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Urbanization and Health Conditions in Nigeria: Dealing with the Urban Health Challenges

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Abstract

Health concerns arising from urbanization requires serious commitment to revamp the Nigerian health sector. In that regards, this study sought to investigate the influence of urbanization and health expenditure on life expectancy and mortality rates in Nigeria from 1981 to 2020. The fully modified ordinary least squares (FMOLS) technique was used to ascertain the influence of urbanization and government health expenditure on life expectancy and mortality rates in Nigeria. From the result of FMOLS, it was observed that urbanization exerts a positive and significant effect on life expectancy; but exerts a negative and significant effect on mortality rates. Moreover, government health expenditure generated a negative and significant effect on life expectancy, but a positive and significant effect on adult mortality. As such, the 15% recommended by the World Health Organization should be given a top priority in order to alleviate the country out of the menace of health tourism that has bedevilled the country over the years.

Keywords
urbanization; life expectancy; mortality rates; government health expenditure

I. Introduction

Urbanization *as a process and the city as a concrete organism are processes that truly mark contemporary society* (Baloi, 2019). Urbanization is a complex set of economic, demographic, social, cultural, technological, and environmental processes that result in an increase in the proportion of a territory's population living in towns and cities, an increase in population concentration in the territory's larger settlements, and an upsurge in population density within urban settlements (Knox, 2009). Intensities of urbanization are strongly connected to intensities of economic development on a global scale, but rates of urbanization are negatively related to heights of economic development (Knox, 2009). Urbanization is influenced by demographic processes such as 'immigration' and 'migration', as well as *natural population increase*, but they are in turn influenced by other factors, particularly structural economic development (Knox, 2009). The economic condition of the population is a condition that describes human life that has economic score (Shah et al, 2020). The size of population and its growth have an unswerving bearing on the economic development, social well-being and political stability of a region (Andrabi, 2020). In further detail, urbanization patterns are the outcome of the interplay of these processes, which are impacted by feedback effects resulting from changing characteristics of urban systems, urban environment, and urban political economy (Knox, 2009).

As pointed out by Chaolin (2020), urbanization is a process in which the industrial arrangement swings away from basic industries and toward secondary and tertiary sectors. In this sense, urbanization include shifts in labour force composition from agricultural to

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non-rural industrial and service occupations, in addition to shifts in thinking patterns, lifestyle, behaviour models, values, and culture. In rapports of material development, urbanization frequently entails the creation of new urban infrastructure and public service facilities to accommodate changing economic and social situations (Chaolin, 2020). Consequently, urbanization is a multifaceted and diverse process that involves people movement from rural to urban regions, conversion of rural and urban land, spatial reconfiguration of settlements, and shifting governance and administration. Thus, concentration of people in bigger urban settlements in a particular region, along with the snowballing *density of population within urban settlements*, are two ways to describe urbanization (International Encyclopaedia of Human Geography, 2020). The progression of urbanization is adequately described by the population movement *from rural to urban* regions and the steady progression in the proportion of urban inhabitants (Eckert and Kohler, 2014).

The two most commonly cited origins of urbanisation in the literature have been the ongoing rural-urban movement and the pace of natural growth (Bodo, 2019). Thoughts have also diverged on the greatest vital contributor to swift urbanization in developing economies, with the majority of opinions appearing to be that *rural-urban migration* was a net contributor to the growth of urban centres from the 1950s to the 1970s, while natural increase has contributed more to urban growth in the last two decades (Chen and Parish, 1996). Human and environmental impoverishment, decreasing quality of life, and the untapped richness of human resources that they represent are among the difficulties faced by this rapid urbanisation (Chen, 2007). Housing and related utilities (water, electricity, etc.) are equally inadequate, resulting in millions of people living in poor and subhuman conditions, afflicted by slum, filth, and similarly deficient social amenities, schools, health, and recreational facilities (Bodo, 2015).

As documented by the United Nations, the global urban population rose from 13% in 1900 to 29% in 1950 and 49% in 2005, and it is expected that by 2030, 60% of the people would live in cities; with majority of the predicted increase to occur in Latin America, Asia, and Africa. As reported by Adewoyin, Chukwu and Sanni (2018), Asia and Africa are expected to be 56 percent and 64 percent urban by 2050, respectively. The urban population in Nigeria was put at 6,955,837 as at 1960 and increased steadily to 9,942,428 as at 1970. This was followed by a massive increase to a record high of 21,421,318 as at 1985. With this, the urban population grew from 15.41% in 1960 to 25.64% in 1985. A summary of the changing pattern and trend of the degree of urbanization is presented in Table 1 and Figure 1 below.

