Geospatial Analysis of the Distribution, Challenges and Improvements on Healthcare Facilities in Keffi LGA, Nasarawa State, Nigeria

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Abstract
Growing populations, an aging workforce, and the rise of chronic diseases are driving up the demand for healthcare services. Health has been equated with wealth because a healthy man is regarded as a wealthy man due to lack of infirmities. Access to primary healthcare facilities (PHFs) in Keffi Local Government Area (LGA) in Nasarawa State, just like in other parts of Nigeria, has become a big challenge. An attempt to address the challenges in the distribution of Healthcare facilities (HCFs) in Keffi requires the use of Geospatial technology (Geographic Information Systems - GIS) hence, this study. The aim of this research is to analyze the spatial distribution, challenges and strategies to improve HCFs utilization in Keffi LGA. Using Global Positioning System (GPS) handheld receiver to Geo-tag the identified HCFs in Keffi LGA across the 10 wards. HCFs records (name, latitude, longitude, attribute information) were stored in a database created using ArcCatalog (ArcGIS) while ArcMap GIS Modeling software was used to map the spatial distribution. Strategies to improve on healthcare delivery were obtained from 200 copies of questionnaires randomly distributed using purposive sampling technique to adult population made up of Healthcare workers and patients patronizing the various HCFs in keffi LGA. The study shows that out of the 22 identified PHCs, 17 are government owned, while the remainder 5 are privately owned; with high concentrations of the HCFs in urban Keffi. Out of the 200 respondents sampled, the males respondents were 102 (51%) and females make up the remaining 98 (49%). The study confirms that Healthcare delivery faces numerous challenges, including workforce shortages, increasing demand, inadequate infrastructure, financial constraints, and the need to address health equity issues. These challenges are further complicated by issues like patient safety, cyber-security, and the rapid evolution of healthcare technologies. The major strategies to improve healthcare utilization in Keffi LGA include employing well trained workers especially medical doctors and professional nurses while more drugs as well as hospital equipment and infrastructure should be made available to the people. In addition, the various HCFs should endeavour to always keep the environment clean through regular sanitation, repair faulty fans and Air conditioners (ACs). It is hoped that with the above strategies, accessibility to, and utilization of, healthcare facilities in the study area will be improved.

Keywords: *GIS Analysis, Health Promotion, Environment, Primary Healthcare Facilities*

1. Introduction

Growing populations, an aging workforce, and the rise of chronic diseases are driving up the demand for healthcare services (Bircher, 2005). Health has been defined as the absence of

disease or infirmity, and a state of complete physical, psychological and social wellbeing (WHO, 2002; 2025; Medicalnewstoday, 2025). The maintenance of good health is a critical component of societal needs; hence, the need for equitable distribution of health facilities as a factor for sustaining the population in a given geographic region (Jimoh & Azubike, 2012). Geographical barriers, lack of transportation, and financial constraints can limit access to care, especially for vulnerable populations. The adequate provision of health care services to ensure their utilization has become a big challenge in many developing nations such as Nigeria. However, despite the *"health for all"* declaration by World Health Organization, health care services continue to be either substandard or low in access, expensive or under-utilized. The available healthcare services in Nigeria are unevenly distributed while many peripheral primary healthcare (PHC) facilities are under used (Jimoh & Azubike, 2012). According to Ajala, Sanni & Adeyinka (2005), lack of basic HCFs in any community or region will lead to inefficiency in production, declining productivity, reduced life expectancy and increases infant mortality rate; hence, the need to have a healthcare system to manage healthcare delivery. Conceptually, a Healthcare 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).

One of the main targets for spatial healthcare facility planning is to achieve equitable geographic distribution (Rilwani & Bello, 2015). However, public policy on healthcare provision in Nigeria over the years addresses the distribution and spatial equity question mainly at the regional level while neglecting the distribution of such facilities within a given Local Government Area (LGA) (Inyang, 1994) like Keffi. As such, healthcare provision are haphazardly distributed due to lack of tangible and reliable planning information and knowledge of Geographic Information System which could help plan in resource allocation and decision making processes (Sufiyan, Mohammed, Bello & Zaharaddeen, 2020). In the utilization of these healthcare services, there are various parameters which tend to have influence on its patronage. Literature shows that distance is the most important factor that influences the utilization of health services in most developing countries where transport facilities are inadequate (Buor, 2003). Keffi Local Government Area (LGA) of Nasarawa State, Nigeria is still regarded as a semi-urban geographic space in terms of the level of developmental initiatives and availability of infrastructure. In addition, travel time and distances to health Centers, according to Onah, Ikeako & Iloabachie (2009), constitute barriers to repeated visits while other factors like services provided and personal reasons affects the utilization of HCFs mostly in rural areas. Law and Morris (1998) substantiated this assertion and then opined that mortality is equally higher in poorer and in more Northern areas of England and Wales due to travel time and distances involved in accessing healthcare services. This is very similar to what obtains in sub-Saharan Africa Nigeria where Keffi LGA is located (Sufiyan, Mohammed, Bello & Zaharaddeen, 2020)

