ANALYSIS OF THE SPATIAL DISTRIBUTION AND UTILIZATION OF HEALTH CARE FACILITIES IN BWARI AREA COUNCIL, ABUJA, NIGERIA

BY

TAWOSE, Titilope Eunice
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A DISSERTATION SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES, AHMADU BELLO UNIVERSITY, ZARIA, IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTER DEGREE OF SCIENCE IN GIS/REMOTE SENSING

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DECLARATION PAGE

I declare this Thesis entitled 'Analysis of the Spatial Distribution and Utilization of Health care Facilities in Bwari Area Council, Abuja, Nigeria', has been carried out by me in the department of Geography, Ahmadu Bello University, Zaria. The information derived from the existing literature has been duly acknowledged in the text and a list of references provided. No part of this thesis has been previously presented for another degree or diploma at this or any other institution.

_____ _____

TAWOSE, Titilope Eunice Date

CERTIFICATION PAGE

This thesis "ANALYSIS OF THE SPATIAL DISTRIBUTION AND UTILIZATION OF HEALTH CARE FACILITIES IN BWARI AREA COUNCIL, ABUJA, NIGERIA" by TITILOPE EUNICE TAWOSE meets the regulations governing the award of the degree of M.Sc. Remote Science/GIS of the Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

_____ _____

Prof. J.G Laah Date

Major supervisor

_____ _____

Dr.D.N Jeb Date

Minor Supervisor

_____ _____

Dr. I.J Musa Date

Head of Department

_____ _____

Prof. k.Bala Date

Dean P.G school

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DEDICATION

This thesis is dedicated to my better half and also to all who love to learn.

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Abstract

This study analyzed the spatial distribution of public healthcare facilities and their utilization in Bwari Area Council of the Federal Capital Territory (FCT), Nigeria. Ballot method of random sampling technique was used to choose four wards out of the existing ten wards in the study area; Usuma, Bwari, Kawu and Igu wards. A total of 400 copies of questionnaire were administered to respondents but a total of 384 copies were retrieved and a total of 16 copies of questionnaire were also administered on the healthcare facilities available within the study area in order to get information about them. The geo-location of the healthcare facilities were collected using a hand-held Garmin CSX 76 Global Positioning System, analysis of data was done in the four selected ward. A spatial database of the Public Health Care Facilities using ArcGIS 9.2 software was created using the attribute data derived from the retrieved health care facility questionnaire, these were compiled in Microsoft excel and linked with the spatial data in ArcGIS Spatial Analyst for the GIS analysis of the spatial distribution and pattern of the facilities in the study area. From the analyses, it was revealed that there existed inadequacies in the availablities of health facilities and personnels within the wards. Two hypothesis were tested using the Spearman Correlation statistical technique to determine the correlation between choice of HCF patronized by respondents and distance and also between choice of HCF and income earned. It was revealed that there is a significant relationship between the choice of HCF and distance in Bwari but otherwise in Usuma and Kawu. A strong positive relationship was also established between income and choice of HCF in Kawu and otherwise in Usuma and Kawu. Igu had a parallel relationship between choice and the two variables. The research showed that there are only two categories of health care facilities which were primary and secondary in the study area. Only two are secondary facilities, these were General hospital in Kubwa and Bwari. It was revealed that only 47.3% of the respondents patronized Public Healthcare Facilities while the remaining 52.7% do not. There exists inadequacy in facilities distribution and health personnel in the study area, it was observed that the available healthcare facilities were not well utilized due to distance, inadequacy of health personnels, equipments, level of income, level of education amongst others. It is therefore recommended that more healthcare are built in the study area and more personnel be employed to work in the HCFs.

CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND TO THE STUDY

Health is a crucial component of human well-being. It is defined by Bircher (2005) as a dynamic state of well-being characterized by a physical and mental potential, which satisfies the demands of life commensurate with age, culture and personal responsibility. Health is among the most important services provided by the government of both developed and developing nations in the world, as the productivity level of any one is dependent on its state of health. According to the Nigerian Federal Ministry of Health (1998), the health of the people does not only contributes to better quality of life but also essential for sustained economic and social development of the country. Thus, health is known to be an important resource in the process of economic development, thereby making expenditure on health a productive investment.

The state of health of any population at any point in time determines the level of her productivity, and according to Awoyemi, Obayelu and Opaluwa (2011), improvement in health leads to improvement in life expectancy, which serves as a robust indicator of human development. Therfore, there is need for adequate and equitable distribution of Health Care Facilities in any given region or nation. According to Deaton (2003), evidence has shown that among poor countries, increase in life expectancy is strongly correlated with increase in productivity and income. Increased productivity by individual or group of people in all sectors depends on the health conditions of the labour force, while improved health and quality of life depends to a great extent on the availability of, and accessibility to health care facilities at affordable cost.

Health care provision in Nigeria is the responsibility of the three tiers of government in the country, these are the Local Government, State Government and the Federal Government who handles the primary, secondary and tertiary facilities respectively. However, because Nigeria operates a mixed economy, private providers of health care also have a visible role to play in health care delivery. The Federal Government's role is mostly limited to coordinating the affairs of the University Teaching Hospitals and the Federal Medical Centres (tertiary health care) while the state government manages the various general hospitals (secondary health care) and the local government focus on dispensaries (primary health care) which are regulated by the Federal Government through the National Primary Health Care Development Authority (NPHCDA).

The utilization of these health care services by people which they are provided for, is regarded to be paramount as it is assumed that increased access and use of health services will improve the health status of the population. This is stressed by Manzoor, Hashmi and Mukhtar (2009), and Onah, Ikeako and Iloabachie (2009), who stated that health care utilization of a population is important and that it is related to the availability, quality and cost of services, as well as to social-economic structure, and personal characteristics of the users. In the utilization of these healthcare services, there are various parameters which tends to have influence on its patronage. According to Buor (2003), it was revealed that distance is the most important factor that influences the utilization of health services in the Ahafo- Ano South District of Ghana which is an indication that distance plays a major role in utilisation. Travel times and distances to health centers according to Onah, Ikeako and Iloabachie 2009, constitute barriers to repeated visits while other factors like services provided and personal reasons affects the utilisation of health care facilities mostly in rural areas.

The pattern of distribution of heath care facilities and level of utilization has since been a thing of interest considering the effect it posses on the developmental level of any region. According to Inyang 1994, the level of access to health care facilities is a function of the degree of fairness in spatial distribution of the health care facilities. It was also observed that the problem that exist in the health care sector is not totally on the service quality but on the adequacy of health facilities provided and according to Ujoh and Kwaghsende (2014), the quality of services rendered is related to the level of manpower available, this explains that it is not only for the facilities to be equally distributed but to have health personnels who can deliver the services to people for which the facilities are created to serve. However, because Healthcare facility distribution in Nigeria has been characterized by significant disparity which is evident in their locational pattern of distribution where some of these healthcare facilities are concentrated in one area at the expense of other areas, the maximum benefits of total of its provision have not beeen enjoyed by all. This is observed to have awaken the need for researches on the pattern and utilization of Health Care Facilities in different part of the world and has made governments to show serious commitment towards addressing the inequalities.

However, more is still expected to be done in addressing this issue and an attempt to address this disparity from technical perspective for better and effective planning requires the use of an information management tool such as the Geographic Information Systems (GIS). The Geographic Information System is a robust suite of technical software designed to accept, analyze, store and output geo-based data. And among the many tools for solving spatial locational problems, it has been acknowledged for its capability in spatial planning and management (Akpan and Njoku, 2013).

It is on this note that this research tend to concentrate on the pattern of Distribution and Utilization of Government owned Health Care Facilities using GIS. Acccording to Galati (2006), Geographic Information System (GIS) is also defined as a collection of computer hardware, software, and geographic data for capturing, storing, updating, manipulating, analyzing, and displaying all forms of geographically referenced information. It is simply put as set of useful tools, which helps everyone from scientists to ordinary citizens to solve geographic problems. This tool seems to be so efficient and accurate in solving most, if not all environmental issues as long as it has its basis in space. According to McLafferty 2003, GIS and related spatial analysis provides a set of tools for understanding the spatial organization of health care. It has been be used by several scholars to combine different data and generate information required for decision making in health management.

1.2 STATEMENT OF THE RESEARCH PROBLEM

The Nigerian population according to the National Population Commission (2006), is estimated to be over 140million, this increasing trend shows a need for increased and improved health services which could be said to be one of the reasons for the involvement of Nigeria in the Millennium Development Goals (MDG). The Millennium Development Goals (MDG) is made up of eight point agenda, out of which three are accrued to health issues, these include; Reduction of child mortality, improvement of maternal health, combat HIV/AIDS, malaria, and other diseases (USAID, 2005). This has made the health sector to be greatly engrossed in the establishment of more health care facilities for the people and It has also inspired several researches to be carried out to examine the distribution, accessibility and utilisation of health care facilities in the different part of the nation. Though this does not imply that there have not

been any related research work done prior to this era of millennium development goals. Much attention has not been paid to the spatial distribution and utilization of Healthcare Facilities in Bwari Area Council most importantly because of many rural areas within the Area Council. No reaserch has documented the spatial distribution as well as the utilization of HCF within the study area. In assessing and determining the state and nature of these health care facilities in localities, regions and countries, a lot of research work has been carried out to give better understanding about the subject matter.

Amongst the researchers are Ajala, Sanni and Adeyinka (2005), who carried out a research on the spatial distribution and accessibilty to Health Care Facilities in Osun State. In the research work, the method of assesment which involves the ratio of population to a particular service was adopted with the data obtained from the state Ministry of Health and Osun State Hospital Management Board, Index of accessibility to health care facilities were computed. The result from the analysis shows that the available health care facilities are grossly inadequate and that the distribution of the available facilities depicts serious inequality. In the work, though the spatial distribution of the facilities was part of a major concern, there was no diagramatical presentation of their outcome in form of map, which could have made understanding easy as they say ‘seen is believing’. Also, GIS tool was not employed which would have help to display the pattern of distribution, from which the distance from one facility to the other can be determined.

Aigbe (2011), examined the utilization of maternal health services in Lagos State, the study was based on household survey of women and how they are able to utilize health services provided for mothers by the state government. The researcher, came up with the fact that there are spatial

differences in the utilization of maternal health services and concluded that people who are at a far distance to the location of these modern health services tend to be at a disadvantage in its utilization. Though utilisation of the health services was the center of the work, it was however, restricted to maternal health services which implies that it is gender biased.

Julius (2007), carried out a research on the significant factors affecting patronage of Health Care Facilities and that distance, had great effect on health care facilities utilization. The research concluded that people at farther areas have low patronage unlike people who had short distance to cover. The study was only centered on the patronage (utilization) but failed to shed light on the pattern of distributiion of the health facilities. Oluwatuyi (2010), also carried out a research in the South Western part of Nigeria, to assess the locational distribution of rural medical services in Ekiti State. The study employed the use of questionnaire in data acquisition and was able to perform the Nearest Neighbour Analysis in examing the travel distance from a facility to the people. The study came up with a result that medical facilities in the study area are unevenly distributed. The study did not employ the use of any GIS tool, which would have given better insight to the subject matter as maps showing the output of his work would have been produced. Abbas, Auta and Muhammad (2012), investigated the spatial distribution of Healthcare facilities in Chikun Local Government Area of Kaduna State, Nigeria, by employing GIS and GPS to map exiting facilities, evaluate adequacy based on World Health Organisation (WHO) standard and propose new ones. However, their results did not show how queries could be carried out to show both spatial and attribute information from a database and also the research work did not take into consideration the utilization of these facilities.

Alabi (2011) studied the spatial distribution of health centers in Lokoja, Nigeria. The study made use of the GPS in acquiring the location of these facilities, employed the use of GIS tool and used the Nearest Neighbour Analysis (NNA) in establishing the distribution pattern of public and private health centers in the study area. The study came up with an indication of weak randomness in the distribution of these facilities. Though the study used GIS in assessing the distributional pattern and also used the GPS for geo-location, the study failed to come up with a database for the spatial distribution of health centers in Lokoja. Ifeanyi, Johnbusco and Chijioke (2012), studied accessibility of Health Care Delivery System within Enugu Urban Area using Geographic Information System. They employed GIS technology to determine the closeness of a facility and shortest route to these healthcare facilities and they came out with a result which shows that most of the healthcare facilities were located within Enugu North Local Government Area while other settlements and LGAs had fewer healthcare facilities. As comprehensive as this study may look, it only concentrated on the spatial distribution, neglecting the utilisation of these services which is also of significance importance.

A careful examination of these studies showed that some did not employ the use of GIS and even where it was employed, utilization of the facilities were neglected. Some other studies also tried to map distribution and utilization, however database was not created. It is these gap in research that this study intends to fill.

The research seek to answer the following questions:

1. How many Public Healthcare Facilities were in the study area?
2. What was the spatial pattern of the Healthcare Facilites?
3. What were the categories of services rendered by these Healthcare Facilities?

4. What was the level of utilisation of these facilities?
5. What were the factors influencing utilisation?

1.3 AIM AND OBJECTIVES

The aim of this research is to analyze the spatial distribution of health care facilities and its utilisation. To achieve this aim, the following objectives were pursued, to:

i. identify all public Healthcare Facilities in the study area
ii. examine the spatial distribution of Healthcare Facilities in the study area
iii. categorise the Healthcare Facilities into primary, secondary and tertiary
iv. assess the level of utilisation by the people in the study area

1.4 HYPOTHESIS

Ho: There is no significant relationship between the utilization of HCF and distance travelled as well as income of respondents at each ward.

1.5 SCOPE OF THE STUDY

This study covered Bwari Area Council which is one of the area councils in the Federal Capital Territory of Nigeria. It is made up of ten wards, which are Byazhin, Ushafa, Kuduru, Igu, Kawu, Shere, Usuma, Kubwa, Bwari Central and Dutse (NAN, 2013). The research work was carried out four out of these ten wards, it was upon these four wards that generalisation were made for good recommendation and better planning policies. The study examined the Locational Distribution of Public Health Care Facilities which have been created from 1996 till date and how these have been utilized. The Area Council was created in 1996 and it is believed that right from the period of its creation, facilities for the well-being of the inhabitants were put in place. The study was also limited to public healthcare facilities as these are regarded as the basic form

of healthcare as it provides the least expensive source of medical treatment to the greater population of people resident in any given area (Effiong, 2010).

1.6 JUSTIFICATION OF THE STUDY

According to Smith (1987), inequality in facilities distribution is of crucial significance particularly in developing societies with dual problems of limited facilities and low personal mobility. According to welfare economic theory, equity in the distribution of basic development needs is indicative of the degree of accessibility of population to such services and facilities. Thus, knowledge on the nature of distribution of health care facilities is expedient in understanding the level of success or otherwise of health care delivery system in any society. It is against this backdrop that this study is carried out to have a good knowledge about the Health Care distibution pattern in Bwari Area Council.

This study will serve as data for further academic research or otherwise and also a baseline data to be utilized by government and non-governmental organisations.