Table 1. Urban Population and Growth (1960 – 2020)

Year	Urban Population	Urban Population (% of Total Population)
1960	6,955,837	15.41
1965	8,296,672	16.551
1970	9,942,428	17.76
1975	12,535,434	19.78
1980	16,131,175	21.97
1985	21,421,318	25.635
1990	28,259,056	29.68
1995	34,764,763	32.205
2000	42,603,694	34.84
2005	54,260,116	39.074

2010	68,917,193	43.48
2015	86,652,535	47.838
2020	107,106,007	51.958

Source: World Development Indicators, 2020

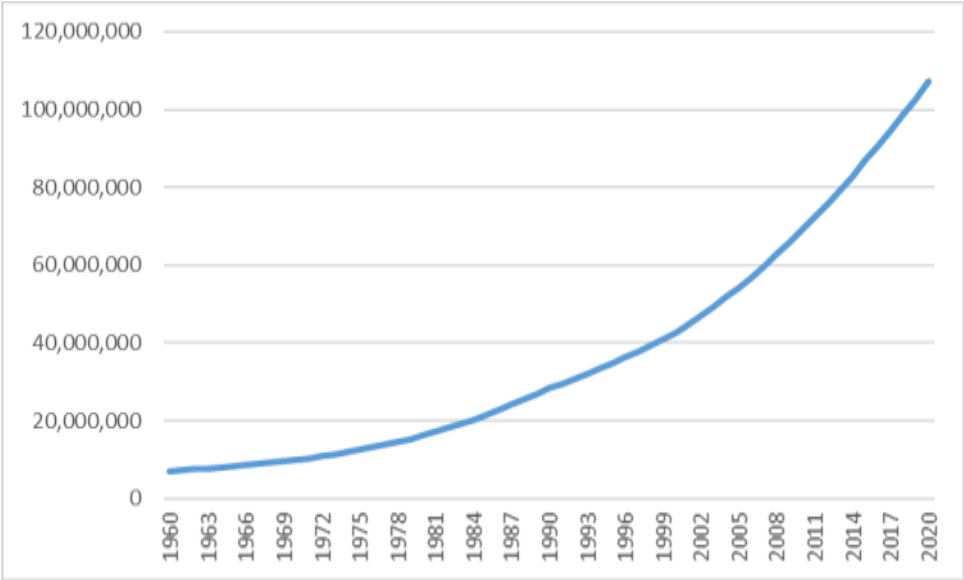

Figure 1. *Trend in the Growth of Urban Population from 1960 – 2020*

The urban population has maintained tremendous increase over the years. It was put at 28,259,056 as at 1990 but increased to 54,260,116 in 2005. As at 2020, the urban population was put at 107,106,007 with the urban population growing at the rate of 51.958% (World Development Indicators, 2020). The rising trend in the urban population is reflected in Figure 1 where the trend depicts a continuous increase over the years. With the projection from the United Nations, it is believed that this rising trend will continue over time.

However, the urbanization trend is not without issues. One such issue is that the leap of social service provision does not sustain with the frequency of urbanization and spatial dispersion in order to meet the population's demands. Healthcare is the utmost imperative of these services because of the consequences of people's health for economic growth at the household and regional levels (UN, 2012; WHO, 2016). Healthcare is becoming more essential due to the effects of urbanization on people's health, some of which are negative (Adewoyin, Chukwu and Sanni, 2018). According to World Health Organization (WHO) data, urban air pollution kills around 1.2 million people worldwide each year, primarily due to cardiovascular and respiratory illnesses (WHO, 2008). Owing to urbanization, pollution is mostly generated by smoke from motor vehicle exhausts, industrial pollutants, home power producing plants, and other household fuel burning. Between 35% and 50% of African urban inhabitants lack access to safe drinking water, 60% lack sufficient sanitation systems, over 1.2 million people die each year in traffic accidents, and more than 50 million suffer different degrees of damage (United Nations, 2003). This generates serious threats on the health conditions of the citizens.

Life expectancy has been exhibiting a lower trend when compared with that in developed economies. The proposed attainment of life expectancy of 70 years has not been met as earlier defined to be achieved by 2020 (Sede and Ohemeng, 2015). The life expectancy was 36.97 years as at 1960 and increased to 40.97 years, 45.33 years and 45.9 years for 1970, 1980 and 1990 respectively. Subsequently, it increased to 46.267 year in

2000 and then slightly up to 50.896 in 2010. In 2020 recently, the life expectancy rate was put at 54.13 years (World Development Indicators, 2020). The behaviour over the years is displayed in Figure 2 below.