A quick analysis of some previous studies is presented below as part of the problem statements and research gap in meeting the demand for proper healthcare facility distribution. For instance, Ajala, Sanni and Adeyinka (2005) implemented a study of healthcare facility distribution as a Panacea for Sustainable Rural Development in Osun State, Nigeria. The study shows that the available HCFs are grossly inadequate and that the distribution of the available facilities depicts serious inequality. In the study, though the spatial distribution of the facilities was part of a major concern, there was no diagrammatical presentation of their outcome in form of map, which could have made understanding easy thereby confirming the adage: "*seeing is believing*". Also, Geographic Information System (GIS) tool was not used which would have

helped to display the pattern of distribution, from which the distance from one facility to the other can be determined.

Similarly, Aigbe (2011) examined the utilization of maternal health services in Lagos State and came up with the fact that there are spatial differences in the use of maternal health services and then 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 patronage. Though utilization of the health services was the center of the work, it was, however, restricted to maternal health services which imply that it is gender biased. Ejiagha, Ojiako & Eze (2012) studied the accessibility to Healthcare Delivery System (HDS) within Enugu Urban Area using Geographic Information System. As comprehensive as this study may look, it only concentrated on the spatial distribution, neglecting the utilization of these services which is also of high importance. Fewer studies have been carried out in rural areas where majority of Nigerians live and health workers shy away from residing due to lack of infrastructure and accommodation, a situation where the further away you move from hinterland or from LGA headquarters, the lesser the healthcare facilities, the medications, the quality of service, the people who are even willing to travel long distances for health service (Ajala, Sanni & Adeyinka, 2005). Gaps have been identified in similar studies as examined above.

Primary Health Care (PHC) is acknowledged as the most focus for delivering effective, efficient, quality, accessible and affordable health services to a wider proportion of the population (World Bank Group, 2007). PHC is the foundation of healthcare system. For most Nigerians, PHC is the first point of contact with the health care system. It is the level at which short-term, uncomplicated health issues should be resolved. The maintenance of good health and easy access to adequate healthcare has been a challenge to humanity. Improving the performance of PHC has been identified as a major global health priority. Physical access to PHC remains a key issue in most low-income countries in which a large proportion of the population often reside in the rural areas at a considerable distance from basic health services (World Health Organization - WHO, 2000). The Health Reform Foundation of Nigeria (2006) specified that it is desirable that every District in rural areas should have at least a dispensary/health clinic, maternity clinic, primary healthcare centre within a 5km service radius based on threshold population

Common in Nigeria, most attempts made at providing adequate health facilities and services in most Local Government Areas (LGAs) in the country have often confined themselves to administrative headquarters or urban areas and with political considerations. Similarly, health planning has concentrated on improving the Bed/population and Doctor/population ratio rather than on their physical, functional and spatial distribution. Health Sector Reform Program outlined that mal-distribution of health institutions, inadequate coverage, and limited accessibility to primary health care services is some of the major problems facing health care delivery at grass root level (Health Sector Reform Programme, 2004; Ejiagha, Ojiako & Eze, 2012). A careful examination of the above studies showed that some did not adopt the use of GIS and even where it was used, utilization of the facilities was neglected. Some other studies also tried to map the distribution and utilization; however, database was not created.

According to Onokerhoraye (1999), a healthcare facility is defined as all units owned by public and private authorities as well as voluntary organizations which provides healthcare services including hospitals, health and maternity centers. Healthcare facilities 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. This was in conjunction with some few private agencies and societies like the Young Men Christian Association (YMCA), the St John, and the Red Cross Societies, who established hospitals, dispensaries and maternities all over the country.

In Adeyemo's (2005) studies, the then colonial government between 1946 and 1956 attempted to provide and develop medical services, which was referred to as Harkens-Walkers ten-year development plan. The Harkens-Walker plan was established with the main objectives of providing portable water, hospitals and maternity centers 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. However, Alabi's (2011) research indicated that there is the problem of coordination due to the sharing of responsibilities among the three tiers of government, with the structure affecting the managerial decision and financing, which has altered the operation of healthcare facilities, hospitals and health centers 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 as part of the ubiquitous strategies to achieving the Sustainable Development Goals (SDGs). 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 SDGs to health issues. These are reduction of child mortality, improving maternal health, combating HIV/AIDS, malaria and other diseases (Bircher, 2005; Ikhuoria & Bello, 2011; Aigbe, 2011; Rilwani & Bello, 2015).

Julius (2006) carried out a research on significant factors affecting the patronage of health facilities by rural dwellers in Owo region in Nigeria with a view to finding solutions to improving services in the health sector. 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 is 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.

