SPATIAL DISTRIBUTION OF HEALTHCARE FACILITIESIN KAZAURE LOCAL GOVERNMENT, JIGAWA STATE, NIGERIA

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ABSTRACT

Good healthcare and well-being is goal number 3 of sustainable development goals as adopted by the UN general assembly in September 2015. Nigeria being a signatory must strive to achieve good healthcare and wellbeing for all ages before 2030. The research analyzed the spatial distribution of public and private health care facilities in Kazaure local government, Jigawa state, Nigeria. Primary geo-data of the healthcare centres were acquired using Garmin e-trex-10 GPS receiver while ArcGIS 10.3 was used to process the data. The spatial data was compiled in Microsoft excel and imported into the spatial database using ArcGIS. Secondary data relating to number and types of healthcare centres were obtained from Kazaure local government healthcare department. It was discovered that there is an existed inadequacy in the availability of health care facilities within the area. The multiple buffer of 2/3 kilometres service radius indicate that the urban area of Kazaure is over-served while most of the rural areas are either under-served or not served at all. Nearest Neighbor Analysis (NNA) ratio number is 0.904 therefore we can say with 95% certainty that the healthcare facilities are distributed randomly within the study area. The results also indicate that there are 15 primary healthcare centres (78.95%), 4 secondary healthcare centres (21.05%) and 0 tertiary healthcare centre (0%) in the study area. Additionally, the public owns 17 healthcare centres (89.47%) while the private healthcare providers own 2 healthcare centres (10.53%). It is therefore recommended that more healthcare centres should be establish in the study area especially secondary and tertiary healthcare centres.

Keywords: Distribution, Healthcare facilities, Spatial and Geographic information System

INTRODUCTION

Health is a crucial component of human well – being. It is defined by Obinna et al., (2018) as a satisfactory and acceptable state of physical (biological), mental (intellectual), emotional (psychological), economic (financial), and social wellbeing. Health care is among the most important services provided by the government in the developed or developing nations of the world, According to the Nigerian Federal Ministry of Health (1998), people' s health does not only contribute to better quality of life, but also essential for sustained economic and social development of the country. Thus, health care is known to be very important in the process of economic development. The state of any population at any point in time determines the level of

her productivity and According to Awoyemi, et al., (2011), health improvement has a direct correlation with life expectancy, which is a robust indicator of human development. There is need for adequate and equitable distribution of health care facilities in any region or nation. According to Deaton (2003) increase in life expectancy is strongly correlated with increase in productivity and income. Increase of productivity of individuals or group of people in all sector depends to a great extent on the availability and accessibility to health care facilities at affordable cost. Health care provision in Nigeria is the responsibility of the three tiers of government namely; Local, State Government and the Federal Government. These three tiers of government are responsible for the management of the primary, secondary and tertiary health facilities respectively. However, because, Nigeria operates a mixed capitalist economy, private operators of health care also play important roles in provision of health care delivery. The Federal Government's role is limited to coordination of Teaching Hospitals and the Federal Medical Centres (tertiary health care centres), the State Government manages the General hospitals (secondary health care centres) while the Local Government coordinates the dispensaries (primary health care centres). The primary health care centres are also regulated by the Federal Government through the National primary healthcare Development Authority (NPHCDA). Buor (2003), revealed that distance is the most important factor that influences the utilization of health services in the AY Ahafo-Ano south district of Ghana. This is an indication that distance plays a major role in utilization of health facilities. The pattern of distribution of health care facilities has positive effects on the development level of any region, According to Inyang, (1994), access to health care facilities is a function of proportionate spatial distribution of the health care facilities. It was also observed that the problem in the health care sector is not limited to quality of services but also on the adequacy of health facilities. Ujoh and Kwaghsende (2014) opined that, the quality of services is related to the level of personnel. It is therefore crucial for health facilities to be equally distributed and as well be manned by adequate number of health personnel.

