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Geospatial Approach to Good Health and Well-Being Assessment in Nigeria: Achieving a Sustainable Healthy Living

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Abstract. Healthy life is the focal point for a sustainable development and prosperous society. By implication this involves a state of well-being that is enjoyed by individual when the body systems are functioning effectively and efficiently together and in harmony with the environment in order to achieve the objectives of healthy living such as adequate sleep, regular physical activities, healthy eating, and so on. This study explores the technique of Geographic Information System by integrating it with statistics to assess the level of good health and well-being among Nigerians. The data used was obtained from the Nigeria National Bureau of Statistics (NBS). The hard-copy of the map of Nigeria acquired from the Federal Ministry of Works and Housing, Ibadan was scanned into the Geographic Information System (GIS) environment, geo-referenced and digitized using on-screen method with both National and States boundaries captured as polygon features. The good health and well-being indicators (Statistics) were then restructured in a GIS format and linked to the digitized boundaries as their attributes to produce health and well-being indices maps. The GIS software used is ArcGIS 10. The results of the study show significant variations in the health and well-being indices of the Nigerian populace spatially. It was therefore recommended that there is need for engaging geospatial technology in assessing the sustainable goal on good health and well-being for all ages. This will help in providing spatial information for better visual interpretations and quick decision-making.

Keywords: Well-being, Indicators, Geographic Information System (GIS), Sustainable healthy living

1. Introduction

Health, according to World Health Organization (2021), is described as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity." By implication this involves a feeling of well-being that is enjoyed by individual when the body systems are functioning effectively and efficiently together and in harmony with the environment in order to achieve the objectives of good living (WHO, 1948; UN, 1996; NBS, 2018). Good health and well-being is the focal point of Sustainable Development Goals (SDG) 3 which is "to ensures healthy lives and promotes well-being for all at all ages by 2030". These phenomenons can be measured by indicators among others such as life expectancy at birth, infant mortality rate, neonatal mortality rate, under-5 child mortality (U5MR) rate, maternal mortality rate, access to clean water, sanitation and road traffic accidents (NBS, 2018).

It is seven (7) years since the 2030 agenda for sustainable development was adopted by the United Nations and its member states in September 2015 (UN, 2015). Several efforts are being made by member countries including Nigeria to contribute towards achieving the 17 Sustainable Development Goals (SDGs). The progress which had been made over time in ensuring healthy lives and promote well-being at all ages can be monitored by mapping out a set of quantifiable indicators for each of the goals. The United Nations has highlighted issues of data quality and data collection abilities to optimally measure various indicators and has emphasized the need for a Data Revolution to enhance the data quality (Kharas, Gerlach and Elgin-Cossart, 2013). Geospatial data is one of the most promising data

sources. It can be applied for monitoring progress in achieving the SDGs. The role of big data in analyzing SDG indicators has been discussed by MacFeely (2019). It has been pointed out that conventional data sources are not sufficient. It has been seen that geospatial technology plays a significant role in measuring some of the targets; hence it is relevant in the implementation of SDGs and monitoring of their progress.

Geospatial technology helps to visualize, question, analyze and interpret for better understanding in terms of relationships, patterns and the trends. It displays after analysis, geographic and spatial data. It is a very valuable tool that can be used to build decision support systems for use (Maliene, Grigonis, Palevicius & Griffiths, 2011). Several studies have employed geospatial analysis techniques in examining healthcare conditions nationally and internationally. Rosero-Bixby (2004) analyzed the condition of healthcare in Costa Rica by measuring its spatial access within the country. His findings provide important information to achieve SDG 3 in Costa Rica because it clearly points out certain communities without adequate access to healthcare. Together with other healthcare indicators such as child mortality rate, if the regional differences are revealed, the government could intensively allocate the budget and human resources in areas lagging behind others to improve the situation for achieving SDG 3. Gaugliardo (2004) studied the situation of the primary care by measuring the distance to a healthcare facility and found the differences in accessibility of primary care in Washington DC. Some areas have more than 70 medical service providers for 100,000 children while others have less than 20. Wang and Luo (2005) studied to find areas, which suffered from the shortage of healthcare workers in Illinois and found that disadvantaged areas were widespread all over the state, except big cities such as Chicago. Both studies implied that Geospatial technology can also be used in medical geography to depict social inequality in developed countries. Some studies have further show the effectiveness of this technology for epidemiology studies to prevent future pandemics. Maude, Nguon, Ly, Bunkea, Ngor and Canavati De Le Torre (2014) analyzed the spatial and temporal data on clinical malaria in Cambodia, and depicted the distribution of the disease and village malaria workers. Timo Lüge (2014) prepared a case study to report how Geospatial techniques were used to combat the recent Ebola outbreak in Guinea. Jones, Patel, Levy, Storeygard, Balk, Gittleman and Daszak (2008) studied global temporal and spatial patterns of emerging infectious diseases (EIDs) and found that the origin of EIDs is significantly correlated with socioeconomic, environmental, and ecological factors. The study also revealed that the fragile regions due to EIDs in the world include developed countries, and the resultant risk map would help to prepare for future outbreaks. Orimoloye, Mazinyo, Nel, & Kalumba (2018) studied about changes in land surface temperature and radiation due to urbanization in South Africa using Landsat data and radiation risks to heatstroke, skin cancer, and heart disease (2018). Strano, Viana, Sorichetta, & Tatem (2018) proposed a tool for supporting the design of disease surveillance and control strategies through mapping areas of high connectivity with roads in the African region (Strano et al., 2018).