The need to bridge the gap in equitable healthcare distribution and resources allocation aimed at improving infrastructure challenges using Geospatial technology (GIS in particular) indicate its importance for this research because of it ability to digitally capture, store, retrieve, manipulate, analyze and present geo-referenced geoinformation (Longley, *et al.*, 2005; Burrough, 2001). Keffi LGA is used as a proof-of-concept as a digital technology gap filled in this study.

2. Materials and Methods

2.1 Study Area Description

Keffi Local Government Area (LGA) in Nasarawa State, Nigeria, is located between latitudes 8^0 18'N and 8^0 51'N and longitude $7^0$18'E and 7^0 40'E (Figure 1). It has area of about 138km^2 and a population of 92,664 based on the 2006 census (NPC, 2006). The postal code of the area is 961. Founded around 1802, A.D. by a Fulani warrior leader, Abdul Zangan, who took the title of Emir (Sciortino, 1920; in Muzzammilwrites blog, 2017), Keffi is a historic town which experiences a warm and humid climate year-round, with a distinct wet and dry season (Figure 2).

The average annual temperature is around 30.27°C (86.49°F), and it's generally hot with the highest temperatures occurring between February and April during the dry season. Dry Season (November to April) period is hot and dry, with temperatures potentially reaching 40°C (104°F). The highest temperatures are usually seen between February and April, described as the "hot season". Whereas, in Wet Season (May to October), rainfall is most significant during this period, particularly from April to October. The rainy season in the northern part of Nigeria, including Keffi, lasts for three to four months (June to September). Some major tribes in keffi LGA includes Eggon, Yeskwa, Gwandara, Fulani, Hausa, Mada, and other minority. Annual rainfall figure ranges from 200mm to about 1100mm about 90% of the rain falls between May and September the wettest months being July and August.

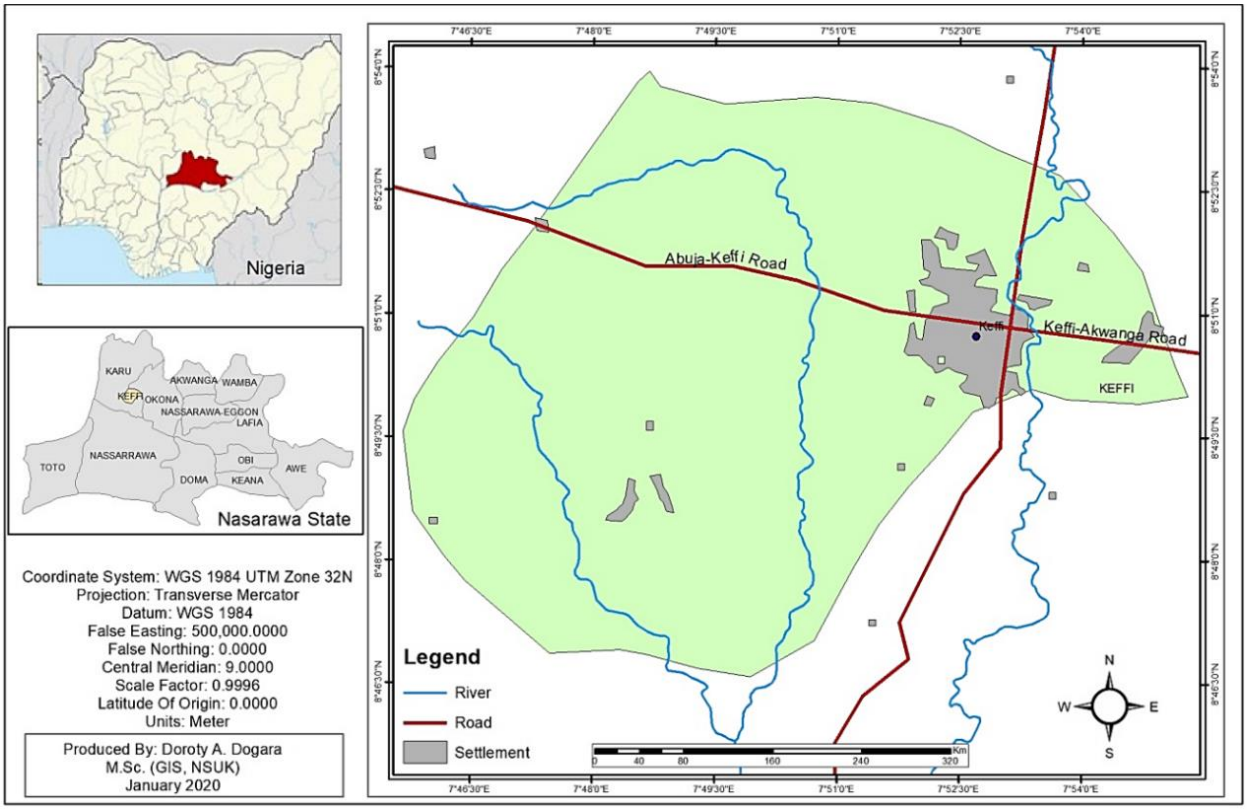

Figure 1: Keffi Local Government Area, Nasarawa State, Nigeria
Source: Adapted from the Administrative Map of Nasarawa State, NASGIS, Nigeria