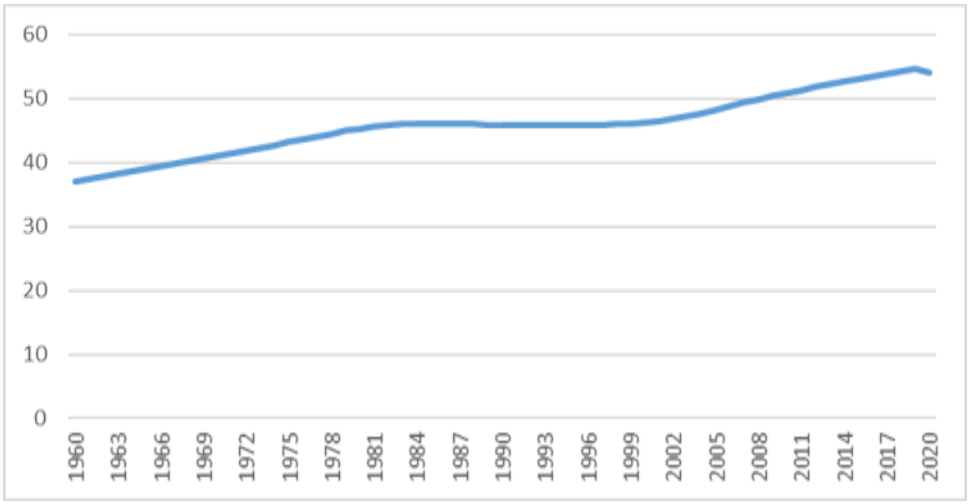

Figure 2. *Life Expectancy at Birth, Total (Years)*

Infant mortality is another key health condition is Nigeria. As at 1981, adult female and male mortality rate was put at 365.994 and 420.874 per 1,000 female adult and male respectively. Meanwhile, infant mortality was put at 125.6 per 1,000 live births. Infant mortality was being exhibiting steady decline over the years, reaching a record low of 74.2 per 1,000 live birth as at 2020. The behaviour is reflected in Figure 3 below.

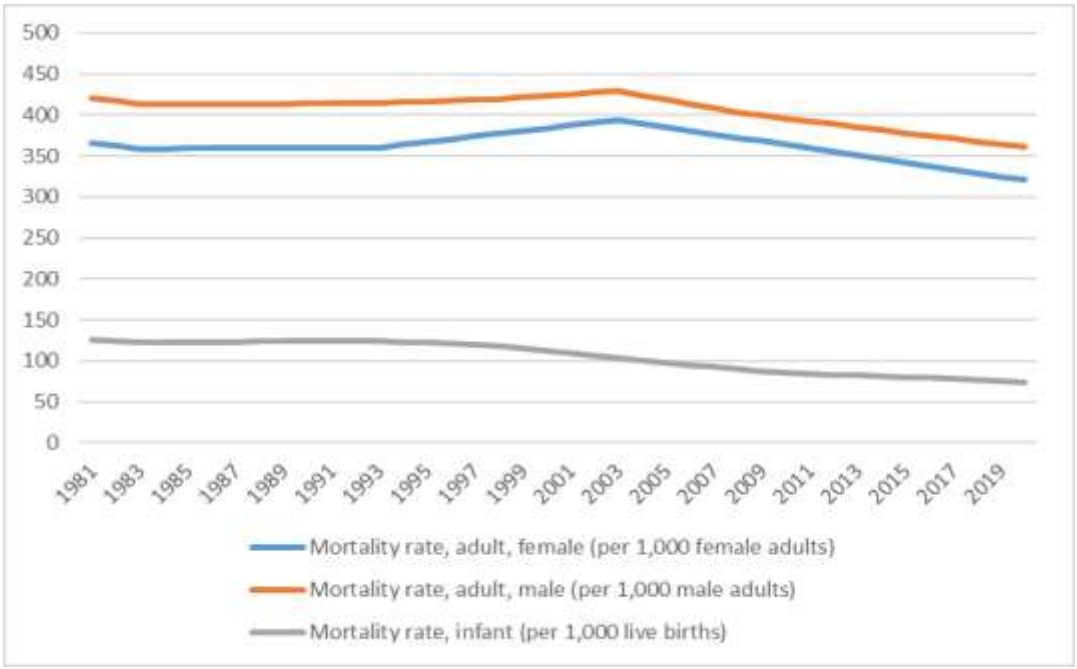

Figure 3. *Mortality Rates in Nigeria (1981 – 2020)*

Both adult female and male mortality rate peaked at 393.739 and 429.458 per 1,000 adult female and male respectively in 2003 and declined steadily to 321.483 and 361.116 per 1,000 adult female and male respectively in 2020 (World Development Indicators, 2020).

The causes of mortality have been sub-categorised into diverse situations. These situations can be linked to the excesses of urbanization which has caused a lot of environmental pollution along with unsafe social infrastructure. The behaviour is reflected in Figure 4 and Table 2 below.

