SPATIAL ANALYSIS OF HEALTH INFRASTRUCTURES IN OREDO LOCAL GOVERNMENT AREA, EDO STATE

BY

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CERTIFICATION

This is to certify that this project was completed by **EDOSA SHEDRACK NWACHUKWU** Department of Geography and Regional Planning in partial fulfillment of the requirement for the award of Bachelor of Science degree in the Department of Geography and Regional Planning, Faculty of Social Sciences, University of Benin, Benin-City, Edo State.

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DEDICATION

This work is dedicated to God Almighty for his unspeakable grace all through my stay in the University of Benin. And also to my loving parents **Mr. & Mrs. Celestine Edosa** for their undeniable support. Special dedication goes to my siblings for their love and support in my education. I love you all.

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ABSTRACT

Spatial distribution of health infrastructure in Edo State using Oredo Local Government area as a case is examined. The location of healthcare facilities in the twelve wards of the local government areas is presented against the background of the pattern of population distribution. Data was obtained from both primary and secondary source. Methods of data analysis are simple ratio, percentages and averages. The Geographic Information Systems analysis was used in spatially depicting data, while coefficient of localization analysis was run with SPSS to determine the level of uniformity in distribution of health facilities with respect to population distribution. Findings show that distribution of he alth care facilities, are not exactly uniform with respect to population distribution among the wards in Oredo Local Government Area. Perception analysis on accessibility, reveal that accessibility to health facilities is average, due to the reasons of poorly maintained accessible roads and financial affordability. The study concluded by recommending a policy of deliberate dispersal of health care services to areas of insufficiency as well locating intending new and affordable health facilities in ideal and accessible locations. It is also suggested that the Government should make provision for better transport systems, improved staffing and equipment in health care centres.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Infrastructural facilities are not evenly spread over space because certain environmental factors, operation of economic, cultural and political processes often produce areas of concentration and specialization. Spatial disparities in the level of development are the results of uneven distribution of natural resources and regional differences in the history of human development (Adefila and Bulus, 2014). The phenomenon of inequality is widely recognized in Nigeria and it was epitomized in the use of such terms as 'advantaged' and disadvantaged' 'privileged and less-privileged'(Adefila and Bulus, 2014). Inequalities are most apparent between the commercial, industrial and urban centres on the one hand and extensive agricultural and poor rural areas on the other hand. The former are generally better provided with both quality and quantity of essential services to the neglect of the rural areas. There is unequal access to productive resources, and basic infrastructures such as schools, health centres, potable water, good feeder roads, culverts, storage and irrigation facilities (Fakayode *et al,* 2008).

In addition, inadequate and low qualities of infrastructures could have serious implication for welfare and persistence of poverty in our society. It is a consensus

among scholars (Ndulu, 2006; Calderon and Serve, 2008; Egbetokun, 2009) that infrastructures are the criteria for the success of public and private efforts aimed at accelerating economic development. It is obvious that one cannot expect rapid socio-economic development without adequate provision for infrastructural facilities. Omofonmwan (2004) had remarked that one of the critical factors that contributed to the high level of rural poverty is the inadequate infrastructural facilities. The role of infrastructural facilities in the overall economic growth and development cannot be overemphasized. United Nation (2011) had remarked that infrastructure plays a critical role in poverty reduction, economic growth and employment for the masses. Moreover, Ale, *et al* (2011) shared similar opinion that provision of basic infrastructures is a prerequisite for developing economies to stimulate economic growth and reach the state of economic recovery and poverty alleviation through increasing and diversifying agricultural outputs. Also, (Calderon, 2009; Egbetokun, 2009) observed that the provision of infrastructures are part of integrated strategy which combine the development of various spheres of life including agricultural, educational, health, nutrition, electrification, water supply and cooperatives simultaneously. This serves as a holistic approach towards solving the regional problem to a large extent. Bamboye (2007) pointed out that individual are poor because they do not have access to infrastructural services for improving quality of life. In the same vein, (Oyewole and Oloko, 2006) had remarked that adequate infrastructures can reduce the cost of

production which affects productivity, level of outputs, and employment. It was remarked that where infrastructures are put in place, level of agricultural productivity will be increased and if otherwise citizens will suffer particularly the rural poor, thus economic renewal and societal welfare become worse and halted (Perkins and Luiz, 2005; Akinola, 2007). Therefore, a strategy to reduce abject poverty needs to incorporate policies to develop both production and welfare oriented infrastructures in order to improve poor people's productive capacity and quality of life.

Data on health administration and coverage in Africa indicate that in many countries, health services are not keeping pace with the changing population either in quality or quantity. There is also a wide gap between different groups within many countries. According to WHO (1977), the number of inhabitants per physician in African countries is in the range of 10,000. Similar poor situations exist with respect to medical assistants, nurses and midwives.

Healthcare in Nigeria is influenced by different local and regional factors that impact the quality or quantity present in one location. In Nigeria a number of factors are responsible for the spatial variation in the distribution of healthcare facilities among the states. Among these are population growth, economic development, increase in human knowledge, social transformation, psychological motives, political strategies, role of missionaries, role of community development, self-help activities

and as well as the nature of settlement pattern and distribution (Onokerhoraye, 1995). Apart from the problem of inadequacy there is uneven distribution.

Due to the aforementioned, the healthcare system in Nigeria has shown spatial variation in terms of availability of facilities in relation to need. However, this is largely as a result of the level of state and local government involvement and investment in health care programs and education in rural and urban areas. For instance, the Nigerian ministry of health usually spends about 70% of its budget in urban areas where 30% of the population resides (Rais Akhtar, 1991). It is thus assumed by scholars that the healthcare service provision is inversely related to the population needs.

This paper is focused on evaluating and examining the spatial variation in the distribution of health care facilities in Oredo Local Government Area of Edo State.

1.2 STATEMENT OF RESEARCH PROBLEM

Since independence, the government has given high priority to the improvement of the health status of the country. However, major disparity in health care services distribution occurs between the rural and the urban communities and in different regions in the country (Njiri P.K, 2012). This is evidenced by the low number of health facilities in some regions while some regions have few or lack health facilities. With the devolution of the government, some regions will face massive shortage and overstressed health care facilities while others will have probably have underutilized health care facilities in reference to their population. This calls for urgent evaluation of the distribution of the health care facilities among the different areas in the country. By comparing the distribution and utilization of the health care services in the different areas in Oredo local Government, the study will try to show how the impact of the unequal distribution of the health care services, with reference to population distribution, affects majority of the people in the study area.

The study will adopt a simple descriptive and comparative approach where the number of health facilities and accessibility in each locality will be compared with the population. The anticipated results of this research paper are expected to give a reasonable approximation of the level of distribution of the various health care

facilities. This will provide a guideline for the stakeholders to formulate policies that would improve the level of health care facility distribution

1.3 RESEARCH QUESTIONS

1. How accessible are the various Health facilities to the people of the different wards in Oredo Local Government Area?
2. How are the Health infrastructures distributed in Oredo Local Government Area?
3. What are the factors responsible for the present distribution pattern of health infrastructure in the area?
4. What can be done to improve on the distribution pattern of health infrastructure?

1.4 AIMS AND OBJECTIVES

The overall aim of this study will be to analyze the distribution of health infrastructures in the study area, with reference to population distribution.

The specific objectives of this research study will be to;

1. Review how the current health facilities are distributed among the wards.
2. Examine the factors responsible for distribution pattern of healthcare facilities
3. Assess the distribution of the health care facilities in each ward in comparison with the population of the study area.

4. Identify possible ways of improving health care facilities distribution in the study area.

1.5 RESEARCH HYPOTHESIS

The following hypothesis will be tested for empirical verification.

Ho-There is no significant relationship between population distribution and distribution of health care facilities.

H_1- There is significant relationship between population distribution and distribution of health care facilities.

1.6 SIGNIFICANCE OF THE STUDY

The significant of this study is to show how health infrastructures are distributed in the study area in relation population distribution in the study area. This will help in showing where health infrastructures are more concentrated and where they are insufficient. This study will help in providing the modalities for improving the distribution of health infrastructures on the study area.

1.7 SCOPE OF THE STUDY

This study examines the distribution of Health infrastructures in Oredo Local Government Area of Edo State, Nigeria. The Data used were obtained from the field through questionnaire, oral interview and personal observation and also from secondary sources such as published and unpublished materials. The study show how health infrastructures are distributed on the study area with reference to population

distribution. It also examines accessibility of the various health facilities. Lastly it explores possible ways of improving health infrastructure distribution and accessibility in the study area.

1.8 LIMITATION OF THE STUDY

In the course of this study certain limitations were encountered. These include the difficulty in obtaining correct and complete responses from the respondent especially when it has to do with their personal lifestyle or activities. Difficulties were also encountered during the course of obtaining data on the health facilities in the study area.

1.9 STUDY AREA

1.9.1 LOCATION AND POPULATION

Edo State lies roughly between longitude 06° 04'E and 06° 43'E and latitude 05° 44'N and 07°34'N of the equator. It is bounded in the south by Delta State, in the west by Ondo State, in the north by Kogi State and in the east by Kogi and Anambra States. Edo occupies a total land area of 19,794 square kilometers and a total population of 2.16 million in 1991. The 2006 census puts the population of Edo State at 3,218,332. The figure is currently projected at well over 3.4 million people. The average population density for the state is 109 persons per square kilometer which is slightly above the national level.

Oredo is a Local Government Area of Edo State, Nigeria. Its headquarters are in Benin City which is also the capital city of Edo State. It has an area of 249 km² and a population of 374,671 at the 2006 census. (National Population Commission, 2006)

1.9.2 RELIEF AND DRAINAGE

Benin City is built on a nearly undulating low lying surface. The eastern edge of it tilted towards the Ikpoba River that drain the eastern portion of the city, while the western edge slopes gently towards Ogba stream that drain the western portion of the City. Benin City is drain by a series of entrenched rivers and small streams such as Ikpoba River, Ogba stream and Osse streams-many depositional land from result especially flood plain characterized with point bars, islets, levees, back swamp and channel filling, alluvial fan and delta. (The Columbia Encyclopaedia, 2005).

1.9.3 GEOLOGY

Benin City lies in the southern part of Nigeria. Different units formation are exposed in the area. Benin formation extends from the west (Lagos, Benin, Warri) and southward (port-Harcourt) and beyond the present coastline; it is composed of over 90% sandstone with shale intercalation. The sand sandstone of Benin are coarse grained, very granular, pebbly, gravelly, locally fine grained, poorly sort, sub angular to well rounded and bear lignite streaks and wood fragment. Some sandstone of Benin formation are dark coloured and some are brown because of the presence or organic matter in them. The formation is a continental deposit of probable upper depositional

environment. Various geologic structural units are associated with the Benin formations which are point bars, channel hills, natural levees, back-swamps, ox-bar fills and beach. All these indicate variability of the shallow water depositional medium. Benin formation is known as the coastal marine sand of Nigeria and it is the source of portable drinking water in place where it is under laid. (The Columbia Encyclopaedia, 2005)

1.9.4 CLIMATE

The State has tropical climate with distinct dry and rainy seasons. Rainy season has duration of seven months beginning from April-October. Rainfall in Benin City ranges from 33.0-1068.0(mm/month). However, no month is completely without rain as the monthly great and diurnal changes of temperature and for most of the year during the day. The temperature ranges from 21.35-34.15(Celsius).

1.9.5 VEGETATION

The State consists largely of flat lands with tropical rain forest in the South and guinea savannah in the North. The natural vegetation around Benin City is lowland rainforest with swamp vegetation in the south and the west to the more matured high forest called forest reserves. Grass is generally absent although there are several exceptions in the north and east of Benin. Many areas around the city are dominated by secondary forests, and rubber plantation. (The Columbia Encyclopaedia, 2005).

1.9.6 SOCIO-ECONOMY ACTIVITIES

The State capital Benin City is famous worldwide for its art treasures. The State is also known for the cultural homogeneity of its people. Industrial undertakings include wood carvings, saw milling, rubber processing, cement and textile production, brewing, agriculture and agro-based production and flour milling. Although Edo is an oil producing State, yet agriculture still dominates economic activities. The State is very rich in agriculture and is a major food basket for the south-south zone. The major agricultural crops include cassava, rice, plantain, yam, sugar cane, cashew, groundnuts, tomatoes, cotton and tobacco, which are geared towards local and national markets. With the vast forest belt, there are various species of economic trees such as Obeche, Iroko, Mahogany, and Raphia Palms.