However, more studies will open up the spatial disparity in the distribution of healthcare facilities in Nigeria's rural communities through continuous spatial data collection and analysis.
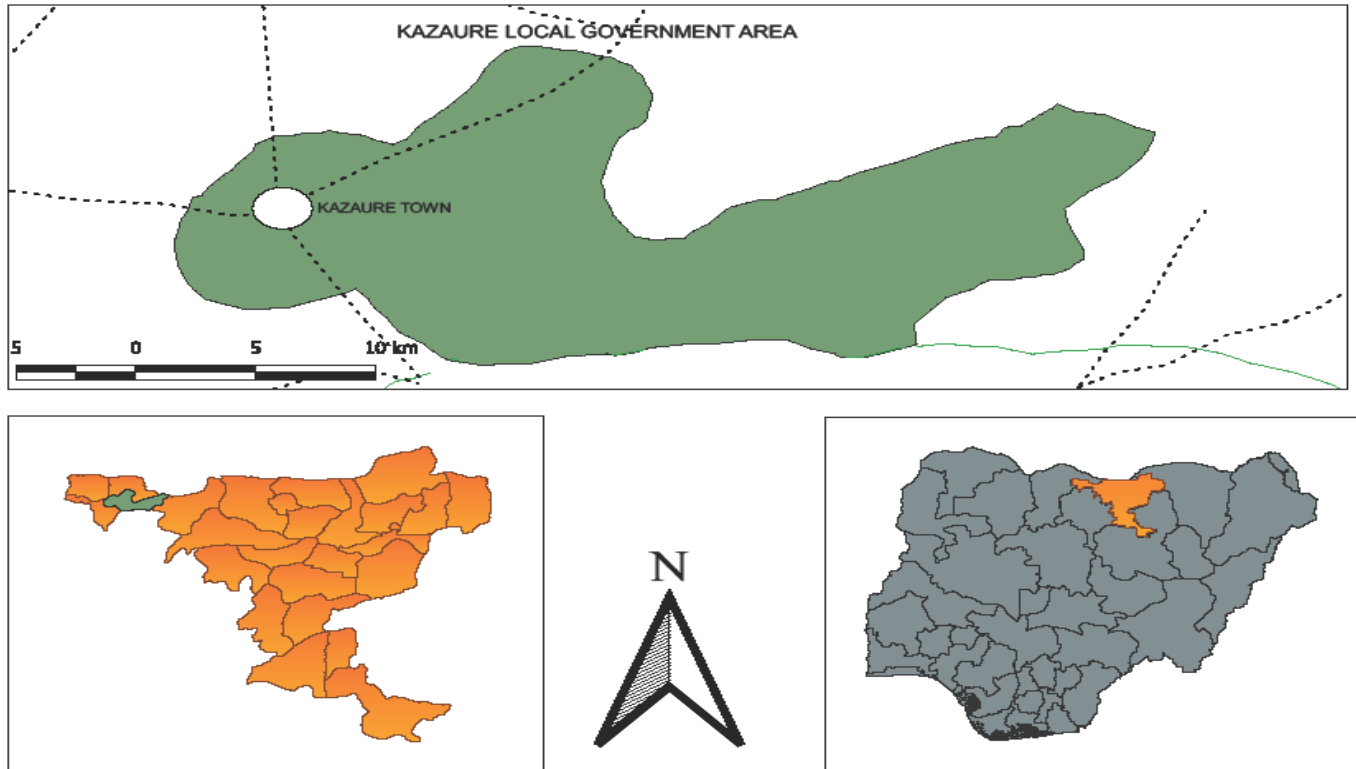
FIG 1: Kazaure Local Government Area
Source: Authors, 2021