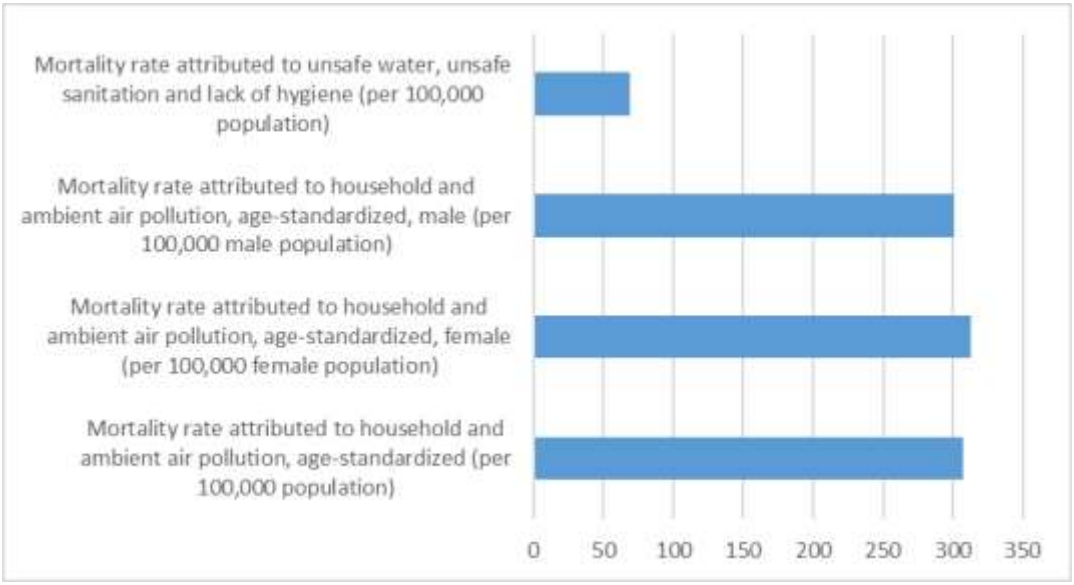

Figure 4. *Mortality Incidence in Nigeria as at 2016*

In Figure 4, the mortality rate accredited to household and ambient air pollution in the female component was reported to be the highest in 2016, followed by the male component. Meanwhile, mortality arising from unsafe drinking water, unsafe sanitation and lack of hygiene per 100,000 populations is the least.

Table 2. Mortality Rate in Nigeria

Year	*Mortality Rate, Adult, Female (Per 1,000 Female Adults)*	*Mortality Rate, Adult, Male (Per 1,000 Male Adults)*	*Mortality Rate, Infant (Per 1,000 Live Births)*	*Mortality Caused by Road Traffic Injury (Per 100,000 Population)*
1981	366	421	126	
1985	359	413	123	
1988	360	414	124	
1990	360	414	124	
1995	367	417	122	
1998	378	419	118	
2000	384	423	113	29
2005	385	419	98	27
2008	372	403	90	25
2010	364	396	86	25
2015	342	378	80	21
2019	325	364	76	21

Source: World Development Indicators, 2020

Meanwhile, mortality caused by road traffic injury (per 100,000 population) was put at 29 persons in 2000. The value declined steadily to 25 persons in 2010 and then to a record low of 21 persons as at 2019.

According to Galea and Vlahov (2005), the link between health care supply and urban life is complex and differs among cities and nations. The discrepancy in income distribution across people and inhabited neighbourhoods, for example, has been shown to have control on the ease of use and quality of healthcare (Almeida *et al*., 2017). Studies have also demonstrated that the distributional configuration of healthcare facilities controls the population's access to healthcare, such that some sections either benefit or at a detriment grounded on where they live inside an urban centre (Ikporukpo, 2002). The *inverse care law* (Hart, 1971) and the *underclass hypothesis* label a state in which healthcare is more easy to get to people of greater socioeconomic groups than to the somewhat poor, and who are further susceptible to ill-health as an outcome of their position (Lineberry, 1976).

The role of the government in providing adequate health facilities in an ever increasing urban areas cannot be over-emphasized. This has been noted in the health expenditure programmes of the government over the years. Expenditure on health can be viewed in both the domestic and external spheres. Health is on the concurrent legislative list of Federal, State, and Local government obligations under the Nigerian constitution, and the health system is built on the Primary Health Care model (PHC). All three levels of government are involved in the provision of health care services. Even within cities, these services are not equally available. In general, health services in Africa are chronically underfunded. In 2001, African leaders issued the *Abuja Declaration*, pledging to devote at least 15% of public spending to health by 2015 (Abuja Declaration, 2013). However, health expenditure is still much below what it should be due to significant financial shortages. Urbanization has led to overall health improvement as well as a significant shift in trends toward an increase in chronic illnesses. Even with urban "advantage" (the health benefits of living in cities vs rural regions), affluent and poor individuals live in vastly different epidemiological environments, even within the same city. As a result, significant socioeconomic gaps have arisen in metropolitan areas, which are paralleled by severe health disparities (UN Habitat, 2015). Furthermore, health is affected by numerous factors beyond the biomedical realm, and as urbanization proceeds in the setting of poor economic performance and bad governance, a fast growing population of urban residents is living in overcrowded slums and shanty towns.