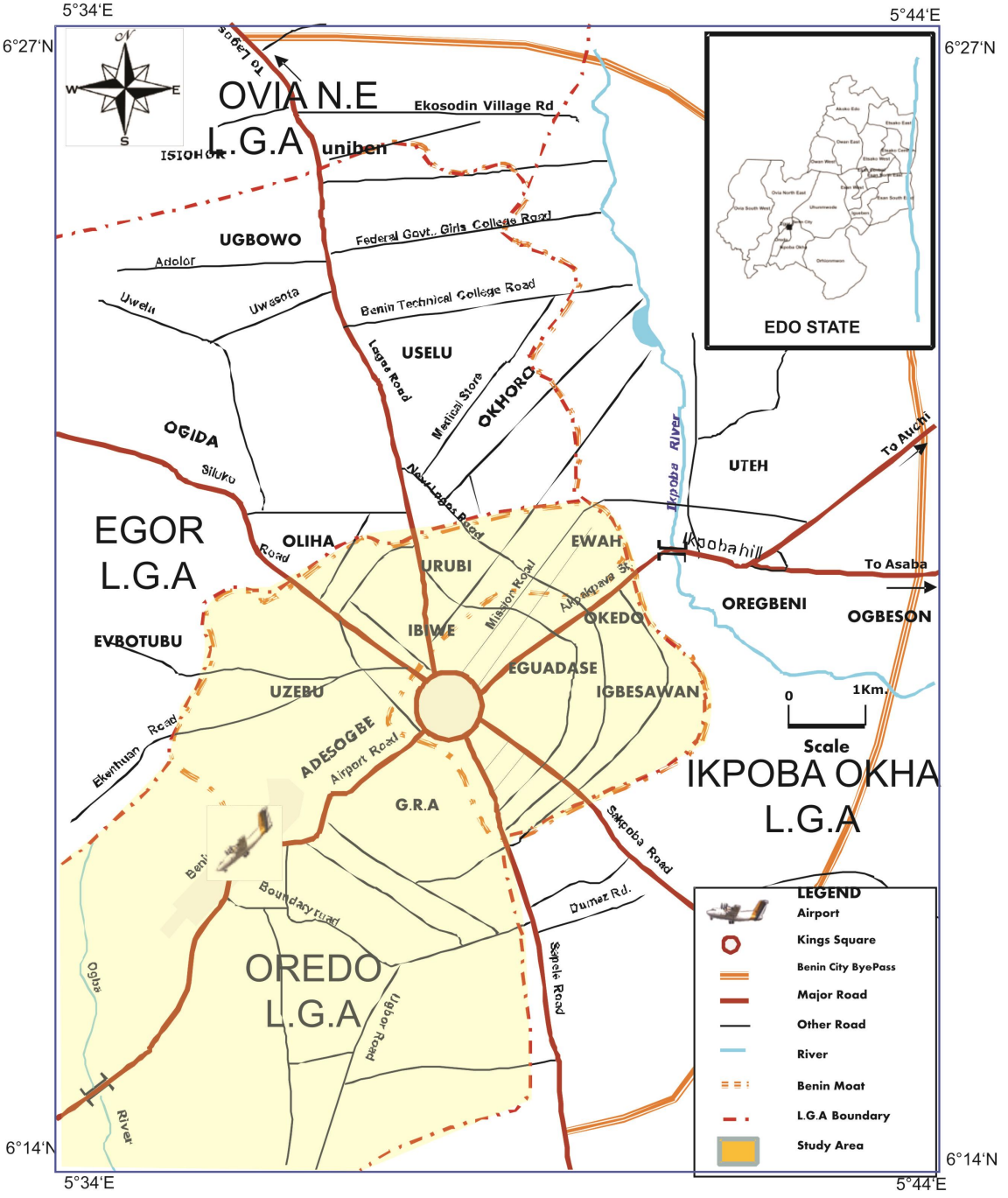

Figure 1: BENIN CITY SHOWING OREDO L.G.A (INSET: EDO STATE)

Source: Ministry of Lands and Survey, Benin City (2016).

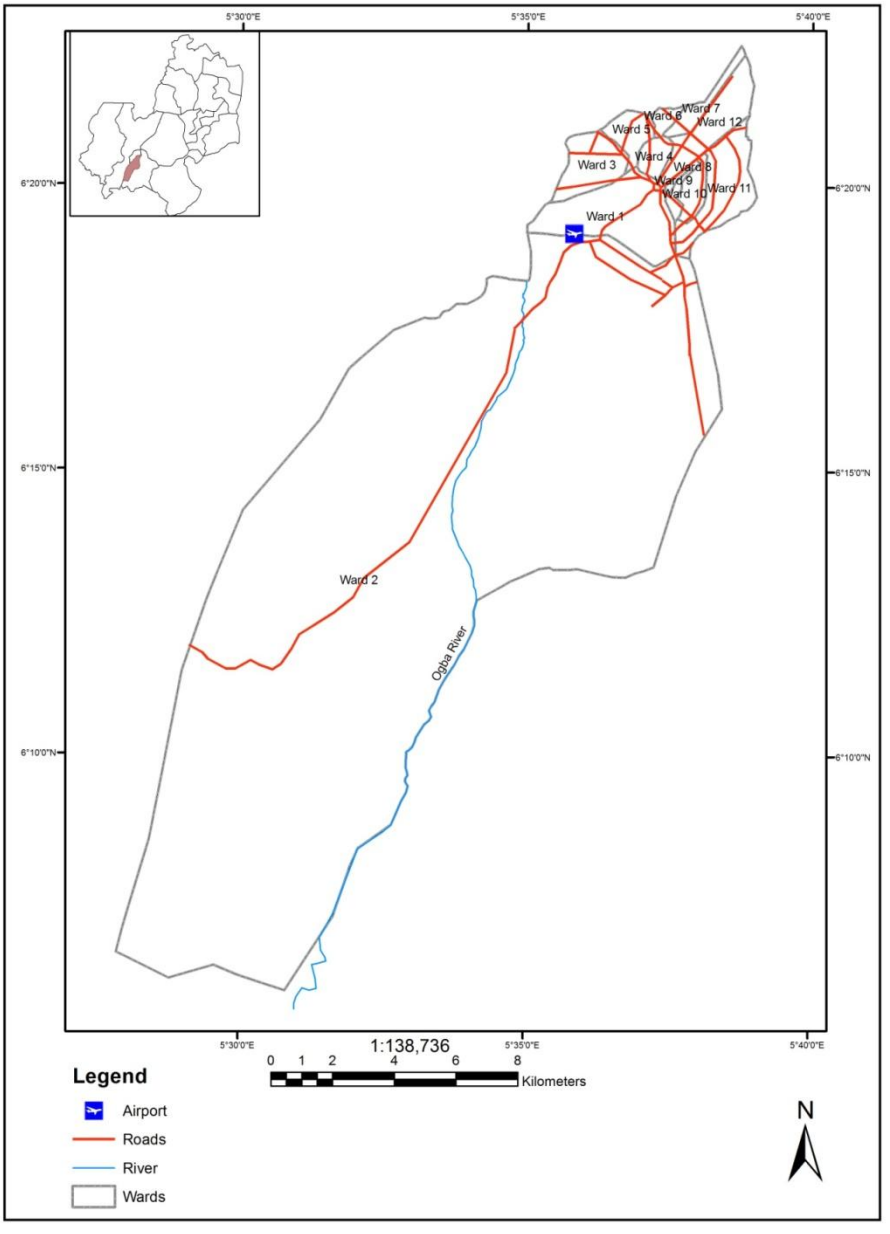

FIGURE 1.2: OREDO LOCAL GOVERNMENT AREA, (INSERT: EDO STATE).SOURCE: GIS CONSULTANT, 2016

CHAPTER TWO

CONCEPTUAL FRAMEWORK/LITERATURE REVIEW

2.1 CONCEPTUAL FRAMEWORK

2.1.1 DEFINITION AND CATEGORISATION OF INFRASTRUCTURAL FACILITIES

Infrastructures are those basic physical, social and institutional forms of capital, which enhance production, distribution, consumption activities and ultimately the quality of life (Ekong, 2000). Essentially, it constitutes facilities such as basic services without which primary, secondary and tertiary productive activities cannot function (Madu, 2012) Infrastructures forms the necessary ingredients for motivating people to be more productive and achieve relative self-reliance (Ekong, 2005). In other words, infrastructural facilities are elements in the package of basic needs which a community would like to procure for better living (Olayiwola and Adeleye, 2005). It is viewed as those facilities and services that are needful to improve on the quality of life of the people. Abumere (2002) put infrastructure to include the system of physical, human, and institutional forms of capital which enables rural residents to better perform their production, processing, and distribution activities, as well as help to improve the overall quality of life. In addition, infrastructure can be better understood as those specialized elements in the development process that bring about improvements in the socio-economic welfare of the masses. Moreover, they are catalysts of development

and at the same time their presence can be an indicator of the level of development (Oguzor, 2011; Oisasoje and Ojeifo, 2012).

Barrios (2007) has assisted in categorizing the infrastructural facilities to include economic facilities such as credit, loan, production support; physical infrastructures such as roads, electricity, irrigation facilities; capacity building in terms of training, information dissemination; and support service namely, market services, and access to basic social services. Idachaba (1995) had attempted the classification of the infrastructures into three namely, first: physical infrastructures consisting of roads, bridges, storage facilities, dams, irrigation, water facilities, and other forms of processing facilities. Second, social infrastructure such as health and medical facilities, educational facilities and third, institutional infrastructure which consists of cooperative societies, farmers' unions, financial institutions like banks, agricultural extension and training services. This classification is of immense importance because socio-economic status of people largely depends on the quality of infrastructural facilities provided with good maintenance culture.

One of the critical problems facing developing countries is the inadequate provision and maintenance of infrastructural facilities and that the poor state of infrastructure in many areas is posing a great challenge to economic developmental efforts particularly level of agricultural and industrial productivity (Abumere, 2002) It was remarked that the infrastructural facilities that should serve as catalyst in the

process of agricultural production are either not available or inadequate and can impede socio-economic transformation Adeoye, *et al*, 2011). The development of infrastructure must be seen as an integral part of the entire economic growth and development.

In Nigeria, a major problem is the pattern of distribution of these basic infrastructures which exhibits urban bias; hence poverty is at a higher level in the rural areas than urban areas. A considerable emphasis is placed on the development of urban infrastructure to the neglect of the rural areas (Oguzor, 2011). Apart from poverty problem, the prime factor for rural-urban exodus is the attraction of the infrastructural facilities placed in the few urban cities and this trend will continue unabated until such facilities are equitably provided and sustained in the rural communities. Aderamo and Magaji, (2010) remarked that the sustainability of the provision, operation and maintenance of appropriate rural infrastructures has eluded the hopes and aspirations created in the minds of rural folks. Umoren *et al* (2009) observed that rural infrastructural development has not been taken seriously in Nigeria and it is often difficult to quantify its direct influence on the quality of life in rural areas.

Rotimi (1994) had attested to the fact that transport and communication were capable of assisting the diffusion of ideas and innovation. In development process, the role of transport and communication cannot be over-emphasized in that they help in no

small measure to spread the benefit of development from the industrial urban centre to the rural hinter-land usually in form of spread effects. In the same vein, Ogunsanya (2002) had remarked that transport was analogous to internal organs of human body that often worked as the life-wire of our socio-economic and political life. Ogunsanya went further to emphasize the considerable importance of transport in any regional economy. In addition Familoni (2001) shared identical opinion when he remarked that the functions that banks perform in the modern society which include operating current, saving and deposit accounts, money transfers, purchase of drafts, procurement of loans for a large variety of purposes and opening its door to business in community, is largely viewed as vehicle of ushering in growth and development.

Umoh (2000) assessed the impact of rural electricity and roads as facilitators of socio-economic development of rural areas in Kaura Namoda (Zamfara State). Umoh discovered that recent installation of rural electricity supply and construction of access roads as increased volume of investments in respect of transport services and which has contributed to economic growth in general.

Akinola (2007) examined coping strategies with infrastructural deprivation through collective action among rural people in Nigeria and discovered that the failure of the government to properly address the problem of rural infrastructure led to the adoption of self-help strategy by the people through collective action. The result further explained that the rural people organized themselves into appropriate

institutional arrangements, mutual agreements and shared understanding, planned and execute public goods and services that directly touched the lives of the people. Fakayode *et al* (2008) examined the place of infrastructures in the agricultural productivity of farm households, using farm level data from Ekiti State, Nigeria.

Similarly, Ale *et al* (2011) examined the importance of rural infrastructural development in solving the problems of food security and city congestion, pointing out that many rural farm families move to the cities where infrastructures are adequately provided at the expense of food production for the large populace all in search for good living. The outcome of the study made it obvious that the level of infrastructural development in rural Nigeria is nothing but poor. It further stated that if the country will continue at this level of lip service in the provision of infrastructural facilities, she will not be able to meet the vision 2020 target of providing food security as contained in the millennium development goals (MDGs).

Infrastructural facilities refer to those basic services without which primary, secondary and tertiary productive activities cannot function. In its wider sense, it embraces all public services from law and order through education and public health to transportation, communications and water supply (Mabogunje, 1976).

Idachaba (1985) divided rural facilities in Nigeria into three main groups; namely, physical (transportation, storage, processing, water resources), social (health, education, utilities) and institutional (cooperative societies, financial institutions,

agricultural research and training and product marketing) infrastructures. In this study, rural infrastructure therefore refers to those facilities and services that are needful to improve on the quality of life of the rural people. Infrastructural facilities in the study area include roads, electricity, police station, silos, post offices and agencies, markets, motor parks, hospitals, primary healthcare centres, banks, primary and secondary schools and town halls.