Geospatial data and techniques can be used very effectively for monitoring most of the SDGs. Furthermore, the scientific results provided through the use of geospatial technologies can provide a strong basis for policymaking to promote sustainable development in communities at local and regional levels (United Nations Secretary, 2016). In this paper, the focus is on how geospatial techniques can be use to assess the progress which had been made over time in achieving Sustainable Development Goal (SDGs 3) on good health and well-being in Nigeria by using a set of quantifiable indicators among others such as life expectancy at birth, HIV/AID, infant mortality rate, neonatal mortality rate, under-5 child mortality (U5MR) rate and maternal mortality rate.

1.2 Study Area

The Federal Republic of Nigeria is located in West Africa between longitude 3^0 and 14^0 East of Greenwich meridian and latitude 4^0 and 14^0 North of the Equator. The country is bordered on the west by the Republic of Benin; on the east by the Republic of Cameroon; on the north by Niger and Chad Republics and on the south by the Gulf of Guinea and Atlantic Ocean (see Figure 1). The land area is 909,890sqkm while water is 13,879sq km. Compared with other West African countries; Nigeria is third in area size, with an estimated population of over 200 million people (National Population Commission & International Classification of Functioning, Disability and Health, 2019). Nigeria is the most populous nation in Africa and contains more the 350 ethno-linguistic groups. The country as at today has evolved into a political structure that consist of 36 states and Federal Capital Territory (Abuja), all constitutionally summarized into six geopolitical zones. There are also, 774 Local Government Areas in the country, each with its own administrative headquarters

(Ademiluyi, 2020). Agriculture is the largest sector of her economy and employs about 70% of the labour force and accounting for more than one-third of the GDP (Ademiluyi, 2020). Nigeria has commercial quantities of over forty-four (44) minerals spread across more than 500 locations across the country. Most of these resources remain untapped till today (Ademiluyi, 2020). From the Gulf of Guinea on the Atlantic Ocean, plateaus and plains constitute most of the country's geography with coastal swamps in the south to tropical forests, woodlands, grasslands in the central areas and semi-desert in the north.

The nation's climate is of arid in the north, tropical in the central and equatorial in the south. Nigeria has two distinct seasons: the wet season which is between April and October and the dry season which lasts from November to March (National Bureau of Statistics and International Classification of Functioning, Disability and Health, 2014). The drainage of the country is made up of Lake Chad, and international water bodies, a dense network of rivers and the lagoons and creeks of the coastal belt. Nigeria is covered by forest of which there are three types: Mangrove Swamp Forest, Freshwater Swamp Forest and Tropical Rain Forest. The country is also covered by Savannah which may be sub-divided into Guinea, Sudan and Sahel Savannah and Montana Vegetation (Ismaila, 2017).

According to Agboola (1986), Nigerian soils are generally light textured and low in cation exchange capacity (CEC); clay content range from 9 to 43% in more than 60% of the area, clay content is less than 15%. The CEC range from 2.40 to 5.95 me/100g of the soils, the value being less than 5 in the majority of the area. Soil PH ranges from 4.2 to 8.1: combined Calcium (Ca) and magnesium (Mg) content varies from 0.5 to 5.55 me/100g; potassium (K) is generally low (0.07 to 0.45) tending to be lowest in soil sandstones. Organic matter content varies from 1 to 2.55%. Nigeria is richly blessed with oil and gas reserves and large deposits of solid minerals, including tin, columbite, iron ore, coal, limestone, lead, zinc, precious metals, and gemstones (Ismaila, 2017).

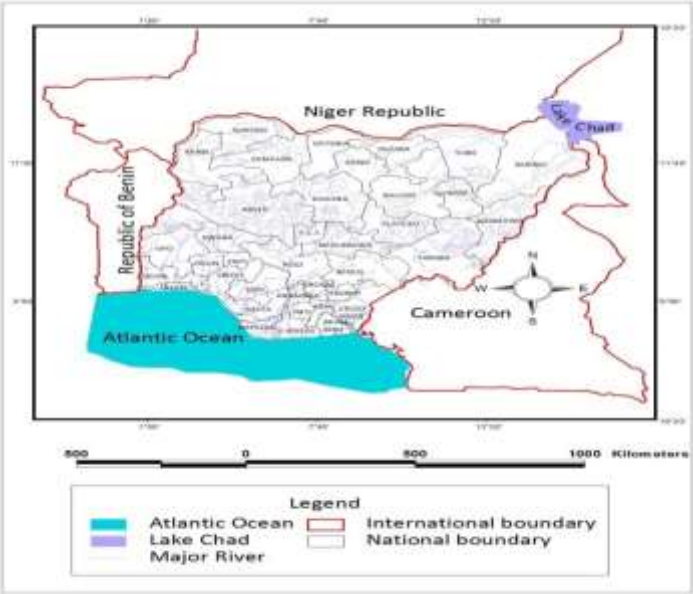


Figure1: Nigeria
Source: The Federal Ministry of Works,Housing and Power,Ibadan,Nigeria (2015)

