

TEACHING HOSPITALS IN AFRICAN NATIONS: INFRASTRUCTURE FOR REGIONAL OR LOCAL COMMUNITY DEVELOPMENT?

Albert Ayorinde ABEGUNDE
Adewole Michael ADEDIGBA
Obafemi Awolowo University

Abstract

The study examined the location of University of Nigeria Teaching Hospital, Enugu, Nigeria (UNTH, Enugu) on the purses of residents in its regional context. Using random sampling technique, it systematically sampled 443 respondents through administration of two sets of structured questionnaires to both staff and patrons of the health institution respectively. Cross-tabulation was used to interpret the distance decay effects of patronage in relation to income of respondents while chi square and correlation matrix were employed to establish the effects of locations where respondents hailed from on their level of patronage in UNTH, Enugu, Nigeria. Findings revealed that groups of respondents with highest monthly income hailed from distant locations of 500-1000kilometres to where the teaching hospital was located while those with low monthly earning hailed from locations less than 501 kilometres from the teaching hospital. The correlation matrix shows a negative correlation of -0.0240 at a significant level of 0.000 between distance and hospital patronage. A negative correlation of -0.197 at a significant level of 0.000 also existed between distance and frequency of visit while a negative correlation of -0.087 with a significance level of 0.067 between transport cost distance to UNTH, Enugu. Similarly, the calculated Chi-square between these variables shows that the value of 85.27 was significant at 0.004 level which was less than 0.05 . These show that there was a significant relationship between distance and patronage of respondents in UNTH, Enugu. The paper established that though the studied teaching hospital ought to be a regional infrastructure, its service is most enjoyed by the poor that hailed from immediate environment. It posits that the income of residents among others in their socio economic characteristics should be considered in locating regional infrastructure that intends to have higher order of coverage in its services to the people in a developing economy.

KEY WORDS

Accessibility, Location, Infrastructure, Spatial Cost, Health Institution

Introduction

Recent literature that advocate for the development of African communities have pointed to poverty, inadequate infrastructure and poor health as major problems in the region (Sachs, McArthur, Schmidt-Traub, Kruk, Bahadur, Faye, and McCor, 2004; Pick, Rispel and Naidoo, 2008 and Onyeiwu, Iorgulescu and Polimeni, 2009). . For instance, Akinola (1997) noted that poor health facilities in Africa threaten their populations and risk lives of both old and young. This could be one of the reasons for life expectancy in Nigeria to be about 45years (World Health Organisation, 2004). Ordinarily, inadequate infrastructure in Africa is a manifestation of their poverty (Ebehichalu and Abegunde, 2007) and also a serious threat to their social and economic development (Wimberly, 1993). Spatial planning in the region must therefore aim at providing basic infrastructure that promote good health and involve in programmes that benefit the masses. Along this line, Ajakaiye and Ncube (2010) argued that

public infrastructure in Africa nations goes beyond its provision, it includes consideration of the people's purses. This was the aim of many African nations' governments for locating university teaching hospitals at regional headquarters. This is because they are higher order service providers that attract patrons from far and near distances within supra urban space (Idachaba, 1985; Christaller, 1933 and Hanmer and Novell, 2000). The existence of any health centre of higher service like that of teaching hospitals must therefore be maximally utilized to reduce mortality rate at low cost on the masses.

This is because teaching hospitals are referral points where patients with chronic and life threatening health problems are referred to from both public and private health clinics and hospitals in a region and sometimes, beyond (Duckett, 2000). They serve as medical training institutions and welfare centres to residents in its geographic space. In urban planning, their scope as training and health centres transcends local and even regional boundaries of their existences (Skeebale, 1972; Mobley, French III and Anselin, 2008 and Nguyen, 2009).

Over the decades, spatial accessibility to basic infrastructure like health institutions in African nations have been calling for serious considerations more than their counterpart countries in developed world (Ogunbodede and Jeboda, 1994 and Pick *et al*, 2008). Regionally, patients in critical health needs must find easy accessibility to health institutions in the caliber of teaching hospitals (Hall, Holman, Platell, Sheiner, Threlfall and Semmens, 2005). In a continent where over half of the populations live below one dollar per day (Adeyinka, Abegunde, Omisore and Olawuni, 2006), spatial location of teaching hospitals without serious consideration to the economy of the people is meaningless. Even where treatment is made free, patients must be able to afford transportation cost before free health care could be enjoined. This paper is an attempt to assess the spatial effectiveness of the location of the University of Nigeria Teaching Hospital in Enugu, Nigeria. It has the aim of appraising its spatial location in relation to the economic capability of its patrons, with a view to establish the primary beneficiary of the health infrastructure within its region of its existence.