According to WHO (1986), health is a state of complete physical, social and mental wellbeing, and not merely the absence of disease or infirmity. Health is considered a means to an end which can be expressed in functional terms as a resource which permits people to live an individually, socially and economically productive life. Health is also considered as a fundamental human right (WHO, 1986).

Health infrastructure (HI) has been seen from a number of perspectives. WHO (1998: 14) viewed HI as "those human and material resources, organizational and administrative structures, policies, regulations and incentives which facilitate an organized health promotion response to *public health* issues and challenges". Public Health Infrastructure (PHI), as defined by the Centers for Disease Control and Prevention (CDC) (2001), is the "underlying foundation that supports the planning, delivery and evaluation of all public health activities and practices". The three components of PHI identified by the CDC (2001) are workforce capacity and competency; information and data systems; and organizational capacity.

Turnock (2004) describes PHI as, “the systems, competencies, relationships and resources that enable performance of public health’s core functions and essential services in every community.” The conceptual framework for a public health system created by Handler *et al*. (2001) include structural capacity which is made up of information, organizational, physical, human and fiscal resources. In this paper, the focus is on the physical infrastructure component of HI. In Nigeria, physical infrastructure clearly indicates the presence of a HI. Most of the other components of HI are established around it.

There are a number of theories and concepts in geographic literature which attempt to explain the spatial distribution and patterns of geographic phenomena in space. The Central Place Theory, the p-Median Model and the Market Area Analysis are some of such theories. (Ayeni, 1979). The central place theory apart from recognizing the spatial distribution of settlements also, identified settlement hierarchy based among other things on the type’s services that settlements provide (Christaller 1966, Ayeni 1979). Thus, higher order centres/services and lower order centres/goods will command differential market areas because they present different range of opportunities to their customers.

According to Smith, Walter Christaller erred in his development of CPT in 1930 by using size of population and number of telephones in determining the importance of a city. Smith recognized that although population size was important to

the area served by a city, the number of kinds of services offered there was more important as a measure of the importance of a city in attracting consumers. In applying CPT to describe the delivery of medical care in California, Smith counted the number of physician specialties to determine the importance of a city in the delivery of medical care.

Christaller also erred in the assumption that cities "emerge". In California and much of the United States, many cities were situated by the railroads at the time the tracks were laid. In California, towns founded by the railroads were 12 miles apart, the amount of track a section crew could maintain in the 1850s; larger towns were 60 miles apart, the distance a steam engine could travel before needing water. Older towns were founded a day's horse ride apart by the Spanish priests who founded early missions.

In medical care regions described by Smith, there is a hierarchy of services, with primary care ideally distributed throughout an area, middle sized cities offering secondary care, and metropolitan areas with tertiary care. Income, size of population, population demographics, and distance to the next service center, all had an influence on the number and kind of specialists located in a population center. (Smith, 1977, 1979) For example, orthopedic surgeons are found in ski areas, obstetricians in the suburbs, and boutique specialties such as hypnosis, plastic surgery, psychiatry are

more likely to be found in high income areas. It was possible to estimate the size of population (threshold) needed to support a specialty, and also to link specialties that needed to cooperate and locate near each other, such as hematology, oncology, and pathology, or cardiology, thoracic surgery and pulmonology. Her work is important for the study of physician location where physicians choose to practice and where their practices will have a sufficient population size to support them. The income level of the population determines whether sufficient physicians will practice in an area and whether public subsidy is needed to maintain the health of the population.

The distribution of medical care in California followed patterns having to do with the settlement of cities. Cities and their hinterlands have characteristics of the Traffic Principle usually have six thoroughfares through them, the thoroughfares including highways, rivers, railroads, and canals. They are most efficient and can deliver the lowest cost services because transportation is cheaper. Those having settled on the market principle have more expensive services and goods, as they were founded at times when transportation was more primitive. In Appalachia, for example, the market principle still prevails and rural medical care is much more expensive.

2.1.2 EQUITY IN THE DISTRIBUTION OF HEALTH INFRASTRUCTURE

According to WHO (1996), equity means fairness. Equity in health means that people's needs guide the distribution of opportunities for well-being. The WHO global strategy for achieving Health for all is fundamentally directed towards achieving greater equity in health between and within populations, and between countries. This implies that all people have an equal opportunity to develop and maintain their health, through fair and just access to resources for health. HI must therefore be equitably distributed in other to facilitate fair and just access to resources for health. HI is one of the socio-economic infrastructures that are considered critical for development in Nigeria. Others include education, water, electricity and transportation.

The Nigeria Core Welfare Indicator study (NBS, 2006), measured Health access in terms of persons living in households with an OM health facility less than 30 minutes away. This clearly indicates the policy emphasis placed on the availability of physical HI in Nigeria. The literature around health inequality is extensive. This literature touches on different aspects of health; HI distribution, status, access, outcomes, etc. HI distribution has been assessed from the perspective of inequality with the emphasis being on health inequality. Health inequalities can be defined as differences in health status or in the distribution of health determinants between different population groups (WHO, 2009). They are the result of 'a complex system operating at global, national and local levels which shapes the way society, at national

and local level, organizes its affairs and embodies different forms of social position and hierarchy. The place people occupy on the social hierarchy affects their level of exposure to health damaging factors, their vulnerability to ill health and the consequences of ill health (Marmot, 2009: 14).

Health inequality refers to differences or variations in health-related quality of life and length of life profiles of different population groups in a nation (WHO, 2009). The causes of urban health inequalities are associated primarily with socio-economic status, income, poverty, deprivation levels, unemployment, incapacity, worklessness, skills and educational level, housing conditions and social mobility as well as life chances (O'Brien *et.al*. 2010). Inequality in health is not the same as inequity in health. Inequalities in health status between individuals and populations are inevitable consequences of genetic differences, of different social and economic conditions, or a result of personal lifestyles. Inequities occur as a consequence of differences in opportunity which result, for example in unequal access to health services, nutritious food, adequate housing and so on. In such cases, inequalities in health status arise as a consequence of inequities in opportunities in life (WHO, 1998). It should however be noted that public policy-induced inequality in HI and other socio-economic conditions will contribute to inequities in opportunities.

According to Whitehead (1992), health inequities are 'differences in health which are not only unnecessary and avoidable but, in addition, are considered unfair

and unjust'. This means that not all inequalities can be described as inequities. Whereas equality means sameness (equality of distributions), equity is *fairness* of distributions Health status affects economic growth and sustainable development. There is evidence that investing in health brings substantial benefits to the economy (Anyanwu & Erhijakpor, 2007). According to WHO (2001), increasing life expectancy at birth by 10% will increase the economic growth rate by 0.35% a year. On the other hand, ill health is a heavy financial burden. About 50% of the growth differential between rich and poor countries is due to ill health and life expectancy. Harttgen & Misselhorn (2006) found that access to health infrastructure is important for child mortality which is one of the health outcomes covered by the MDGs. On the other hand, socio-economic factors, especially poverty, are often found to be strong determinants of health outcomes (Nolte & Mckee, 2004; Young, 2001; Leger, 2001). In most developing countries, health attainment indicators for the poor tend to be worse than the national average (Tandon, 2007). Also, the extent to which such health inequalities exist varies significantly across countries. Empirical evidence suggests that health inequalities have been persistent over time and, in many cases, have been growing (ADB, 2006). The rich can ignore government finance and health facilities; and access private sector health facilities on their own while the poor are more dependent on the public sector OM infrastructure and governments often do not have enough resources to expend on pro-poor health

programmes and interventions (Tandon, 2007). Sachs (2004) has hence been calling for a scaling up of government health programmes in order to attain health-related MDGs.

2.1.3 REVIEW OF HEALTH POLICY IN NIGERIA

The MDGs had three out of eight goals directed at promoting health. These are reduction in child mortality, improvement in maternal health and combating HIV/AIDs, malaria and other diseases (UNDP, 2003). The first goal, which is the eradication of extreme poverty and hunger, is also indirectly related to health given the effect of poverty and hunger on the health status of individuals. This is an indication that the health sector requires significant public policy attention and commitment of resources. The governments of most states in South-west Nigeria, including Ekiti State, have laid emphasis over the years on free medical treatment, at least, for the vulnerable segment of the population (Ekiti State Planning Commission, 2004)) thus implying an alignment of public policy with the MGDs.

The National Health Accounts revealed that the bulk of health spending by Nigerians is on curative care, which utilizes 74% of the total healthcare. Preventive care is a distant second; this consumes only 1% of total healthcare in 2002. In some African countries, including Nigeria, government expenditure on health may have increased over the years but, it is still below the statutory recommendation (WHO 2001). WHO estimates that a minimum government expenditure of USD34 per person

per year will be required to provide an essential package of public health interventions in order to achieve health related MDGs (WHO 2001). Nigeria is just striving to meet this target (NPC, 2004). Nigeria's health policy which has identified primary healthcare as its fulcrum, defined a three tiered referral system for the management of patients. A network of primary healthcare centres in proximity to where people live, offering care of relatively low technology, is the first level of care from which patients gain entry into the healthcare system. Seriously ill patients beyond the management competence of primary healthcare workers are referred to secondary level general hospitals from where referrals are made to tertiary health facilities. The division of labour between the three complementary and easily recognizable levels seemed a rational, equitable and cost-effective way of dealing with the healthcare problems of the rural poor (Musa & Ejembi, 2004). Health service management is decentralized at the three tier levels. In addition, some states have Health Management Board (HMB), which is responsible for direct service delivery while the Ministry of Health focuses on policy formulation, standard setting and; monitoring and evaluation. The private sector provides 65.7% of healthcare delivery in Nigeria. Efforts are on for increased public-private participation in healthcare delivery but there is yet to be a framework for collaboration (WHO, 2011). The underlying principles and values for the National Health Policy include: the principle of social justice and equity and the ideals of freedom and opportunity; health and access to quality and affordable healthcare is a

human right; equity in healthcare and in health for all Nigerians is a goal to be pursued; and primary healthcare shall remain the basic philosophy and strategy for national health development (Federal Republic of Nigeria, 2004).

2.2 LITERATURE REVIEW

Health is an integral part of development. The health care as a constitutive element of well-being and yet it has been one of the most neglected aspects of development in India (Dreze J. And Sen A 2005). Just as health status is influenced by the socio-economic factors, similarly health services are shaped by the socio-economic and political factors of any region (Baru R., Acharya A., Acharya S., Shiva Kumar A.K. And Nagraj K.2010). Inequality in the distribution of health care facility is a common manifestation of these factors and a general feature of health care system in India. According to Rajeshwari and Sinha (2004), the distribution of health care institutions in India is guided by locational preferences. Public health is nothing but, the practice of preventing disease and promoting good health within groups of people, from small communities to entire countries (Pradad B.A.2013). In this context, an attempt is made to examine the spatial distribution of health care infrastructure in Sundarban. It is not surprising that there is a tremendous pressure on existing health care system to meet the need of vast population. Hence an assessment of available

resources is imperative for proper allocation and efficient utilization of health care services.

In a review of literature on barriers to access to health services, Ensor and Cooper (2004) regard distance and time as two crucial factors affecting the procurement of health services in many low income countries. According to them, the direct costs of transport invariably account for a substantial percentage of overall expenditure in health care equation of individuals. For instance, in a study carried out in North-east brazil, travel cost of procuring health care have been estimated at 25% of total expenditure on health (Terra de Souza et al, 2000) and 28% in Cameroon (Sauerborn et al, 1995). In Bangladesh, studies have shown that transport cost to health services centres is next to expenditure on drugs by patients (CIET Canada, 2002). Besides, cost of transport, the physical access to health services is also critical particularly where the locations of such facilities are not objectively located (Andrew, 1997). Some other scholars have focused on the significant role of the socio-economic characteristics of urban residents on their access to health care services in both developed and developing countries, (Andrew, 1997: Olawuni, 2007). In a study of access to health care among urban minority communities, Andrew (1997) observed that health care providers are less accessible to the urban poor because of their financial predicament. According to him, many urban poor are often sick given the

unhealthy environment they live in and because most of them seek for treatment only when critically ill, they seem to expend more on treatment.

In Nigeria, Adesanya et al (2002) have examined the mobility of urban poor to various services in Adamawa (Yobe State), Lagos (Lagos State), Port Harcourt (Rivers State), Onitsha (Anambra State), Jos (Plateau State) and Kaduna (Kaduna State). This nationwide study revealed that accessibility characteristics of urban poor to the various social and economic centres are generally very low. According to them, the urban poor travel over considerable distances to different activity centres in Nigeria. For instance, it was found that only 42% of the populations were located within one kilometre of such services as schools (primary and secondary), pipe borne water points, primary health centres and dispensaries. On the other hand, 25.1% of the population travels beyond nine kilometers in order to get to the nearest hospitals. Adesanya et al (2002) study also noted the influence of income of urban residents on their accessibility and frequency of trips to hospitals. They found that low income earners make fewer trips to hospitals because of high transport cost and treatment charges. It is clear from the foregoing paragraphs that there is a dearth of works on the accessibility of the urban population to health facilities in the medium-sized cities and towns in southwestern Nigeria in particular and elsewhere in Africa in general. This neglect is unwarranted in a growing economy like Nigeria where individual good health and physical and

mental well being should be regarded as an agent of national socio-economic development.