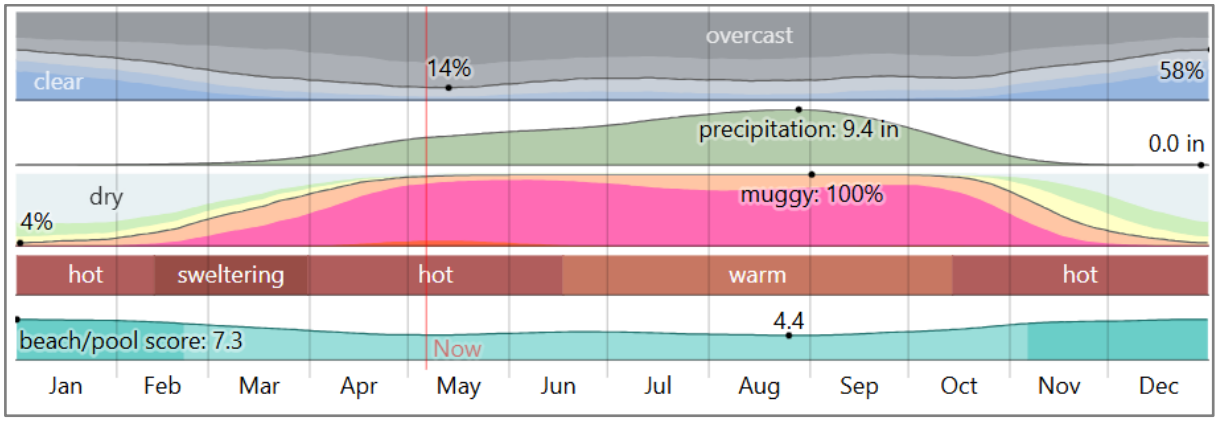

Figure 2. Keffi Weather By month

In Keffi LGA, there are numerous mineral resources, including Gold, tin and columbite. Crops including millet, sorghum, yams, and cotton are also grown in the region, making farming another important economic activity there. The Keffi Cattle Market, which draws hundreds of thousands of buyers from across the country yearly, is one of the livestock markets located in Nasarawa State. Animal husbandry and handicrafts are two other significant economic pursuits of the residents of Keffi LGA. Additionally, Keffi is home to numerous officially and privately owned banks, hotels, and other institutions (Mambula, 2017). Most farmers in keffi are poor and rely on subsistence agriculture for a living, this has a direct relationship with their nutritional intake and invariably their state of health (Spronk *et al.*, 2014). Farming, mostly with local implements, is the mainstay of the people of Keffi Local Government Area. The fertile nature of the land allows the production of varieties of both grains and root crops such as maize, beans, yams, cassava among others. In addition to varieties of fruits trees and herbs, thus, about 70% of the land area in Keffi LGA is farmland there are local industries like wood carving, pottery, dyeing, cloth weaving and blacksmithing that also thrive in the area. Keffi Town is also one of the commercial nerve centers in the state. Its close proximity to the Federal Capital Territory (FCT) has led to development of hotels, business centers, shopping centers while, and the Nasarawa State University is located within Keffi town in addition to the School of Health and Federal Medical Centre as well as other effective private healthcare centers like the Nagari Allah Magai Hospital.

Thus the towns and villages in Keffi that requires improved, effective and efficient healthcare delivery systems includes: Villages and places under the Keffi Local Governments Area are: Angwan Iya, Angwan Rimi, Anguwan Jaba, Anguwan Maiganga, Anguwan-Lambu, Angwan Salabu, Dan Dabi, Fagidi, Gangare Tudu, Ganta, Gidan-Kare, Jigwada, Kaibo Mada, Keffi East, Kofar Goriya, Liman Abaji, Saura, Sabon Gari, Tila, Tunayi, Yar Kadde, and Yara

2.2 Materials and Methods

Data on the distribution of identified Government-owned Healthcare Facilities (HCFs) and private healthcare facilities that offers immunization services were examined. Keffi LGA constitutes 10 wards, questionnaire were administered to selected wards. Also, documents containing attribute information of the HCFs were collected and Focus Group Discussion (FGD) was held with the managers of Healthcare and also with the people living in the study area that patronizes HCFs. For sampling the target group, the purposive sampling was used. Purposive sampling means sampling selected population based on the need of the researcher. In this case, only perceived adults more than 18 years were targeted regardless of religion, class

or status. Direct field survey with the Garmin 72s handheld Global Positioning System (GPS) receiver was used to collect geographic coordinates (latitude and longitude). Respondents/hospital users' information were obtained from sampling 200 copies of structured questionnaire. The sampled structured questionnaire in each of the wards visited was to enquire about the choice of HCFs and to know their challenges in terms of access and utilization. One of the data from this source was the list of all Primary Health Care facilities in Keffi LGA which was obtained through the Health Department of Keffi LGA, so as to identify the Settlements within these Healthcare Facilities. The administrative map of Keffi LGA was sourced from the the Nasarawa Geographic Information Service (NAGIS) at Karu.