Infrastructure and Sustainable Regional Development

Idachaba (1985) sees infrastructure as forms of capital, which aids production distribution and consumption activities as well as enhancing the quality of life. He classifies infrastructure into three broad groups namely: physical, social and institutional infrastructure. Physical infrastructure includes transportation, processing, storage, irrigation and soil conservation. Social infrastructure are health, education, water and electricity while institutional infrastructure are cooperative societies, financial institutions, agricultural research extension and training centres, market post and telecommunication facilities. These basic services and facilities prepare the built environment for productive activities (Bhalla, 2000). Significant in this is that location of infrastructure aids socio-economic growth and development of a region (Ajakaiye and Ncube, 2010).

In other dimension, infrastructure can serve as a tool in reducing poverty, sustain growth and promote regional development. This could be why Abumere, Okafor and Oluwasola (2002) opined that any programme for poverty reduction or indeed for the overall regional development cannot succeed unless supported by infrastructure. It was noted by Akinola (1997) that people in the awkward regions are poor because they do not have access to basic necessary infrastructure. Bhalla (2000) showed how poverty is manifested in the

regions of Africa by inadequate infrastructure like potable water, sanitation, housing, health centres, electricity, schools and training institutions to mention but few. For example, unsafe drinking water, lack of sanitation and unhygienic housing are directly related to the prevalence of water borne, human waste related and air borne diseases like dysentery, cholera, diarrhea, tuberculosis, bronchitis, influenza, measles and malaria (Buowari (2010) and Adedigba, Afon, Abegunde, Nwhator and Bamise, 2007). Bhalla (2000) stated further, that whenever any of such diseases attack the people in developing nations, there is drastic reduction in productivity and the resultant effect is poverty. The effect can be worse when such people are economically depressed and can not easily access standard health centres. Provision of infrastructure is important in the improvement of welfare on standard of living in any given region (Ebehichalu and Abegunde, 2007). Significant in these arguments is that although infrastructure aids sustainable regional planning and development, the economy of the beneficiaries within space is of more priority in urban economic planning

Accessibility and Spatial Cost in the Location of Health Institutions within Geographic Space

The argument that location influences the use of medical facility within region is not new in the literature. Effective spatial distribution of health service has long been recognized as an important factor in access to health-care with numerous studies describing an inverse relationship between distance and health-care utilization. Bhalla (2000). Jong, Smith, O'Connell, Goldstein and Armstrong (2004) showed that people living in areas of Australia with limited access to services have poorer health than people living in metropolitan areas and by extended implication are less productive in the economy of the area than their counterparts that have easy accessibility to health institutions. Jones and Bentham (1988) also examined the relationship between asthma mortality and access to health services. Their finding was that asthma has mortality relationship between geographic proximity to services, and mortality has also been demonstrated for ischaemic heart disease in Australia.

In a similar study, Hall *et al*, (2005) found that accessibility within space has a significant effect on patterns of surgical care in people with colorectal cancer. Sexton and Sexton (2000) also found out that populations living outside capital cities have higher death rates than those living in capital cities. In sub-Saharan African setting, it was once argued by Oppong and Hodgson, (1994) that improvements in accessibility can be achieved with better locational choices and without additional facilities put in place. Hall *et al* (2005) concluded that locational accessibility to services is generally not an independent predictor of utilization of medical institutions, but it is a variable that accounts for 50% of usability. Accessibility to medical facilities is a multidimensional variable that plays a central role in the behavioural model of health service utilization.

The definition of accessibility has been refined in the medical geography literature, by distinguishing between potential and realized accessibility. Potential accessibility refers to the locational relationship between service providers (hospitals) and surrounding populations. The actual utilization patterns of these facilities form the basis for revealed accessibility, (Love and Lindquist, 1995).