One of the critical problems facing developing countries is the inadequate provision and maintenance of infrastructural facilities and that the poor state of infrastructure in many areas is posing a great challenge to economic developmental efforts particularly level of agricultural and industrial productivity (Abumere, 2002) It was remarked that the infrastructural facilities that should serve as catalyst in the process of agricultural production are either not available or inadequate and can impede socio-economic transformation Adeoye, *et al*, 2011). The development of infrastructure must be seen as an integral part of the entire economic growth and development.

In Nigeria, a major problem is the pattern of distribution of these basic infrastructures which exhibits urban bias; hence poverty is at a higher level in the rural areas than urban areas. A considerable emphasis is placed on the development of urban infrastructure to the neglect of the rural areas (Oguzor, 2011). Apart from poverty problem, the prime factor for rural-urban exodus is the attraction of the infrastructural facilities placed in the few urban cities and this trend will continue unabated until such facilities are equitably provided and sustained in the rural communities. Aderamo and Magaji, (2010) remarked that the sustainability of the provision, operation and maintenance of appropriate rural infrastructures has eluded

the hopes and aspirations created in the minds of rural folks. Umoren *et al* (2009) observed that rural infrastructural development has not been taken seriously in Nigeria and it is often difficult to quantify its direct influence on the quality of life in rural areas.

Regardless of these studies of health infrastructural distribution in the country, this study is focused on the distribution of health infrastructures in the local level. This study is to show how the health infrastructure are been distributed evenly or unevenly distribution in Oredo local government area of Edo state.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discussed the method used in this research design, population of study, sampling techniques/sample size, description of research

3.2. Research Design

Research design is defined as a detailed outline of how investigation will take place. A research design will typically include how data is to be collected, what instruments will be employed, how the instruments will be used and the intended means for analyzing data collected. It serves as a guide to step-by-step research for relevant details required to provide answers to research questions or solutions to research problems.

The type of research design that will be used for this study is the survey method; this is one which involves collection of data to investigate existing phenomena. It is chosen because the terms of study for this research calls for immediate response.

3.3 Population of Study

Population is the aggregate of the element under study. It is a group of individuals or items that share one or more characteristics from which data can be

gathered and analyzed. The sample size that will be used in this study is determined based on the amount of data required to have sufficient statistical power and also the purpose the researcher is to achieve with the study. Based on scientific method and experimental judgment, the sample size for this research project will be representative of the total population, which is 374,515 residents of Oredo Local Government Area. (National Population Commission, 2006). The study is been carried out in the following wards in located in Oredo Local Government Area of Edo State which are in both urban and rural area. These wards include;

1. Ogbe
2. Iyeke-ogba
3. Uzebu
4. Okemole
5. Oliha
6. Iyaro
7. New Benin
8. Okedo
9. Ikpema
10. Ogboka
11. Ogbelaka
12. Ewaise

3.4 Sample Size and Sampling Technique

Sample size can be seen as "a limited number of elements selected from a population which is a representation of the population." Hence, Sample size determination involves showing how the representative of that population was selected. It is a group of items taken from the population for examination. It is simply a smaller part of the population. Samples are useful because they allow the researcher to examine the characteristics of the population.

To determine our sample size it is imperative to adopt a mathematical approach to solve for our sample size. We also need to project the population of the study area to date, using a growth rate of 2.7% (National Population Commission, 2006) of Edo State. I hereby adopted the formulas below to derive every necessary parameter.

Calculating the projection for the year 2016;

$Pn = Pe^{rt}$

Pn = projection

P = population

e = constant with value equal 2.7183

r = rate of population growth

t = time

= 428,650 X $2.7183^{0.027 \times 5}$

= 428,650×1.1445

= 490,589 (projected population for 2016)

Applying the Yamane (1967) statistical formula for sample size,

This formula is thus: $n = \frac{N}{1+Ne^2}$

N = Total population

n = Sample size

e = error margin

Confidence level of 85% is used with an error margin of 0.07

$$\frac{490{,}589}{1 + 493{,}065 \times 0.07^2}$$

$$\frac{490{,}589}{1 + 493{,}065 \times 0.0049}$$

$$\frac{490{,}589}{1 + 2416.02}$$

= 203

The sample size for Oredo Local Government area is therefore 203. But for conveniences 17 copies of the questionnaire was distributed among each of the wards making it a total questionnaire of 204. So therefore a total of 204 questionnaires were administered using the stratified random sampling methods, covering all wards of the Local Government Area.

3.5 Description of research instrument.

The instrument used for this study was the questionnaire, which is a set of questions designed to obtain written responses from the respondents. It is a vital instrument for gathering information from people about their opinion, attitude and perceptions on a given phenomenon. The questionnaire was divided into two parts. Part A was on the demographic/socio- characteristics of the respondents and Part B made up of structured questions that answered the research questions.

3.6 Sources of Data Collection

In a bid to gather the data used in this research, various means were used depending on the type of information sought. The chief sources of data include.

1. Primary Sources
2. Secondary Sources

3.6.1 Primary Sources

This source of data collection provided a means of collecting first-hand information for the research, specially the under listed method served this useful purpose.

a) Questionnaires

b) Oral interview

c) Field survey

3.6.2 Secondary sources

Secondary sources were taken from various journals, gazette, seminar paper, textbooks, past project and some other documented materials, some of which were published while some were not.

3.7 Instrument for Data Collection

Owing to the area covered by this study, questionnaire was designed for data collection. The questionnaire was personally designed and administered to the respondents while retrieval was equally through the same process. It consists of a set question designed to gather information data for analyzing the result of which are used

to answer the question. The questionnaire was prepared in brief structure with multiple choices, close ended answer and simple opened questions. The questions were clear and concise.

3.8 Method of Data Collection

The researcher administered the questionnaires personally to the respondents. The researcher vetted the outlet routinely issuing the questionnaires to the residents of the study area, also making sure that the issuing of double questionnaire copies was avoided and ensured minimum loss of questionnaire copies.

3.9 Method of data analysis

In the presentation, descriptive analysis and interpretation of data, tabular, statistical methods such as pie-chart, bar-chart etc and textual modes of data presented using Statistical Package for Social Science (SPSS) version 22.0 and also the use of GIS analysis. Hypothesis was using the use of Location-Allocation Analysis to show the number of facilities in each ward in relationship to its population and also Coefficient of Localisation Analysis, a type of Gini coefficient was used to reveal the level of uniformity in distribution of health facilities, with respect to population distribution across the study area. The responses for each relevant question in the

questionnaire are represented in tables and the statistical results used to compare relative importance to various answers.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 INTRODUCTION

This chapter present analyses and discusses results generated from the primary and secondary data. The results were discussed with the aid of charts and tables. For better understanding, this chapter was done in sections.

4.2 HEALTH FACILITIES AND POPULATION STATISTICS

The table below shows the distribution of Health Facilities in Oredo Local Government Area and their respective population statistics.

Table 4.1: List of Health Facilities and their Locations and Population in Oredo Local Government

WARD	NAME	HEALTH FACILITIES	POPULATION
1.	Ogbe	Bethel Faith Epid Unit Gods Care Modic God's Mercy	85,886

		Ihenyen Med. Centre Oreste Oredo Staff Clinic	
2	Iyeke-Ogba	Arougba Primary Health Centre Central Hospital Chidex Maternity Edi Int'l Hospital Ekae Primary Health Care Emwinyomwanru Evbudoia Faith Mediplex Hospital Military Hospital Nigeria Air-Force Hospital NNPC Med. Centre Oredo Primary Health Centre Stella Obasanjo hospital Ugbor Primary Health Centre Ugogogi Health Centre	237,522

		Utagban Health Centre	
3	Uzebu	Chisi Cottage Hospital Ekpen Hospital God's Mercy Hospital Ideal Clinic Safe Haven Hospital Time Hospital Uniben Health Centre	22,660
4	Okemole	Gift Hospital Osa-Amadin Maternity	4,073
5	Oliha	Edo Maternity God's Mercy Hospital	18,561
6	Iyaro	Unity Hospital	5,439
7	New Benin	Ernosa Health Post Hope Hospital New Benin Primary Health Centre	22,090
8	Okedo	Sharon Hospital Suyi Medical Centre	3,970

9	Ikpema	Urban health Centre	17,158
10	Ogboka	Christ Medical centre Living Spring Clinic	5,677
11	Ogbelaka	St. Mattaise Anglican Hospital Christ Way Medical Centre Irowa Medical Centre	22,625
12	Ewaise	St. Philomina Hospital	43,390
	Oredo LGA	Grand total	489,051

Source: Medical Department, Oredo Local government Area

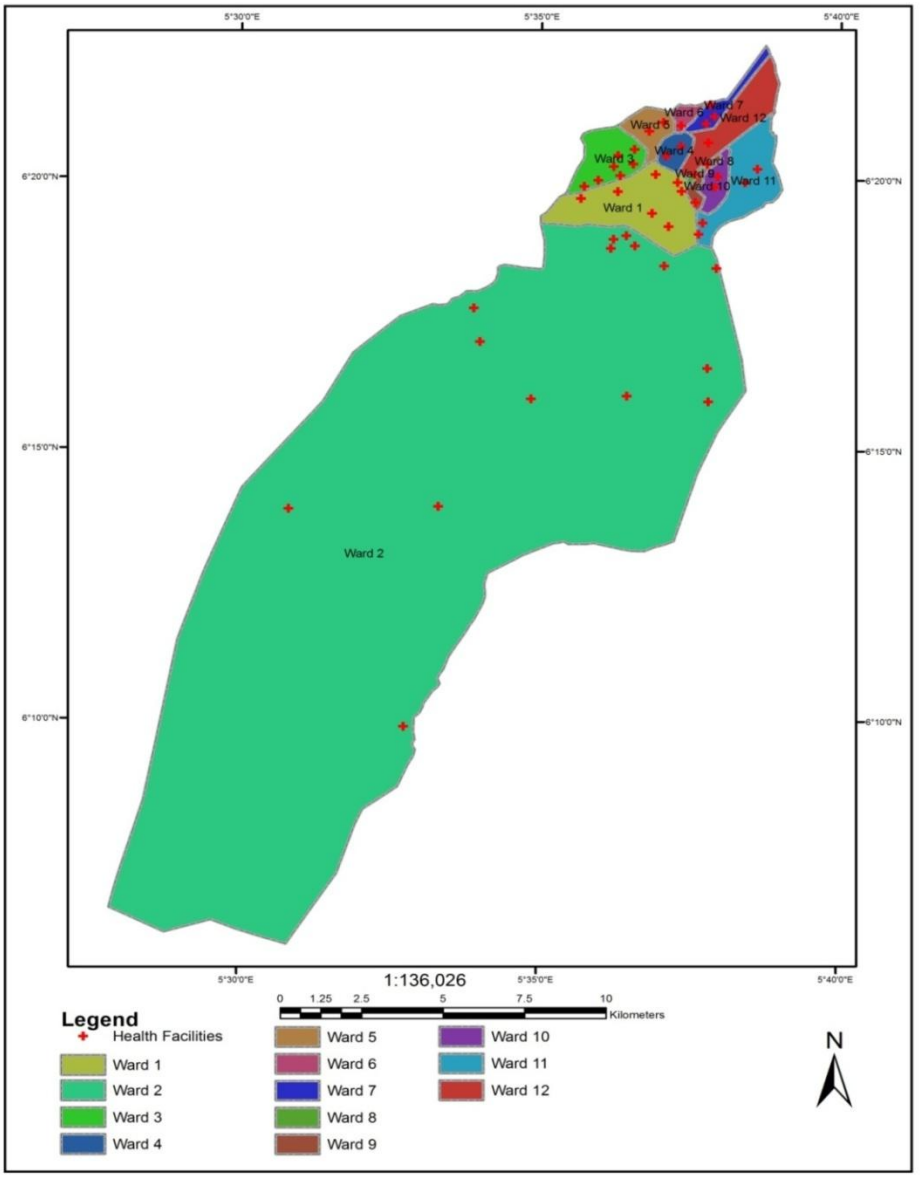

Figure 4.1: Distribution of Health Facilities in the various Wards of Oredo local Government Area.

Source: Researcher GIS Analysis, 2016

4.3 QUESTIONNAIRE ANALYSIS

4.3.1 SOCIOECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

4.3.1.1 Sex of Respondents

As seen in figure 4.1, 71.09% of the respondents which is the majority of the respondents are males, while 28.92% of the respondents are male. This shows that most of the respondents in the study area are males.