Methodologically, the objectives analyzed were carried out as follows:
i. To identify and map the locations and spatial distribution of PHC facilities in Keffi, detailed database of healthcare facilities was created and used for analysis. It shows the type, ownership and coordinate (Latitude/Longitude) parameters of the studied health facilities. The second aspect was the creation of the Geo-database for all the healthcare facilities for the study area based on the GPS point data collected during fieldwork. The structured database was exported to ArcGIS map mapping environment for display using the "Add x, y tool". The entered attribute information of HCFs were geo-tagged and then geo-visualized (map) using ArcMap in ArcGIS software. Developing database is to create the structured data storage systems that simplify the process of accessing the data and support for further analysis.

ii. To examine the challenges in healthcare delivery and then articulate strategies on improved use of the available HCFs, the responses collated from the sampled questionnaire were aggregated and analyzed as well as relying on practical aspects of daily life experience from field observation. General best practices in improving healthcare facilities were obtained from existing standard literature to serve as a guide on the best strategies to adopt in improving health service delivering in keffi LGA.

3. Results and Discussion

3.1 Identification and Mapping of the Spatial Distribution of Healthcare Facilities in Keffi LGA

As indicated in Table 1, the identified Healthcare Facilities (HCFs) in the study area that offers immunization services across the ten (10) wards shows that 17 out of the 22 identified are government owned while the remainder 5 are privately owned. On the categorization, 15 of them are Primary Healthcare facilities, while 2 are standard medical centres (i.e, Federal Medical Centre and General Hospital Keffi, 1 private Hospital (Nagari Allah Magai Hospital), and 4 Clinics and Maternity.

Thus, one can deduce from the facilities identified that government plays a major role in the healthcare system and management of the people in Keffi LGA. Also, Figure 3 shows the satellite image map of the locations of these healthcare facilities. The spatial distribution of the identified Health facilities is illustrated in Figure 4. The study reveals that most of the HCFs are situated within the urban areas in Keffi LGA especially in the city centre as one travels from the overhead bridge heading towards Akwanga from Abuja axis. From Figure 4, it is abundantly clear that there are unserved areas due to the absence of quality HCFs, hence the need to have more of them to cater for the growing needs in healthcare delivery in Keffi LGA.

In view of the increase in population and spread of settlements, there is the need to increase the number of HCFs in the fringes of Keffi LGA to cater for those far away from the city centre. And, with increasing urban blights in the study area, there is bound to be increase in health challenges. It was revealed from the Focus Group Discussions (FGDs) that the study area has high level of un-coordinated waste disposal; most of which end up in streams and road side. Most of the drainage systems are blocked by waste. This triggers health hazards like mosquitoes. This is a red-flag as far as health and environmental managements are concerned.

Table 1. Database of Identified Healthcare Facilities (HCFs) in Keffi LGA

S/N0	Name of ward	Healthcare Facility Name	Ownership	Category of Facility	Latitude	Longitude
1	Angwan RIMI	PHC Ang ninzo	Government owned	Primary Heathcare	8.871	7.882
2	Angwan RIMI	Nagari Hospital	Privately owned	Hospital	8.851	7.881
3	Angwan RIMI	ERCC Clinic	Privately owned	Clinic and Maternity	8.859	7.873
4	Goriya	Federal Medical Center	Government owned	Medical Center	8.848	7.884
5	Gangare Tudu	Al-Nur Hospital	Privately owned	Clinic and Maternity	8.833	7.88
6	Liman Abaje	PHC Tsohon Kasuwa	Government owned	Primary Heathcare	8.843	7.875
7	Todun kofar	PHC Kofar Pada	Government owned	Primary Heathcare	8.846	7.872
8	Iya 1	Shukura Hospial	Privately owned	Clinic and Maternity	8.856	7.87
9	Iya 1	Spring Hospital	Privately owned	Clinic and Maternity	8.853	7.878
10	Iya 2	PHC Ang waje	Government owned	Primary Heathcare	8.836	7.875
11	Iya 2	General Hospital Keffi	Government owned	Medical Center	8.844	7.862
12	Sabon Gari	PHC Sabon Gari	Government owned	Primary Heathcare	8.871	7.858
13	Sabon Gari	PHC Yarkade	Government owned	Primary Heathcare	8.842	7.863
14	Sabon Gari	PHC Saura	Government owned	Primary Heathcare	8.806	7.906
15	Sabon Gari	PHC Ang maikai	Government owned	Primary Heathcare	8.813	7.851
16	Sabon Gari	PHC Gauta	Government owned	Primary Heathcare	8.814	7.87
17	Jigwada	PHC Jiwada	Government owned	Primary Heathcare	8.901	7.885
18	Jigwada	PHC Kaibo Mada	Government owned	Primary Heathcare	8.858	7.844
19	Jigwada	PHC Ang Jaba	Government owned	Primary Heathcare	8.874	7.913
20	Jigwada	PHC Tila	Government owned	Primary Heathcare	8.871	7.858
21	Yara	PHC Main Market	Government owned	Primary Heathcare	8.843	7.878
22	Yara	PHC Sabon Layi	Government owned	Primary Heathcare	8.837	7.881