Some authors considered the cost of patronizing hospitals with space (Coory, Scott and Baade, 2002; Hall, Holman, Sheiner and Hendrie, 2004; Hall *et al*, 2005; Mitropoulos, Gianmikos and Sissouras, 2006). According to them, they examined the socio economic attributes of the patients. These include income, education, occupation, age and gender. They

believed that these influence the choice of and degree of hospital patronage in any region. Coory *et al* (2002) was one of such writers. He investigated the effects of socio economic status and location on utilization of hospital. The authors found wide disparities in access. They concluded that free access to health care did not necessarily ensure equitable access. Hall *et al* (2004) examined the influence of social, economic and locational disadvantage on lung and breast cancer patients in West Australia. Their finding was that survival was poorer in patients treated in public hospitals with low socio economic groups.

The arguments above revealed that location of health centres and socio economic characteristics of residents have influence in the patronage of health facility in many geographic regions of the world. In addition, patients are more conscious of their income when considering the type of hospitals to patronize and their locations. Research works of Mitropoulos *et al* (2006) clearly supported this assertion. This is because they noted that patients preferred to use local health centres than those of higher order for the fear of paying heavy bill, and therefore proposed a mathematical programme model for locating hospitals and primary health care centres within regions. According to them, this model would assist patients in considering travel cost in patronizing hospitals of close proximities. This indicates that hospital accessibility is significant in its spatial planning.

In Nigeria, previous work has concluded that spatial distribution of hospital facilities was not considered by government, leading to a very high ratio of the country's populations been underserved by these facilities (Owoola, 2002). This has also been proved similar to the attitude of policy makers in other developing countries of Africa when considering spatial distribution of hospital facility in their built environment (Rahman and Smith, 1999).

Two variables should be considered in analyzing hospital accessibility and locational effect on residents. Mitropoulos *et al* (2006) identified these variables as minimization of distance between patients and facilities, and equitable distribution of the facilities among residents. Consideration of these variables will enable researchers to introduce a new aspect to location problem, namely public preferences and decentralization of the health care system. This study is an empirical contribution to the validity of the first variable in the work of Mitropoulos *et al* (2006). The study analyses the residents' economic behaviour to the location of tertiary hospital in a developing economy within an African region.

Theoretical Framework

Significant among location theories that is directly related to this study is the Central Place Model of Walter Christaller (1933). He hypothesized the distribution of centralized services in relation to the spacing size and function pattern of urban centres. His choice of a hexagonal mesh for spheres of influence for facilities and services posits that there would not be overlapping services of common facilities in a given geographical space. In other words community facilities and services are of different ranges.

The range of a particular service would be directly proportional to the size of the community where it is located and vice-versa. By extension, a hierarchy of centres would evolve. Towns with the lowest level of specialization would be evenly spaced and surrounded by their hexagonally shaped service area. This means that for each group of six small settlements, there would be larger community with more specialized functions, which would also be averagely equidistance to other seemly larger community(ies) with the same degree of specialization.

Significant in these are that, first, the theory reveals individuals behavioural patterns in a geographic space. This is because people will tend to move to centres of minimum distance to their origin to enjoy social facilities and economic benefits. It also shows that countryside of small towns and villages are not expected to possess all the facilities that are expected of industrial or urbanized centres. Hence, this is the reason for migration of labour force to the pole to enjoy basic infrastructure and amenities.

The theory therefore provides basis for the grouping of villages and towns in the location of social infrastructure and economic development. This is very important in developing nations where there is acute need for equitable distribution of meagre resources for optimum advantage. In relation to this study, Christaller's model provides opportunity to test residents' socio economic behaviour in relation to spatial distribution of regional infrastructure. There is the need to revalidate the relevance of this theory in the new millennium within a newly developing economy like that of Nigeria. This study though focuses more on spatial viability of regional infrastructure in relation to residents' level of patronage as affected by the their economy; is an advantage to re-establish the relevance of this theory in third world nations.

Method of Study

Data for this study were derived from primary source. The primary data was obtained through preparation and administration of structured questionnaires administered on staffers and patients who had patronised the health institution in times past or during the course of this study. Available information on the names and addresses of specific members of staff that had patronised the hospital within the space of a year before this study was used to locate relevant staff that form part of the sample frame for this study. According to Table 1, the breakdown of the number of these staff were doctors (35), nurses (48), administrative workers (50) and casual workers (150). Records in the hospital about the patients in the month when the questionnaire for the study was administered also revealed that average monthly patients in the hospital wards were 1,162 while outpatients had a figure of 805. These placed the sample frame for this study at 2,250. The sampled units were systematically selected from the hospital records and the questionnaires administered randomly to 20% of the population. In the course of administering the questionnaire, hospital workers and patients that fell within the sample size were sought for in their respective offices and wards/clinics accordingly. The residential addresses of discharged patients were used to locate their whereabouts within the study area.