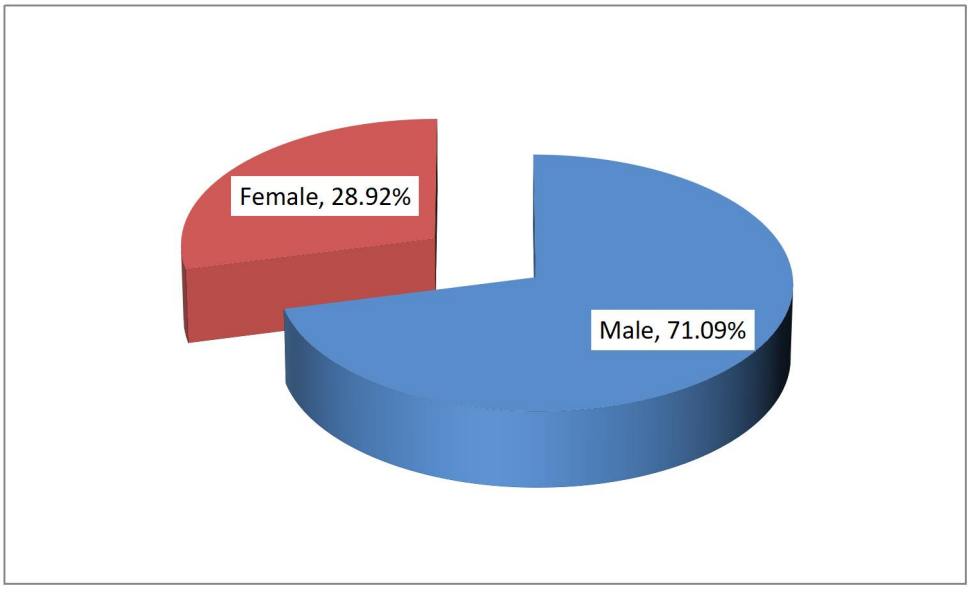

Figure 4.2: Sex of Respondents

Source: Fieldwork, 2016

4.3.1.2 Age Group of Respondents

In the study, 31.37% of the respondents were less than 18 years, 29.90% were between the ages of 18-25 years, 20.59% were between 26-35 years and 2.45% are above 46 years. From the result, the age group with the highest number of respondents is those that are below 18 years.

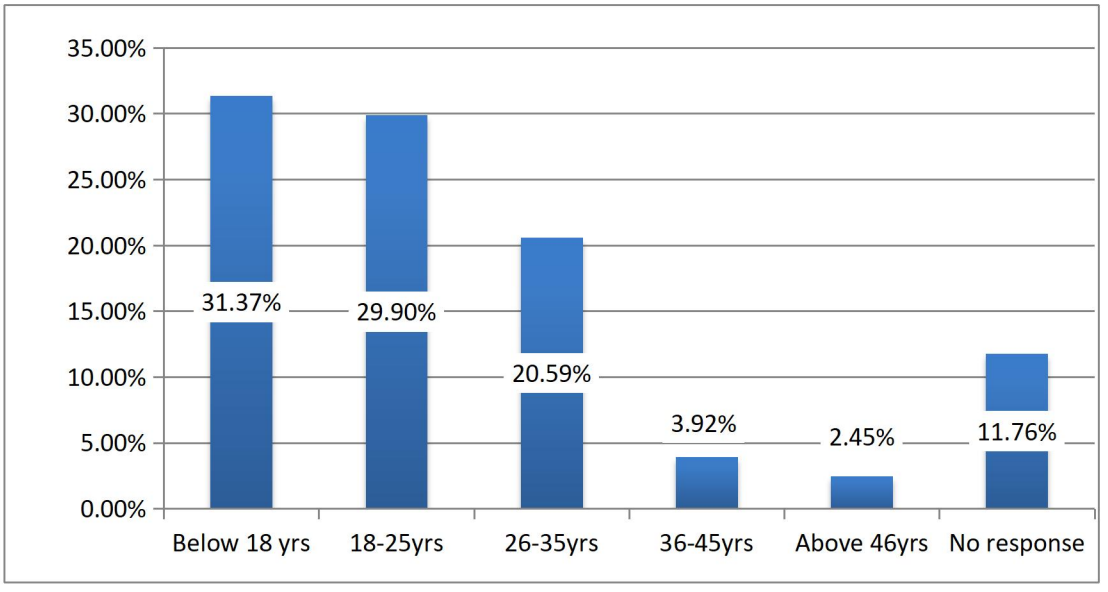

Figure 4.3: Age of Respondents

Source: Fieldwork, 2016

4.3.1.3 Educational Qualification of Respondents

In the study, 52.94% of the respondents which is the majority of the respondents have no formal education. 18.14% had primary education as their highest

level of education. Those with OND/HND are made up 10.78% of the total response. This shows that a little above half of the respondents had no formal education.

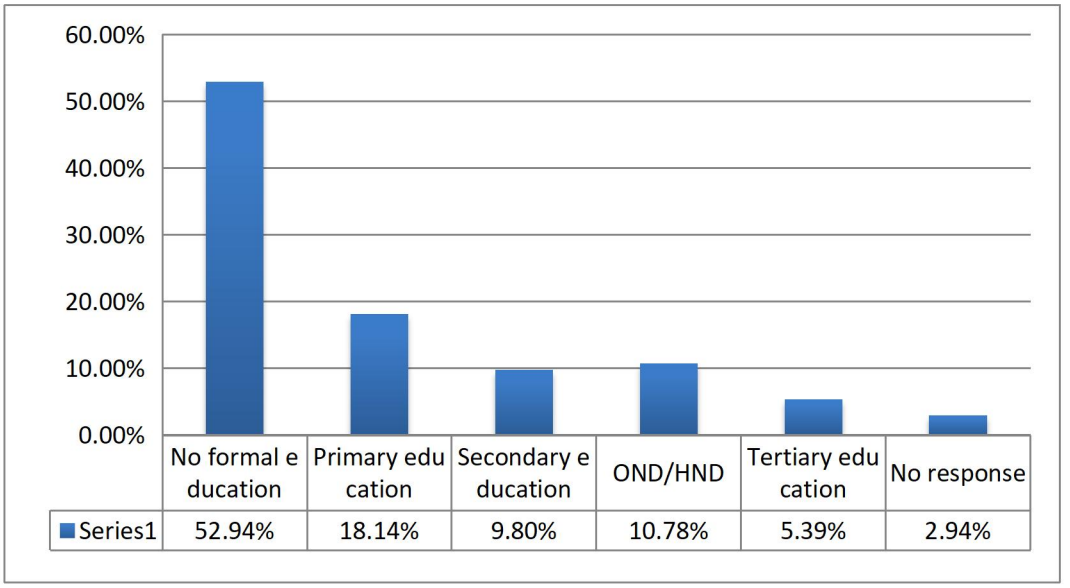

Figure 4.4: Educational Qualification of Respondents

Source: Fieldwork, 2016

4.4 COMMUNITY CHARACTERISTICS AND HEALTH CARE PROVISION

4.4.1 Rural or Urban Community

From the study, majority (81.86%) of the respondents resides in the urban area. While 18.14% of the respondents are in the rural area. This shows that the study area cuts across more of the urban and few of the rural area. Most of the wards in the study area fall within the urban area and parts of ward 2 falls within the rural area.

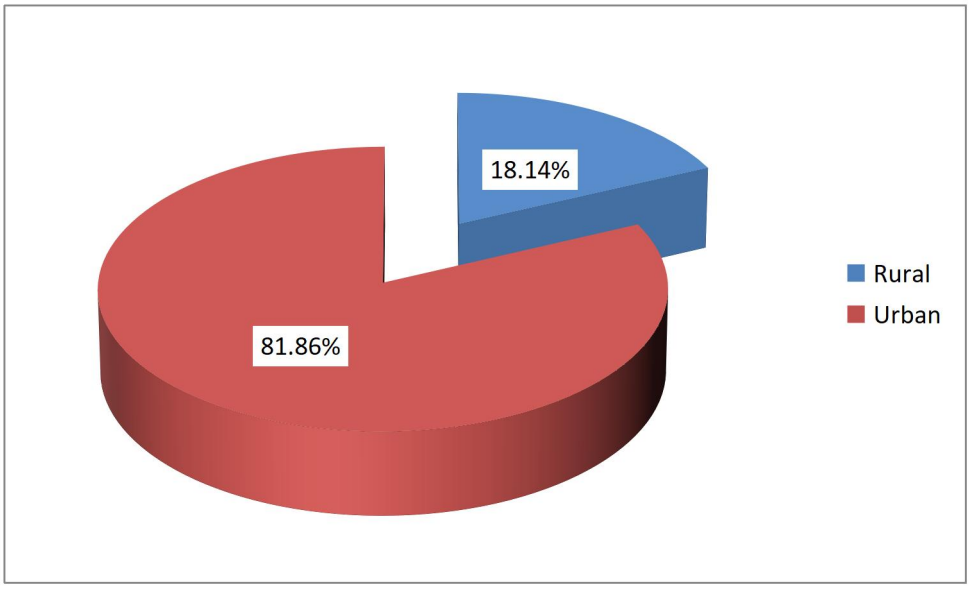

Figure 4.5: Type of Community of Respondents

Source: Fieldwork, 2016

4.4.2 Population of Study Area

Table 4.2: Population of Study Area

		Frequency	Percent
Population	Densely populated	31	15.2
	Averagely populated	57	27.9
	Sparsely populated	39	19.1
	No response	77	37.8
	Total	204	100.0

Source: Fieldwork, 2016

As seen in Table 4.2, the response show that 27.9% of the respondents said their area is averagely populated. 15.2% shows that it is densely populated. While 19.1% of the respondents said that their area is sparsely populated.

4.4.3 Availability of Health Facilities

In the study, majority (50.5%) of the respondents are of the opinion that there is a health facility in their area. While 45.1% of the respondents said that there is no health facility in their area.

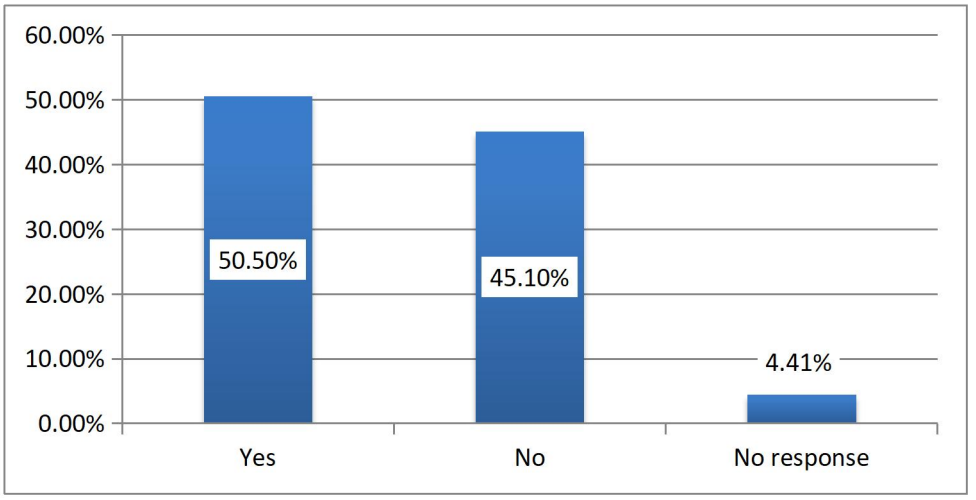

Figure 4.6: Availability of Health Facilities in Respondent's Area

Source: Fieldwork, 2016

4.4.4 Type of Health Facility

From the study, there is more of private health centres than any other health any other health facility in the study area. This can be seen from the response rate of 59.31% which shows that there is the availability of private health facility in the study area and as a result there low affordability of health care in relation to the Table 4.7. 25.49% of the response shows that there is both the presence of private and public health facilities in their area. While public health facility is the health facility that is least available with about 10.78% response rates accepting its presence.

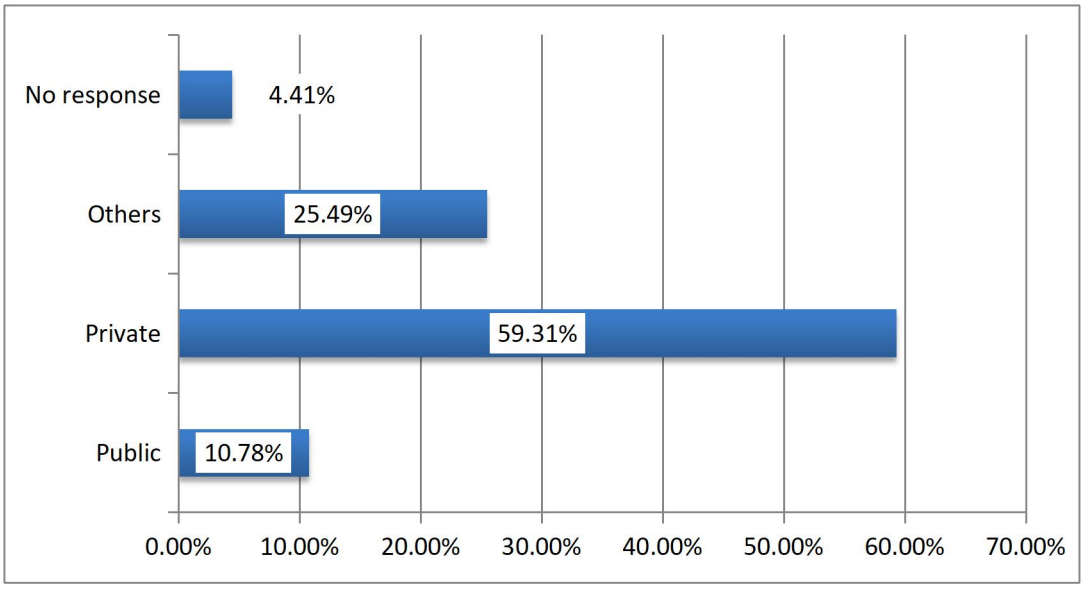

Figure 4.7: Type of health facilities in the study area

Source: Fieldwork, 2016

4.4.5 Number of Health Facility Located Close to Respondents

Table 4.3: Responses on Number of Health Facilities Close to Respondents

Range of Health Facilities in Respondents residential area	Frequency	Percent
0-3	47	23.0
4-6	140	68.6
7-9	2	1.0
Above 10	3	1.5
No responses	12	5.9
Total	204	100.0

As seen in Table 4.3, 68.6% of the respondents said that there is about 4-6 health facility in their area. 23% of the response shows that it's about 0-3 health facilities. While a few of the respondents said that it's above 10 health facilities in their area.