CHAPTER TWO: CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

2.1 CONCEPTUAL FRAMEWORK

2.1.1 The Concept Of Health

Health is defined as the general condition of a person's mind and body, usually meaning to be free from illness, injury or pain, the general condition of the body or mind with reference to soundness and vigor. The World Health Organization defined it as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. Health is central to community well being as well as to personal welfare. It has a strong influence on people's earning capacity and it is fundamental to people's ability to enjoy and appreciate every other aspect of life (Julius, 2007). Health care services is one of the infracstructure services that is an essential ingredient for productivity and growth as a healthier labour force would work more effectively and increased productivity becomes the resultant effect, thereby bringing about a raise in per capital income. According to Ajala,Sanni and Adeyinka (2005), lack of basic health care facility in any community or region will lead to inneficiency in production, declining productivity, reduced life expectancy and increases infant mortality rate.

A Health System is an organizational set up or framework charged with the responsibility of distributing or servicing the Health care needs of a given community (Asuzu, 2004). According to the World Health Report (2000), a Health System is also defined as comprising all organisations, institutions and resources that are devoted to producing health actions. It is a complex system of inter-related elements that contribute to the health of people in their homes, educational institutions, in work places, the public (social or recreational) and the psychological environments as well as the directly health and health-related sectors. Healthcare institutions

according to Ujoh and Kwaghsende (2014) are service-oriented institutions which provides medical care facilities that comprises of observational, diagnostic, research and therapeutic and rehabilitative services to the general population. Health is amongst the most important services provided by government authorities in every country of the world. In every developed and developing nations, a tangible proportion of the wealth of such country is devoted to health care provision and sustainability. In developing countries, the expenditure on health care provision and sustainability ought to be more as it determines to an extent the level of economic and otherwise development which takes place. This in turn will help to speed up a nation's development as the health of the people does not only contribute to better quality of life but also sustains economic and social development of the country as a whole. The Understanding of the fact that the economic production capacity of any area, region or nation for national development is equally proportional to the state of health of the people has made issues on health facilities and its provision a subject of intense research interests today as health is a fundamental goal of development.

2.1.2 Utilization

According to Owoseni, Jegede and Ibikunle (2014), the health seeking behaviour of people and utilization of healthcare facilities is influenced by the socio-economic status of people. Utilization is the way in which things are put into use. There are some theories which facilitate the understanding of the utilization of health services, there are;

2.1.2.1 The Sick Role Theory proposed by Parsons (1951)

According to the sick role theory, when a person is sick, he adopt the role of being ill. This theory comprises of four main components which are 1) the person is not responsible for their

state of illness and is not expected to be able to heal without assistance, 2) the person is excused from performing normal roles and tasks, 3) there is general recognition that being sick is an undesirable state and 4) to facilitate recovery, the individual is expected to seek medical assistance and to comply with medical treatment which then brings in the issue of utilization. The Parsons' theory was discovered to be inadequate as it failed to look at variability in illness behavior even though it identified typical behavior in individuals who are ill.

In 1978, another theory was propounded which looked at the factors influencing health care seeking. This is the illness behaviour of people, this takes into consideration the psychological approach to health care utilization. This was propounded by Mechanic David in 1978, the theory incorporates ten decision points which determine illness behavior: 1) the salience of deviant signs and symptoms, 2) the individual's perception of symptom severity, 3) the disruption of the individual's daily life as caused by the illness, 4) the frequency of symptoms and their persistence, 5) the individual's tolerance of symptoms, 6) the individual's knowledge and cultural assumptions of the illness, 7) denial of illness as a result of basic needs, 8) whether or not response to the illness disrupts needs, 9) alternative interpretations Rebhan 4 of symptom expression, and 10) treatment availability via location, economic cost, psychological cost (stigma, humility, etc.), and treatment resources. Both theories, though different in view, is centered on the state of illness of a person and how health care delivery is sought for and what determines utilization. A model of health care utililsation which examines different variables influencing health service usage was developed by Rosenstocket. The model believes that there are four important variables that influence individuals to seek treatment and reduce susceptibility to disease. These are; firstly, individuals only seek medical care if they believe themselves as

vulnerable to a certain disease. Secondly, treatment is affected by how serious illness is perceived to be. Thirdly, the benefits of treatment must be evident to motivate individuals to action. Lastly, they refer to the media, friends or family and if they are absent from an individual's life.

However, as good health brings about positive effect on economic development of any region, it is expected that health services provided are utilised as there will always be utilization determinant factors. It is on this that a critical look into the utilization of healthcare facilities is based. This research examined distribution and utilization of healthcare facilities in a bid to know if the distribution is adequate and also to know the factors that determined their health service usage.

2.1.3 Accessibility

Accessibility refers to the ease of reaching destinations. According to Beedasy (2010), access to health care services is a function of many variables which includes financial resources of patients, education, age, gender, race, access to medical insurance, availability of health providers, culture, knowledge of how and when to access health providers, recommendations of family and friends, familiarity with the hospital, Geographical location of health care services, distance, transportation facilities and travel cost. It is the cost of travel in terms of distance time or expenses between between patient and service locations. The geographic Accessibility is anchored on how easily a health user can physically reach the provider's location. When examining geographic accessibility to health care, the dimensions put into consideration are spatial and aspatial. The spatial considers the availability and accessibility while the aspatial

considers the socio-cultural and economic factors, all of which are important. Geographic access is a determining factor of healthcare seeking behaviour of a patient for utilization of a facility to be achieved, this makes examining spatial availability and accessibility of health care facilities important.

According to Beedasy (2010), calculating physical accessibility to health care services can be done in several ways, these include; Euclidean distance (Buffering), road network analysis or road network travel time. The research emphasis is on the utilization of the facilities having considered locational distribution, but accessibility is looked into as it influences the utilization of services in any region.

2.1.4 Geographic Information System

A GIS is a computer based information system designed to work with spatially referenced data. According to Burrough (2001), GIS is defined as the science and technology related to the gathering, storage, manipulation, analysis and visualization of georeferenced data. It defers from other information system because it uses data which have spatial locations in its analysis and attribute components which describes the properties of such components, which therefore, give a true representation of whatever data inputed to it. A Geographic Information System consists of components which interacts together to answer spatial questions which can be relied upon in decision making process, these components are hardware, data, software and users. GIS technology has been associated with mapping and management of natural resources. It represents three different concept which are; information system about a territory, its database (attributes), and the software (Nichols *undated*). Representation of these data is done based on the perception

of the earth surface and it is usually represented in two format; raster and vector data formats. The raster format is a field representation where points in space have values attached to it. It represents a continous field such as elevation, temperature, vegetation or water flow while the vector format is a geometrical object representation where spatial phenomena are defined as lines, points and polygons, it is a arc node representation which stores points by (x,y) or (x,y,z) cordinates. It is a decrete field representation which describes a relative position of objects to one another. (Longley, Goodchild, Maguire and Rhind 2005). The vector data format can also be used for continuous data but such representations leads to more complex algorithms for analysis than the raster data representation, in th same manner, raster data format can also be used for discrete feature representation.

In Geographic Information System analysis, a phenomenon is the entity which has been seen to have a spatial location on the surface of the earth, its database talks about the attributes of the entity, this gives a description about the different characteristics of the object or entity . These attributes are usually managed in a database which uses cordinates or identification numbers to link attributes to the data it represents. Among the software used for these analysis are ArcGIS, ERDAS IMAGINE and IDRISI. In this research, GIS is used for analysis of data with spatial references in order to give a visual representation of phenomena and to solve locational problems in spatial planning. The research data was reprented in vector data format.

2.2 LITERATURE REVIEW

2.2.1 Provision and distribution of Health Care Facilities in Nigeria

According to Onokerhoraye (1999), a health care facility is defined as all units owned by public and private authorities as well as voluntary organizations and which provides health care

services including hospitals, health and maternity centers. They are those facilities which are put in place to take care of the health of the populace of any given area, place or region. It also refers to the physical structure and supporting equipment established for the provision of health services (Shuaib 2007). According to Alabi (2011), the advent of the provision of health facilities in Nigerian cities can be retraced back to the colonial period, when the Army corps provided free medical services to the colonial army and the then civil servants and it was in conjunction with some few private agencies and societies like the Young Men Christian Association (Y.M.C.A), the St John and the Red Cross societies, who established hospitals, dispensaries and maternities all over the country.

According to Adeyemo (2005), the then colonial government Between 1946 and 1956 attempted to provide and develop medical services, which was referred to as Harkens-Walker's ten year development plan. The Harkens-Walker plan was established with the main objectives of providing portable water, hospitals and maternity centres and the training of medical personnel. This attempt however failed due to lack of coordination of the several agencies created by the central government, for instance in 1954 there was the adoption of the federal system of government in Nigeria where each regional government was made to create separate health schemes. The inability to successfully coordinate this health schemes led to the failure of the plan. (Alabi, 2011). Following the failure of Harkens-Walker's ten year development plan, came another plan from 1970-1974, which was to correct the problems of the formal plan. This new plan was to improve the health service delivery and to restore all the facilities that were destroyed by Nigeria civil war (1967-1970), with priorities set on environmental sanitation and the training of medical personnel. This plan also failed due to the inability to cushion the

tremendous devastation of the civil war, which left the cities bereft with high poverty level, malnutrition and economic inflation, (Alabi, 2011). After this, came another plan called, the Basic Survey Health Scheme (BHSS) fixed in the Nigerian third National development plan of 1975-1980, this served as a corollary of the earlier scheme. The scheme was to increase access of large segment of the populace to health care facilities, from 25% to 60%. It was also aimed to adjust locational distribution of health care institutions for preventive health programme, where health care was to be taken to the local level.

The provision of health care facilities in Nigeria has ever since been a thing of major concern and the 1999 constitution of the Federal Republic of Nigeria made health a concurrent legislative item whereby the three tiers of government are vested with the responsibilities of promoting the health of the people. The Federal Government which is the apex government is charged with the responsibility of establishing and cordinating the affairs of the University Teaching Hospitals Specialist Hospitals, Federal Medical Centres and National hospitals while the State Government manages all the available General Hospitals, Cottage and Mission hospitals and the Local Governments focuses on clinics, dispensaries, private clinics and maternity centres. These three tiers of governverment, by design, are closely related to one another with the higher tier been charged with the responsibility of assisting the other tiers by handling referral cases from the lower facilities.

According to Nengak and Osagbemi (2011), the Federal Government through the ministry of health is responsible for health policy formulation, strategic guidance, coordinating, supervising, monitoring and evaluation of the health system at all levels. The tertiary health facilities consist

of specialized services provided by Teaching Hospitals and other Specialist Hospitals which provide care for the specific disease such as orthopaedic, optalmic, psychiatric, maternity and pediatric cases. The facilities have good support services to serve as referral institutions for the secondary level health facilities. The State government operates secondary facilities, which include general hospitals and comprehensive health centres. These secondary facilities are normally designed to provide services to patients referred from the primary health care centres through outpatients and in patient services of hospitals for medical, surgical, pediatric patients. The local government operates the facilities which are the first point of contact for most patients, and, is usually the only available health practice setting for most people in the rural areas in Nigeria, (Alabi 2011). However, there is the problem of coordination due to the sharing of responsibilities among the three tiers of goverment, with the structure affecting the managerial decision and financing, which has altered the operation of healthcare facilities, hospitals and health centres in terms of service provision and medical inputs. The performance of these institutions in the health care sector must be assessed if health and development goals will be met. In a bid to show a quick and good response to the need for improving the health of her populace, Nigeria had accrued three out of the eight point agenda of the Millenium Development Goals to health issues. These are reduction of child mortality, improving maternal health, combacting HIV/AIDS, malaria and other diseases (USAID, 2005).

The distribution of the health care facilities in Nigeria has to do the with the spatial locations of the available facilities. In other to access the distributional pattern of these facilities inNigeria, alot of researches has been carried out in several places of the country. Atser and Akpan (2009), analysed the spatial distribution and accessibilities of Health Care Facilities in Akwa-Ibom state

against the philosophy of achieving the MDGs in the health sector. The study used data from government establishment and direct observation in 50 rural communities using spatial sampling framework. Six health indicators variables were obtained and analysed to assess the level of access to health care facilities. The result depicts a lopsided pattern of distribution of health care facilities in Akwa- ibom state which impede the delivery of health care services in the state. The study concluded that there is an aggressive need for intervention to have other health care facilities located in areas that are lacking. However, the research failed to look at utilisation of the existing ones and the factors that determines the utilisations.

The use of GIS in solving the problem of inequality in health care facility distribution is no longer new. Alabi (2011), looked at the distribution of health centres in Lokoja, Nigeria using the GIS. He choose 5 neighborhoods within the study area and pinpointed the locations of existing health care centres with the aid of Global Positioning System (GPS). He also used the Nearest Neighbour Analysis (NNA) inferential statistical tool to establish the distribution pattern of public and private health centres in the study area. The result of the analysis showed weak randomness with an output of 0.99228 which exceeded the 2- score table value of -0.723417 which indicates insignificant accessibilities. The researcher concluded that in areas where population is not evenly distributed, the mean centre of population distribution is calculated as the demand, thereby, forming the origin of location. The research though tried to look at the distribution of health centres, the researcher did not look at the capacities of the health centres as possible factor determining the choice of utilisation

2.2.2 GIS and accessibility to Health Care Facilities

Access to health care is an important component of an overall health system and it has a direct impact on the burden of disease that affects many countries in the developing world. According to Jaro and Ibrahim (2012), accessibility has physical, time, economic and social dimensions. The physical dimension deals with the condition of the road, the time dimensions refers to the time spent on a journey, the economic dimension deals with money spent on a journey and the social dimension has to do with the culture and values of the people, which determines the use of particular facility. For any facility to be utilized in any region the accessibility has to be considered and this is hanged on the transport, which serves as a medium by which movement from one place to the other is made possible (Jaro and Ibrahim 2012). Accessibility therefore, aid the patronage and utilization of basic welfare facilities, which as result bring about changes in the use of such a facility. The maintenance of good health and easy access to adequate healthcare has been a challenge to mankind. This challenge has led to attempts by government(s) and non-governmental outfits to set up public healthcare facilities in various parts of the world. According to Effiong (2010), public healthcare is regarded as the basic form of healthcare, as it provides the least expensive source of medical treatment to the greater population of people resident in any given area.