2. Research Methodology

2.1 Data Types and Sources

The data used for this study include statistical reports on good health and well-being indicators in Nigeria for year 2019 obtained from the National Bureau of Statistics (NBS) report while the analogue map of Nigeria was extracted

from the Federal Ministry of Works, Housing, Ibadan, Nigeria. The Geographic Information System (GIS) software used for this study is ArcGIS 10.0.

2.2 Data Processing and Method of Analysis

The method of analysis engaged with in this study is both simple descriptive statistics (table and percentage) and Geographic Information System (GIS) technique (through the use of Kernel density method in ArcGIS 10.0).

The hard copy of the map of Nigeria acquired was scanned into the GIS environment. Geo-referencing was done by the use of tied-points method. The geo-referenced map portrayed information as to where the areas represented on the map fits on the surface of the earth. It was then digitized using on-screen method with the national and state boundaries captured as polygon feature.

The data set of good health and well-being indicators were restructured in a format (Text Delimited) for implementation in the GIS environment and linked it to the digitized national and state boundaries as their attributes to produce maps that visualize assessment for each indicator for better monitoring and progress.

3. Results and Discussions

Assessment of Sustainable Development Goals Implementation Performance in Nigeria on Life Expectancy at birth, HIV/AID, Fertility and Maternal Mortality rates

This section presents and discusses the assessment of the performances of sustainable development goals implementation on good health and well-being in Nigeria. For this reason, four (4) major health indicators were used as bases for assessment. They are; (1) Life Expectancy at birth (2) HIV/AID Patients (3) Fertility rates (4) Maternal Mortality rates.

Table 1: Percentage Distribution of Life Expectancy at birth, HIV/AID, Fertility and Mortality rates by sex and states.

State	Life Expectancy Rate (%)		HIV/AID Patients (%)		Total Fertility Rate (%)	Maternal Mortality Rate (%)
	Female	Male	Female	Male	Female	Female
Abia	53	49	58.5	41.5	5.1	375.9
Adamawa	44	42	56.6	43.4	5.5	1841.9
Akwa Ibom	51	49	50.8	49.2	4.5	150.9
Anambra	50	47	58.7	41.3	4.3	279.0
Bauchi	49	45	41.3	58.7	6.8	593.8
Bayelsa	53	47	57.3	42.7	4.8	471.1
Benue	50	46	55.3	44.7	4.8	809.6
Borno	48	42	55.4	44.6	6.1	2374.8
Cross-River	56	51	47.0	53.0	4.4	642.3
Delta	50	48	59.5	40.5	5.2	394.1
Ebonyi	52	47	47.2	52.8	5.2	218.0
Edo	48	46	35.0	65.0	3.8	641.4
Ekiti	53	48	56.8	43.2	4.4	876.8
Enugu	53	49	56.3	43.7	3.8	519.0
Gombe	49	45	58.6	41.4	7.3	371.3
Imo	52	50	66.2	33.8	5.1	642.9
Jigawa	48	44	70.0	30.0	8.5	298.8
Kaduna	48	43	30.1	69.9	5.6	452.6
Kano	49	46	49.1	50.9	7.7	364.3
Katsina	51	47	39.5	60.5	7.5	214.2
Kebbi	50	48	33.3	66.7	7.7	506.1
Kogi	48	45	54.7	45.3	3.7	1267.8
Kwara	53	48	52.3	47.7	4.4	904.4
Lagos	51	48	51.7	48.3	4.0	110.4
Nassarawa	51	45	59.8	40.2	5.7	817.0
Niger	53	47	62.4	37.6	6.4	387.0
Ogun	53	50	64.1	35.9	4.5	258.8
Ondo	52	50	31.2	68.8	4.5	115.9
Osun	55	52	48.2	51.8	4.7	344.1
Oyo	55	51	56.9	43.1	4.9	184.0
Plateau	47	43	56.6	43.4	5.6	278.5
Rivers	49	46	57.7	42.3	3.3	483.4

Sokoto	51	48	57.5	42.5	7.3	737.4
Taraba	51	48	56.5	43.5	5.5	623.2
Yobe	46	42	56.6	43.4	6.8	1678.9
Zamfara	50	47	56.0	44.0	7.3	259.8
FCT(Abuja)	55	50	56.8	43.2	4.6	83.6
National	**51**	**47**	**53.1**	**46.9**	**5.8**	**567.5**