4.4.6 Health Facility Accessibility

This can be seen from the analysis that shows that 40.20% of the respondents saying that the health facilities are accessible. 10.29% of the response shows that the health facilities are highly accessible. While 39.22% of the response shows that the health facilities are not accessible. This study shows that on the average health facilities are not accessible.

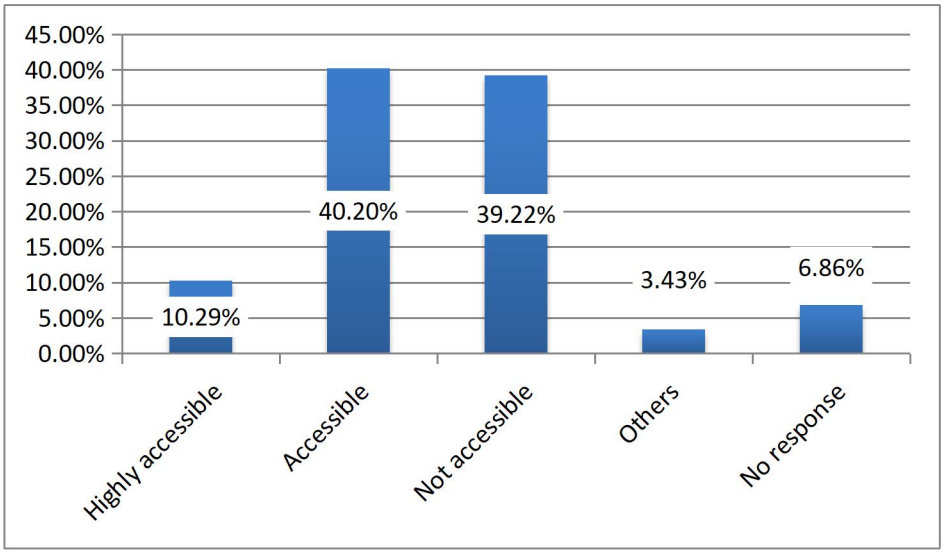

Figure 4.8: Accessibility of health facility in the study area

Source: Fieldwork, 2016

4.4.7 Visitation Frequency

In terms of the visitation, a majority (56.37%) of the respondents said that they visit the health facility once in six months. 20.10% of the response shows that the visitation is once a month. 13.24% of the respondents said it's just once in two weeks.

While 3.43% of the response shows that the visitation is just once a week. This study shows that the patronage level of the health facilities is low and this led to a longer time of visitation.

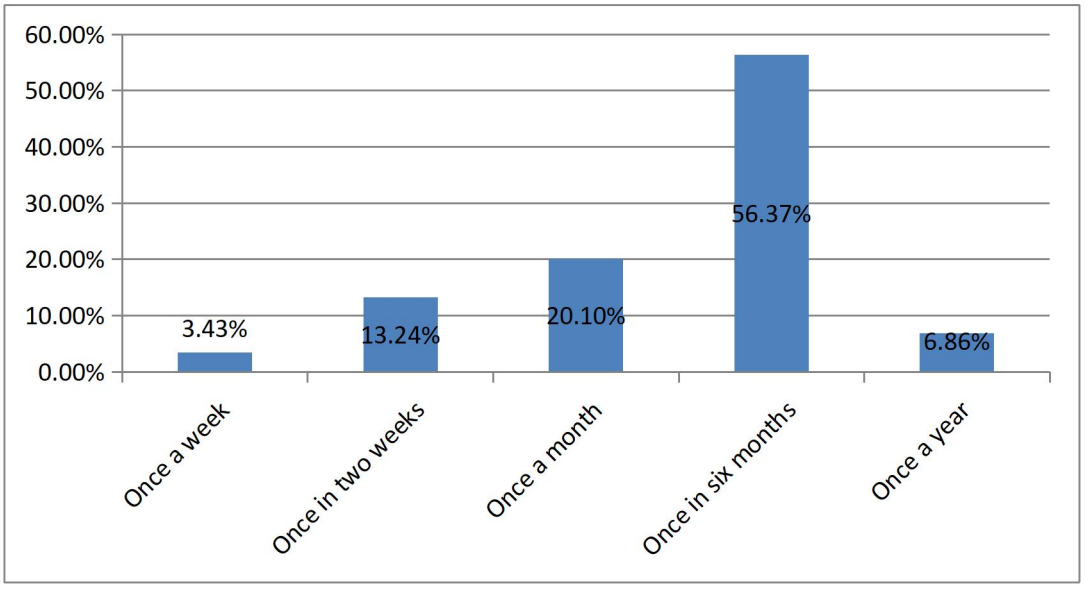

Figure 4.9: Visitation of health facility

Source: Fieldwork, 2016

4.4.8 Most Recent Visitation

From the study, majority (40.20%) of the respondents visited the health facility beyond a year ago. 36.76% of the respondents visited it beyond a month ago. While a few (20.10%) of the response shows that the respondents visited a month ago. This shows that the visitation level is low.

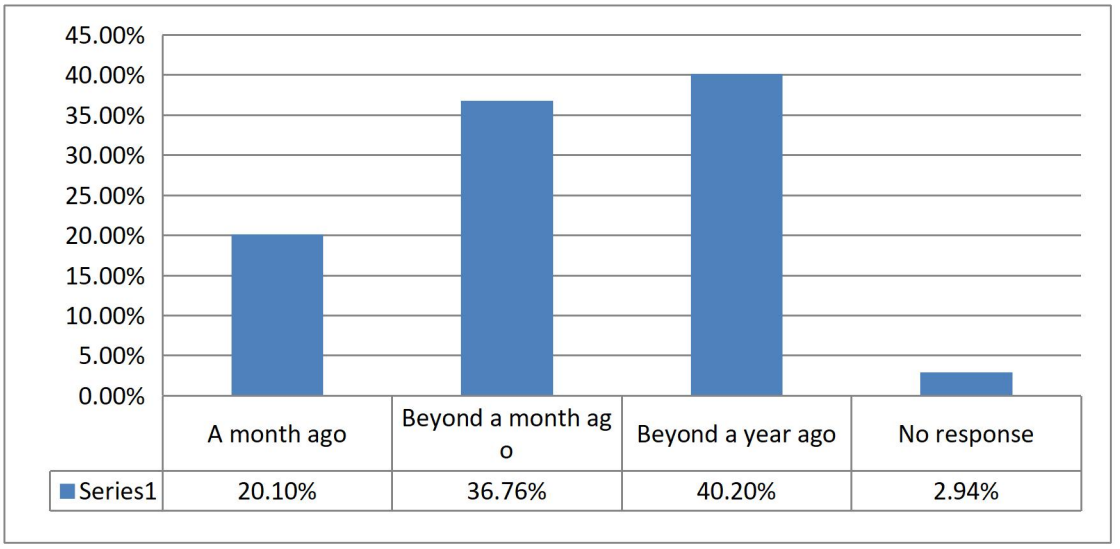

Figure 4.10: Most recent Visitation of health facility

Source: Fieldwork, 2016

4.4.9 Quality of Service

Table 4.4: Quality of service provided by Health Facility

Quality of Services Provided by Health Facility	Frequency	Percentage
High	33	16.2
Average	96	47.1
Low	75	36.8
Total	204	100.0

Source: Fieldwork, 2016

Table 4.4 shows that respondents are of the opinion that the quality of services provided by the health facilities is on the average. This can be seen from the analysis which shows that 47.1% of the respondents said the quality is average. 36.8% of the response shows that the quality is low. While 16.2% of the respondents said the quality is high.

4.4.10 Causes of Low Quality Service

Table 4.5: Causes of Low Quality service in Health Facility

Cause of Low Quality	Frequency	Percent
Lack of qualified staff	26	12.7
Lack of health equipments	48	23.5
Lack of bed space and drugs	41	20.1
Others	6	2.9
No response	83	40.7
Total	204	100.0

Source: Fieldwork, 2016

The respondents are of the opinion that causes of the low quality of health facilities is due to lack equipment (23.5%), bed space and drugs (20.1%) and lack of services of qualified staff (12.7%). Although the leading cause is opined to be lack of equipment (23.5%)

4.4.11 Health Infrastructure Standard

Table 4.6: Current Health Infrastructure Standard

Current Health Infrastructure Situation	Frequency	Percent
Up to standard	12	5.9
Not up to standard	54	26.5
Average	83	40.7
Very poor	48	23.5
No response	7	3.4
Total	204	100.0

Source: Fieldwork, 2016

From table 4.6, 40.7% of the respondents are of the opinion that the health infrastructure is average, while 26.5% said it's not up to standard. 23.5% of the respondents said the health infrastructure is poor, while 5.9% accepted that the health infrastructure is up to standard.

4.4.12 Affordability

Table 4.7: Affordability of Health Services

Affordability of Health Services	Frequency	Percent
Highly affordable	13	6.4
Affordable	131	64.2
Not affordable	54	26.5
No response	6	2.9
Total	204	100.0

Source: Fieldwork, 2016

From table 4.7, 64.2% of the respondents are of the opinion that it's affordable. Although with the high level of response showing that the health facilities are affordable, 26.5% said the health facilities are not affordable. From the analysis, the high response rate shows that the health services provided by the facilities are affordable.

4.4.13 DISTRIBUTION OF HEALTH FACILITIES

In the study as seen in the analysis in figure 4.10, the health facilities are not everywhere. This can be seen from the response rate of 76.96% of the respondents

saying no the presence of health facilities everywhere. While a few (16.67%) of the respondents said yes.

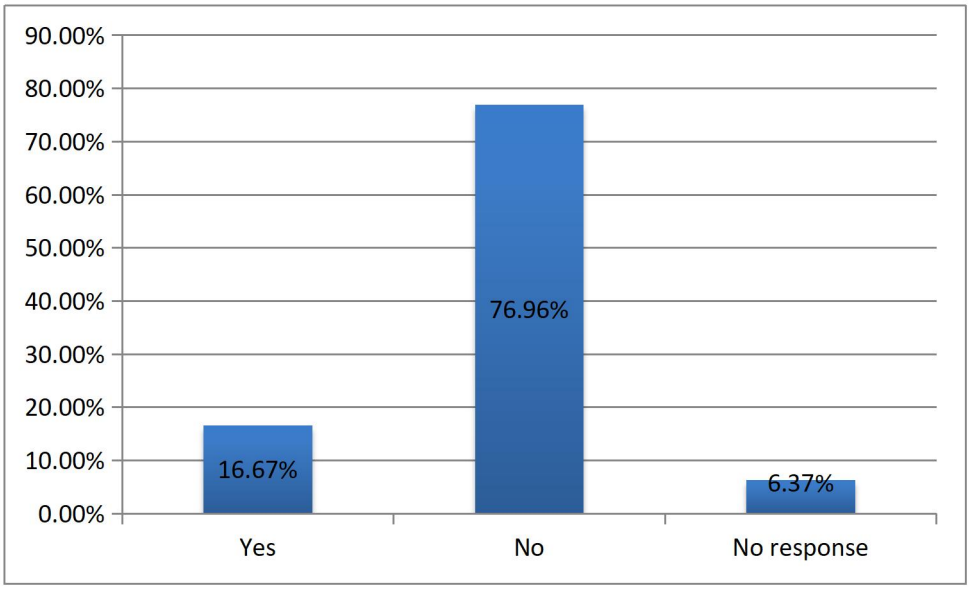

Figure 4.11: Distribution of Health Facilities

Source: Fieldwork, 2016

4.5 GIS ANALYSIS

4.5.1 DISTRIBUTION OF HEALTH FACILITIES WITH RELATION TO POPULATION IN OREDO LOCAL GOVERNMENT AREA.

As seen in the analysis, ward 2 has the highest population, which is due to its size. Ward 1 is the second has the second highest population. Ward 7,11,3,5,12 and 9 has follows with a population that falls within 5678-43390. While ward 6, 4, 10 and 8 has the least population due to the small size of their territory.