METHODOLOGY

A reconnaissance survey was carried out in order to know the nature and more information of the location of the health care facilities in the study area. The data utilized in this research were obtained from two sources these are the primary and secondary sources. The primary data was collected through field survey. Secondary data which include list of primary, secondary and tertiary and also private health/public health care facilities were obtained from Kazaure local government health department. The locations of the health care facilities were identified and the spatial data (coordinates) of the located health care facilities collected through the use of the *Garmin e-trex-10 Global Positioning System receiver* (GPS) which were recorded on the spot. The administrative map of Kazaure was obtained from divaGIS shape files. The collected geo-spatial data was processed using ArcGIS 10.3. These involves creating a numerous thematic maps reflecting the geo-spatial location of the healthcare facilities, the data was also subjected to nearest neighbour analysis (NNA) and also a 2/3 kilometres service radius multiple buffer. The secondary data obtained was also presented on the tabular form.

STUDY AREA

Kazaure is an emirate, a local government and a city in Jigawa state of Nigeria. It is located at 12^0 $39^'$ $10^".46N$ and 8^0 $24^'$ $43.41^"E$. Kazaure emirate has a total land area of about 690sqm (1,780km2) with a previous population which was recorded a decade ago (2006) of about 161,496 but as of current

statistics, the population is estimated to be 210,000 people. The topography of Kazaure local government of Jigawa state is characterized by undulating land with hills of various sizes spanning several kilometres in parts of the local government. Kazaure has an average elevation of 475metres above sea level, it is mildly densely populated with 258 people per kilometre square (km2), an estimated 3.8% of the children below 5 years old are underweight with a mortality of 114 per births.

RESULTS AND DISCUSSION
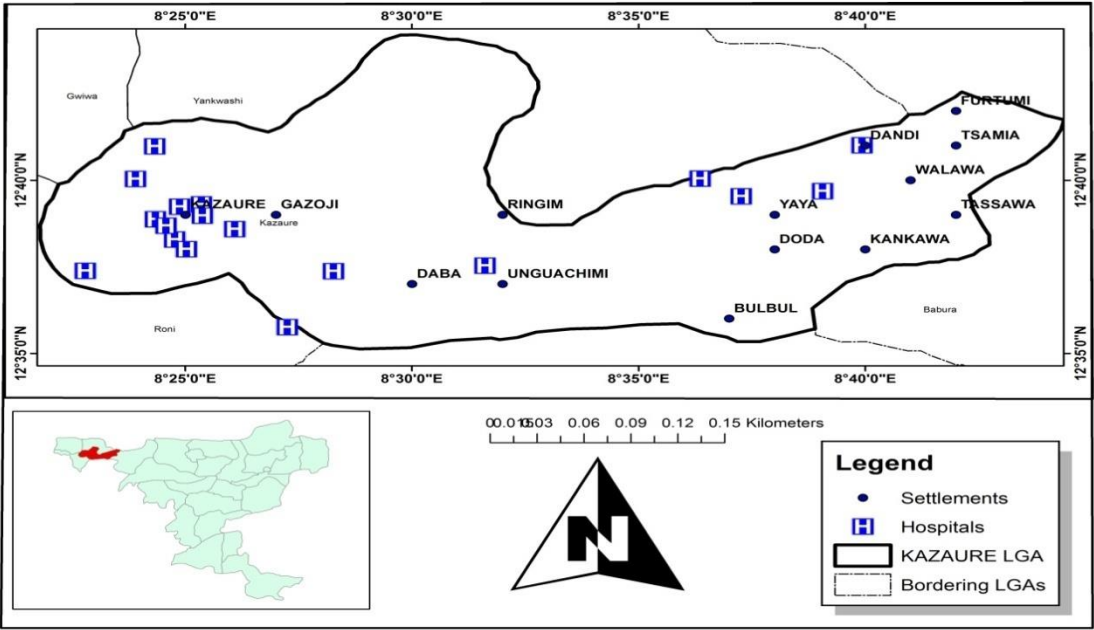**Categories of healthcare facilities in Kazaure Local Government Area**
The table below shows the percentage and number of healthcare facilities in Kazaure, which are categorised into primary, secondary and tertiary. The primary is having 78.95%, secondary 21.05% and tertiary 0%.