On average, around 78 percent of Nigerians live within 10 kilometres of some type of health institution, however there are geographical differences, with those in the Southwest at 88 percent compared to 67 percent in the northwest. In general, health indices in urban regions are significantly higher than in rural ones, however contemporary urbanization trends are obscuring this urban advantage due to slum residents' poor health. Women in cities are more likely than women in rural regions to get prenatal care, and 52 percent of urban women are likely to use a health care facility.

Given the urbanization trends and the concomitant government efforts in the health sector, the broad objective of the study is to examine the effect of urbanization and government expenditure on health outcomes in Nigeria. The specific objectives include:

a. Examining the influence of urbanization and government health expenditure on life expectancy in Nigeria.
b. Investigating the influence of urbanization and government health expenditure on mortality in Nigeria.

II. Review of Literature

The theories of interest that are relevant to this study include the theory of self-generated urbanization, modernization theory, dependency/world-system theory, and theory of urban bias.

2.1 The Theory of Self-Generated Urbanisation

According to this theory, the occurrence of urbanisation calls for two distinct situations: the generation of surplus products that put up with people in non-agricultural activities (Hawley, 1981) and the attainment of a level of social development that allows large communities to work successfully alone (Bodo, 2015). This sort of shift, which resulted in urbanisation, is thought to have occurred concurrently throughout the Neolithic era, when the first towns appeared in the Middle East (Wheatley, 1971). This hypothesis also contends that rural-urban movement was the catalyst for this type of urbanisation, as people began to migrate to cities in search of industrial employment (Childe, 1950). Thus, industrialization was highlighted as the driving force behind the flight of people from rural to urban regions.

2.2 Modernization Theory

From the 1950s through the 1970s, this idea was popular and influential. According to the idea, urbanization occurs as a result of the introduction of new goods and innovations into society via industrialization, technical application, information penetration, and cultural dissemination (Smith, 1996). To begin, while viewing urbanization through the lens of modernization, it is usual to notice components of modernization (new things) in any culture that has transitioned from the primitive age (Stone Age) to a new or modern way of doing things. Second, the role of technology in social organization and moulding society is self-evident, since urbanization generally follows. The current condition of urbanization and development in the globe cannot be separated from its original state at the beginning of modernity (Kasarda and Crenshaw, 1991). Most advancements are the result of technologically driven societies, which can boost or increase economic capabilities, provide surplus food through improved agricultural systems, and use mechanical and electronic tools or machines to reduce citizen workload while increasing speed and efficiency of work done (Nolan and Lenski, 1985).

2.3 Dependency/World-System Theory

This urbanization viewpoint arose as a result of modernization theory's failure to account for both the causes and effects of urbanization in developing nations (Bodo, 2015). According to the theorists in this school, this type of system is introduced by either purposeful coercion or the intrinsic logic of capitalism in particular regions, as well as the prevalence of underdevelopment among the people (Galtung, 1971). A more rudimentary level of critical analysis of dependency/world-system theory had been reviewed, whose views were based on three assumptions (Kasarda and Crenshaw, 1991). At first, these critical theorists thought that a distinct sort of capitalist growth pattern existed in civilizations, which they attributed to a type of social organization. Second, in order for capitalism to exist, certain social structures must exist, such as unequal exchange, uneven growth, individual social inequality, core-periphery hierarchies, and dominance structures (Kasarda and Crenshaw, 1991).

2.4 Theory of Urban Bias

Michael Lipton, a development economist and a leading proponent of the urban bias theory, explained this theory in 1977 in his paper by comparing the data of 63 less developed countries and nine developed countries, which revealed that urban-rural disparity is growing in poor countries as governments of these nations tend to intervene in markets in ways that impose taxes on agriculture, whereas governments of richer nations were doing the opposite (Lipton, 1977; Dixon and McMichael, 2016). In this sense, rural people have been portrayed as being parasitized by urban populations, who gain tremendously from the purchase of inexpensive goods from rural communities and attractive urban constructions from rural tax revenues (Dixon and McMichael, 2016). This bias in favour of urban settlements has resulted in disparities in consumption, wage, and productivity levels amid rural and urban areas, necessitating a mass exodus of rural dwellers to cities in search of greener pastures and a higher standard of living (Corbridge and Jones, 2005).