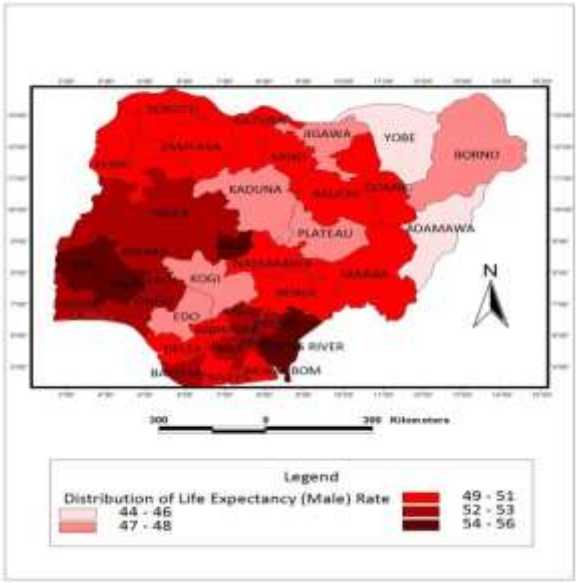
Source: National Bureau of Statistics (2019).

Table 1, Figures 2a, b, c, d, e & f shows the distribution of life expectancy, HIV/AID, fertility and maternal mortality rates across Nigeria by sex and states. Averagely, the life expectancy at birth for a Nigeria woman stands at 51years compared with her male counterpart which is 47 years. HIV cases are high (53.1%) among the women than the men (46.9%). Looking at states contributions to HIV/AID incidence in Nigeria, Jigawa state (70.0%) takes the lead while Kaduna state (30.1%) with the lowest. The total fertility rate was 5.8 births per woman with Jigawa state (8.5) recording the highest fertility rate followed by Kano (7.7), Kebbi (7.7), Katsina (7.5), Gombe (7.3), Sokoto (7.3) and Zamfara (7.3) states while Rivers (3.3) state has the least fertility rate among the Nigeria women. The table further revealed the maternal mortality rate as 567.5 per 100,000 live births. Borno (2374.8) state has the highest maternal mortality rate among the thirty-six states in Nigeria followed by Adamawa (1841.9), Yobe (1678.9) and Kogi (1267.8) states while the Federal Capital Territory (FCT), Abuja (83.6) with the least rate (see Table 2).

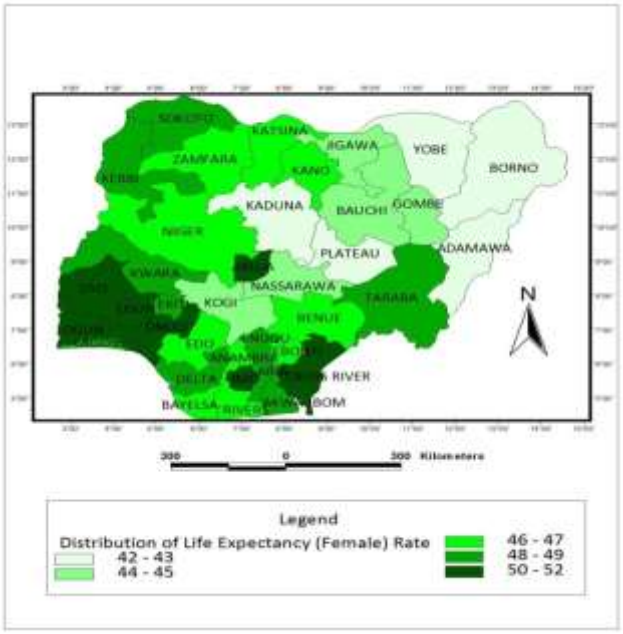
Life expectancy at birth in Nigeria is on the increase for a decade, which is from 49.4 in 2007 to approximately 54 in 2017. Likewise, Under-5 Mortality Rate per 1000 live births had drastically reduced from 145.7 to 100.2 and compared with some other reference countries (Ghana, Malawi, Rwanda, Sudan, Norway, United States of America, China and Australia), Nigeria with a population of about 195 million has performed poorly. In 2013, maternal mortality in Nigeria is 560 deaths per 100,000 live births; whereas in 1980, it was 516 deaths 100,000 per live births. This may be as a result of poor health facilities, lack of access to quality health care, malnutrition due to poverty, herder-farmer conflicts, female genital mutilations, abortions, and displacements due to Boko Haram terrorism in the North East of Nigeria. In Nigeria the lifetime risk of death for pregnant women is 1 in 23 (NNHS, 2018).

Nigeria HIV/AIDS indicator and impact survey (NAIIS) 2018 revealed that the national HIV prevalence rate among adults ages 15–49 is 1.4 percent. The epidemic is more concentrated and driven by high-risk behaviours, including having multiple sexual partners, low risk perceptions and inadequate access to quality health care services. Youths and young adults in Nigeria are particularly vulnerable to HIV, with young women at higher risk than young men (NNHS, 2018).