Measuring accessibility to health care contributes to a wider understanding of the performance of health systems within and between countries which facilitates the development of evidence based health policies. According to Oliver and Mossialos (2004), accessibility to health care is concerned with the ability of a population to obtain a specified set of health care services. Looking at accessiblity in a geographic term, it is often referred to as spatial or physical accessibility and this is concerned with the relationship between the spatial separation of the

population and the supply of health care facilities that is, how people can move from one place to another to seek health services without having to go through difficulties. Many factors affect a population's ability to access appropriate levels of health care, according to Oliver and Mossialos (2004), these factors are grouped into three and they are; Availability, Acceptability & Affordability (Socio-economic) and thirdly, the Geography. The availability refers to the health care facilities from which a patient can choose from, acceptability and affordability looks at how well the people are willing to accept what is provided for them not allowing their religious beliefs, culture to deny them of use and is the health services affordable for them when looking at the cost while the geography deals with where exactly are these facilities located. All of these become the underlying factors for health care service utilization

Geographic Information System (GIS), according to Galati (2006), is a collection of computer hardware, software, and geographic data for capturing, storing, updating, manipulating, analyzing, and displaying all forms of geographically referenced information. GIS, which is a tool for spatial analysis, according to Cromley and McLafferty, (2002), has three important functions in health research and policy analysis these are; spatial database management, visualization and mapping, and spatial analysis. The use of Geographic Information Systems (GIS) for the measurement of physical accessibility is well established and has been applied in so many research projects in different areas, this includes retail site analysis, transport, emergency service and health care planning (Black. Steve, Aguilar, Vidaurre, and El Morjani, *undated*). GIS is therefore, well suited to measuring spatial accessibility to health care facilities as it contain the main components needed for such analysis, these includes:

• Data capture, storage, management and manipulation tools for both spatial and attribute data

• Analysis such as buffering, overlay, proximity and shortest path or route

• Mapping and visualization tools to communicate the results of analysis

According to Burrough (2001), the ability of GIS to manipulate data from specific geographic locations, and the ability to gather, store, manipulate, analyse and visualize georeferenced data have offered the opportunity to create a realistic perspective of the world and a chance to see the future action, with these a better approach and useful knowledge about accessibility to health facilities for for a high level of utilization is presented which can easily be adopted for use. The ability and flexibility of the GIS tool makes it easy for so many, such as the scientist, engineers, planners, surveyors and every resource managers to bring together large sets of spatial data into useful information, thus, offering a new perspective and fresh approaches to solving problems in our environment. A lot of researches has been done in the recent years using GIS for analysis, for example, Ghosh (2011), used GIS to analyse the association of urban environment features that facilitated viral activities of West Nile Virus (WNV) and compared the spatial association between West Nile Virus infected mosquito pools and human cases with heterogeneous urban characteristics in Minnesota USA between 2002 and 2007. His results showed that West Nile Virus is considerable higher in areas close to swamps, parks and water discharge sites. Lovett, Parfitt and Brainard (2006), also used GIS to depict mobile hazards associated with traffic flows and transportation of hazardous wastes.

The health of a population through the availability of health care facilities are important concerns for developing countries and access to health care is a significant factor that contributes to a healthy population. In order to find lasting solution to the problems encountered in accessing

these Health Care Facilities the World Health Organization (WHO) has been working on the development of methods and models for measuring physical accessibility to health care using several layers of information integrated in a GIS (Black, Steve, Aguilar, Vidaurre and El Morjani, *undatedl*). Two of these methods which are borne out of the initiatives of Evidence and Information for Policy Cluster (EIP) and the Health Analysis and Information Systems (AIS) are Measuring Physical Accessibility using AccessMod and Measuring Physical Accessibility using SIGEPI (Geographic Information Systems in Epidemiology and Public Health), these are presented and compared in relation to a particular public health problem in Central America in the work of Black, Ebener, Aguilar, Vidaurre and El Morjani *(undated).* In the study, only travel times and distances were considered as the geographical indicators of accessibility. No cultural, organizational or economic accessibility were considered. The SIGEPI was used to help contribute to the strengthening of health workers capacity in epidemiological analysis by providing them with efficient tools integrated in a GIS. Thus, helping to develop health situation analysis, monitoring, and evaluation of the effectiveness of health interventions required for decision-making and planning in health.

From the SIGEPI perspective, geographical accessibility took into consideration the relative location between population and health services taking into account specific environmental conditions. A Composed Index of Critical Accessibility Index (CICA) was calculated in SIGEPI using the the simplified estimation of composed measurements indexes. The analysis undertaken using the SIGEPI approach helped to identify the populated places that had poor accessibility levels to the road network, taking into consideration travel times to, and along the available road network. The second method which was used is the AccessMod which is a GIS based module. It

helps in the analysis of an existing health facility network through the generation of the catchment areas and determination of the population covered by each of the facilities and also the determination of locations for new health facilities in order to scale up the existing network or to perform different analysis when no information about the location of the existing health facility networks is available (e.g. for cost-effectiveness analysis). The objective of these two methods is to provide tools that could be used in countries, and most especially in developing countries, where the need to access health care is one of the key elements for reducing the burden of diseases. There are also other means through which the spatial accessibility to health services has been assessed in order to determine utilization, one is the use of distance to the location of the service considering time and money cost and ratio of population to a particular service amongst others. The use of ratio of population to a particular service by computing index of Accessibility was employed by Ajala, Sanni and Adeyinka (2012), to examine Accessibility to Health Care in Osun State as the researchers believe that if there are adequate manpower then accessibility is enhanced. The variables employed in the research were population ratio to bed space, population ratio to medical doctor and population ratio to nurses/ midwives, these were chosen because doctors and nurses are directly involved in providing health care services to the people bed spaces is a basic requirement in health care delivery in any region. The population ratio per medical officer is useful in determining the workload of a medical officer and his efficiency on the job. The number of health service seekers to be attended to per clinic determines how long a patient has to wait before he or she is attended to, this helps to measure the accessibility of patient to medical consultation. If there is low population per health personnel, then accessibility is increased and vice versa and when accessibility is increased, utilization is also increased and when utilization is increased it can be concluded that health is

improved and economic growth is enhanced. Improved health and quality of life depends to a great extent on the availability of, and accessibility to health care facilities at affordable cost (Ajala, Sanni and Adeyinka 2012).

2.2.3 Utilization Of Health Care Facilities

The great positive impact of Health Care Facilities on the population of any given area cannot be over emphasised, this is due to the almost universal demand for the services they provide which in turn determine the efficiency and state of mind of a population. With this, there is ought to be a definite theory for the location and distribution of health facilities as in the case with other public facilities, but it has been observed that the location theories that existed are concerned basically with commercial, industrial, residential and agricultural activities (Onokerhoraye 1999). Health care service utilization pattern plays a fundamental role in defining national health status. Health care in Nigeria is influenced by different local and regional factors that impacts the quality or quantity present in one location. Due to the aforementioned, the health care system in Nigeria has shown spatial variation in terms of availability and quality 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. Utilization patterns give an indication of current preferences amongst people already deciding to seek care. It can help inform where a target population already goes for health management, allowing services and referral to be built up and to maximise their impact. They can also indicate where they do not go and where services may be downgraded. People do not seek one source of care, and differ in their behaviours according to who is affected and what diseases are experienced. The decision to seek care is mediated by opportunities to seek care, especially concerning time and cost. These

decisions are not isolated to individuals but are embedded in a broader household and social organizational decision process and the capacity to allow seeking of care.

Recognizing that adequate supply of infracture service in a health centre as an important ingredients for productivity and growth, Julius (2006), carried out a research on significant factors affecting the patronage (utilization) of health facilities by rural dwellers in Owo region, Nigeria. This was done in order to know the health status of the population and thereby encourage the patronage of the available health facilities within and outside their communities. In the research, questionnaire was made use of in order to get information from health consumers among the dwellers and it identified 20 consumer variables which were fitted to regression model and it concluded that only 9 out of the 20 variables significantly affected the patronage of health facilities. The order of these variable are distance travelled, transport cost, illness type, distance of the nearest facility to home, marital status, income, length of stay in the village, educational status of the dweller and religion.

Mazzilli and Davis (2008), carried out a research work on health care seeking behaviour in somalia to determine health service utilisation, in the study, Somalia was divided into seven zones; South Central Zone, North West Zone, North East Zone, Pastoral zones, Agro-pastoral zones, Riverine–SCZ and IDP zones. It was discovered that only the last three zones had a higher patronage to public health facilities while the first four zones preferred the private facilities over the public. The private sector are particularly used in urban centres by populations with the financial means to use them as big towns demonstrate greater diversification in the range and sophistication of private services and private pharmacies are particularly used in major

urban centres. Distance and transport combined with time tend to pose a negative effect on the utilization of public health facilities. Findings have also demonstrated the higher use of the private sector (particularly pharmacies) to manage recent illness in various parts of Somalia much more than the public sector (Mazzilli and Davis 2008).

According to Aigbe (2011), Maternal health, a major component of nation's health status is largely influenced by the extent of access to available health services but less is known about the impact of neighbourhood characteristics on the differences in the use of maternal and child health (MCH) services. This brought about a research on spatial aspects of utilization of maternal health services in Lagos state, Nigeria in order to examine preventive health service utilization pattern from the spatial perspective. In the study, a household survey of 1,337 women in three social areas of Lagos State which based on stratification of the urban area employed gave three classes which are high, medium and low class based on the socioeconomic status of their residents, was carried out so as to examine the pattern and differences in the use of preventive health services by mothers. Multivariate Analysis was employed in the examination of the pattern of antenatal care (ANC) by mothers and the findings indicated that maternal residence and distance factors are key variables in the explanation of differential pattern in the patronage of the health services under study.

CHAPTER THREE: STUDY AREA AND RESEARCH METHODOLOGY

3.1 INTRODUCTION

This section discusses the methodology employed in carrying out this research work and also give an insight about the study area. The sample population, method of data collection as well as method of data analysis were also discussed in this section.

3.2 THE STUDY AREA

3.2.1 Location

This study was carried out in Bwari area council of the Federal Capital Territory in north-central geo-political zone of Nigeria. It is located between Latitudes 9^0 14' 38.28''N and 9^0 20' 01.41''N and between Longitudes 7^0 21' 44.58E and $7^0$23'28.00'' E. The Area Council is located in the geographical centre of Nigeria bordering Niger State and covers a total land mass of 914km^2. It is made up of ten wards namely; Bhazim, Ushafa, Kuduru, Igu, Kawu, Shere, Usuma, Kubwa, Bwari Central and Dutse (NAN, 2013). See figure 3.1.

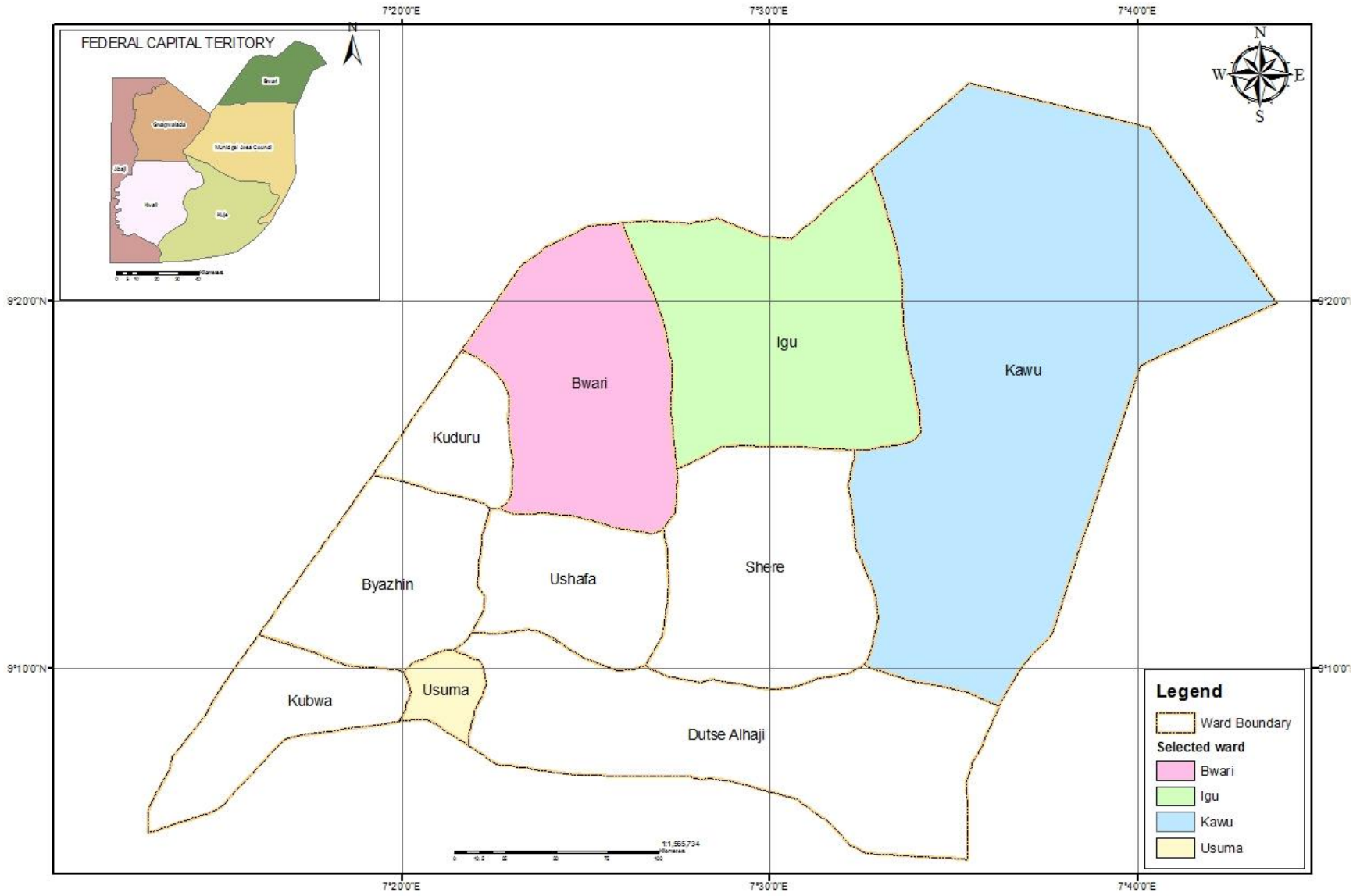


Figure 3.1: Administrative map of Bwari Area Council showing the study site.
Source: Field survey, 2015

3.2.2 Climate

Bwari has two main seasons, rainy (April to October) and dry (November to March). During the dry season, the typical month being February, the temperature varies between 30°C to about 37°C . Annual rainfall is reported to exceed 1,600 mm, most of it occurring during the rainy season. The mean total annual rainfall is between 1,100 – 1,600mm, with about 80% of it occurring between May and October during the peak of the rainy season. Rainfall is heavy and an event can last more than 6 hours. Rainfall rates of about 50mm/hr are common between July and August. The annual rainfall regime consists of two peaks occurring in July and September as exemplified in the data for mean monthly rainfall for Abuja. In general the area experiences a bimodal pattern of rainfall. (FCT Secretariat, 2012)

Wind in the study area is strongly influenced by the seasonal migration of the dry and moist air masses through the region. During the months of April to September, when the moist southern air mass predominates, winds in the FCT are from the south-west and to a lesser extent from the south and west. As the dry air mass descends from the north, the region is dominated by north-easterly winds. These winds predominate from October through March and are frequently dust laden (FCT Secretariat, 2012).

3.2.3 Geology

Bwari and other parts of the FCT are predominantly underlain by high grade metamorphic and igneous rocks of pre-Cambrian age. These rocks consist of gneiss, migmatites and granites. In general, the rocks are highly sheared and can be divided into four major groups, as follows: Metamorphosed Supracrustal (Exogenetic) Rocks: Rocks in this group includes; Mica Schist (sh), Marble (m), Amphibolite and Amphibole Schist (a), Fine Medium Grained Gnesis. Migmatitic

Complex: This includes; Migmatite (mi), Migmatitic Gneiss (mg), Granite Gneiss (gg), Porphyroblastic Granite-Gneiss (pg), Leucocratic Granite Gneiss (lg) . Intrusive GraniteCoarse Grained Granite (eg). (FCT Secretariat, 2012).