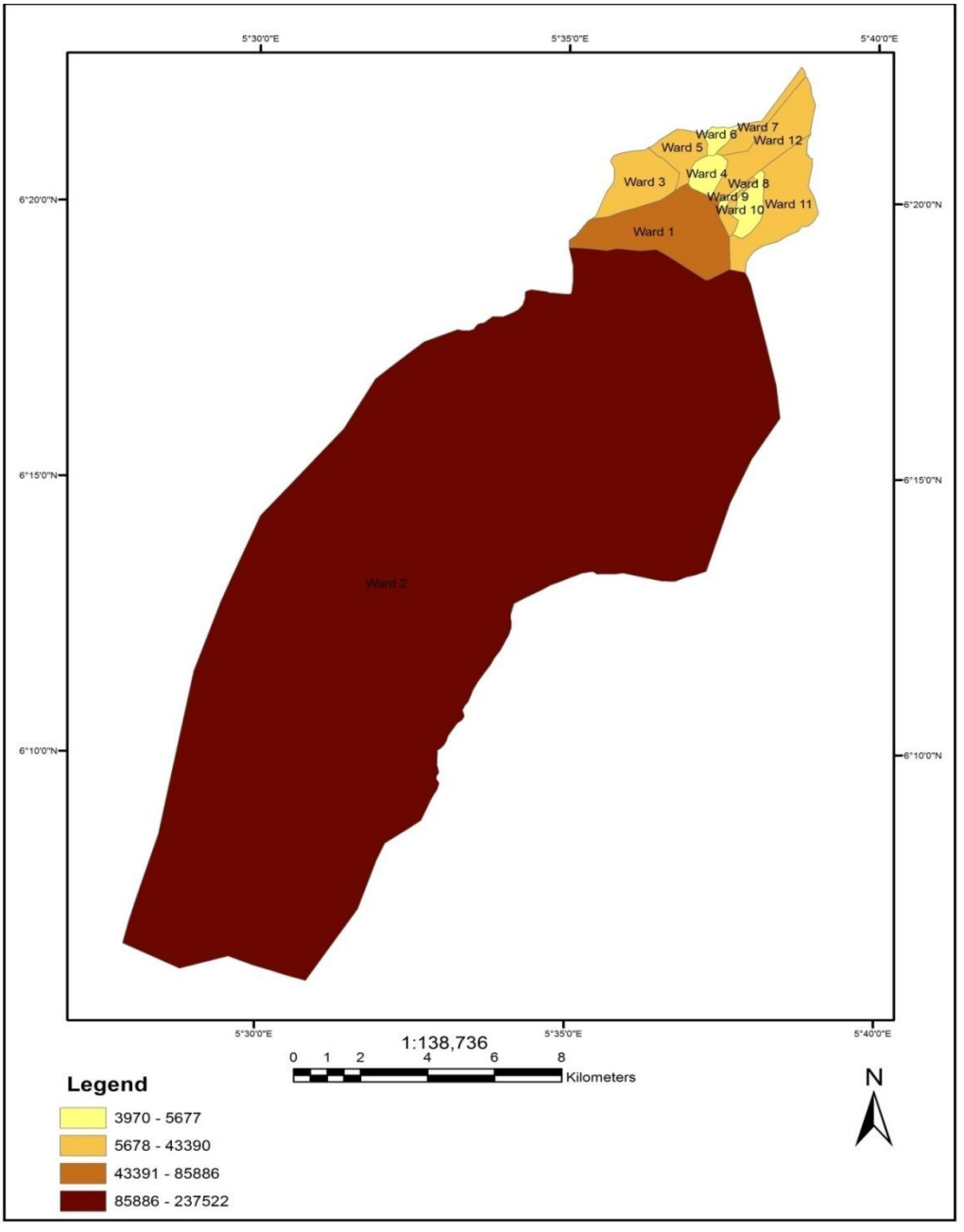

Figure 4.12: Wards and Population Size

Source: Researcher GIS Analysis, 2016

4.5.2 HEALTH FACILITY AVAILABILITY

Most of the wards in the study area have health facilities that range from 2-3. This can be seen from map which shows that ward 5, 4, 7, 9, 10 and 11 has 2-3 health facilities. Three wards (8, 12 and 6) have just 1 health facility. While ward 2 which is the biggest ward in the study area has 16 health facilities located in it.

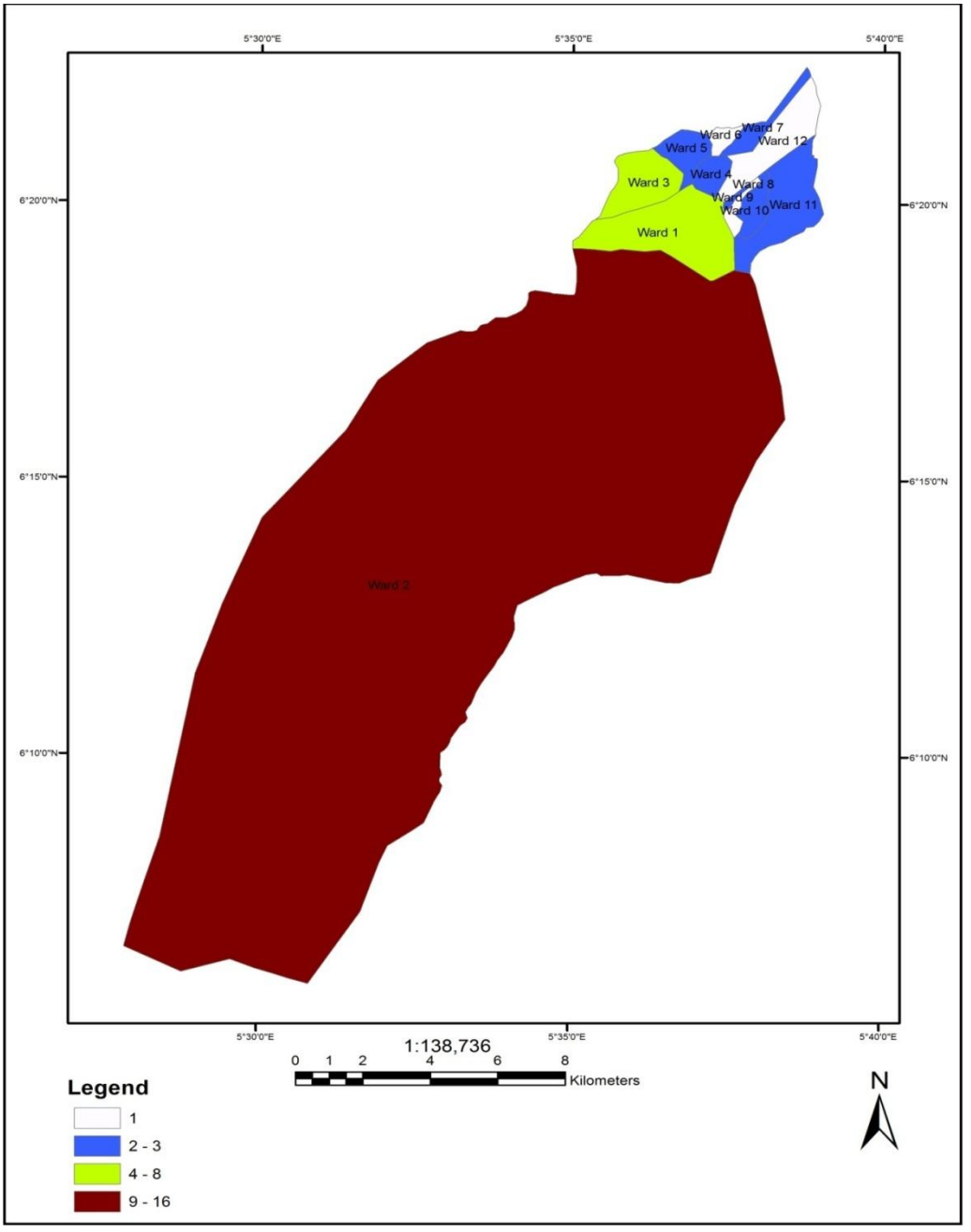

Figure 4.13: Health Facility Availability per ward

Source: Researcher GIS Analysis, 2016

4.5.3 LOCATION-ALLOCATION ANALYSIS OF THE DISTRIBUTION OF HEALTH FACILITIES IN OREDO LOCAL GOVERNMENT AREA.

The Location Analysis is used to define the number of individuals allocated to the use of a particular resource, in this case health facility. In this study, in order to relate the number of health facilities within each ward and its population, the total population of each ward will be divided by the number of health facilities within it.

Mathematical, it can be represented as;

$$\frac{Population\ of\ Ward}{Number\ of\ Health\ Facilities}$$

This is calculated for each ward. The higher the location allocation coefficient, the more the over use and stress on existing health facilities and vice versa. This is summarised in table 4.8

Table 4.8 Summary of Health Facilities and Population of Wards in Oredo Local Government Area.

Wards	Number of Health Facilities	Percentage (%)	Population	Percentage (%)	Location Allocation Coefficient
1	8	16.7	85886	17.6	10735.8
2	16	33.3	237522	48.6	14845.1
3	7	14.6	22660	4.6	3237.1
4	2	4.2	4073	0.8	2036.5
5	2	4.2	18561	3.8	9280.5
6	1	2.0	5439	1.1	5439.0
7	3	6.3	22090	4.5	7363.3
8	2	4.2	3970	0.8	1985.0
9	1	2.0	17158	3.5	17158.0
10	2	4.2	5677	1.2	2838.5
11	3	6.3	22625	4.6	7541.7
12	1	2.0	43390	8.9	43390.0
Total	**48**	**100**	**489051**	**100**	**125850.5**

Source; Field Work, 2016

The Location-Allocation Coefficient for the whole Local Government is given by

$$\frac{\text{Population of the L.G.A}}{\text{No.of Health Facilities}}$$

489051/48= 10189 persons per health facilities

The lower the allocated population per ward of health facilities, the less stress on health facilities in that ward. In the study, ward 3, 4, 9 and 10 has less population allocated to the health facilities in their various wards. Ward 6, 7 and 11 are next with allocation that ranges from 3238-7542 population per health facility. Ward 1 and 5 has an allocation of between 7543-10736 populations per health facility. Ward 2 and 8 has an allocation population range of 10737-17158, while ward 12 has the highest number of people per health facility, which is 43,390. This study is of the opinion that that wards having Location-Allocation coefficient superseding that of the whole local government area are poorly served. Some of these wards includes ward 1, 2, 9 and 12.

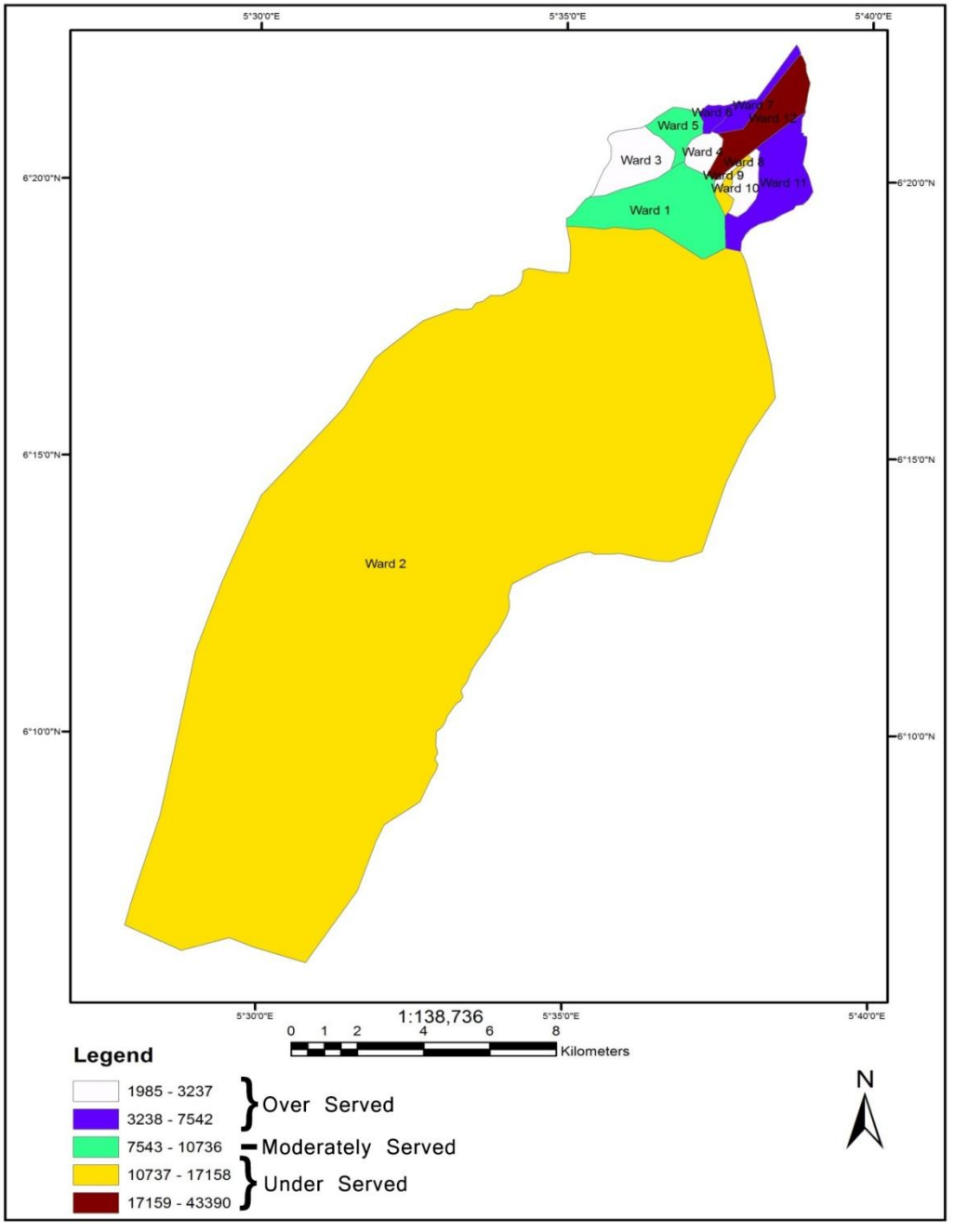

Figure 4.14: Location-Allocation of Health Facilities per Ward

Source: Researcher GIS Analysis, 2016

4.6 TESTING OF HYPOTHESIS

In this section attempt was made to test the hypotheses of this study using the coefficient of localisation technique. In the coefficient of localisation, a value of 0.0 indicates that health facilities are distributed across the area in exactly the same proportions as population. Values between 0.0 and 0.9 reflect increasing levels of localisation, while value of 1.0 implies that health facilities in the study area are extremely localised and concentrated in one or few places. The closer the coefficient value is to zero, the more uniformly distributed are health facilities, while the closer it is to one, the more concentrated is the distribution of health facilities in the study area.