Table 1: Categories of healthcare facilities in Kazaure

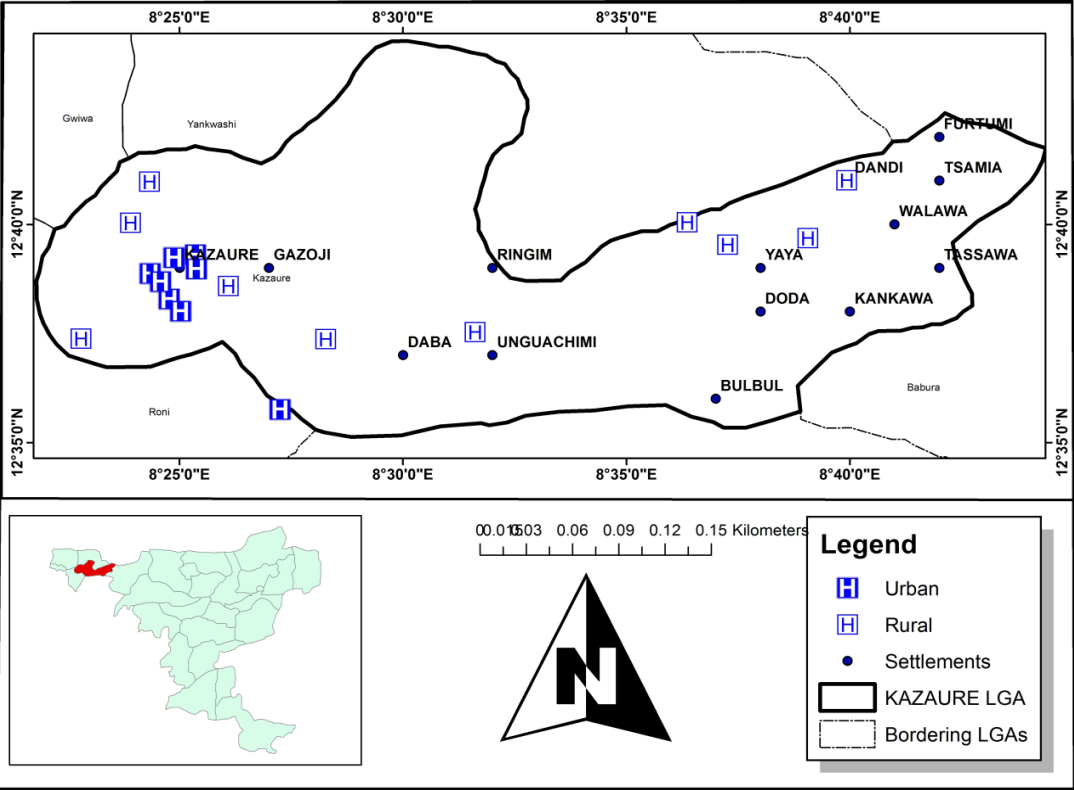| CATEGORY	NUMBER	PERCENTAGE
PRIMARY	15	78.95%
SECONDARY	4	21.05%
TERTIARY	0	0%
TOTAL	19	100%

Source: Author's complication, 2018

FIG 2: The map below shows the location of the hospital in Kazaure Local Government Area.

Source: Author, 2018

FIG 3: The map below shows the rural/urban healthcare facilities in Kazaure Local Government Area

Source: Author, 2018

Ownership of healthcare facilities in Kazaure Local Government Area

The table below shows the ownership of healthcare facilities in Kazaure where by public have the total number of 17 healthcare and 89.47% and private have 2 healthcare and 10.53%.

