

# Spatial Distribution of Primary Health Care Centres In Ughelli South And Warri South Local Government Areas of Delta State, Nigeria

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**ABSTRACT:-** The mapping of primary health care centres in Ughelli South and Warri South Local Government Areas (LGA) of Delta State was carried out. The objective is to provide Geo-spatial information about the distribution and accessibility of the Primary Health Care Centres in the Local Government Areas. Germain GPS was used to capture the Co-ordinates of the Health Centres which was analysed using Arc Map 9.3 (ESRI) GIS software. The multivariate analysis showed that the nearest neighbour value for Warri South Local Government  $R_n=0.665341$  which imply a clustered pattern of distribution. Ughelli South LGA  $R_n=0.9599$ . This results showed randomised distribution rather than clustered pattern of distribution. The importance of primary health care centres to the grass root dwellers is discussed.

**KEYWORDS:** Ughelli South LGA, Warri South LGA, Primary Health Centre, Germain GPS.

## INTRODUCTION

The term Primary care is thought to date back to about 1920, when the Davison report was released in the United Kingdom. The "white Paper" mentioned primary care centres intended to become the hub of regionalized services in that country [1]. Institute of medicine (IOM) In their report defined primary Health care as provision of integrated accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs developing a sustained partnership with patients and practicing context of family and community [2], [3]. The ultimate goal of Primary Health Care (PHC) is better health for all. This ideal model of health care was adopted in the declaration of the international conference on Primary Health Care held in Alma Ata in 1978 and became a core concept of the World Health Organization's goal of Health for WHO(1978)[4] To achieve the goal of health for all WHO has identified five key elements to achieving the goals.

- i. Reducing exclusion and social disparities in health (universal coverage reforms)
- ii. Organising health services around people's needs and expectations (service delivery reforms)
- iii. Integrating health into all sectors (Public policy) (leadership reforms)
- iv. Pursuing collaborative models of policy reforms dialogue (leadership reforms)
- v. Increasing stakeholder participation

In Nigerian, explicit consideration has not been given to the need for equity in the planning and distribution of health care facilities over the years. This has led to the emergence of many regions within the Country where both public and private health care facilities are sparsely provided.

Often regions with difficult terrain and physical environment are neglected. One major region in Nigeria which has generated much interest internally and internationally is the petroleum – producing region of the country otherwise known as the Niger Delta (where the local Government Areas are located) [5]. The objective of this paper is to carry out a Geographical Information System mapping of the primary health care centres and to use spatial statistics to describe their spatial distribution in Warri South Local Government, Ughelli North and Ughelli South Local Government Areas of Delta state.

## MATERIALS AND METHODS

### 1. STUDY AREA:

Warri South Local Government consist Warri main town on Geographic coordinates  $0.005.73333$  ( $^{\circ}E$ ) and  $05.53352$  ( $^{\circ}N$ ). The area is characterized by flat masy swampy terrain, water bodies, river scenes and evergreen forest and the soil consist of the alluvial and hygromorphic soils[6]. There are some creeks in the are a such as: Tori Creek, and the major river is the Warri River which his a tributary of the Forcados River, which discharges into the Atlantic Ocean[7]. Warri South Local Government is one of the most densely settled are in Delta state, Nigeria. Nigerian population commission census figure of 2006 give a figure of three hundred and four thousands as the population of Warri South Local Government Area.

### UGHELLI SOUTH LOCAL GOVERNMENT AREA.

Ughelli South LGA is on Geographic Co-ordinates  $9^{\circ}45' N$  and  $8^{\circ} 43' E$ . It has an area of  $786 \text{ km}^2$ . The population of the local government was put at 213,576 at the 2006 Nigerian Census. The Topgraphy of the area is marshy with Mangrove forest. The people of the local government are mainly farmers and fishermen. The local government is one of the highest Crude oil producing areas in Delta State and hosted Otorogun gas plant one of the largest in Africa is situated at Out-jeremi the headquarter of the local government.

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**2. DATA COLLECTION:**

The main data for this study was a SPOT XS (Multi-spectral Image with Spatial Resolution of 5 metres, recorded in 3 spectral bands and radiometric resolution of 8 bits. The administrative and topographic maps used were collected from relevant government agencies. The geographic coordinates of the Primary Health Care Centres were taken and recorded with an hand held eTrex Garmin Global Positioning System (GPS).