Minor Intrusions: Rhyolites (ry), Quartz Feldspar Porphyry (py), Daca titea and * Anddesites (an), Dolerites and Basalts (b). Other formations are Quartzite (qz), Pegmatite (p), Quartz vein (q)

3.2.4 Soil and Vegetation

The soils of the study area are generally shallow and sandy in nature, The high sand content particularly makes the soils to be highly erodible. The shallow depth is a reflection of the presence of stony lower horizons. The vegetation type around the study area is tropical guinea savannah. The dominant vegetation comprises of an extensive grass under storm which occur annually and scattered trees and dense patches of shrubs. However, patches of rain forest vegetation occur as riparian (stream side) forest. The trees and shrubs do not form a complete canopy. (FCT Secretariat, 2012).

3.2.5 Growth and Development of Study Area

The administration of the Federal Capital Territory covers six Area Councils of which bwari is one, these area councils were created to bring goverment closer to grassroots. Bwari Area Council was created in october 1996 alongside Kwali Area Council. It is located in the North East of the Federal Capital Territory. According to National Population Commission (2006), the population of the area council was 227, 216 in 2006 and the projected population at 3.2 % annual growth rate gave total number 292,655 (2015 projected). The high soil fertility of the area, supports a population that is predominantly engaged in farming activities. Nevertheless, the number of public servants in the area has been on the increase, this is owed to the citing of key Federal Institutions in the area, some of which are; Nigerian Law School Headquarter, Joint Admission Matriculation Board(JAMB),

Nigeria Defence College, Lower Usman Dam and Federal Government Girls College. Bwari Area Council is made up of several ethnic groups, some of which are Gbagyi, Koro, Fulani amongdt others. Because of the level of farming practised in the Area Council, it is referred to as the 'food basket of FCT'. (FCT Secretariat, 2012).

Apart from the Bwari township and its neighbouring communities, other parts of the Area Council are typically rural. The commercial activities of some notable banks such as Zenith bank, First Inland bank, Aso savings and Afri bank has helped to improve the state of the Area Council. Though fast developing, the Area Council which is made up of ten wards seems to be experiencing inadequacy in some of its infrastructures most especially the health care facilities and portable water which are stretched (FCT Secretariat, 2012).

3.3 METHODOLOGY

3.3.1 Reconnaissance Survey

A reconnaissance survey was carried out in order to get acquainted . From recconnaissance survey, it was discovered that out of the four study sites, Bwari central had the highest population followed by Usuma and then Kawu and Igu.

3.3.2 Data Types / Sources of Data

The types of data include:

i. location of health care facilities
ii. the number of health care facilities
iii. ownership types
iv. categories of services rendered

v. the utilization of facilities

vi. class and categories of facility

vii. capacity of facilities.

Sources of Data

The data utilized in this research work, were acquired from two sources, these are the primary and the secondary sources.

3.3.2.1 The Primary Source of Data

Field survey was carried to obtain information on the availability or otherwise of health care facilities. With the aid of a handhled Global Positioning System (GPS) the geo locations of the facilities were acquired and recorded. Also, information were gathered from residents using structured questionnairre in each of the wards visited to inquire about the choice of health care facility and to know reasons for their choice. In the same manner, data were gathered from the management of each Health Care Facility in the sampled wards about their capacities in terms of number of Doctors, Nurses/Midwives, Bedspace and Laboratory Technologists using questionnaires.

3.3.2.2 The Secondary Source of Data

One of the data from this source is the list of all public health care facilities in the area council which was obtained through the Health Department of Bwari Area Council, so as to identify the settlements with these health care facilities in the Area Council. The administrative map of Bwari Area Council was also sourced for from the department of Lands and Survey in the Area Council which served as the base map. Literatures were gotten from journals, textbooks, encyclopedia,

internet materials, conference papers, seminar papers, unpublished and published dissertations and thesis were also reviewed.

3.3.3 Research Design

This explains the structure of investigations that was aimed at identifying variables for the research and the relationship that exist between them. The structure of this research work follows the pattern of defining and explaining the study population, sample population and sample size determination, sampling techniques, data collection procedure and methods of data analysis.

3.3.4 Sample Size and Sampling Technique

All Government owned Health Care Facilities operating in Bwari Area Council constitute the population for this research work. These are organizations charged with the responsibility of taking care of the health issues by improving the health status of the people through health intervention strategies and services. In the case of this study, these comprises of general hospitals, primary health centers and dispensaries. Bwari Area Council is made up of ten wards, (NAN, 2013) these wards includes; Bwari Central, Byhazhin, Usuma, Kubwa, Kuduru, Igu, Shere, Ushafa, Dutse and Kawu. Out of these wards, four wards were selected for the study using the ballot method of random sampling technique in order to give each ward an equal chance of being selected. The wards chosen were; Bwari Central, Igu, Kawu and Usuma. A total of 400 copies of household questionnaires were administered to the residents in these chosen wards to assess the utilization of health care facilities.

This sample size was arrived at using the Yarmane‘s formula below:

$$n = \frac{N}{1 + N(e)2}$$

Where: n = sample size

N =Total Population (292,665)

e = Level of Significance (0.05)2

$$= \frac{292,665}{1 + 292,665\ (0.05)2}$$

$$= \frac{292,665}{1 + 73163.75}$$

$$= \frac{292,665}{73164.75}$$

= 400

To determine how the questionnaires were distributed in each ward, Yarmane’s formula for determination of respondents was used. This is shown below;

$$\frac{nx400}{N}$$

Where n = population of each ward

N = total population of selected wards

400 = total copies of questionnaires to be administered

This is shown in Table 3.1.

Table 3.1: Selected wards and the proportion of population sampled

Selected wards for sampling	**2015 projected population of selected wards**	**Proportion of sampled population**
Bwari Central	29,677	155
Usuma	22,782	119
Kawu	9,251	78
Igu	14,755	48
Total	**76,465**	**400**

Source: Field survey, 2015

The questionaire admnistration in all the selected wards was done using systematic sampling technique. Households were chosen randomly in every 3rd house within the major streets of the wards. Another set of questionnaire was administered on the available Health Care Facilities to gather information about their capacity.

3.3.5 Method Of Analysis

The analysis of data collected from both primary and secondary sources were carried out using both GIS and Statistical analysis methods.

3.3.5.1 GIS Analysis

The GIS analysis was grouped into three and the main software used in carrying out these analyses was the ArcGIS 9.3 version.

3.3.5.2 General Spatial Distribution

The first objective of this research work was to identify all the public healthcare facilities in the study area. In order to get the spatial locations of the identified healthcare facilities for mapping, the Global Positioning System (GPS), was used for acquiring their locational attributes which were geo-referenced in order to give them locations on the earth surface. For the general spatial distribution, the Area Council shapefile was exported from the FCT shapefile, to create a ward map for the Area Council, the coordinates of the localities were plotted on the shapefile and with the help of the 2013 Spot 2.5 meters, the localities were digitized into different wards in the Arc-Map environmnet. The cordinates of each Health Care Facilities were then overlaied on the ward map shapefile to show them as found located in the different wards. The location of each of the health care facilities was used to analyze general spatial distribution within the study area. Having done this, the eveness in the distribution distribution of the facilities can be assessed.

3.3.5.3 Health Care Facility Distribution Pattern

In assessing the spatial distribution and utilization of the public health facilities found in the study area, the category of the facilities were determined and mapped, so also the distribution pattern of the capacity of the health facilities were mapped. With the existing general spatial distribution map, each needed information for mapping were plotted on the map in the Arc-Map environment to show the distribution pattern as the case may be. With each facility located as point features in the ward map using their geo-locations, the attribute data of each facility which were already compiled in MS excel were linked with the spatial data in ArcGIS spatial Analyst for analysis.

3.3.5.4 Database creation

The shapefile of Bwari Area Council exported from the FCT shapefile, was imported into the ArcGIS 9.3 environment. The next step was the data entry about the entity 'Healthcare facility', the schema was created using the following; facility name, location (ward), class of facility, category (Primary, Secondary and Tertiary), X and Y cordinates, number of health personnels (Doctors, Nurses, Midwives, Laboratory Technologists) and the number of bed space. These was done in the MS excel and was linked with the spatial data in the ArcGIS environment using ARCGIS 9.3 software.

3.3.5.5 Statistical Analysis

The statistical analysis involved descriptive analysis of data collected using bar charts and pie charts while frequency analysis was carried out on all the variables in the questionnaire. The use of correlation coefficient through SPSS statistical package was employed to find out if there is relationship between the choice of Health Care Facility by respondents and distance travelled.

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

4.1 INTRODUCTION

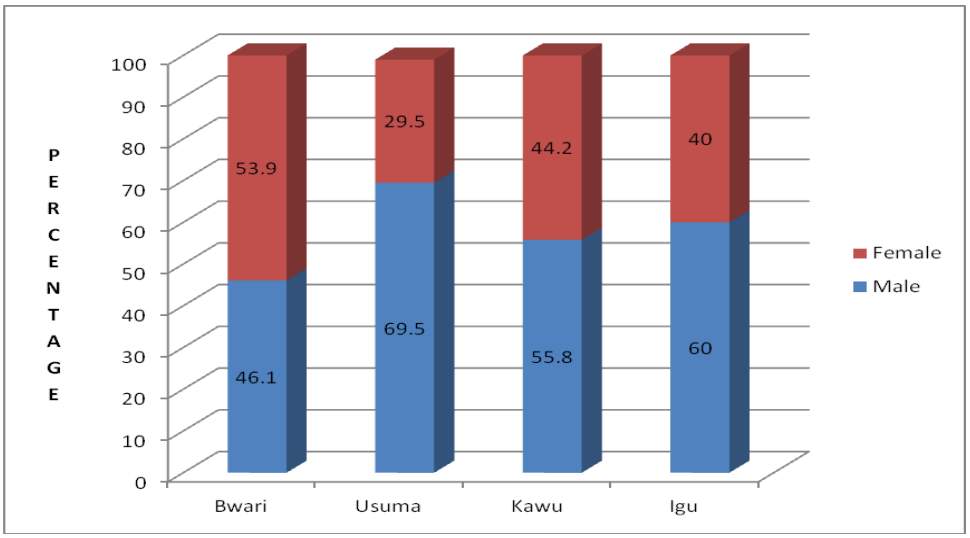
This chapter contains the result and interpretation of the field findings in the study. The data presentation starts with the descriptive analysis, using tables and charts as it applies. It explains household information on healthcare facility accessibility, usage and capacilty of the Healthcare facilities in the study area. Out of the 400 copies of questionnaire which is the sampling size, 384 copies were retrieved. Data presentation and analysis was done based on the retrieved copies. A total of 155, 119, 78 and 48 copies of questionnaire were distributed in Bwari Central, Usuma, Kawu and Igu wards respectively and out of these, a total of 154, 115, 77 and 38 copies of questionnaire were retrieved respectively.

4.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

4.2.1 Gender

Figure 4.1 shows the percentage distribution by gender of respondents in the selected wards.

Figure 4.1: Percentage Distribution of respondents by Gender



Source: Field Survey, 2015

The gender distribution in the selected ward of the study area as seen in Figure 4.1 shows that all wards except Bwari central ward have a higher proportion of male respondents while a higher female proportion was recorded in Bwari central ward, this was so because only available and willing respondents were interviewed and it was observed that more males were available for interview in Usuma, Kawu and Igu wards, this is not out of place as household heads were the main targets of the questionnaire administration as they have a role to play in the financial responsibility of most household.

4.2.2 Age Distribution, Marital Status and Number of Children

The distribution of respondents by age is represnted in Table 4.1.

Table 4.1: Age Distribution of respondents

Age Class	Bwari		Usuma		Kawu		Igu	
	Frequency	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Less than 19	0	0	0	0	11	14.3	0	0
20-24	15	9.7	11	9.6	8	10.4	4	10.5
25-29	30	19.5	31	26.9	15	9.5	8	21.0
30-34	60	38.9	15	13.0	27	35.0	0	0
35-39	22	14.3	27	23.5	0	0	11	28.9
40-44	19	12.3	15	13.0	8	10.4	4	10.5
45-49	4	2.6	8	6.9	4	5.2	11	28.9
50-54	0	0	0	0	0	0	0	0
55-59	4	2.6	8	6.9	4	5.2	0	0
60-64	0	0	0	0	0	0	0	0
65 and above	0	0	0	0	0	0	0	0
TOTAL	**154**	**99.9**	**115**	**99.8**	**77**	**100.0**	**38**	**99.8**

Source: Field Survey, 2015

The percentage distribution of respondents by age as seen in Table 4.1, shows that a large proportion of respondents in the study area falls between the reproductive age group (20-49 years) which had a resultant effect on their health seeking behaviour, it was revealed that almost all the respondents made use of one health service facility or the other, thus, the need for additional facility in these areas

Table 4.2: Pecentage Distribution By Marital Status and Number of Children

	Bwari		Usuma		Kawu		Igu	
Marital Status	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Married	60	38.9	57	49.6	42	54.5	15	39.5
Single	79	51.3	54	46.9	27	35.1	8	21.1
Divorced	11	7.1	0	0	4	5.2	0	0
widow	4	2.6	4	3.5	4	5.2	11	28.9
separated	0	0	0	0	0	0	4	10.5
TOTAL	**154**	**99.9**	**115**	**100.0**	**77**	**100.0**	**38**	**100.0**
Number of children	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
none	68	44.2	54	46.9	23	29.9	4	10.5
1-3	48	29.2	38	33.0	23	29.9	11	28.9
4-6	41	26.6	23	20.0	23	29.9	8	21.0
7-9	0	0	0	0	8	10.3	11	28.9
10 and above	0	0	0	0	0	0	4	10.5
TOTAL	**154**	**99.9**	**115**	**99.9**	**77**	**100.0**	**38**	**99.8**

Source: Field Survey, 2015.

Findings as shown in Table 4.2 revealed that three out of the four selected wards, have a greater number of people who are married while Bwari Central recorded a higher number of singles. The increased number of the married showed an increase in demand for health care services as there were needs to cater for themselves and their children. It was also revealed that Bwari central and Usuma wards recorded less number of people whose spouse were dead compared to Kawu and Igu wards, number of children birthed were also observed to be more in Kawu and Igu wards compared to Bwari central and Usuma wards where a reduced number of children were recorded. These pattern may not be far from the fact that Bwari central and Usuma ward seem to be more developed and as such have a higher number of educated people unlike Kawu and Igu wards which were observed from recognaissance survey to be rural like and in rural area, people tend to give birth to more children as they consider them as source of labour especially for farming activities.

4.2.3 Educational Characteristics of Respondents

The educational background of the respondents differs, this ranges from no formal education, primary education, secondary education, tertiary education to quranic education.