Source: Fieldwork (2024)

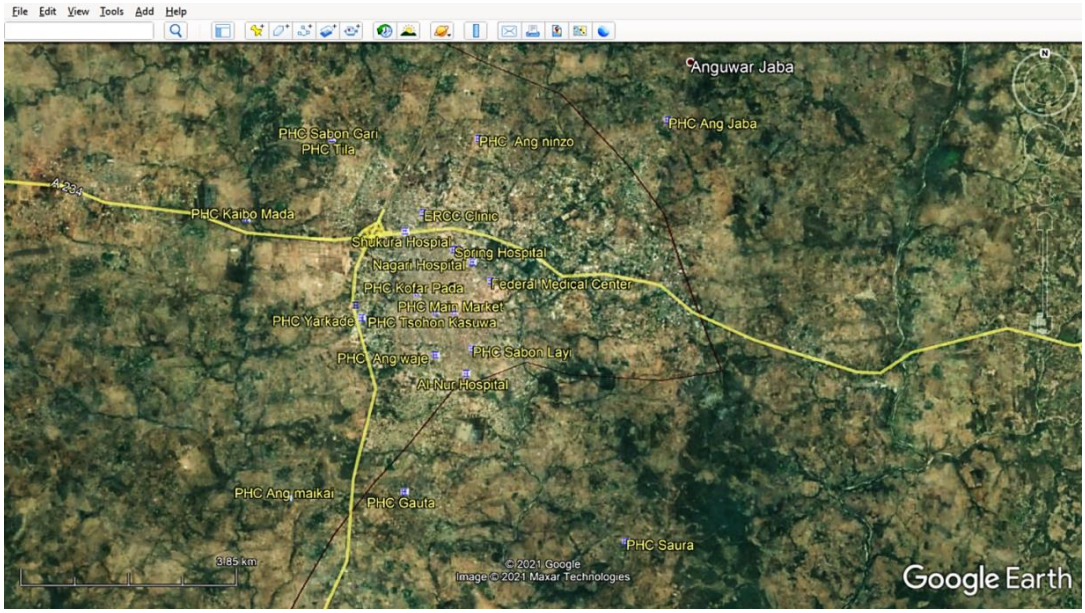

Figure 3: Satellite Image Map showing the Spatial Locations of the Studied Healthcare Facilities in Keffi Overlaid on Google Earth Pro