By 2030, if Nigeria is to reduce maternal mortality ratio to less than 70 per 100, 000 live births (OSSAP-SDGs, 2020), all hands must be on deck to achieve it. People can start by promoting and protecting their own health and the health of those around them, by making well-informed choices, practicing safe sex and attending antenatal care in government approved health centres. There should be more awareness in communities about the importance of good health, healthy lifestyles as well as people's right to quality health care services, especially for the most vulnerable such as women and children. Government, local leaders and other decision makers should be held accountable to their commitments to improve people's access to health and health care (NBS, 2019).


JIGAWA
YOBE
BORNO
KADUNA
PLATEAU
ADAMAWA
KOGI
EDO
RIVER
BOM
N
300 0 300 Kilometers
Legend
Distribution of Life Expectancy (Male) Rate
44 - 46
47 - 48
49 - 51
52 - 53
54 - 56

(a)


KATSINA
JIGAWA
YOBE
ZAMFARA
KANO
BORNO
KADUNA
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GOMBE
NIGER
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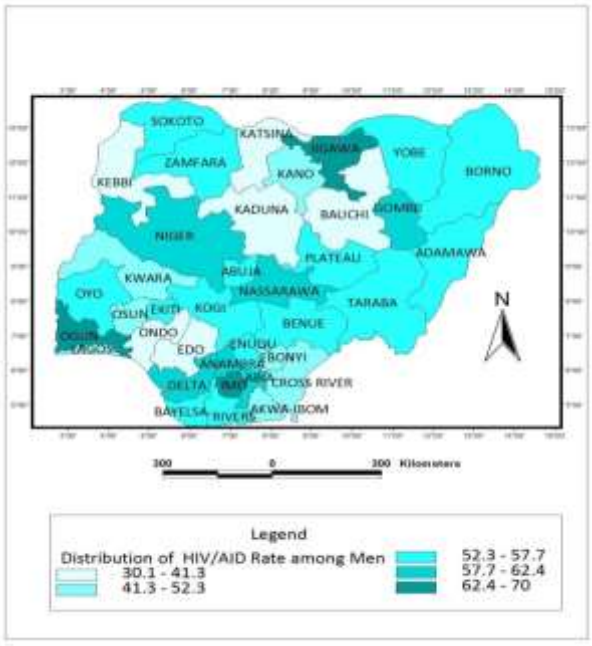
ADAMAWA
KWARA
NASSARAWA
TARABA
KOGI
BENUE
EDO
DELTA
RIVER
BOM
N
300 0 300 Kilometers
Legend
Distribution of Life Expectancy (Female) Rate
42 - 43
44 - 45
46 - 47
48 - 49
50 - 52

(b)


SOKOTO
KATSINA
JIGAWA
YOBE
ZAMFARA
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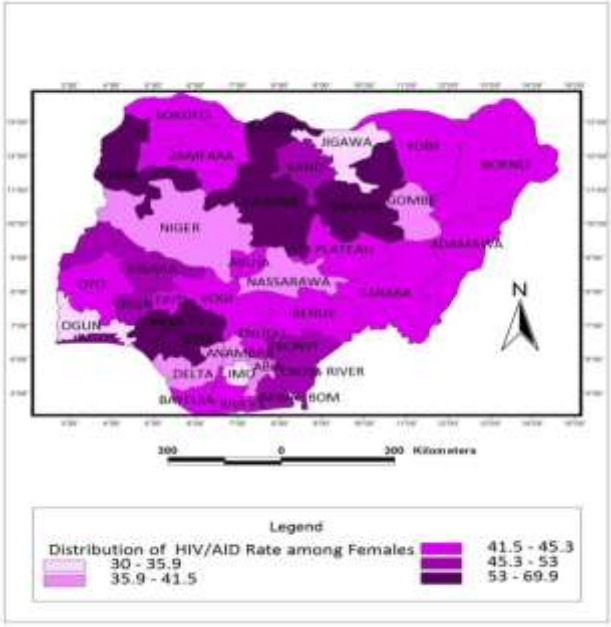
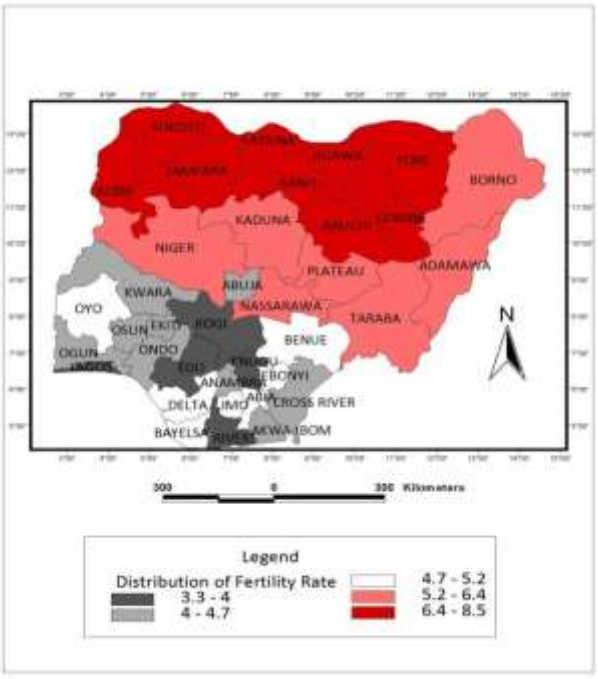
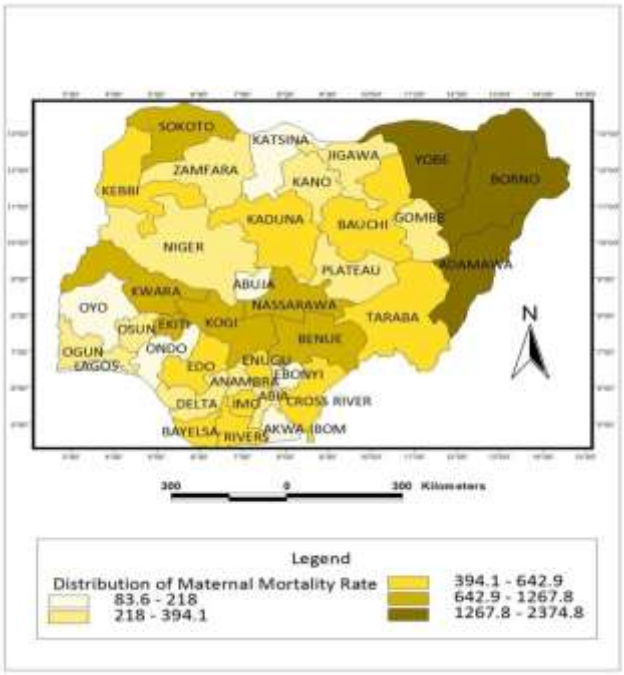
KEBBI
KADUNA
BAUCHI
GOMBE
NIGER
PLATEAU
ADAMAWA
ABUJA
KWARA
NASSARAWA
OYO
OSUN
EKITI
KOGI
TARABA
ONDO
BENUE
EDO
ENUGU
BONYI
DELTA
CROSS RIVER
BAYELSA
AKWA-IBOM
N
300 0 300 Kilometers
Legend
Distribution of HIV/AID Rate among Men
30.1 - 41.3
41.3 - 52.3
52.3 - 57.7
57.7 - 62.4
62.4 - 70