Few studies have been conducted to check on the link amid urbanization and health conditions. For the period 1980 to 2011, Sede and Ohemeng (2015) investigated the socioeconomic determinants of life expectancy in Nigeria. The study found that traditional socio-economic factors such as per capita income, education, and government health spending, which are thought to be very successful in influencing life expectancy in poor nations, are not relevant in the case of Nigeria. In lieu of this, the study suggested that Nigerians' life expectancy might be increased if the quality of government health spending was prioritized.

Adewoyin, Chukwu, and Sanni (2018) looked at the urbanization trend in Ibadan, Nigeria, evaluated the spatial distribution of healthcare facilities in the city, and established a link between these and the population's access to healthcare depending on where they live in the city. Pearson's Product Moment Correlation, ratios, Gini Coefficient, and Lorenz Curves were used to analyse secondary data for the study. While the population increased by 12.4% between 1999 and 2014, the number of hospitals and doctors decreased by 53 percent and 38 percent, respectively. The hospital-to-population ratio grew from 1:1,000 in 1999 to 1: 2,600 in 2014. In addition, the doctor-to-population ratio grew from 1: 79,000 to 1: 86,000. When compared to the other communities where the majority of the urban poor dwell, the people in the wealthier neighbourhoods of the city was also found to have greater access to healthcare facilities.

Effiong and Bassey (2020) looked at the impact of government health spending on Nigerians' quality of life from 1981 to 2018. The study used the Autoregressive Distributed Lag (ARDL) model. The ARDL bounds test revealed that there is a definite long-run connection between government health spending and life expectancy. The research's main results include that government health spending had a substantial beneficial impact on life expectancy in Nigeria during the study period, both in the short and long term.

Given the paucity of empirical works in this area, this paper therefore provides further empirical findings on the influence of urbanization on health conditions. The health conditions considered include life expectancy, adult mortality (male and female), and infant mortality rates.

III. Research Methods

3.1 Basic Study Design

This study is an empirical approach towards ascertaining the influence of urbanization and health expenditure on health conditions in Nigeria. The study covers the time span of 1981 to 2020. The data are subjected to diagnostic test before being analysed using an econometric technique.

3.2 Model Specification

In ascertaining the influence of urbanization and government health expenditure on life expectancy in Nigeria, the study adopted the model of Effiong and Bassey (2020) with some form of modification. With the intended modifications, the model is specified as follows:

Model 1: Life Expectancy Model

$$LFE_t = f(UBN, CDE, GDPG, GHE, PGR) - - - - - - - - - - - - - - - (3.1)$$

Where:

LFE = life expectancy at birth
UBN = urbanization
CDE = carbon intensity
GDPG = per capita GDP
GHE = government health expenditure
PGR = population growth rate

Equation (3.1) is transformed into a stochastic form as follows:

$$LFE_t = \beta_0 + \beta_1 UBN_t + \beta_2 CDE_t + \beta_3 GDPG_t + \beta_4 GHE_t + \beta_5 PGR_t + \mu_t - - (3.2)$$

Where β_0 is the drift; β_1 to β_5 are the parameters to be estimated; and μ is the error term.

In examining the influence of urbanization and government health expenditure on mortality rate in Nigeria, our model is specified as follows:

$$MOT_t = f(UBN, CDE, GDPG, GHE, PGR) - - - - (3.3)$$

Where MOT is the mortality rate and all other variables are as earlier defined. Disaggregating MOT into adult female mortality, adult male mortality, and infant mortality, our subsequent models are specified as follows:

Model II: Adult Female Mortality Model

$$AFM_t = \beta_0 + \beta_1 UBN_t + \beta_2 CDE_t + \beta_3 GDPG_t + \beta_4 GHE_t + \beta_5 PGR_t + \mu_t - - (3.4)$$

Model III: Adult Male Mortality Model

$$AMM_t = \beta_0 + \beta_1 UBN_t + \beta_2 CDE_t + \beta_3 GDPG_t + \beta_4 GHE_t + \beta_5 PGR_t + \mu_t - - (3.5)$$

Model IV: Infant Mortality Model

$$INM_t = \beta_0 + \beta_1 UBN_t + \beta_2 CDE_t + \beta_3 GDPG_t + \beta_4 GHE_t + \beta_5 PGR_t + \mu_t - - (3.6)$$

Where AFM is the adult female mortality, AMM is the adult male mortality, and INM is the infant mortality.

3.3 Sources of Data

The data for data used in this study are secondary in nature. They were obtained from Central Bank of Nigeria statistical bulletin and World Development Indicators. Variables upon which data was collected on include life expectancy (LFE), urbanization (UBN), carbon intensity (CDE), per capita GDP (GDPG), government health expenditure (GHE), population growth (PGR), and mortality rates (MOT). Data on government health

expenditure was obtained from Central Bank of Nigeria statistical bulletin while data on all other variables were obtained from the World Development Indicator.