Table 2: Ownership of healthcare facilities in Kazaure Local Government Area

OWNERSHIP	NUMBER	PERCENTAGE
PUBLIC	17	89.47%
PRIVATE	2	10.53%
TOTAL	19	100%

Source: Author's compilation, 2018

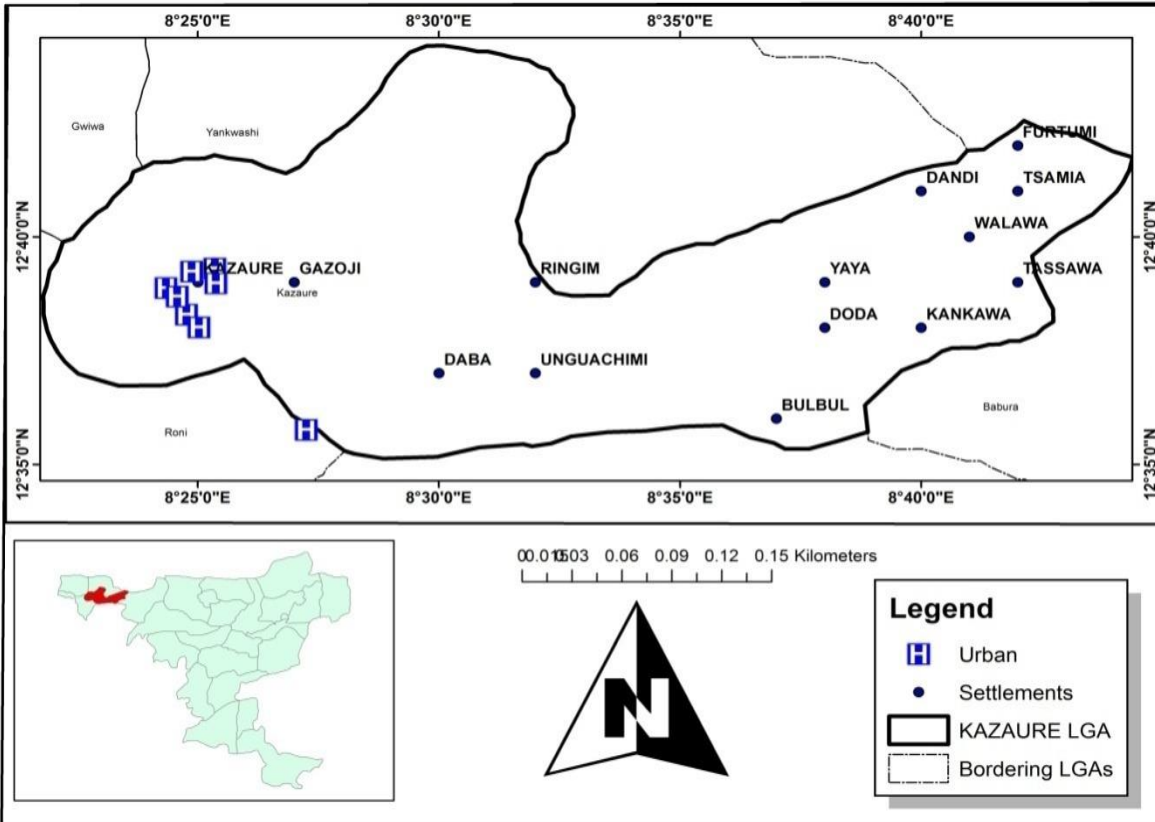**Classification of healthcare facilities based on their locations**
The table below shows the total number of healthcare facilities in urban and rural areas including their percentage, whereby urban area is having 9 healthcare facilities at 47.37% and rural area is having 10 healthcare facilities at 52.63%.