(c)


JIGAWA
ZAMFARA
KANO
BORNO
GOMBE
NIGER
PLATEAU
NASSARAWA
OYO
OGUN
BENUE
DELTA
CROSS RIVER
BOM
N
300 0 300 Kilometers
Legend
Distribution of HIV/AID Rate among Females
30 - 35.9
35.9 - 41.5
41.5 - 45.3
45.3 - 53
53 - 69.9

(d)





(e) (f)

Figures 2a, b, c, d, e & f showing the distribution of life expectancy rate for male, female, HIV/AID among male and female, fertility and maternal mortality in Nigeria

Assessment of Sustainable Development Goals Implementation Performance in Nigeria on Neonatal, Infant, Child and Under-5 Mortality rates.

This section presents and discusses the assessment of the performances of sustainable development goals implementation on Neonatal, Infant, Child and Under-5 Mortality rate in Nigeria.

Table 2: Distribution of Neonatal, Infant, Child and Under-five Mortality Rate in Nigeria.

State	Neonatal Mortality Rate	Infant Mortality Rate	Child Mortality Rate	Under-Five(5) Mortality Rate
Abia	-37	55	30	83
Adamawa	21	49	37	84
Akwa-Ibom	21	42	32	73
Anambra	-23	39	15	53
Bauchi	41	81	87	161
Bayelsa	29	57	41	95
Benue	41	70	14	82
Borno	-26	42	42	82
Cross-River	20	38	15	52
Delta	28	48	16	63
Ebonyi	30	47	15	62
Edo	N/A	N/A	N/A	N/A
Ekiti	-46	69	18	86
Enugu	N/A	N/A	N/A	N/A
Gombe	35	90	78	162
Imo	-35	66	33	96
Jigawa	37	83	120	192
Kaduna	28	66	18	82
Kano	69	112	103	203
Katsina	35	68	72	135
Kebbi	55	111	70	174
Kogi	29	49	28	75
Kwara	27	40	6	45
Lagos	29	45	6	50

Nasarawa	47	81	43	121
Niger	59	100	54	149
Ogun	-28	49	19	66
Ondo	-30	37	32	67
Osun	-56	78	25	101
Oyo	-42	59	15	73
Plateau	34	55	27	80
Rivers	-27	41	18	58
Sokoto	28	51	72	119
Taraba	22	64	45	105
Yobe	44	64	41	102
Zamfara	33	104	118	210
FCT-Abuja	27	44	28	71
National	**39**	**70**	**54**	**120**