3.4 Analytical Technique

The analytical technique for this study stems from the output of the diagnostic test. The diagnostic test employed is the unit root test to ascertain the order of integration of the variables. The test is conducted based on the Augmented Dickey-Fuller approach and the Philip-Peron approach under the constant linear trend assumption. Further, the fully modified ordinary least squares (FMOLS) is used to ascertain the influence of urbanization and government health expenditure on life expectancy and mortality rates. This method tests the stability of the long-term connection across variables and offers extra supple econometric framework. Also, the method can aid in the clarification of conceivable asymmetry in the reaction of one variable to variations in another variable.

IV. Results and Discussion

4.1 Unit Root Test

In ascertaining the stationarity properties of the time series variables, this study utilizes the Augmented Dickey-Fuller (ADF) unit root test and the Philip-Peron (PP) test as a confirmatory test. The estimation is conducted using the constant and linear trend assumption. The result is summarized in Table 3 below.

Table 3. Test for Unit Root Result

Augmented Dickey-Fuller Test				Phillip-Peron Test			
Variables	Level	First Difference	Second Difference	Level	First Difference	Second Difference	Order of Integration
UBN	-2.0081	-1.7926	-5.8261**	-0.6309	-1.8957	-5.8261**	I(2)
LFE	-3.0169	-4.3458**	---------	0.9042	-4.7541	--------	I(1)
GHE	-5.2626**	--------	---------	-5.2591**	--------	--------	I(0)
AFM	-1.6209	-2.4008	-5.9856**	0.0542	-2.4034	-5.9866**	I(2)
AMM	-1.5810	-2.7665	-5.9502**	-0.2001	-2.7997	-5.9502**	I(2)
INM	-12.713**	--------	----------	-1.8119	-1.9104	-4.7016**	I(2)
CDE	-4.5104**	---------	---------	-4.3321**	--------	----------	I(0)
GDPG	-2.4967	-10.466**	-------	-3.7995**	--------	----------	I(0)
PGR	-4.4424**	--------	--------	-2.7862	-4.1438**	----------	I(1)

Source: Author's Computation Using Eviews 10

The result of the unit root test indicates that UBN, AFM, AMM, and INM are all stationary at second difference, as such, they are all I (2) series. The results are in harmony with the two test except for INF where the ADF test reported its stationarity at level but the PP test reported it at second difference. The result of the PP test is upheld since it is often considered to be more superior. Meanwhile, life expectancy (LFE) and population growth (PGR) are both stationary at first difference – they are I (1) variables. Government health expenditure (GHE), carbon intensity (CDE) and per capita income (GDPG) are all reported to be stationary at level hence, they are all I (0) variables. For the fact that the variables are stationary at mixed order of level, first difference and second difference, the conventional

OLS will generate biased estimates. As such, we utilize the fully modified *OLS* approach in our analysis.

4.2 Fully Modified Ordinary Least Squares (FMOLS) Regression

The analysis of the influence of urbanization and government health expenditure on life expectancy and mortality rate is conducted using four distinct models as specified in the methodology section. The result is portrayed in Table 4 below.

Table 4. Fully Modified OLS Regression Results

Variables	Model I: Life Expectancy	Model II: Adult Female Mortality	Model III: Adult Male Mortality	Model IV: Infant Mortality
Urbanization	0.3596 (0.0000)***	-2.3044 (0.0021)***	-2.5365 (0.0000)***	-1.6254 (0.0000)***
Carbon Intensity	-3.4849 (0.0520)*	44.5345 (0.2091)	29.2103 (0.2124)	7.9670 (0.4731)
Per Capita GDP	-0.1048 (0.0009)***	-1.2890 (0.0327)**	-1.0662 (0.0087)**	-0.2363 (0.2039)
Health Expenditure	-0.0911 (0.5250)	7.0583 (0.0191)**	4.0465 (0.0398)**	-2.0353 (0.0312)**
Population Growth	14.4176 (0.0000)***	-97.5881 (0.0483)**	-97.1475 (0.0041)**	-74.8474 (0.0000)***
C	-4.0492 (0.5290)	705.8620 (0.0000)***	755.8371 (0.0000)***	370.5301 (0.0000)***
R-squared	0.9583	0.5364	0.8148	0.9663
Adjusted R-squared	0.9515	0.4616	0.7849	0.9609

*Note: Probabilities are enclosed in brackets. *, **, and *** denotes significance at 10%, 5% and 1% respectively.*

