaths attributed to COVID-19 in Nigeria. Even though the Federal Capital Territory was second largest in terms of COVID-19 cases with 19,617 cases, Edo State had the second highest number of deaths attributed to the pandemic. This can be attributed to treatment factor. For example, the Federal Capital Territory had 242,845 number of tests when compared to Edo State that had only 33,739 tests. In contrast, Zamfara and Kogi States had the lowest number of deaths attributed to COVID-19 with 8 and 2 casualties corresponding to 0.39 and 0.10 percents respectively of the total number of deaths in Nigeria attributed to COVID-19.

Over the past five years, under-five mortality rate and infant mortality have remained steadily high in Nigeria with 117 deaths per 1000 live births and 74 deaths per 1000 live births respectively. As at 2023, the infant mortality rate in Nigeria is estimated at 54.740 deaths per 1000 live births which represent a 2.63 percent decline from that of 2022. Sub-Sahara African countries have the highest maternal mortality rate with 533 maternal deaths per 100,000 live births, yearly, they estimated 200,000 maternal deaths yearly which is over two-thirds; that is about 68 percent of all maternal deaths in the globe. Maternal Mortality Ratio was reported to be high in sub-Saharan Africa and other developing countries, with India and Nigeria alone accounting for about 34 percent of maternal deaths in the world. The World Health Organisation (WHO) also estimated Maternal Mortality Ratio in Nigeria at 814 per 100,000 live births.

Studies revealed that regionally, maternal mortality is high in all regions including south east. As at 2020, it was reported that in south-east Nigeria, the maternal mortality ratio was 902.7 per 100,000 live births and Ebonyi state was among the leading states of high maternal mortality rate recording over 7,014 deaths in just 40 health facilities. In northern Nigeria, there is high level of maternal mortality which was estimated between 1,152-1,445 per 100,000 live births which is also very high. The major cause of this high rate in northern Nigeria can be attributed to low access to reproductive health care services coupled with low level of women education and early age of entry into reproduction.

There are several leading factors to maternal deaths in Nigeria. These factors include such as unsafe abortion, inadequate human resources in various health centres, obstructed labour, delay in seeking health services by women, haemorrhage infection, inadequate equipments in many Nigerian clinics, delay in referrals services, inadequate ambulance services for transportation, and hypertensive diseases; most especially complications of unsafe abortion. Underutilisation of efficient and effective reproductive healthcare services and poor access to health care facilities have also been identified as other causes of high maternal mortality rate in Nigeria.

Community-based organisations need to rise up towards this challenge through advocacies and awareness programmes by educating mothers and public in general on maternal health and causes of maternal mortality, encouraging birth spacing and family planning, discussing and recognising potential signs that may necessitate emergency intervention.

As part of policies in reducing mortality rates in Nigeria, the government established primary health care services. Presently, Nigeria has more than 34,000 Primary Health Care (PHC) centres that are at the entry point level covering all hard-to-reach communities and health wards. With this backdrop, improving on the affordability, accessibility, availability of health care services most especially ensuring quality primary health care services will go a long way in reducing high rate of maternal and neonatal mortality in Nigeria. Maternal and Infant mortality can be reduced in Nigeria through provision of information on breastfeeding, baby-care and its benefits, vaccination of newborns at age-appropriate times, warning parents on dangers associated with exposing infants to second hand smoke, and counselling parents on placing infants sleeping on their backs.

V. Conclusion

There is need for more collaborative effort of the Nigerian government through partnership with international organisations and other foreign agencies such as the World Bank in implementing strategies towards addressing epidemiological diseases in Nigeria. More action plan in preventing mortality and morbidity need to be put in place such as the National Action Plan (NAP) against COVID-19 which was saddled with the responsibility of providing a national strategy that prescribes guidelines on how to prevent and curtail the spread and eliminating the threat of the virus. The Nigerian government also need to be proactive with urgent need in ensuring that children are protected against diseases through vaccination. This will go a long way in preventing morbidity and reducing mortality in Nigeria.

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