Table 4.3: Percentage Distribution of Respondents by Household Size and Level of Education

	Bwari		Usuma		Kawu		Igu	
Household size	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
1-5	76	49.3	84	73.0	34	44.2	11	28.9
6-10	78	50.6	31	26.9	27	35.1	8	21.0
11-15	0	0	0	0	12	15.5	8	21.0
15 and above	0	0	0	0	4	5.2	11	28.9
TOTAL	**154**	**99.9**	**115**	**100.0**	**77**	**100.0**	**38**	**99.8**
Education Level	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
No formal education	4	2.6	0	0	12	15.5	19	50.0
Primary education	11	7.1	0	0	23	29.9	11	28.9
Secondary eduation	44	28.6	27	23.5	30	40.0	0	0
Tertiary education	95	61.7	88	76.5	12	15.5	8	21.1
Quranic	0	0	0	0	0	0	0	0
Others	0	0	0	0	0	0	0	0
TOTAL	**154**	**100.0**	**115**	**100.0**	**77**	**100.0**	**38**	**100.0**

Source: Field Survey, 2015

The pattern of Educational Distribution in Table 4.3 revealed that most of the respondents in Bwari Central ward and Usuma ward were more educated than Kawu and Igu wards, Igu ward had the highest percentage of people with no fomal education. Bwari Central and Usuma wards were discovered to have more government facilities such as the General hospitals, Area Council secretariat, banks which required skilled labour with higher educational qualifications to work in them, thus, the higher concentration of educated people in those areas. Number of household size were discovered to be higher in both Kawu and Igu wards while reverse is the case in Bwari Central and Igu wards, this could be attributed to the higher amount of money paid for rentage in these areas unlike Kawu and Igu wards where housing facilities are more affordable.

4.2.4 Income Distribution by Respondents, Choice of Health Care Facility and Distance Traveled to HCFs

The level of income of an individual plays a significant role in their ability to afford medical care. The income level of respondents are presented in Table 4.4

Table 4.4: Percentage Distibution of Respondents by Level of Income.

	Bwari		Usuma		Kawu		Igu	
Income of respondents	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Less than 10,000	22	14.3	15	13.0	38	49.4	8	21.1
10,000 - 20,000	34	22.1	23	20.0	27	35.0	11	28.9
20,000 - 30,000	4	2.6	11	9.6	8	10.4	19	50.0
30,000 - 40,000	34	22.1	17	14.8	4	5.2	0	0
40,000 and above	60	38.9	49	42.6	0	0	0	0
TOTAL	**154**	**100.0**	**115**	**100**	**77**	**100.0**	**38**	**100**

Source: Field Survey, 2015

The income level of respondents in each ward is shown in Table 4.4, it was revealed that Bwari Central and Usuma wards have more higher salary earners compared to Kawu and Usuma wards, this is not far from the fact that these wards served as preffered residence for more skilled workers who work in both government and private organizations in the Area Council and its environments.

Table 4.5: Percentage Distribution of Respondents by choice of Healthcare facilities

	Bwari		Usuma		Kawu		Igu	
Choice of HCF	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Government	72	46.8	23	20.0	73	94.8	38	100.0
Private	41	26.6	92	80.0	0	0	0	0
Traditional home	4	2.6	0	0	0	0	0	0
Government and Private	37	24.0	0	0	0	0	0	0
All of the above	0	0	0	0	4	5.2	0	0
TOTAL	**154**	**100.0**	**115**	**100.0**	**77**	**100.0**	**38**	**100**

Source: Field Survey, 2015

As shown in Table 4.5, Igu ward has the highest percentage of people who patronized Government facilities, followed by Kawu, then Bwari Central and Usuma. The patronage of government facilities by Igu and Kawu wards could be attributed to their low level of income as private facilities are usually known to have higher service charge.

4.3 DISTRIBUTION AND UTILIZATION OF HEALTHCARE SERVICES

4.3.1 Population Distribution and the location of Health Care Facilities in the study site

The establishment of the seat of Government in Abuja in 1991, has brought about an increase in the population growth in Abuja, been the Federal Capital Territory of Nigeria. According to the population and housing census result of 1991, the population for the FCT was estimated at 378 671 and by 2006, it has grown to a population of 1,405,201 according to the official gazette for the 2006 population and housing census. For effective planning, the Federal capital Teritory was grouped into six administrative regions; the Abuja Municipal Area Council (AMAC), Abaji Area Council, Bwari Area Council, Kuje Area Council, Kwali Area Council, and Gwagwalada Area Council.(The Master Plan for Abuja, 1979). Acccording the 2006 population and housing census, out of these Area Councils, Abuja Municipal Area Council (AMAC) have the highest population with a total of 778,567 followed by Bwari Area Coucil having a total of 227,216 followed by Gwagwalada, Kuje, Kwali and Abaji in order of population figures.

Each of these area councils are futher subdivided into wards. Bwari Area Council which is the study area have Ten wards out of which Four wards were selected, these four wards are; Bwari Central, Usuma, Kawu and Igu wards. According to the 2015 projected population, Bwari Central have the highest population followed by Usuma ward while Kawu and Igu followed respectively. The 2006 National Population Commission for the wards was sourced for and thse were projected to 2015 using the linear projection method. The population figure for the wards chosen for sampling is presented in Table 4.6.

Table 4.6: Estimated population of selected wards and existing Public Health Facilities

Ward	Projected Population	Number of Health Care Facility	General Hospital	Primary Health Centre	Clinic and Maternity
Bwari Central	29,677	5	1	2	2
Usuma	22, 782	2	1	1	_
Kawu	14, 755	5	_	2	3
Igu	9, 251	4	_	2	2

Source: Field Survey, 2015

4.3.2 Existing Public Health Care Facilities in the selected wards

The percentage distribution of existing healthcare facilities in the chosen wards is presented in figure 4.2

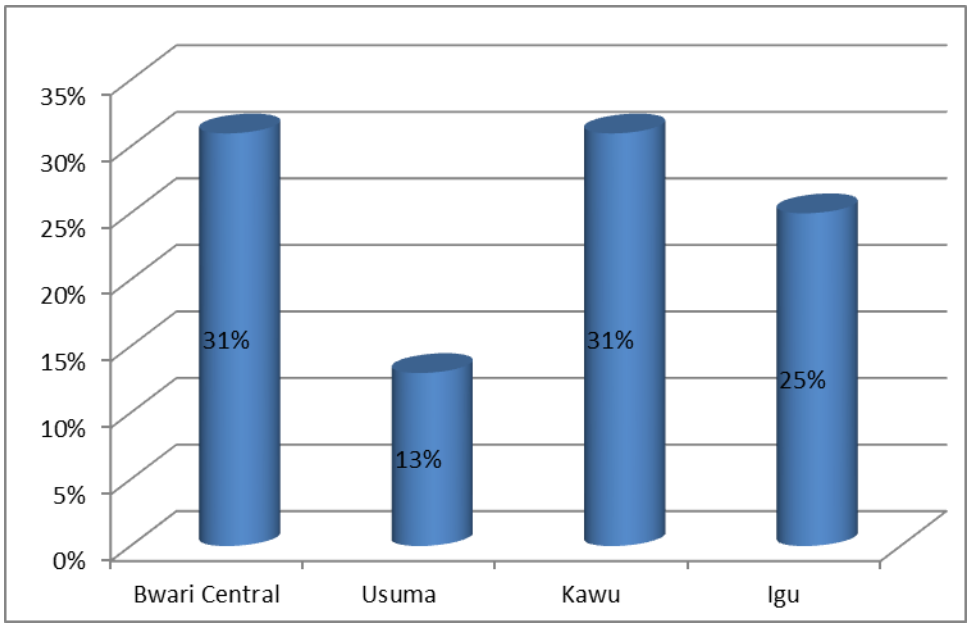


Figure 4.2: Percentage Distribution of existing Public Health Care Facilities in the selected wards
Source: Field Survey, 2015

Findings as shown in Table 4.6 and Figure 4.2 revealed the distribution of health facilities in the study area. Bwari central ward has five public Health Care Facilities out of which only 1 is a secondary category while the remaining four are in primary category. Usuma ward has two

Health Care Facilities one secondary facilty and one primary health care facility. Kawu ward has five wards and Igu ward has four all of which are primary facilities. Based on Health Standard by National Primary Health Care Development Agency (NAPCDHA), it was observed that there is inadequacy in the spatial distribution of the primary health care facilities, the provision of General Hospital, according to this standard is adequate, the Area Council is provided with two general Hospitals. The standards indicate that a ward must have a primary health centre and villages in a ward with population of about 2000 to 5000 people, must be provided with a maternity or health clinic. The spatial distribution of public health care facilities in the selected wards is represented in Figure 4.3.

In these facilities, findings showed that there are a total number of 73 doctors, 162 nurses, 81 midwives, 23 laboratory technologist and a total of 246 bed spaces. Out of the sixteen public health facilities found in the study site, there are about eight facilities which have only one doctor, five facilities are without a doctor, one facility has two doctors, the two secondary hospitals located in Bwari and Kubwa have 21 and 42 doctors respectively.

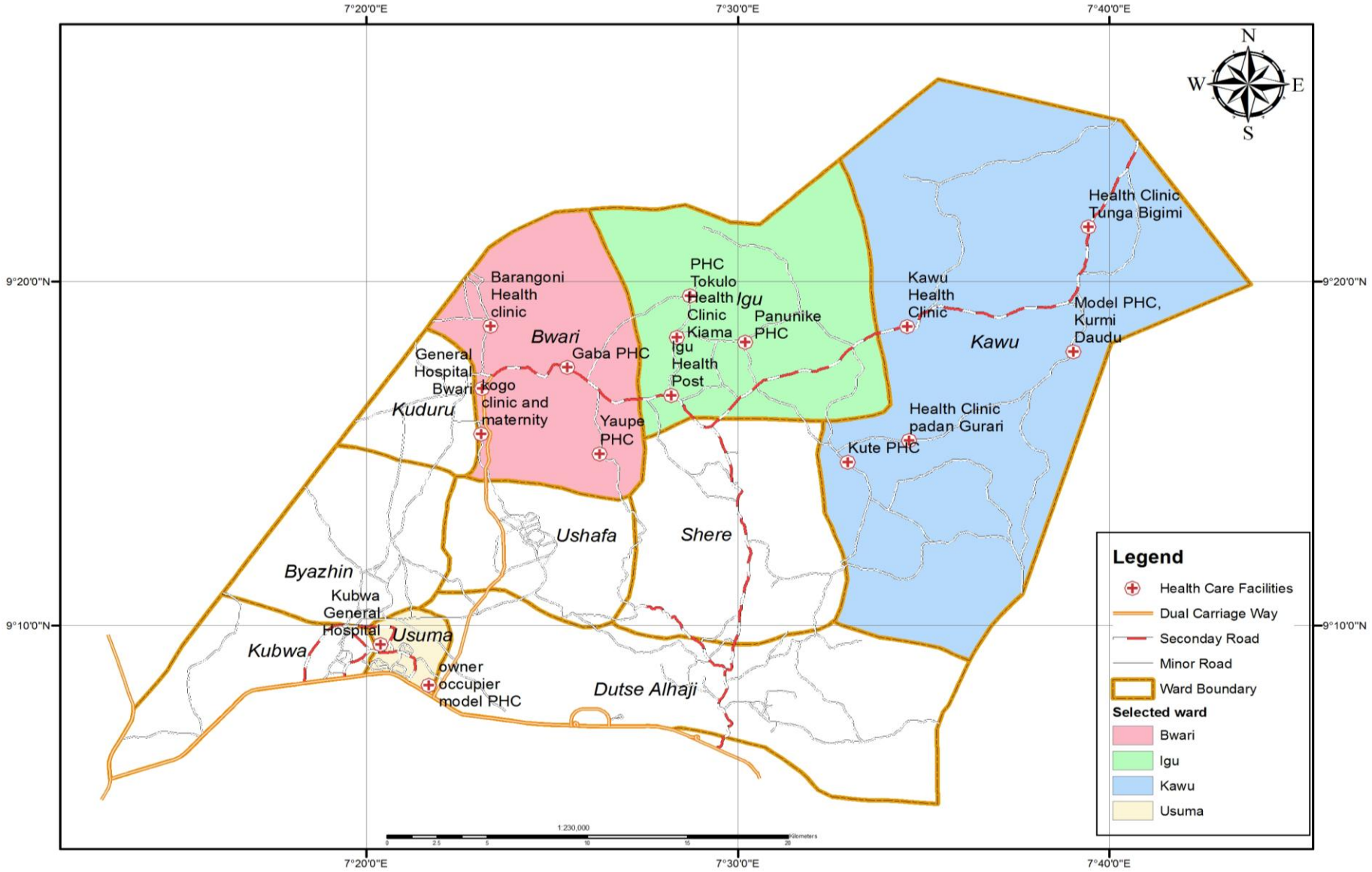


Figure 4.3: Spatial Distribution of Public Healthcare Facilities in the study area
Source: Field Survey, 2015

4.4 UTILIZATION PATTERN OF THE HEALTH CARE FACILITIES

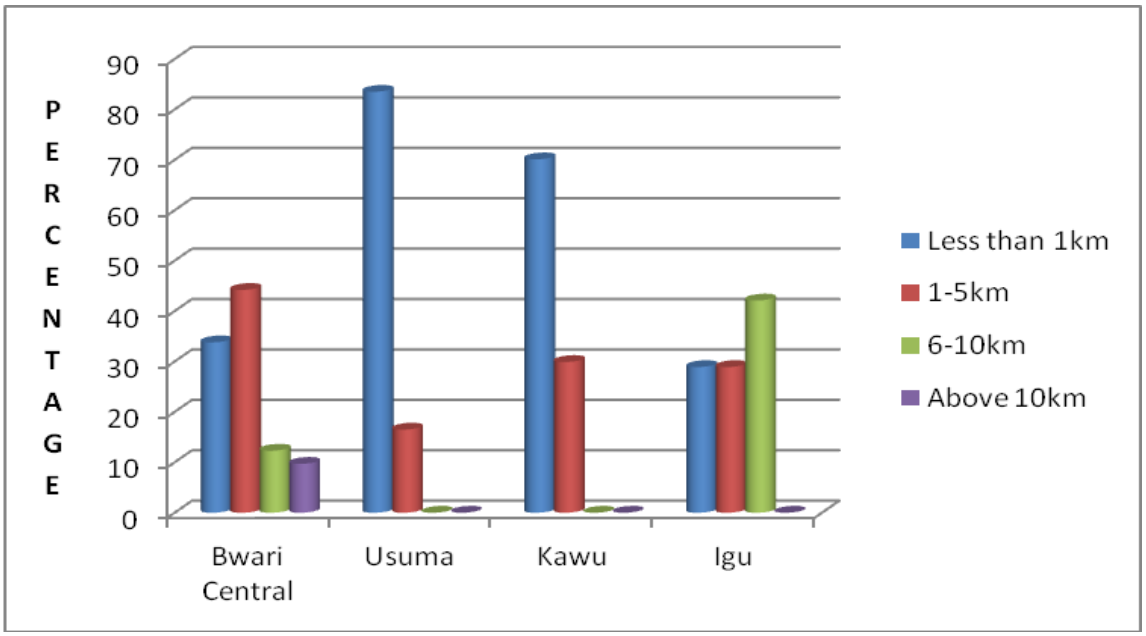
The distribution of Health Care Facilities in the study site which are the four wards, have revealed some localities are not quite accessible to health care facilities. A total of 384 respondents were interviewed through questionnaire survey which covered the selected four wards in the Area Council. The survey sought to know through questionnaire administration, the type of facilities available within the localities, the category, class, the services rendered that is accessible, attitude and capacity of the available health personnel. The findings revealed that there are government owned facilities, private owned and traditional homes which renders health care to people. The study revealed as shown in Table 4.5 a higher patronage of Government facilities in Kawu and Igu wards compared to Bwari Central and Usuma wards which on the other hand recorded higher patronage of private owned health facilities, a few number of respondents were observed to patronize multiple health care facilities.