Table 3: Classification of healthcare facilities based on their location

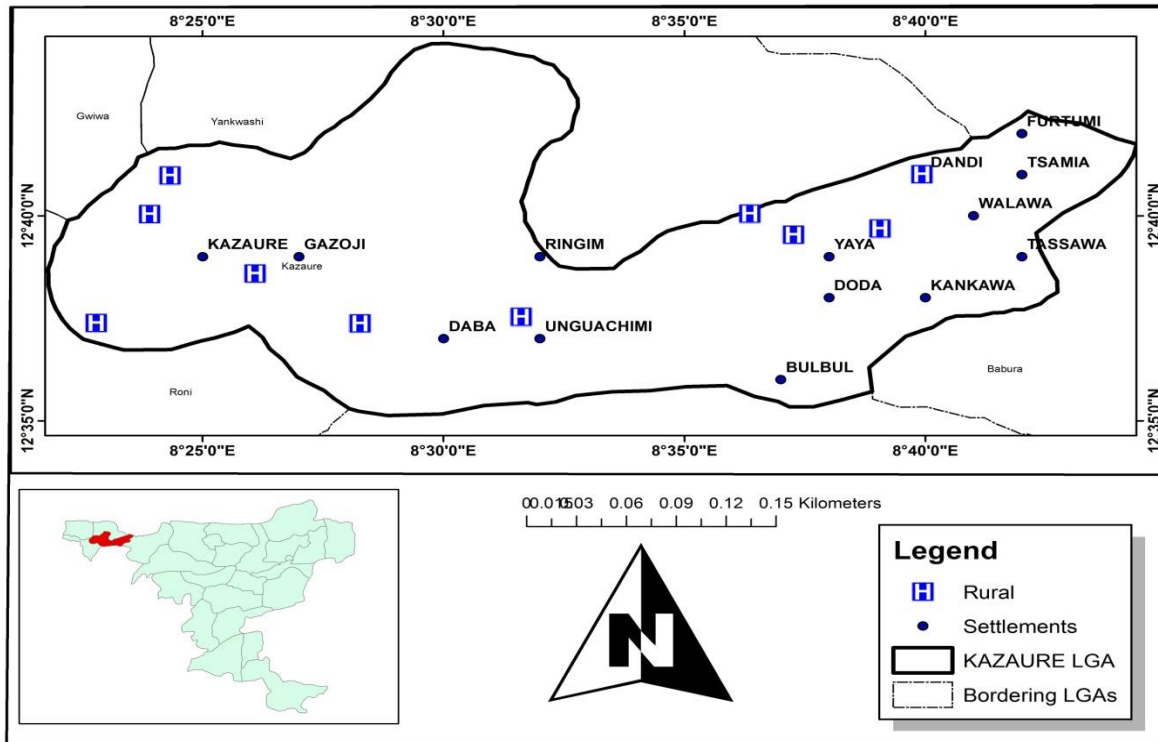| LOCATION	NUMBER	PERCENTAGE
URBAN	9	47.37%
RURAL	10	52.63%
TOTAL	19	100%

Source: Author's compilation, 2018
FIG 4: The map below shows the location of hospitals within Kazaure town (urban area)