The formula used is stated as follows:

$$CL^t = \frac{1}{2}\sum\left[\frac{Hi^t}{\sum Hi^t} - \frac{Pi^t}{\sum Pi^t}\right]$$

Where;

CL^t = Coefficient of localisation at time t.

Hi^t = Number of Health Facilities at a region at a time t

Pi^t = Population of region at a time t

The hypothesis that was tested is stated as follow.

H_0: There is no significant relationship between Population distribution and distribution of health care facilities.

H_1: There is a significant relationship between Population distribution and distribution of health care facilities.

Table 4.8 Showing Coefficient of Localisation Analysis

Wards	**Hi^t**	$\frac{\mathbf{Hi^t}}{\sum \mathbf{Hi^t}}$	**Pi^t**	$\frac{\mathbf{Pi^t}}{\sum \mathbf{Pi^t}}$	$\frac{\mathbf{Hi^t}}{\sum \mathbf{Hi^t}} - \frac{\mathbf{Pi^t}}{\sum \mathbf{Pi^t}}$
1	8	0.167	85886	0.176	-0.009
2	16	0.333	237522	0.486	-0.153
3	7	0.146	22660	0.046	0.1
4	2	0.042	4073	0.008	0.034
5	2	0.042	18561	0.038	0.004
6	1	0.021	5439	0.011	0.01
7	3	0.061	22090	0.045	0.016
8	2	0.042	3970	0.008	0.034
9	1	0.021	17158	0.035	-0.014
10	2	0.042	5677	0.012	0.03
11	3	0.061	22625	0.046	0.015
12	1	0.021	43390	0.089	-0.068
Total	**48**		**489051**		
Coefficient of Localisation = 0.24					

Source: Researcher Analysis, 2016

Summation of negative differences = 0.24

Summation of positive differences = 0.24

Therefore, $CL^{t} = \frac{1}{2}$ the summation of both positive and negative differences

Which is given as $\frac{1}{2}\sum[0.24 + 0.24] = 0.24$

From the result, the value of coefficient of localization at time is 0.24. The implication is that the distribution of health facilities is close to being uniform, but not completely uniform compared with population distribution. This disproves the null hypothesis which states that "*There is no significant relationship between Population distribution and distribution of health care facilities*". In other words population to an extent has a bearing on the distribution of health facilities. So therefore, the alternate hypothesis which states that "*There is a significant relationship between Population distribution and distribution of health care facilities*" is consequently accepted.

4.7 DISCUSSION OF RESULTS

The data analyzed and interpreted has revealed the following results in relation to the aims and objectives of the study.

The study shows that health facilities are distributed among the wards but not evenly. Some wards tend to have more health facilities than others. From the study ward 2 tend to have the more health facilities unlike the other wards. This study corroborates with the works of Henkel, (1984) and Mundende, (1984) were both have showed health services are very unevenly distributed in Zambia, on the bases of several indices, including ratios of hospital beds, nurses, and doctors of population.

The study reveals that health facilities are majorly private owned than public owned and this affects the cost or affordability of health care services. The study shows that affordability of health care services is on the average and also most health facilities are averagely accessible.

In term of relating the number of health facilities within each ward and its population, Location Allocation Coefficient was used to analyse this relationship. The study shows that provision of health facilities per individual in some wards fall below the provision of health facilities per individual for the local government area. The paper is of the opinion that wards superseding that of the whole local government area are poorly served, they include ward 1, 2, 9 and 12.

Also in term of the hypothesis tested using Coefficient of Localisation Analysis, the study also reveal that null hypothesis which states that "*There is no significant relationship between Population distribution and distribution of health care facilities*" was disproved. In other words population to an extent has a bearing on the distribution of health facilities. So therefore, the alternate hypothesis which states that "*There is a significant relationship between Population distribution and distribution of health care facilities*" is consequently accepted.

Nevertheless, it is important to point out the fact that from the observed values on the table 4.8, wards 4, 8 and 11, which have the higher positive differences, have a greater proportion of health facilities compared with their share of total population. While ward 2 and 12 which have the greatest negative differences of -0.153 and -0.068 respectively have the least share of health facilities compared with their share of the population. Therefore, any policy aimed at decentralising the distribution of health facilities should seek to favour most especially wards 2 and 12, which have lower proportions of health facilities compared to their share of the total population.

The study reveals that on an average the respondents have limited access to health facilities in the study area. The study reveals that health facilities are majorly private owned than public owned and this affects the cost or affordability of health care services. The study shows that affordability of health care services is on the

average and based on health facility visitation frequency of respondents, most health facilities are averagely accessible.

The study also shows possible ways for the improvement of health facilities distribution in the study area was also ascertained from the respondents. These possible ways includes; provision of standard health facilities, provision of adequate and qualified medical staff, health equipments should be provided in the available health care centres and to make health services affordable for low income earners.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

The point of discuss here is on the summary of findings, conclusion and recommendations that arose from the study. The summary of findings, conclusion and recommendation are based on the range of literature and collected primary data review by the study.

5.2 SUMMARY OF FINDINGS

This study has endeavored to provide well enough answers to the research questions raised and also provide adequate information concerning its aims and objectives. The summary of these are;

The study reveal that urban development in Oredo Local Government has been observed as one of the most important factor influencing the present pattern of distribution of health care facilities in the study area and this has been observed from the high level of urban centre in the study area.

On the issue of health facilities accessibility, the study shows that on an average the respondents have no access to health facilities in the study area. The study reveals that health facilities are majorly private owned than public owned and this

affects the cost or affordability of health care services. The study shows that affordability of health care services is on the average and also most health facilities are averagely accessible.

The study shows that provision of health facilities per individual in some wards fall below the provision of health facilities per individual for the local government area. The hypothesis tested using Coefficient of Localisation shows that health facilities distribution is not uniform compared to the population distribution.

Finally the possible ways for the improvement of health facilities distribution in the study area was also ascertained from the respondents. These possible ways includes; provision of standard health facilities, provision of adequate and qualified medical staff, health equipments should be provided in the available health care centres and to make health services affordable for low income earners.

5.3 RECOMMENDATION

Considering the result from the study, it is important to highlight some necessary ways to improve on the health facilities in the study area and if implemented could play an important role in ameliorating the problem of health facility distribution and inequality. The following policy considerations are recommended;

- More robust investigation be carried out in the existing health care facilities, especially primary health care facilities with a view to establishing the levels of health manpower, available bedding and other facilities as well as the actual access level individual and communities have to health facilities in the study area
- The government should adopt a population threshold as a yardstick for health care facility distribution as this is the only approach to ensure equity in distribution of healthcare.
- The government should continue to play an active role in the provision of public health facilities in this sector that is increasingly being dominated by private entrepreneur who are driven by the profit motive.
- Health ministry should have an infrastructure management division with qualified architects, engineers, and specialists to plan and maintain health infrastructures.
- All government and donors must priotize repairs, maintenance or rehabilitation of the infrastructures instead of merely focusing on creating new ones.

5.4 CONCLUSION

The study was at aimed at examining the spatial analysis of health infrastructures in Oredo Local Government Area using the wards. From the findings it is seen that health facilities are not exactly uniformly distributed among the wards of the Local Government Area, in relation with their population distribution. The study shows that affordability of health care services is on the average and also most health facilities are averagely accessible, therefore health facilities should be made more accessible by providing better access roads to health facilities and palliatives put in place by government and charitable organizations to reduce the financial cost of services rendered by health facilities.

From the findings, wards 2 and 12 have lower proportions of health facilities compared to their share of the total population. So therefore more attention should be given to these wards.

Possible ways for the improvement of health facility distribution in the study area was also ascertained from the respondents. These possible ways include; provision of standard health facilities, provision of adequate and qualified medical staff, provision of health equipments in the available health care centres and making health services affordable for low income earners.

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APPENDIX 1

Department of geography and Regional Planning,

Faculty of social Sciences,

University of Benin, Benin City, Nigeria

QUESTIONNAIRE

Dear Respondent,

I am an undergraduate student of the above named department and university undertaking a full-time B.Sc. Program as part of the requirements for the award of B.Sc. degree. I am undergoing a research study on **Spatial Analysis of Health Infrastructures in Oredo Local Government Area, Edo state.**

Kindly provide the correct information requested. The information will be treated with utmost confidentiality. Thanks for your cooperation and attention.

Thank you.

Edosa, Shedrack Nwachukwu

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

Please tick (√) where appropriate or provide an appropriate answer to the question.

1. What is the name of your ward? _____
2. What is your sex? (a) male ( ) (b) female ( )

3. What is your age? (a) below 18years ( ) (b) 18-25years ( ) (c) 26-35years ( ) (d) 36-45years ( ) (e) above 46years ( )
4. What is the level of your education? (a) no formal education ( ) (b) primary education ( ) (c) secondary education ( ) (d) OND/HND (e) tertiary education ( )
5. What is your household size? _____
6. What is your religion? (a) Christian ( ) (b) Muslim( ) (c) African traditional religion ( )
7. What is your monthly income? (a) ₦5,000-₦10,000 ( ) (b) ₦11,000-₦20,000 ( ) (d) ₦21,000-₦30,000 ( ) (e) ₦31,000-₦40,000 ( ) (f) ₦41,000 and above ( )
8. What is your occupation? (a) farmer ( ) (b) trader ( ) (c) civil servant ( ) (d) corporate worker ( ) (e) applicant ( ) (f) others specify_____

SECTION B: COMMUNITY CHARACTERISTICS AND HEALTH CARE PROVISIONING

9. Is this a rural or urban community/area? (a) Rural ( ) (b) Urban ( )
10. How is the population of this area like? (a) Densely populated ( ) (b) Averagely populated ( ) (c) Sparsely populated ( )
11. Is there any health facility in this community (a) Yes ( ) (b) No ( )
12. Which type of health facility is in this community (a) public ( ) (b) private (c) others specify_____
13. How many health facilities are found in your area? (a) 0-3 ( ) (b) 4-6 ( ) (c) 7-9( ) (d) 10 and above ( )
14. How accessible is the health facility (a) highly accessible ( ) (b) accessible ( ) (c) not accessible ( ) (d) others specify_____
15. How often do you visit any of the nearest health facility for health treatment/advice? (a) once a week ( ) (b) once in two weeks ( ) (c) once a month ( ) (d) once in six months ( ) (d) once a year ( )

16. When was the last time you visited any of the health centre located close to you? (a) a week ago ( ) (b) a month ago ( ) (c) beyond a month ago ( ) (d) beyond a year ago ( )
17. What is the level and quality of services provided by the health centre? (a) high ( ) (b) average ( ) (c) low ( ) (d) others specify_____
18. If (c) above, what do you think is the cause? (a) lack of qualified staff ( ) (b) lack of health facilities ( ) (c) lack of bed space and drugs ( ) (d) others specify_____
19. What is the current health infrastructure situation in your community? (a) up-to-standard ( ) (b) not up-to-standard ( ) (c) average ( ) (d) very poor ( )
20. Are the health services affordable? (a) highly affordable ( ) (b) affordable ( ) (c) not affordable ( )
21. Do you think that health centres are everywhere in this community? (a) Yes ( ) (b) No ( )
22. State any reasons that may deter you from visiting health centres when the need arises?

    _____

    _____
23. What do you think can be done to improve on the health infrastructure distribution?

    _____

    _____