**3. DATA CONVERSION AND ANALYSIS**

Data acquired were converted to make them compatible with the GIS software. The topographic maps were converted from analogue to digital format by scanning them with an AO (A ZERO) scanner and geo-referenced in Arc View to allow for integration with the remotely sensed data within ARCVIEW. The spot XS multi-spectral data was already pre-processed and in digital format. Using the geo-referencing tool, the image was used to co-register the map by identifying ground control points on the image and in the map respectively. On screen digitizing was done to capture the various layer and theme relevant for the GIS analysis. A supervised classification was carried out on the image data to classify the image into six homogenous classes in order to generate the required spatial classes. The following classes were divided: built-up areas, cultivated lands, bare surfaces, water bodies, forests and wetlands. Supervised classification is the process of using samples of known identity to classify pixels of unknown identity. The samples of known identity are those pixels within the training areas identified during or through the analysis of fieldwork. The analyst therefore defined on the image. [8], [9], [10]. The classes were carefully digitized on screen from the image into different layers, while town names and landmark features were digitized from the administrative and topographic maps of the study area. All these spatial data was integrated into Review for manipulation and GIS analysis. Data integration functions of the GIS involve combining maps of the same geographical area at different scale, dates, coordinate and projections. It also entails the integration of digital map data with remote sensing data (satellite imagery). The capability of a GIS to overlay separate map layers of the same geographical area to produce a composite or new map of the study area combining the characteristics of the various map was explored in a GIS environment. In overlay analysis, the location is held constant and several other variables are simultaneously evaluated.

distance=0.1930019. The spatial distribution of these health centres indicates therefore that it is more random than clustered. A close analysis further shows a fairly clustered pattern in the northern part of Ughelli South LGA. Notable among settlements with these health Centres are: Egbo-Uhurie, Usiefrun, Ekapkamre among others. At Otu Jeremi there is a General hospital, while other settlements have Primary Health Care centres. The study also revealed that there are no Health Centres in the southern part of the study area, the terrain here is marshy. Which may not encourage human settlement and activities compared to the northern part of the local government area?

**SPATIAL DISTRIBUTION OF HEALTH CENTRES IN UGHELLI SOUTH LGA.**

A total number of eighteen health centres were visited in Ughelli South LGA. The Nearest Neighbour Analysis of health centres here revealed an  $R_n=0.9599$  ( $R_n < 1.0$ ), with  $N=17$ , area of study =  $779.70 \text{ km}^2$ , observed mean distance =  $0.496933$ , while expected mean