The utilization of multiple health care facilities by some respondents is not unusual as seen in the study carried out by Ogunlesi (2004) on The Pattern of Utilization of Prenatal and Delivery Services in Ilesa, Nigeria where findings showed that 25.0% of respondents utilized multiple health care facilities for prenatal care. The choice and preference of an individual in a particular HCF is seen in the level of patronage of such health care facilities in different areas. Also, seeking health care in more than one source explains the trend that there exist differences in behavioural pattern of the people. Therefore, they seek medical care according to the ailment being experienced as well as beliefs of causes of such diseases, (Mazzilli and Davis, 2008). The source of income respondents also plays a major role in the type and choice of facility visited, respondents in both Kawu and Igu wards were discovered to be low income earners compared to residents of Bwari Central and Kubwa wards.

In this research, interest was on the available health rendering facilities which are government owned, the research showed that there is no tertiary facility in the study area but primary and secondary facilities, these includes Dispensaries, Clinic and Maternity, Medical Centers and General Hospitals. The primary facilities served as the first point of consultation for all patients within the Nigerian health care system and the secondary facilities provided specialised services to patients who were referred from the primary health care level.

The services available and rendered by secondary facilities in the study area are general consultation, maternity services, gynecology, obstetric services and minor surgeries. In looking at the reasons why some facilities were preferred to another, 65(16.9%) of the respondents based their choice of where to seek care on the availability of equipments and skill, not minding the cost of services as long as their needs can be satisfied, 42(10.9%) based their choice on cost. Forty five (11.7%) based their reason for choice on availability of drugs, putting into consideration health care centres which have pharmacies where the prescribed drugs can be easily obtained or in some cases where it can be freely accessed. This is not unusual as Mazzilli and Davis (2008), in their study of Health Care Seeking Behaviour in Somalia observed that children under five attend MCHs more often than the rest of the population, because the MCHs are supplied with kits of drugs that cater to illnesses of those in the under five category. On the other hand, 87(22%) of the respondents considers distance in their choice of where to seek health care, this could be attributed to cost of transport which may not be affordable by some, Mazzilli and Davis (2008), in their study of Health Care Seeking Behaviour in Somalia revealed that distance constitute one of the most significant obstacle in seeking health care and as such, people are only limited to health facilities available in their localities not putting into consideration what might happen if their needs are not met but may instead succumb to traditional method of health care.

Figure 4.4 Percentage distribution by Travel Distance of Respondents



Source: Field Survey, 2015

The findings revealed as shown in Figure 4.4 that out of the four wards, only Bwari central ward traveled above traveled above 10km in seeking health services, other wards showed a contrary record, nevertheless, number of health seekers decreased as distance increased, this explained that the level of utilization of health care facilities by respondents decreased as distance increased

4..5 CAPACITY OF HEALTHCARE FACILITIES

Capacitiy of the healthcare facilities in the study area is another major factor that determines their utilisation. The type of service rendered, personnel strength, number of beds and other facilities can determine the suitability of each HCF for different medical cases. This section describes the capacity of the HCFs in the sampling area.

4.5.1 Distribution of Health Care Facility by Category

The category of the health facility available gives an understanding on whether a facility is a primary facility, secondary facility or tertiary facility. There are basically three categories of

health care facilities, these are primary, secondary and tertiary facilities. Two categories of health care facility existed in the study area; these are the primary and the secondary Health Care Facilities. The primary facilities were found to be predominant in the study area. There are only two (2) secondary Health Care Facilities in the study area. These are the General Hospital in Kubwa and the General Hospital in Bwari. This level of health care provides specialised services to patients who are referred from the primary health care level (Abubakar and Ibrahim, 2013). The category of Health Care Facilities in the study area is shown in Figure 4.5.

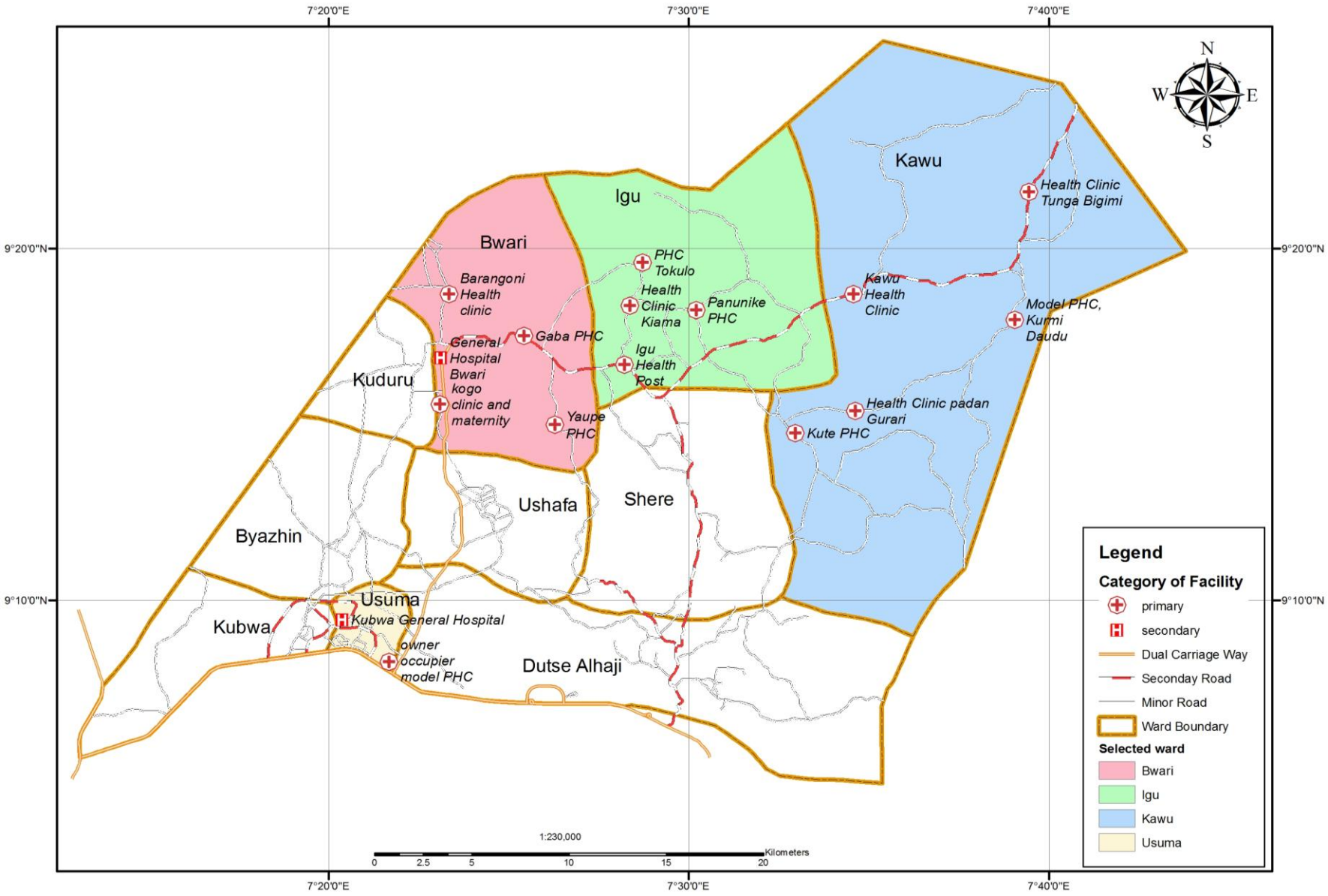


Fig 4.5: The Category of available health care facilities in the selected wards.
Source: Field Survey, 2015

4.5.2 Number of Available health personnels in the HCFs

The number of available health personnels in a HCF is one of the factors of determining the capacity of HCF to deliver medical servicies. The capacity of Doctors, Nurses, Midwives and Laboratory Technologist in the available public healthcare facilities were investigated in this research. The results of number of doctors obtained from available health care facilities in the study area is presented in the Figure 4.6.

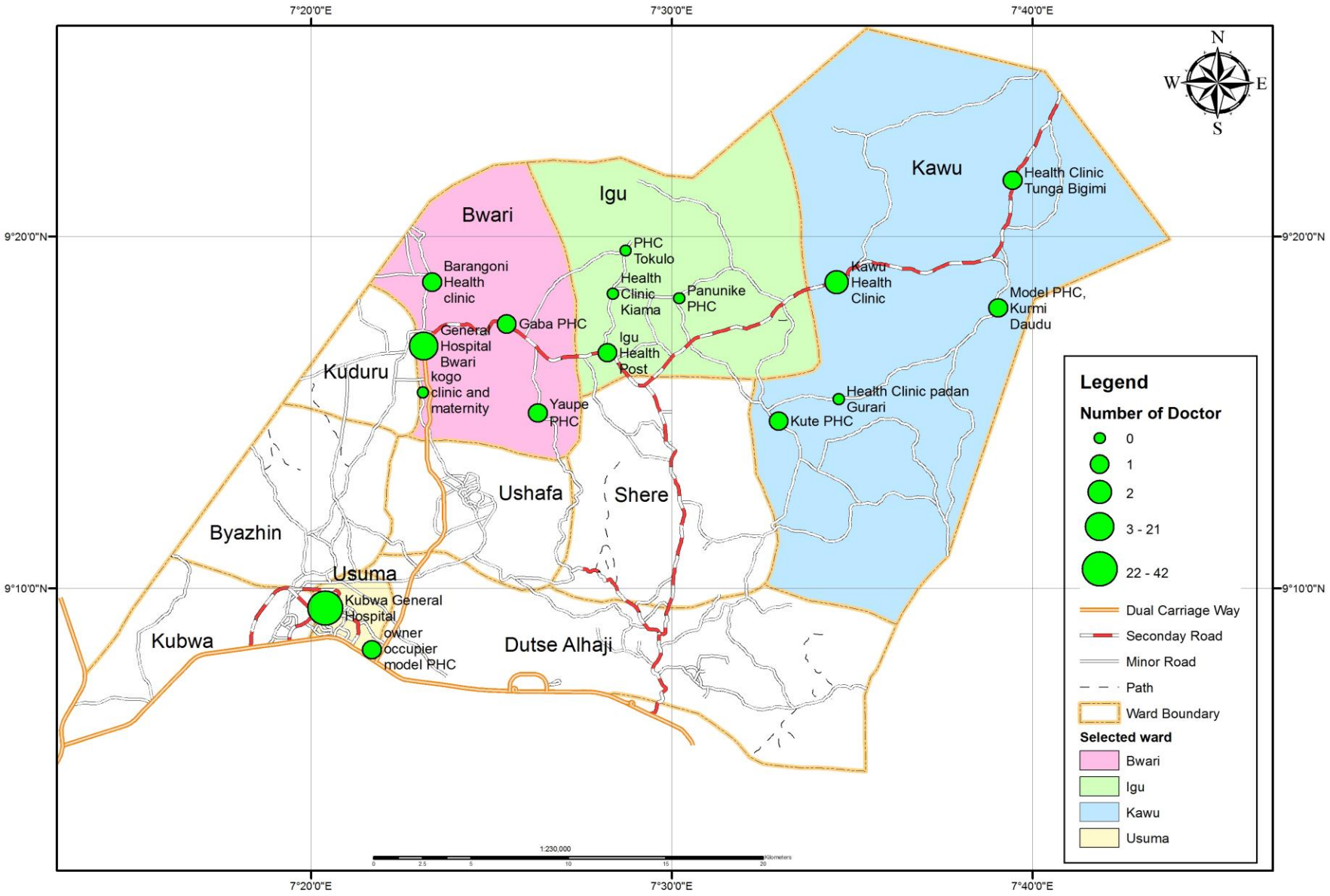


Figure 4.6: Number of available Doctors in the study area
Source: Field Survey, 2015

Figure 4.6 showed the graphical representation of the number of doctors available in the health care facilities found in the area. From Figure 4.6, it could be seen that some of the facilities did not have doctors to attend to people, these are; Health Clinic Kiama, Primary Health Center Panunuke, Health Clinic Padan Gwari, Primary Health Centre Tokulo, kogo Clinic and Maternity while Model Primary Health Centre Kurmi Daudu, Primary Health Centre Yanpe, Igu Health Post, Barangoni Health Clinic, Primary Health Centre Kute, Health Clinic Tunga Bijimi, Primary Health Centre Gaba and Owner Occupier PHC, have one medical doctor each to attend to patients. Kawu Health Clinic have two doctors, Bwari General Hospital have thirteen doctors while General Hospital Kubwa have seventeen doctors.Apart from General Hospital Bwari and Kubwa which had more than 10 doctors and can provide higher level of health services such as surgeries, there is no other facility within the the selected wards that can attend to people on such matter.