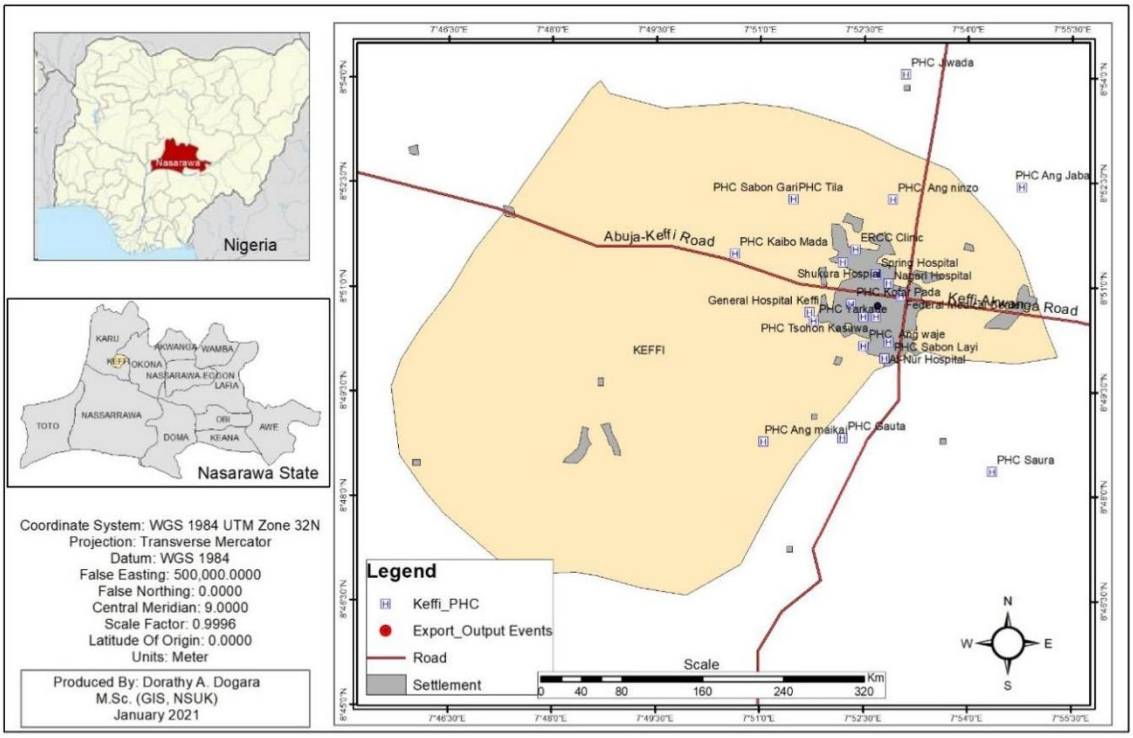

Figure 4: Spatial Distribution of Healthcare Facilities in Keffi and Environs
Source Data: Authors' Analysis (2024)

3.2 Challenges and Strategies to Improve on Healthcare Facility Utilization in Keffi

3.1 Challenges to Healthcare Delivery in Keffi LGA

Before one can determine the strategies to improve the utilization of healthcare facilities in the study area, the attitude of the healthcare workers must be examined. Thus, in an attempt to assess the attitudes of Healthcare workers in Keffi LGA, the study revealed that, on the average, 88 of the respondents confirmed that Healthcare workers are harsh and rude (44%). Despite the above observations, 48 (24%) of the respondents posited that the healthcare personnel know their jobs while 15 (7.5%) underscore the fact that they don't treat well and 20 (10%) are equally of the view that some are quite understanding and friendly. It is equally revealing that while 18 (9%) rated them as not always available, only 11 (5.5%) assessed them to keep to time. Naturally, different people with different character depending on who one meets while seeking healthcare services.The above findings is a clear indication of the need to do more in restoring the glory and professional conducts in both government and private healthcare centres. The study, however, suggests that most private HCFs tend to be on their best considering the fact that they are not funded by the government and as such they need the patients to be in business. Thus, they had to always ensure that their services are in top gear so as to retain their patients patronage. This is done since the private HCFs only depend on the services rendered to remain relevant unlike the government-owned facilities that depends mainly on government budgets whether they behave well or not.

It is also important to point out that there are not enough healthcare personnel attending to gender differences 164 (84%), as 36 (18%) respondents agreed to having enough. This is understandable as the government hospitals are mandated to perform general services regardless of individual gender differences. Besides, most of the hospital staff members are

limited and employments are not done based on gender request but on availability and qualification regardless of sex.

In specific terms, the major challenges of healthcare delivery in Keffi LGA, and in Nigeria in general, can be summarized as follows: rising costs of healthcare services, financial challenges for providers, shortage of healthcare professionals, the need for improved mental health systems, increased demand for personalized care, big data and cybersecurity issues. The above is mainly due to the fact that most patients are uninformed in terms of healthcare delivery standards. In addition, there is lack of funding to build and maintain infrastructure, healthcare services are too expensive for most Nigerians, and there is inadequate properly trained and compensated staff in Keffi lGA, thereby making effective and efficient healthcare delivery a top priority for intervention. Literature confirms that other compounding factors to the deplorable state of health care management system include physical facilities that are decaying, equipment that are obsolete, scarcity of skilled health professionals, roles of stakeholders, coordination systems are weak (Olujimi, 2006; Setlhapelo & Wolvaardt, 2022). To worsen the situation, inadequate political commitment especially at lower levels, poor coordination, and deficiency of communication between various actors, lack of transparency, poor services they provide, lack of access, competition by alternative provider poor accountability and poor accessibility causes restrain on the healthcare system in terms of service delivery. This should be discouraged and improved upon with deliberate policies and actions so as to increase the average life span and the overall well-being of the people.

3.2 General Healthcare Improvement Strategies

As shown in Table 2, to improve healthcare delivery services in Keffi LGA in particular, and in Nigeria in general, strategies should focus on strengthening primary healthcare, investing in technology, fostering public-private partnerships, and improving workforce retention and training. Specific areas for improvement include ensuring drug availability, strengthening immunization programs, and promoting health education and awareness.

Table 2: Stratgies for improving Healthcare Delivery in Keffi

S/N	Strategies	Specific Interventions
1	Strengthen Primary Healthcare (PHC)	a. Focus on prevention and early intervention b. Improve access and affordability c. Improve quality of care
2	Leverage Technology:	i. Invest in digital health solutions ii. Utilize mobile health (mHealth) iii. Explore AI and machine learning
3	Foster Public-Private Partnerships (PPPs)	a) Engage private sector providers b) Develop financing mechanisms c) Ensure regulation and quality control
4	Improve Workforce Capacity	1) Increase staffing levels 2) Improve training and education 3) Retain and motivate healthcare workers

5.	Multidimensional Strategies	I. Strengthen health systems II. Ensure drug availability III. Improve immunization programs IV. Promote health education and awareness V. Address social determinants of health VI. Strengthen oversight and accountability, VII. Improve cross-functional coordination

3.2.1. Strengthen Primary Healthcare (PHC)

Focus on prevention and early intervention requires that PHC should be the first point of contact for most health needs, offering preventive care, early detection of illnesses, and basic treatment. Also, to improve access and affordability, PHC services should be made accessible to all, particularly in underserved areas, through strategies like mobile health initiatives and community health workers. In addition, improving quality of care should include ensuring adequate staffing, training for healthcare professionals, and providing access to essential drugs and supplies.