Source: National Bureau of Statistics (2019).
Note: N/A= Not Available

Table 2, Figures 3a, b, c & d shows the distribution of neonatal, infant, child and under-five mortality rates across Nigeria by states. Neonatal mortality rate is defined as the probability of children dying within the first month of birth (NNHS, 2018). Table 2 & Figure 3a revealed that neonatal mortality rate stood at an average of 39 per 1,000 live births in Nigeria with Kano (69 per 1,000 live births), Niger (59) and Kebbi (55) states with the highest neonatal mortality rate. The map generated (Figure 3a) also collaborate these findings in a visual form for a better understanding and quick interpretation. From the figure, Kano, Niger and Kebbi states are the hotspot areas in terms of neonatal mortality rate in Nigeria followed by Benue, Nasarawa, Plateau, Bauchi, Gombe, Yobe, Jigawa, Katsina and Zamfara states having neonatal mortality rates ranging from 31-47 per 1,000 live births (see Figure 3a). Most of the states with high rate of neonatal mortality are found in the northern part of Nigeria when compared with the southern part that is characterized with most of the states recording negative neonatal mortality rates (see Figure 3a).

Infant mortality rate is the probability of children dying before reaching one year and under- five mortality rates is the probability of a child dying before the age of five. Table 2, Figure 3b &3d shows that infant mortality rate is 70 per 1,000 live births while under- 5 mortality stood at 120 per 1,000 live births in Nigeria. Kano state has the highest infant mortality rate of 112 per 1,000 live births followed by Kebbi (111), Zamfara (104) and Niger (100) states. In terms of under-5 mortality rate, Zamfara state has the highest (210 per 1,000 live births) followed by Kano (203), Jigawa (192), Kebbi (174), Gombe (162) and Bauchi (161) states. Figures 3b &3d further strengthen these findings with Kebbi, Zamfara, Niger, Kano, Bauchi and Gombe states classified as the hotspots states for both infant and under-5 mortality rates. As far back year 2015, the SDG baseline report shows that there were only 89 deaths per 1000 live births. However, this ratio increased substantially to 128 deaths/1000 live births in 2016 and 2017, and 132 deaths/1000 in 2018 (OSSAP-SDGs, 2020; NBS, 2017). Researches have shown that the causes of under-five mortality in Nigeria are malaria, pneumonia, diarrhoea and other preventable infectious diseases (Olalubi & Bello, 2020). The low rate of immunization of children under five is also believed to contribute to the mortality rate with only 21 per cent of Nigerian children were fully immunized between 2016 and 2017 (NBS & UNICEF, 2017).

Table 2 also revealed that the average child mortality rate in Nigeria is 54 per 1,000 live births. Jigawa state had the highest child mortality of 120 per 1,000 live births, while Kwara and Lagos states had the lowest of 6 per 1,000 live births each. The child mortality rate map generated (see Figure 3c) further visualizes these findings with many of the northern states considered to be highly vulnerable areas.