Source: Author's Computation Using Eviews 10

In model 1, we ascertain the effect of urbanization and government health expenditure on life expectancy in Nigeria. The result indicate that urbanization has a positive and significant effect on life expectancy in Nigeria. It follows that a unit percent increase in urbanization will increase life expectancy by 0.3596%. This positive effect can be linked to access to modern medical facilities in the urban areas and improved standard of living therein. Carbon intensity is also observed to have a negative and significant effect on life expectancy in Nigeria. Thus, a unit percent increase in carbon intensity will lead to a 3.4849% decrease in life expectancy in Nigeria. This is because high carbon intensity is associated with life threatening diseases, especially the respiratory diseases. Per capita income is seen to exert a negative and significant effect on life expectancy in Nigeria. This can be linked to the fact that Nigeria is categorized as a low income country. As such, the low level of income cannot support the desired standard of living. The resultant effect is a reduction in the life expectancy of the citizens. Health expenditure is observed to have a negative but insignificant effect on life expectancy in Nigeria. The reason for this can be linked to failure on the part of the government to meet the 15% budget allocation to the health sector as recommended by the World Health Organization (WHO) in the Abuja Declaration of 2001. As reflected in the meagre health sector allocation, it could not be surprising that the present health expenditures could not exert any significant effect on life

expectancy in the country. Population growth pose a positive and significant effect on life expectancy in the country. A unit percent increase in population growth is followed by a 14.4176% increase in life expectancy and vice versa.

In Model II, III and IV where we modelled adult female mortality, adult male mortality, and infant mortality respectively, it is observed that urbanization has a negative and significant effect on the three measures of mortality in Nigeria. A unit percent increase in urbanization will reduce adult female mortality, adult male mortality, and infant mortality by 2.3044%, 2.5365%, and -1.6254% respectively. In the same manner, carbon intensity has a positive but insignificant effect on mortality in Nigeria. This implies that high carbon intensity is associated with high mortality rates in Nigeria. Per capita income has a negative and significant effect on adult female and male mortality, but has a positive but insignificant effect on infant mortality. Thus, a unit percent increase in per capita income leads to a 1.2890% and 1.0662% decrease in adult female mortality and adult male mortality in Nigeria. Health expenditure exerts a positive and significant effect on both adult female and male mortality but a negative and significant effect on infant mortality. Thus, a unit percent increase in health expenditure increases adult female and male mortality by 7.0583% and 4.0465% respectively; but reduces infant mortality by 2.0353%. The argument here is that health expenditure has been reducing infant mortality Nigeria. This can be linked to massive immunization exercise that has been conducted for children, as well as free healthcare services for children at designated hospitals. Meanwhile, adults need to foot their health bills in most cases leading to pressure in accessing good health facility given low level of income. Lastly, population growth has a negative and significant effect on all the measures of mortality. A unit percentage increase in population growth reduces adult female mortality, adult male mortality, and infant mortality by 97.5881%, 97.1475% and 74.8474% respectively. Population growth could be a signal for increased expenditure on health to cater for the rising population, and this will in turn reduce mortality.

V. Conclusion

Ecological and metropolitan health anxieties relate to the unending danger of infectious ailments and injuries accompanied with pitiable sanitation, contaminated drinking water, mounds of solid waste, hazardous roads, polluted air, and toxic wastes, all of which are ecological health glitches of poverty. For the reason that it encompasses other types of deprivation, such as physical assets, political power, access to basic services, and access to social capital, urban poverty is the most important predictor of environmental health hazards (The World Health Report, 1995). This paper therefore went into analysing the influence of urbanization and government health expenditure on health conditions (life expectancy and mortality rates) in Nigeria from 1981 to 2020.

The study utilized the fully modified ordinary least squares (FMOLS) approach of analysis. The result from the FMOLS revealed that urbanization exert a positive and significant effect on life expectancy; but it exerts a negative and significant effect on mortality rates. Thus, a unit percent increase in urbanization increases life expectancy by 0.3596%. Also, a unit percent increase in urbanization leads to a 2.3044%, 2.5365% and 1.6254% decrease in adult female mortality, adult male mortality and infant mortality respectively. Moreover, government health expenditure exerts a negative and significant effect on life expectancy, implying that a unit percent increase in health expenditure leads to a 0.0911% decrease in life expectancy. This has been linked to the meagre allocation to the health sector over the years. With respect to mortality, government health expenditure

exerts a positive and significant effect on adult female mortality and adult male mortality, but exerts a negative and significant effect on infant mortality. The implication is that a unit percent increase in government health expenditure will reduce infant mortality by 2.0353% on the average and vice versa.

Given the above findings, this paper concludes that urbanization is desirable in promoting the standard of living of the citizens but is dangerous to the level of mortality rates in the country. As such, there is need to curb carbon emissions that is prevalent in urbanization as well as allocating adequate budget to the health sector. As a point of start, the 15% recommended by the WHO should be given a top priority in order to alleviate the country out of the menace of health tourism that has bedevilled the country over the years. In addition, it is of great importance to stimulate the economy in order to increase the income per head of the citizens. This is because the present per capita income of Nigerians generates a negative and significant effect on the life expectancy in the country. It is also necessary because per capita income will reduce mortality rate in both the adult and infant categories.

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