3.2.2. Leverage Technology in Healthcare Services

Investing in digital health solutions such as Telemedicine, electronic health records (EHRs), and health information systems (HIS) can improve access, efficiency, and data management. In Utilizing mobile health (mHealth), Mobile apps and messaging can be used to provide health information, reminders, and remote monitoring. Likewise, AI and machine learning technologies can be used for diagnostics, treatment personalization, thereby improving operational efficiency.

3.2.3. Foster Public-Private Partnerships (PPPs) in Healthcare Services

Engaging private sector providers in PPPs can leverage private sector expertise and resources to expand access to healthcare services, just as develop financing mechanisms in Innovative financing models, such as micro-insurance and national health savings accounts, can help make healthcare more affordable. Similarly, in ensuring regulation and quality control, Public sector oversight is crucial to ensure that PPPs provide quality care and are not exploitative.

3.2.4. Improve Workforce Capacity in Healthcare Services

While increasing staffing levels, a well-trained and adequately staffed workforce is essential for effective healthcare delivery. Also, ensuring that improvement in training and education are sustained by making sure that healthcare professionals receive continuous man-power development (CMPD) courses in their relevant fields to stay up-to-date with contemporary state-of-the-arts best practices. It is also important to retrain and motivate healthcare workers because, attractive salaries, benefits, and career development opportunities are needed to retain skilled professionals.

3.2.5. Multi-dimensional Strategies in Healthcare Services

Strengthening the health systems includes improving health information systems (HIS), vital statistics, and civil registration. It is also important to ensure that drugs are availability in HCFs in Keffi LGA because, a reliable supply chain for essential drugs is crucial for effective treatment. This is also what leads to improved immunization programs. Immunization is a vital tool for preventing infectious diseases in Keffi LGA and elsewhere. Therefore, promoting

health education and awareness indicates that educating the public about health risks and preventive measures is important for improving health outcomes. Social determinants of health issues like poverty, inequality, and lack of access to education can have a significant impact on health just as strengthening oversight and accountability is important. Thus, robust oversight mechanisms are needed to ensure that healthcare providers are held accountable for the quality of care they provide. In addition, improving cross-functional coordination reveals that effective collaboration between different sectors, such as education, agriculture, and environment, is needed to address the broader determinants of health.

Health promotion and awareness creation is needed to carry all stakeholders or actors in the healthcare delivery system along. Health promotion is the process of enabling people to increase control over, and to improve their health. To reach a state of complete physical, mental and social well-being, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment. Thus, this study, therefore, affirms that Healthcare promotion is very important and urgent in Keffi LGA and in the entire country in view of the fact that World Health Organization (WHO, 2000) in its overall health system performance, earlier ranked Nigeria 187 out of 191 of her member nation. This is the deplorable state of health system in Nigeria. This is due to the poor political will, gross under funding, and lack of capacity at the Local Government Area (LGA) level to manage emerging chronic healthcare challenges.

4. Summary and Conclusion

While it has been revealed that healthcare facilities are major within the urban centre in keffi LGA, the study showed that a number of factors or challenges are responsible for the poor delivery of healthcare service in the entire study area. This challenges cuts across poor funding, lack of awareness, inadequate healthcare personnel, lack of political will, poor sanitation, environmental blight and inadequate training of healthcare officers. In view of the above challenges, and to improve healthcare delivery in Keffi LGA in particular, and in Nigeria in general, the study affirms that strategies should focus on strengthening primary healthcare, investing in technology, fostering public-private partnerships, and improving workforce retention and training. Specific areas for improvement include ensuring drug availability, strengthening immunization programs, and promoting health education and awareness. Others strategies to improve healthcare utilization in Keffi LGA includes employing more capable hands especially medical doctors and skilled professional nurses while more drugs and hospital equipment and structures should be made available. In addition, the various HCFs managers should endearvour to always keep the environment clean by regular cleaning and fixing of electric assets, faulty fans and Air conditioners (ACs). There should be deliberate healthcare promotion by the relevant ministries, departments and agencies (MDAs) in healthcare delivery while promoting partnership. Finally, periodic training and re-trainings of healthcare workers is advocated too for all the different categories of healthcare professionals and support staff members. It is hoped that with the above strategies, accessibility to, and utilization of, healthcare facilities in the study area will be improved.

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