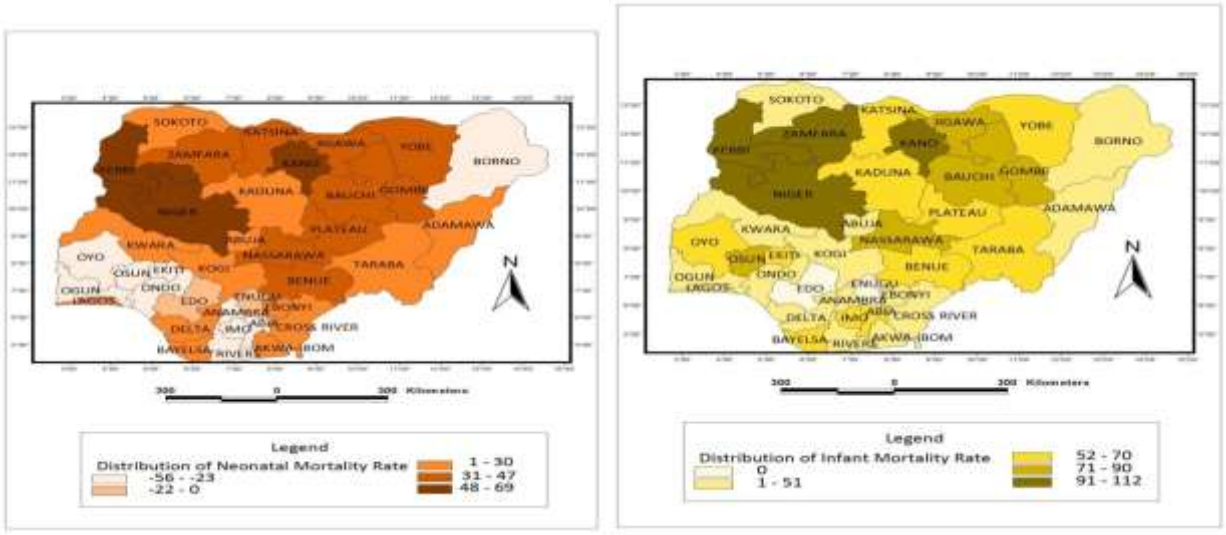


Figure 3a &b: The Distribution of Neonatal and Infant Mortality Rate in Nigeria

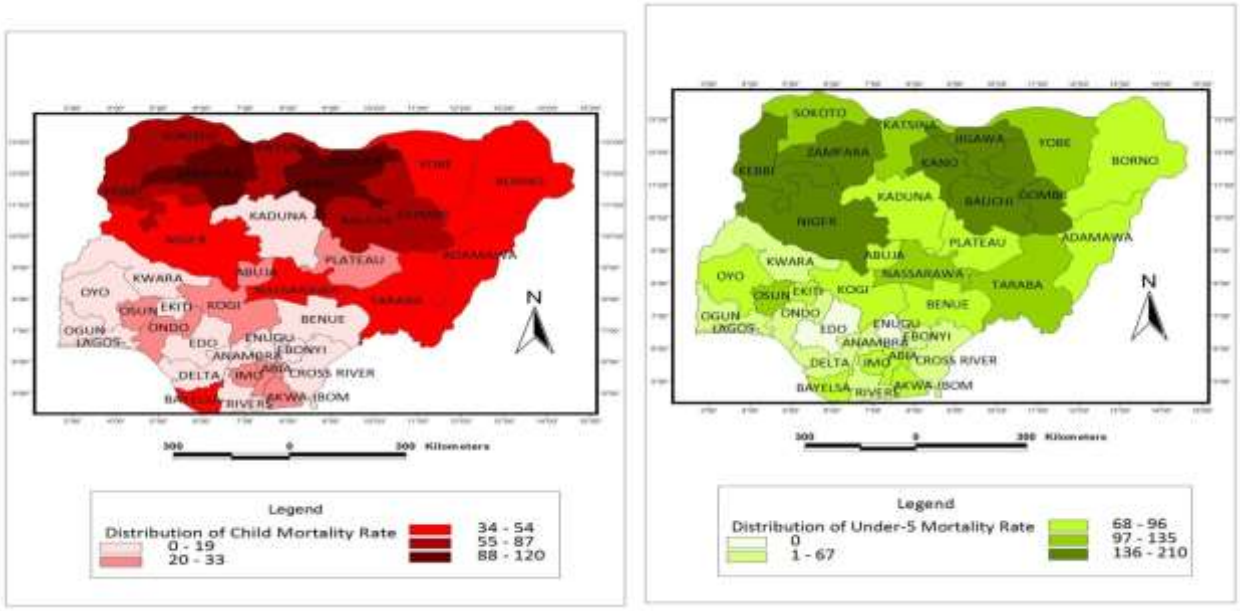


Figure 3c&d: The Distribution of Child and Under-5 Mortality Rate in Nigeria

4. Implications of Findings of the Study

Findings of this study shows that the general health and well-being of Nigerian people is deteriorating. Among the most debilitating is the very high maternal mortality rate (567.5 per 100 000) and studies have shown that high maternal mortality in Nigeria has contributed to household poverty by reducing household income or creating child-headed households (OSSAP-SDGs,2020). Under-five mortality rates with deaths per 1000 stand as 120, for the Federal Government's target of 64 under-five deaths per 1, 000 by 2022 (NSHDP11) and less than 25 in 2030 to be achieved, then there must be an improvement in immunization and effective implementation of the Reproductive, Maternal, Newborn, Child & Adolescent Health plus Nutrition services and other health packages, together with the provision of the NHIS and the SSHIS, because these strategic interventions address not only the health- related factors but also the socio-economic challenges of the poor (OSSAP-SDGs,2020) .

The mapping of the health and well-being indicators across the Nigeria states further provides a lens into the weakness of the healthcare system of the country spatially and revealing visually, the states with high percentage in each of the indicators, areas considered to be hotspots and that needed urgent attention. The maps generated can further serve as tools in

implementing the SDG 3 target of having good health and well-being by 2030 in Nigeria, since phemeneon are sometime explain better in a visual form for quick decision and response.

5. Conclusion and Recommendation

This study employed geospatial approach in assessing the health and well-being of Nigerians. The health and well-being indicators extracted from the Nigeria National Bureau of Statistics report of 2019 were used as instrument for assessment. The study engaged both descriptive statistics and Geographic Information System (GIS) techniques as methods of analyses. Findings from the study show that generally the health and well-being of Nigerians is deteriorating. As at 2019, the life of expectancy for both male (47years) and female (51years) is dreadful. The state with the highest life expectancy for both female (55) and male (51) is Oyo state. The spread of HIV/AID is still very high in the country with an average percentage of 53.1% for females and 46.9% for males. Maternal mortality rate of 567.5 per 1,000 is still very high compared with the 2030 SDG3 target of 25 per 1,000. The following states in Nigeria; Yobe, Borno and Adamawa between the range of 1267.8 and 2374.8 have the highest maternal mortality rate. The death rate of under- five child per 1,000 is 120 nationally with Kebbi, Zamfara, Niger, Kano, Jigawa, Bauchi and Gombe having the highest under-five child mortality rate between the range of 136 and 210.

Therefore, it is recommended that geospatial techniques should be developed for the implementation and monitoring of all other SDGs for quick decision and responses.

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