4.5.2.1 Number of Nurses in the Health Care Facilities in the Study Area

The capacity of nurses in the available public Health Care Facilities in the selected wards is shown in figure 4.7

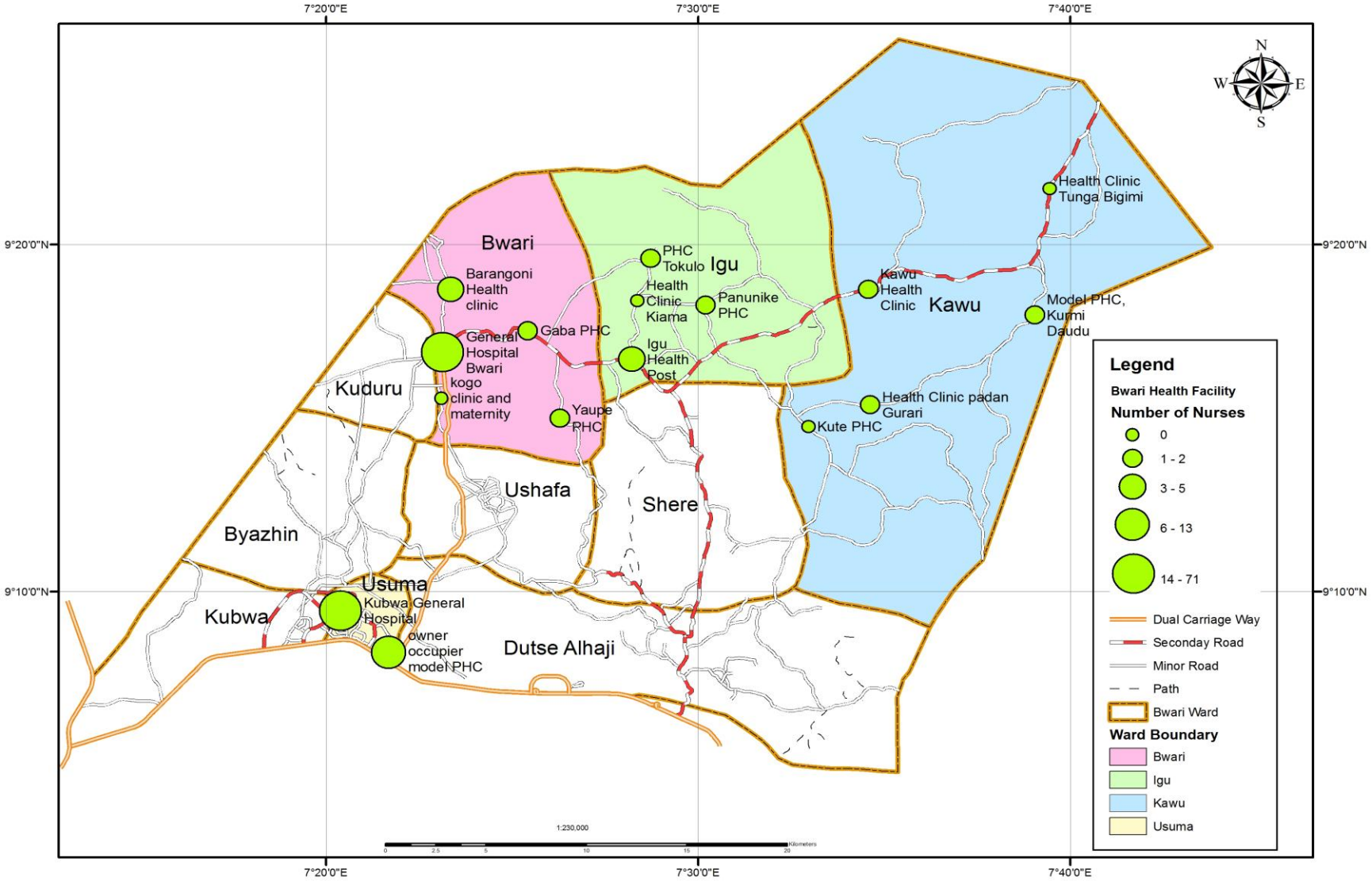


Figure 4.7: Number of available Nurses in the Health Care Facilities in the study area
Source: Field Survey, 2015

Figure 4.7 revealed that four of the facilities does not have nurses at all, these are Kogo Clinic and Maternity, Health Clinic Tunga Bijimi, Primary Health Centre Kute and Health Clinic Kiama. These except Health clinic Tunga Bijimi are clinic and maternity while Health clinic Tunga Bijimi is a dispensary but all are primary health facilities. Facilities like Model PHC, Kurmi Daudu and Primary Health Centre Yanpe which are medical centres have two Nurses each while Primary Health Clinic Tokulo, Primary Health Clinic Gaba, Primary Health Clinic Panunuke and Health Clinic Padan Gwari, have one nurse each. Barangoni Health Clinic and Igu Health Post have three and five Nurses respectively. Owner Occupier Model PHC have thirteen Nurses while General Hospital Bwari and General Hospital Kubwa, have a total number of 50 and 51 Nurses respectively.

4.4.2.2 Number of Midwives in the Health Care Facilities in the Study Area

The number of midwives in the Public Health Care Facilities of the selected wards in the Area Council is presented in Figure 4.8

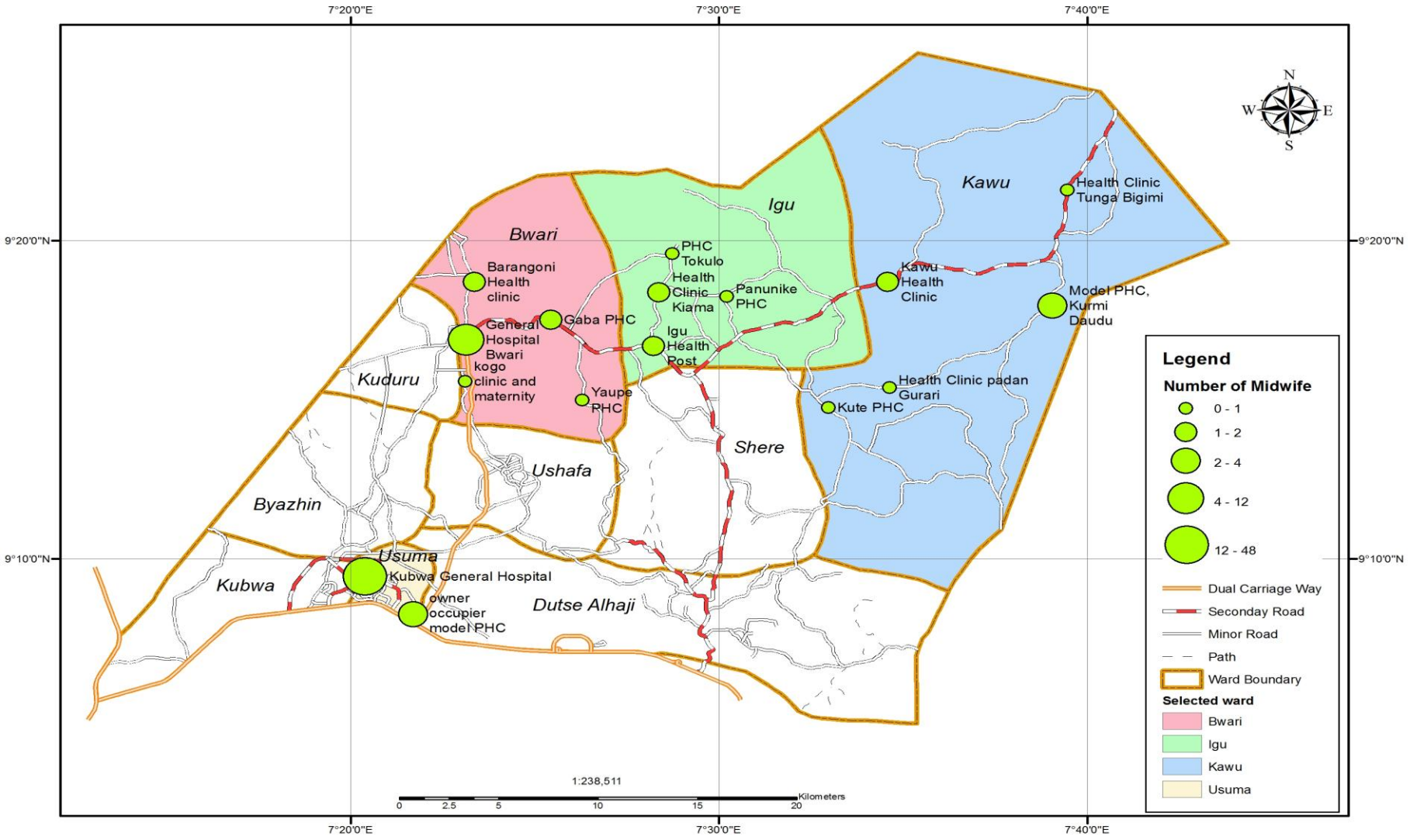


Figure 4.8: Number of available Midwives in the study area
Source: Field Survey, 2015

Midwives are those helps in the delivery of maternal healthcare service, thus their importance in an HCF cannot be undermined. Figure 4.8 showed the number of Midwives available at the various HCFs in the study area. It also showed that only Kubwa General Hospital have more than 12 Midwives and Bwari General Hospital have exactly 12 Midwives while the rest have below 12 Midwives.

4.5.3 Number of available Beds in HCFs

From the data collected, it was discovered that most of the HCFs have lesser number of bedspaces. The number of bedspace available in each health facility in the study site is shown in Figure 4.8.

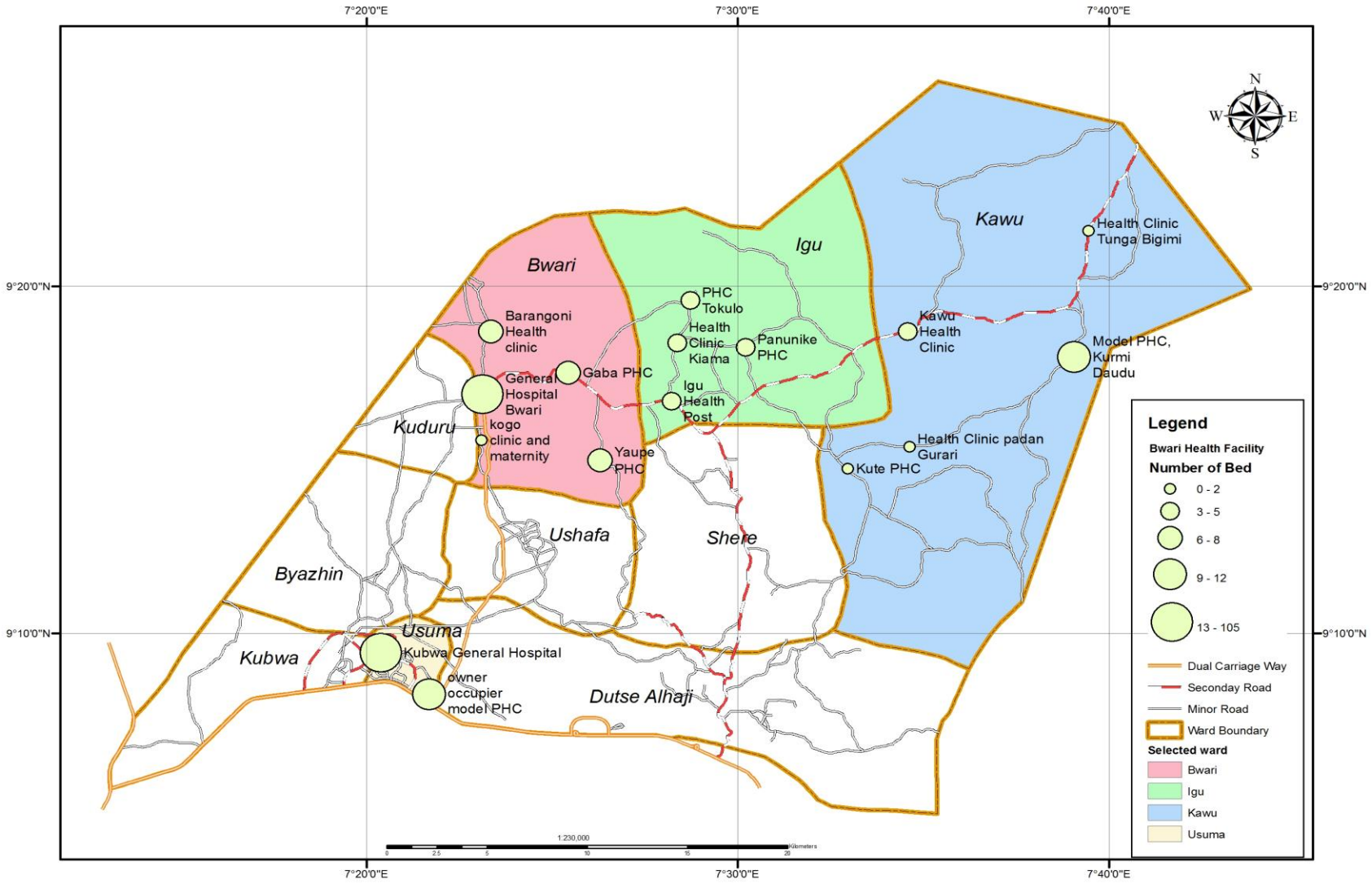


Figure 4.9: Number of available Bedspace in the Public Healthcare Facilities in the study area
Source: Field Survey, 2015

4.6 IMPROVING ON THE HEALTH CARE FACILITIES

This section explains the views and opinions of the residents on ways to improving the healthcare service delivery in the study area. Table 4.7 shows the view and opinion of repondents from the four wards.

Table 4.7: Suggested ways of improving the available Health Facilities

Ways of improving Health Care Facilities	**Frequency**	**Percentage**
More hospitals should be built	76	19.7
Employ more personnel	53	13.8
Personnel should improve on good attitude	45	11.7
Provide more amenities and equipment	65	16.9
Payment of bills and drugs should be affordable	61	15.8
More public enlightenment about HCFs	15	3.9
HCFs should be opened by weekends	8	2.0
On job training should be encouraged	8	2.0
HCFs should be well funded	15	3.9
Improved welfare of personnel	19	4.9
Enforce law to monitor HCFs	4	1.0
No idea	15	3.9
Total	**384**	**100.0**

Source: Filed Survey, 2015

The opinion that that more facilities should be built ranked the highest, which is an indication that there is inadequacy in the distribution of health facilities in the study area, a higher percentage also suggested that more needed equipment should be provided. Provision of more facilities, good equipment for services and cost was discovered to dominate opinions and views of respondents on how to improve health services in the study area.

4.7 HYPOTHESIS TESTING

The hypothesis postulated for this study was tested using correlation coefficient. The distance covered by individual to their preferred Health Care Facilities and reason for their choice of Health Care Facility, were correlated to determine whether there is a relationship between the utilization of the Health Care Facilities and distance to them as postulated in the hypothesis. The income of respondent and reason for their choice of Health Care Facilty, were also correlated to determine whether there is a relationship between the level of Utilization of Health Facilities and their income.

HO: There is no significant relationship between the utilization of HCF and distance to the HCF as well as income of respondents at each ward.

With the aid of SPSS 20.0, Spearman's rho and Kendall's tau-b, statistics were used to measure the rank-order association relationship between the three ordinal variables (Choice of Health Care utilized, Distribution of Income and Distance Travelled by respondents to access Health Care Facilities) in four different wards of the Area Council, which are Bwari central, Usuma, Kawu and Igu. This method of Non-parametrical test was used because it works regardless of the distributions of the variables.

Non-parametric Correlations for Bwari ward

			Distribution of Respondents by Choice of Healthcare Facilities	Distribution of Travel Distance of Respondent	Distribution of Income by Respondent
Spearman's rho	Distribution of Respondents by Choice of Healthcare Facilities	Correlation Coefficient	1.000	.867**	-.048
		Sig. (2-tailed)	.	.000	.554
		N	154	154	154
	Distribution of Travel Distance of Respondent	Correlation Coefficient	0.867**	1.000	-.072
		Sig. (2-tailed)	.000	.	.376
		N	154	154	154
	Distribution of Income by Respondent	Correlation Coefficient	-.048	-.072	1.000
		Sig. (2-tailed)	.554	.376	.
		N	154	154	154

**. Correlation is significant at the 0.01 level (2-tailed).

According to the result shown above in Bwari ward, Correlation value 0.867 reported between the variables “Distribution of Respondents by Choice of Healthcare Facilities and Distribution of Travel Distance of Respondent” is positive and significantly different from 0 because the p-value <0.0001 is less than 0.01 level of significant. On the other side, the Non-parametric test showed that though the relationship is negative, there is no any significant correlation between neither ‘‘Distribution of Travel Distance by Respondent and Distribution of Income by Respondent” nor “Distribution of Travel Distance of Respondent and Distribution of Income by Respondent” This mean that there is significant relationship between utilization of HCF and distance to the HCF. Therefore based Bwari ward, the null hypothesis is rejected and the alternative hypothesis is accepted.