Table 1 reflects that a total of 450 questionnaires were distributed and administered while 443 questionnaires were retrieved and found worthy of being analysed. The questionnaires were distributed within the hospital units as follows. The consultants and nurses had 07 and 09 questionnaires respectively. Only 08 questionnaires were retrieved from the nurses. Administrative workers had 50 questionnaires. Patients' wards had the highest number of the questionnaires. They had 233 questionnaires, out of which 229 were retrieved. In the outpatients' clinics 160 out of 161 questionnaires were retrieved while 29 out of 30 casual workers returned the questionnaires distributed to them.

Data retrieved were compiled, coded and analysed using the Statistical Packages for Social Statistics (SPSS version 16) software. Cross tabulation was used to interpret the distance decay effects of patronage in relation to income of respondents. The study also used

chi square and correlation matrix to establish the effects of locations where respondents hailed from on their level of patronage in UNTH, Enugu, Nigeria.

Table 1: Sample Selection and Number of Questionnaires Administered in University of Nigeria Teaching Hospital, Enugu.

Sample Size	Sampling Frame	Sample Size	Questionnaires Retrieved
Consultants and Resident Doctors	35	07	07
Nurses	48	09	08
Administrative Workers	50	10	10
Patients in Wards	1,162	233	229
Outpatients in Clinic Rooms	805	161	160
Casual workers	150	30	29
Total	2,250	450	443

Findings and Discussions

Income by Distance from Residents of Respondents in the Study Area

Table 2 shows that groups of patients earning highest monthly income 37,500-45,000 Naira (\$235.00-281.00) (6.6%) and above 45,000 Naira (\$281.00) (0.7%) in the study hailed from distant locations of 500-1000 kilometres (Km) to where the teaching hospital is located. Nearly half of the residents earned below 22,501 Naira (\$140.00) monthly and hailed from locations less than 501 Km from the teaching hospital. This indicates that income of patients in Nigeria University Teaching Hospital affected their patronage in the study area. In other words, poor people located far from UNTH could not afford to patronize the hospital.

Table 2: Cross-tabulation of Income of Patients in UNTH, Enugu by Distance to their Residences.

Distance (Km.)	Income (Nigeria Naira)							No respondents	Total
	Below 7,500	7,500-15,000	15,000-22,500	22,500-30,000	30,000-37,000	37,500-45,000	Above 45,000		
0-200	54 (12.0%)	14 (3.2%)	—	—	—	—	—	—	68 (15.2%)
201-500	—	41 (9.3%)	79 (17.8%)	17 (3.8%)	1 (0.2%)	—	—	—	138 (31.1%)
501-1000	—	—	—	45 (10.2%)	33 (7.5%)	29 (6.6%)	3 (0.7%)	100 (22.6%)	210 (47.6%)
Above 1,000	—	—	—	—	—	—	—	27 (6.1%)	27 (6.1%)
Total	54 (12.0%)	55 (12.5%)	79 (17.8%)	62 (14.0%)	34 (7.7%)	29 (6.6%)	3 (0.7%)	127 (28.7%)	443 (100%)

Relationship Existing between UNTH Enugu and Level of Patronage of Respondents

Similarly, Table 3 reveals the correlation matrix of the patronage factors in the study area. The table shows the quantitative measure of the level of relationships among the factors that affect the patronage of UNTH Enugu. The patronage factors include the socio-economic characteristics of the patrons and other relevant factors. These include their education, income, residential location, transport cost, gender among others.

In order to investigate the relationship existing between location and patronage of people in the study area, four major factors were chosen from the variables. These are factor 1, 2, 3, and 11, which stand for hospital patronage, frequency of visit, transport cost from patrons' residences, and distances from patrons' residences respectively. These are the major location factors that affected the patronage of UNTH Enugu as at the time of this study. In table 4, factor 1 is the dependent variable, while factors 2, 3, and 11 are the independent variables.

Table 3: Correlation Matrix of the Factors that affect the Patients' Patronage in UNTH, Enugu.