Source: Author, 2018

FIG 5: The map below shows the location of hospitals within Kazaure villages (rural area)
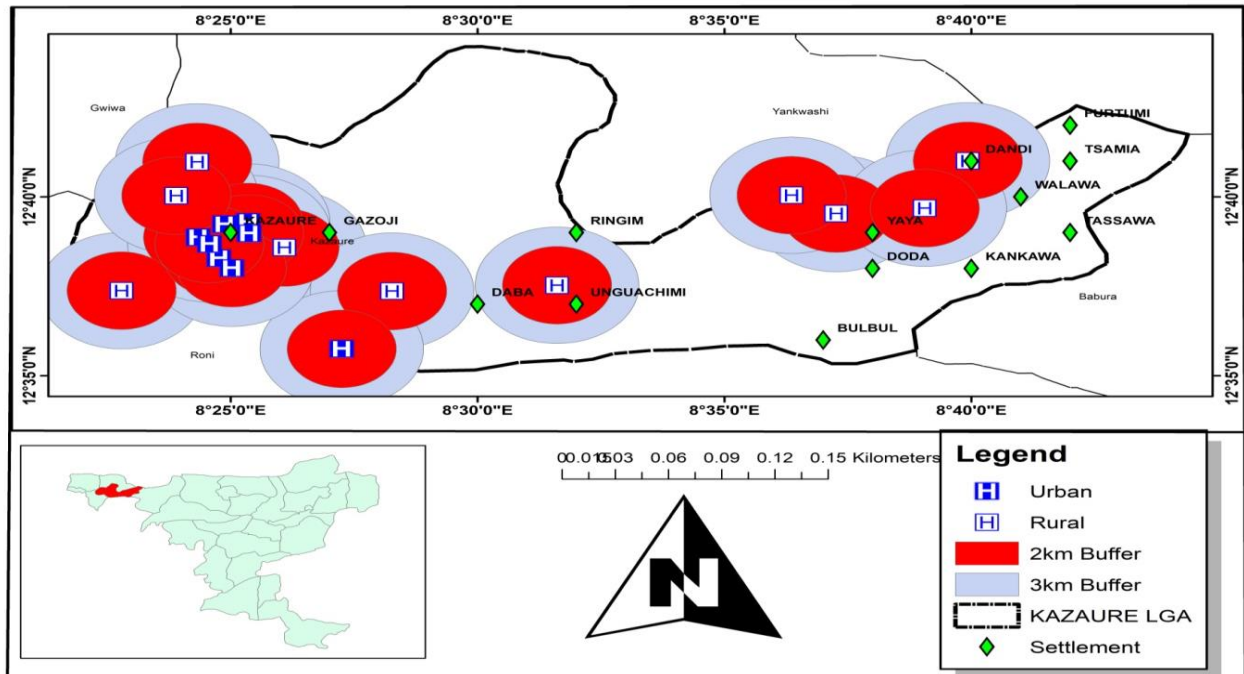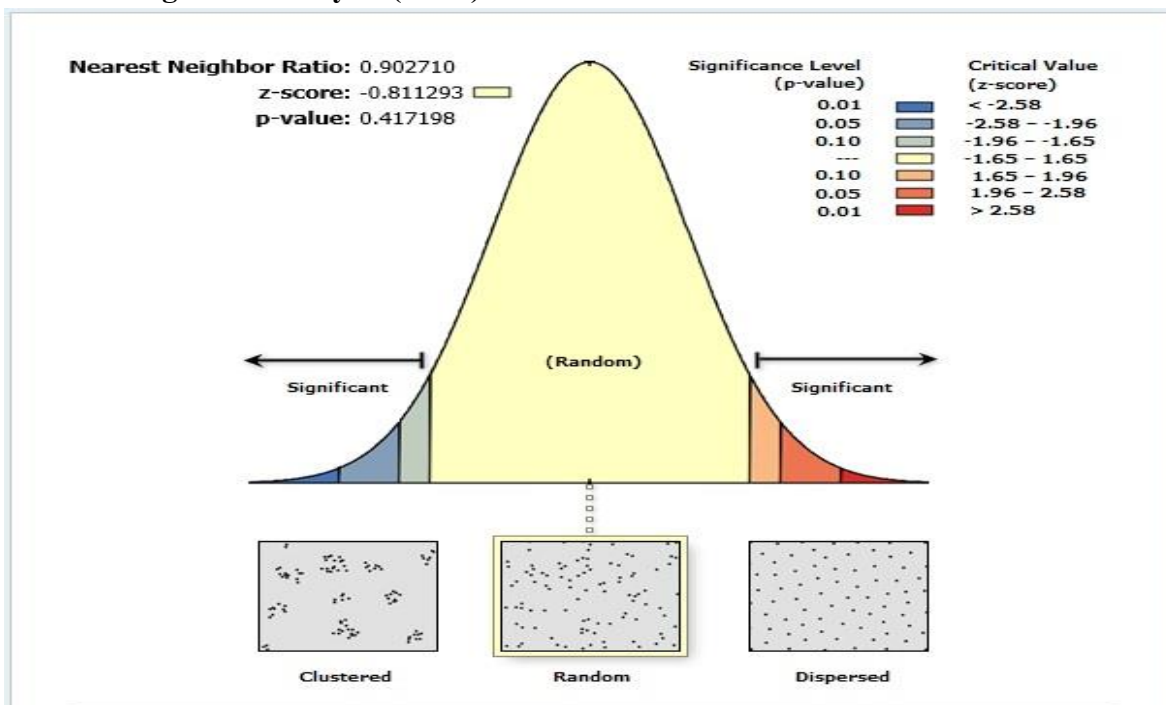
Source: Author, 2018