Non-parametric Correlations for Usuma ward

			Distribution of Respondents by Choice of Healthcare Facilities	Distribution of Travel Distance of Respondent	Distribution of Income by Respondent
Spearman's rho	Distribution of Respondents by Choice of Healthcare Facilities	Correlation Coefficient	1.000	.222*	.011
		Sig. (2-tailed)	.	.017	.907
		N	115	115	115
	Distribution of Travel Distance of Respondent	Correlation Coefficient	.222*	1.000	.464**
		Sig. (2-tailed)	.017	.	.000
		N	115	115	115
	Distribution of Income by Respondent	Correlation Coefficient	.011	.464**	1.000
		Sig. (2-tailed)	.907	.000	.
		N	115	115	115

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed).

In Usuma ward the result of the Non-parametric test matrix indicated that at 0.01 level (2-tailed), there is a significant relationship between "Distribution of Travel Distance of Respondent and Distribution of Income by Respondent" with a positive correlation value of 0.464. also, at 0.05 level (2-tailed) the analysis established the fact there was a relationship between the variable "Distribution of Respondents by Choice of Healthcare Facilities and Distribution of Travel Distance of Respondent" with a correlation value 0.222. Similar to the case of bwari ward, there is no any significant correlation between" Distribution of Respondents by Choice of Healthcare Facilities and Distribution of Income by Respondent" but the correlation value is positive.

Non-parametric Correlations for Kawu ward					
			Distribution of Respondents by Choice of Healthcare Facilities	Distribution of Travel Distance of Respondent	Distribution of Income by Respondent
Spearman's rho	Distribution of Respondents by Choice of Healthcare Facilities	Correlation Coefficient	1.000	-.025	.421**
		Sig. (2-tailed)	.	.830	.000
		N	77	77	77
	Distribution of Travel Distance of Respondent	Correlation Coefficient	-.025	1.000	-.024
		Sig. (2-tailed)	.830	.	.833
		N	77	77	77
	Distribution of Income by Respondent	Correlation Coefficient	.421**	-.024	1.000
		Sig. (2-tailed)	.000	.833	.
		N	77	77	77
**. Correlation is significant at the 0.01 level (2-tailed).					

Observation from Kawu ward indicated a significant relationship between "Distribution of Respondents by Choice of Healthcare Facilities and Distribution of Income by Respondent" with a positive correlation value 0.421. This is quiet different from the observation in Bwari ward and Usuma where the relationship was by chance.

Nonparametric Correlations for Igu location

			Distribution of Respondents by Choice of Healthcare Facilities	Distribution of Travel Distance of Respondent	Distribution of Income by Respondent
Spearman's rho	Distribution of Respondents by Choice of Healthcare Facilities	Correlation Coefficient	.	.	.
		Sig. (2-tailed)	.	.	.
		N	38	38	38
	Distribution of Travel Distance of Respondent	Correlation Coefficient	.	1.000	.863**
		Sig. (2-tailed)	.	.	.000
		N	38	38	38
	Distribution of Income by Respondent	Correlation Coefficient	.	.863**	1.000
		Sig. (2-tailed)	.	.000	.
		N	38	38	38

**. Correlation is significant at the 0.01 level (2-tailed).

Observation from this group of respondent in Igu ward showed that sampled respondent only have one Choice of Healthcare Facilities they access. This may be due to effect of no other alternative choice of Healthcare Facilities.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter concludes the research work. It gives highlights of findings, and explains the recommendations.

5.2 SUMMARY OF FINDINGS

Findings from this research showed that there are only two categories of health care facilities which are primary and secondary in the study area. In the area, only two are secondary facilities, these are General Hospitals in Kubwa and Bwari which handles referral cases from other Primary Healthcare Facilities. Others that are primary in categories seem to not be put into much service as there exist inadequacy in both facilities and personnel (Doctors, Nurses, Midwives, Laboratory Technologist). In the facilities, it was discovered that only Kubwa General Hospital And Bwari General Hospital have 42 and 21 Doctors respectively while other HCFs have 1 each with the exception of Kogo Clinic, Pannuke PHC, PHC Padan Gurari, PHC Tokulo and PHC Kaima which have no Doctor.

The same trend was observed in the distribution of Nurses as well as Midwives, Kubwa and Bwari General Hospitals have 71 and 60 Nurses respectively, Owner Occupier PHC have 13 Nurses while Igu PHC have 5 with the rest having below 5 Nurses. The same applied to number of Midwives, Kubwa and Bwari General Hospitals have 48 and 12 Midwives respectively while others have less than 5 each. Laboratory services were available in only 3 Health Care Facilities in the study area, these are Kubwa General Hospital, Bwari General Hospital and Owner Occupier PHC where there are 15, 7 and 1 Laboratory Technologists respectively. The available number of Bed spaces in the Health Care Facilities are in the same order with other variables. Kubwa General Hospital have 105 bed spaces while Bwari General Hospital have 71 bed spaces followed by PHC Kurmi Daudu with

12 bed spaces, Owner Occupier PHC with 11 bed spaces and others having below 10 Bed spaces. It was also discovered that out of the HCFs in the study area, Kogo Clinic and Maternity was not functional as at the time of data collection.

Different pattern of utilization of Public Facilities in the study area was discovered. In Bwari Central ward 46.8% of the respondents patronized Government Health Facilities while 26.6% patronized Private owned Hospitals, respondents in Usuma ward patronized both Government and Private owned Facilities, 20% of respondents patronized Government health Facilities while 80% utilized Private Facilities, 94.8% of repondents in Kawu ward patronized Government Facilities and 5.2% utilized Government, Private and Traditional Health services, it was discovered that no respondents in Igu ward patronized other Health service facility apart from Government Owned facilities. The choice of health users in terms of who provided health services for them differs from one person to the other in all the wards and what influence their choice was found to also differ. Those in the less developed localities of the Area Council (Kawu and Igu) were found to engage more in farming activities and also have low income and they utilised public owned health facilities more compared to those in the developed localities such as Bwari Central and Usuma. The income of the residents of the developed localities were found to be higher than those in the less developed localities, a higher percentage of these respondents were found to be engaged in white collar jobs and engaged in less farming activities.

5.3 CONCLUSIONS

In view of this study, which has provided an insight to spatial distribution and utilization of Health Care Facilities in Bwari Area Council, Abuja, the following conclusions were arrived at; Government hospitals were more patronized than private hospitals in Bwari Central, Kawu and Igu wards. In Bwari central ward, 46.8% of the respondents patronized government owned facilities while 26.6% of respondents patronized private owned facilities, Usuma ward recorded the lowest patronage of government owned facilities and the highest for private owned facilities, the percentage is put at 20% and 80% respectively, 94.8% of respondents in Kawu ward patronized government owned facilities while 4% utilised the services of public, private and traditional health service providers. It was discovered that 100% of the respondents in Igu ward patronized public health facilities with no recorded preference for other health service providers. It was also discovered that there exist inadequacy and uneveness in the spatial distribution of health care facilities in the study area. Consequently, it was revealed that there was no adequacy in the number of personnel available in these facilities and not all facilities were put into use as one of them (Kogo Clinic and maternity) was found shut down at the time of visit.

Hypothesis testing for this research shows that there is strong positive relationship between choice of HCF and distance while there is negative relationship between choice of HCF and income in Bwari ward. The situation is different at Usuma ward where there is weak positive relationship between choice and distance and weak positive relationship between choice and income. The relationship at Kawu ward is negative between choice and distance while that of choice and income is positive. There is a parallel relationship at Igu as their choice is based on the only available functional HCF.

5:4 RECOMMENDATIONS

The main objective of this study is to shed light on the spatial distribution and utilization of Health Care Facilities in Bwari Area Council. Having carried out this research, the following recommendations have been outlined which may be useful in assisting the ministry of health and the government body at large in planning the further distribution of facilities and improving the efficiency of the already existing ones.

i. Efforts should be intensified to build more health facilities to cover all wards in Bwari Area Council.

ii. More health workers should be employed to work in the facilities so as to give the people the best and also to save lives most especially in the primary facilities.

iii. The government should try to work on subsidising the cost of services and drugs so that the masses can enjoy provided facilities and accessing the hospitals won't be for the rich alone.

5.5 SUGGESTION FOR FURTHER RESEARCH

Further research on this topic is suggested so as to cover all the wards in the area council. It is also suggested that the study should not be limited to public health care facility but other health service providers should be looked at. This will help to further determine the capacity and utilization of available health facilities.

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Appendix 1

QUESTIONNAIRE

DEPARTMENT OF GEOGRAPHY, FACULTY OF SCIENCE

AHMADU BELLO UNIVERSITY, ZARIA.

The researcher is an M.Sc. student, conducting a research on the Spatial Distribution of Public Healthcare Facilities in Bwari Area Council as part of the requirement for the award of M.Sc. degree in GIS and Remote Sensing in Ahmadu Bello University, Zaria.

Any information given by you will be used purely for academic purpose and be treated with utmost confidentiality.

TYPE 1 (HOUSEHOLD QUESTIONNAIRES)

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

1. Name of the ward ----------
2. Sex of respondent; Male [ ] Female [ ]
3. Age; less than 15[ ], 16-20[ ], 21-25[ ], 26-30[ ], 31-35[ ], 36-40 [ ], 41-45[ ], 46-50[ ], 51-55[ ], 56-60[ ], 61-65[ ]
4. Marital Status; single [ ], married[ ], divorced [ ], separated[ ], widow [ ]
5. Number of children ----------
6. Educational Background; no formal education [ ], primary education [ ], secondary education[ ], tertiary education [ ], Quaranic education[ ], others specify [ ]
7. Name of occupation ----------
8. Respondents monthly income; Less than 10,000 [ ], 10,000- 20,000[ ], 21,000-30,000[ ], 31,000- 41,000[ ], 41,000 and above[ ]

SECTION B: HEALTH CARE FACILITIES AVAILABLE

9. What type of health care facility do your have in your neighbourhood; (a) Goverment Hospital (b) Private hospital (c) Traditional hospital (d) Chemists
10. Which health care personnel attends to you when you visit the facility (a) Doctors (b) Nurses (c) public health officer

11. What type of services are available; (a) surgery (b) general consultation (c) maternity services (d) gynacological services (e) all of the above (f) others specify ----------

SECTION C: UTILISATION OF HEALTH CARE FACILITIES

12. What type of hospital do you visit? (a) Government hospital (b) Private hospital (c) Traditional home (d) all of the above (e) None of the above
13. What is the reason for your choice? (a) availability of equipment (b) Cost effectiveness (c) availability of drugs (d) suitability of location
14. Distance travelled to your preferred HCF (a) less dan 1km (b) 1-5km (c) 6-10km (d) above 10km
15. How long does it take to see a health personnel? (a) almost immediately (b) 30mins- 1hr (c) above 1hour
16. Attitude of personnel (a) like, if Yes, given reasons ----------
    If No, given reasons ----------
    (courteous, understanding, keep to time, friendly, know their job, harsh, not always available, dont treat well).
17. Are there enough personnels to attend to gender differences? (a) yes (b) no
18. Cost of treatment (a) Very Expensive (b) Moderately ok (c) Not expensive
19. Satisfied or not? (a) satisfied (b) not satisfied.
20. In your own opinion, in what way do you think health care can be improved? ----------
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TYPE 2: QUESTIONNAIRE FOR HEALTH CARE FACILITIES.

DEPARTMENT OF GEOGRAPHY, FACULTY OF SCIENCE

AHMADU BELLO UNIVERSITY, ZARIA.

The researcher is an M.Sc. student, conducting a research on the spatial distribution of health care facilities in Bwari Area council as part of the requirement for the award of M.Sc. degree in GIS and Remote Sensing in Ahmadu Bello University, Zaria.

Any information given by you will be used strictly for academic purpose and be treated with utmost confidentiality.

Facility Attribute

Name of facility ----------

Location of facility ----------

Category ; (a) Hospital (b) Clinic and maternity home (c) Dispensary (d) Medical centre

Ownership; (a) Public (b) Private

Class of the the facility (a) Primary (b) Secondary (c) Tertiary

Facility Capacity

1. Number of Medical doctors ----------
2. Number of Nurses ----------
3. Number of Midwives
4. Number of Laboratory Technologist----------
5. Number of Bed available ----------

For Reaearcher's use only

Geo-location of the facility: (i) X coordinate ----------

(ii) Y coordinate ----------

Appendix 2

Database of HCFs in selected wards of Bwari Area Council

	Name Of HCF	Ward	Class of Facility	Category	Latitude	Longitude	NO of Doctors	NO of Nurses	NO of Midwife	NO of Laboratory Technologist	NO of Bed space available
BWARI AREA COUNCIL	Kogo clinic and maternity	Bwari	clinic and maternity	Primary	9.259527778	7.384944444	NA	NA	NA	NA	NA
	Barangoni Health clinic	Bwari	clinic and maternity	Primary	9.311722222	7.389083333	1	3	2	NA	8
	Yanpe PHC	Bwari	Medical centre	Primary	9.249777778	7.438055556	1	2	NA	NA	6
	Pannuke PHC	Igu	Dispensary	Primary	9.30407500	7.503416667	NA	1	1	NA	5
	Kute PHC	Kawu	clinic and maternity	Primary	9.245833333	7.549416667	1		1	NA	2
	Health Clinic Padan Gurari	Kawu	Dispensary	Primary	9.256388889	7.577055556	NA	1	NA	NA	1
	Model PHC, Kurmi Daudu	Kawu	Medical centre	Primary	9.299361111	7.650833333	1	2	4	NA	12
	PHC Clinic Tokulo	Igu	clinic and maternity	Primary	9.326555556	7.478694444	NA	1	1	NA	4
	Health Clinic Tunga Bigimi	Kawu	Dispensary	Primary	9.359916667	7.657472222	1	NA	1	NA	2
	Health Clinic Kiama	Igu	clinic and maternity	Primary	9.306222222	7.472694444	NA	NA	2	NA	3
	Igu Health Post	Igu	clinic and maternity	Primary	9.278194444	7.470194444	1	5	2	NA	4
	Gaba PHC	Bwari	clinic and maternity	Primary	9.291916667	7.423722222	1	1	2	NA	7
	Kawu Health Clinic	Kawu	clinic and maternity	Primary	9.311666667	7.57625	2	2	2	NA	5
	General Hospital Bwari	Bwari	Hospital	Secondary	9.281472222	7.385388889	21	60	12	7	71
	owner occupier model PHC	Usuma	clinic and maternity	Primary	9.137555556	7.361388889	1	13	3	1	11
	Kubwa General Hospital	Usuma	Hospital	Secondary	9.157444444	7.339722222	42	71	48	15	105

Source: Field Survey, 2015