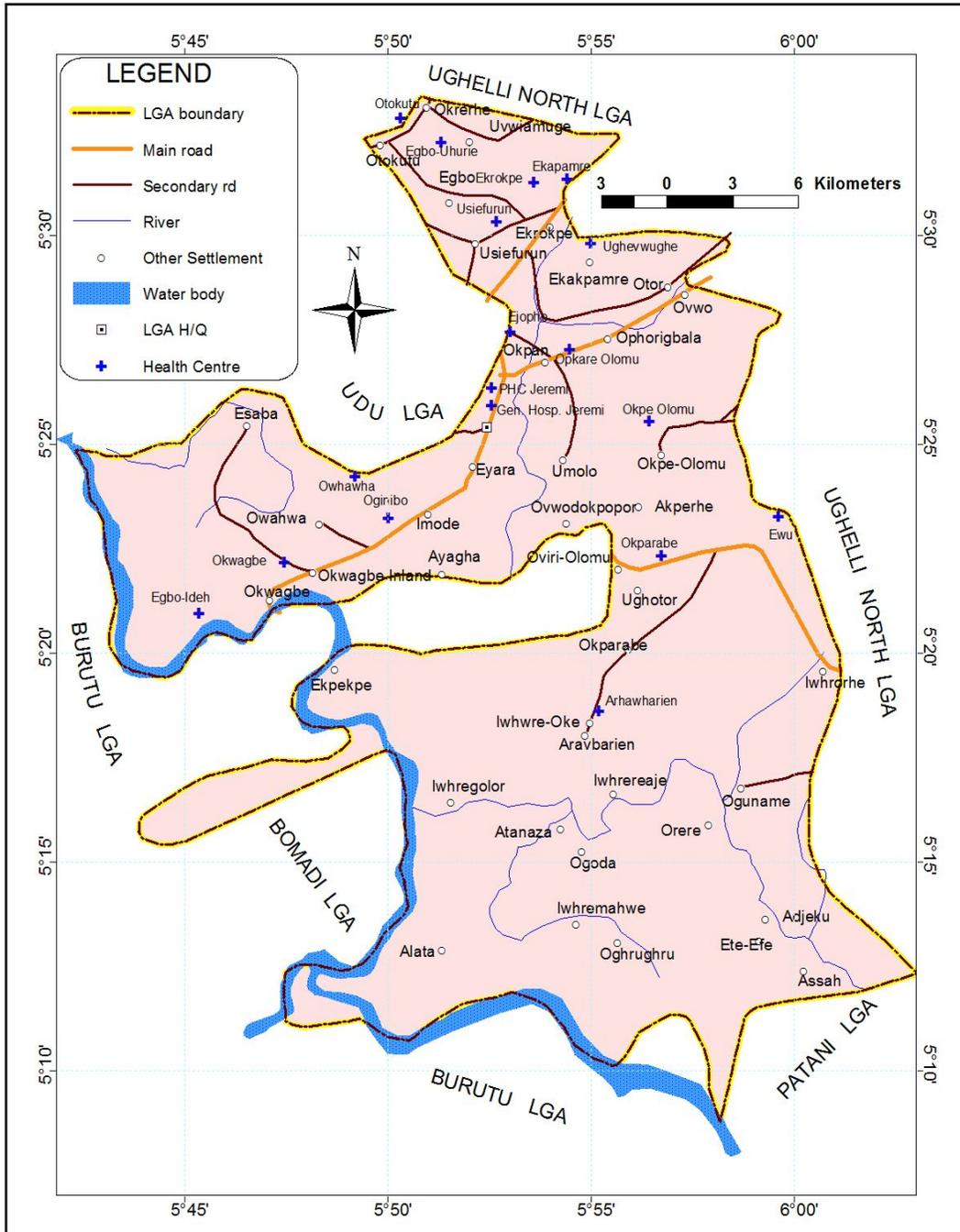
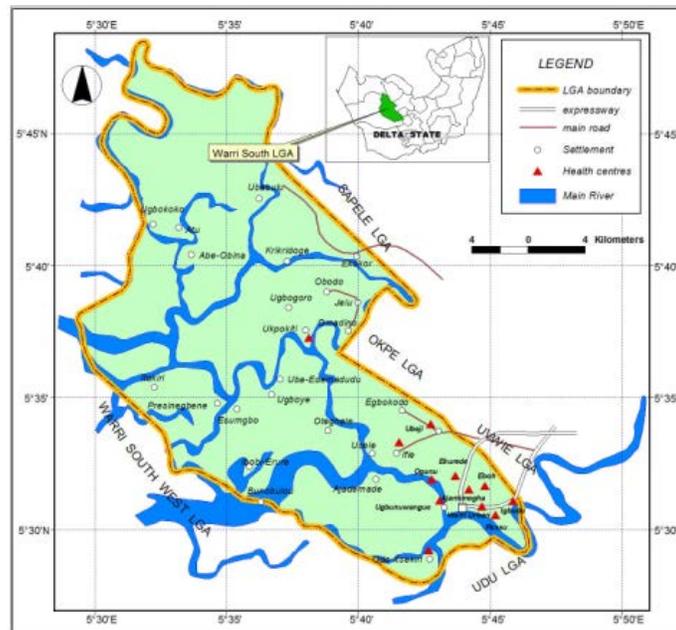


Figure 1: spatial distribution of health centre in Ughelli South LGA

**SPATIAL DISTRIBUTION OF HEALTH CENTRE IN WARRI SOUTH LGA**

Total number of twelve health centres co-ordinates were taken with the GPS. The nearest neighbour analysis of the PHC the observed mean distance of the centres is 0.22127km apart with expected mean distance 0.365529km. Study area is 550.66 km<sup>2</sup>, the  $R_n = 0.60534$  ( $0 \leq R_n \leq 1$ ) this implies clustering pattern in the distribution

of the PHC. The test significance,  $Z = 2.61544$  which shows the clustering is significant. Also it could be observed that the centres were clustered within certain portion of the Warri South LGA. The swamp terrain and physical environment could be a major factor in the distribution pattern of the PHC because white land is available for human settlement and usage.



**Figure 2:** spatial distribution of health centre in warri south LGA.

## CONCLUSION

We have used Geographic information system (GIS) and Geospatial statistics to study distribution patterns of the Primary Health Care Centres (PHC) Ughelli South and Warri South LGAs of Delta State, Nigeria. This shows that the PHC distribution is clustered. The topography of the area (Swamp terrain) may be a major determining factor responsible for this pattern of distribution because majority of land mass (over sixty percent) for Warri South were not accessible for human settlement. The population ratio to PHC is between (12,000:1, and 25,000:1). This is very inadequate if the goal of health for all as stipulated by world health organization is to be achieved. There is urgent need for local authority and state government and Non-Governmental organization to setup more functional, accessible health care centres. Health of the populace will improve if mal distribution of PHC is corrected and greater emphasis is placed on PHC this will help to lower cost of care, improve Health through access to better services and reduce the inequities in population Health.

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