Multiple Buffer

The map below indicate a multiple buffer of 2/3 kilometres service radius area of all the healthcare facilities in Kazaure local government area.

FIG 6: 2/3 Kilometre buffer of healthcare facilities in Kazaure Local Government Area

Source:Author, 2018

Nearest Neighbour Analysis (NNA)

Average Nearest Neighbor Summary	
Observed Mean Distance:	2670.9662 Meters
Expected Mean Distance:	2958.8321 Meters
Nearest Neighbor Ratio:	0.902710
z-score:	-0.811293
p-value:	0.417198
Dataset Information	
Input Feature Class:	Hospitals
Distance Method:	EUCLIDEAN
Study Area:	665356223.601008
Selection Set:	False

FIG 7: NNA result (Source: Author, 2018)

The NNA ratio number is 0.90therefore we can say with 95% certainty that the healthcare facilities are distributed **randomly** within the area in view.

DISCUSSION OF THE RESULT

Findings from this research showed that there are only two categories of health care facilities which are primary and secondary in the study area. It was discovered that there are only four secondary hospital in the area, which are Kazaure General hospital, HussainiAdamu Federal Polytechnic, Kazaure hospital, Zainab memorial hospital and Hafsat Clinic Jawosanda, among them only Kazaure General hospital and Hussaini Adamu Federal Polytechnic Kazaure, hospital are government owned while the rest are private owned health care providers.

CONCLUSION

The study, this has provided an insight into the spatial distribution of health facilities in Kazaure local government. In the study area we have 15 primary health care centres which are having 78.95%. and Secondary health care centres 4 which is having the total percentage of 21.05, whereby the total number of health care centers in Kazaure is 19, likewise in terms of ownership of healthcare facilities public has 17 and 89.47% private has2 and 10.53%, the health care facilities was classified into Town and Rural whereby Town is having a total number of9 and 47.37% and rural having a total number of 10 and 52.63%. NNA result also indicates that the healthcare facilities are randomly distributed within Kazaure local government area. Thus, the study has indicated that there is great disparity and inequality in the distribution of health care facilities in the study area and it has also collaborated the work of Ujoh and Kwaghsende2014 that analyze the distribution of health facilities in Benue state, Nigeria.

RECOMMENDATIONS

The main objective of the study is to shed light on the spatial distribution of healthcare facilities in Kazaure local government area. Having carried out this research the following recommendation have been outlined which may be useful in assisting the ministry of health and other government bodies in planning better distribution of facilities and improving the efficiency of the already existing ones;

    i.   Efforts should be intensified to build more health facilities to cover all wards in Kazaure local government area.

    ii.   Government should put more efforts at providing additional secondary hospitals in Kazaure local government area.

    iii.   The buffer also indicated that the urban area is over-served while the rural areas area are under-served. This trend should also be rectified

    iv.   Healthcare facilities should also be sparsely distributed in area to improve accessibility and utilisation.

SUGGESTION FOR FURTHER RESEARCH

Further research on this topic is suggested so as to cover all the wards in the area council it is also suggested that the study should not be limited to public healthcare facility but other healthcare service providers should be looked into. A further research on access and utilization of healthcare facilities will shade more light on existing inadequacies.

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