	1	2	3	4	5	6	7	8	9	10	11	12
1	1.00											
2	0.44	1.00										
3	0.27	0.06	1.00									
4	0.22	0.09	0.12	1.00								
5	0.16	0.26	0.13	0.08	1.00							
6	0.01	0.13	0.05	0.00	0.06	1.00						
7	0.03	0.07	0.06	0.08	0.02	0.17	1.00					
8	0.09	0.09	0.10	0.01	0.04	0.03	0.04	1.00				
9	0.08	0.06	0.07	0.11	0.02	0.15	0.28	0.23	1.00			
10	0.07	0.02	0.15	0.00	0.03	0.23	0.55	0.11	0.19	1.00		
11	0.24	0.20	0.09	0.24	0.15	0.15	0.08	0.04	0.22	0.00	1.00	
12	0.01	0.05	0.06	0.20	0.20	0.12	0.08	0.02	0.28	0.08	0.09	1.00

Key to Table 3

1. Hospital Patronage 2. Patronage Frequency 3. Transport Cost.
 4. Education 5. Income 6. Services Received
 7. Age 8. Mode of Transport 9. Occupation
 10. Purpose of Visit 9. Distance 12. Gender

As observed earlier in Tables 2 and 3, Table 4 also reveals that distance was a significant factor of patronage. The correlation matrix shows a negative correlation of – 0.0240 at a significant level of 0.000 between distance and hospital patronage. A negative

correlation of -0.197 at a significant level of 0.000 also existed between distance and frequency of visit. Again, the table shows a negative correlation of -0.087 with a significance level of 0.067 between transport cost and distance to UNTH, Enugu. These show that there was a significant relationship between distance and patronage as at the time of this study. The negative correlation deduces that a decrease in distance leads to an increase in patronage, and that due to increase in transport cost. In another dimension, a unit increase in distance and transport cost leads to a decrease in patronage. This also shows that patrons would travel to hospitals that were nearest to their residential locations where transport cost is least. This agrees with the postulation of Walter Christeller (1933) that residents would naturally seek for satisfaction over community facilities and services with least cost and distances to their residences.

Table 4: Correlation Matrix of the four factors influencing Patients' Patronage in UNTH, Enugu, Nigeria.

	Hospital Patronage	Frequency of Patronage	Distance	Transport Cost
Hospital Patronage	1.00			
Frequency of Patronage	0.438	1.00		
Distance	-0.240	-0.197	1.00	
Transport Cost	0.274	0.058	-0.087	1.00

Table 5 presents the report of Chi-square tests of significance for distance and frequency of visit of patients to UNTH, Enugu. This table shows that the test was significant, with $\chi^2 = 85.27$; at p value = 0.004 . This implies that a significant relationship exist between frequency of visit and hospital patronage.

Table 5: Chi-Square Test of Significance of Distance and Frequency of Visit in UNTH, Enugu.

	<i>Value</i>	Df	Significance
Pearson Chi-square	85.268	54	0.004
Likelihood Ratio	93.222	54	0.001
Linear by linear Association	0.405	1	0.524
No of valid cases	443	-	-

Conclusion and Recommendations

The study examined the spatial cost effectiveness in the location of University of Nigeria Teaching Hospital, Enugu, Nigeria (UNTH, Enugu), and attempted to confirm if the economies of the nearby and distant residents influenced their patronage within supra urban space. This is with the intention of establishing the extent of the influence of the regional infrastructure on the masses who were to benefit from its location. Findings revealed that poor people who were located far from UNTH, Enugu could not afford to patronise the hospital. This is because nearly half of the sampled residents earned below 22,501 Naira (\$140.00) monthly and hailed from locations less than 501 km from the teaching hospital. There was also a significant relationship between distance and level of patronage as at the time of this study. The negative correlation observed deduces that a decrease in distance leads to an increase in patronage, and that due to increase in transport cost.

Similarly, a unit increase in distance and transport cost leads to a decrease in patients' patronage. This also shows that patrons would travel to hospitals that were nearest to their residential locations where transport cost is least ($\chi^2 = 85.27$, $p = 0.004$). These show that there was a significant relationship between distance and patronage of respondents in UNTH, Enugu. There is the need to consider the economy of the people in developing nations in the location of basic infrastructure facilities like that of teaching hospital in agreement with the suggestions of Mitropoulos *et al* (2006) and Rahman and Smith (2000). The paper recommended that the income of residents among others should be considered in locating regional infrastructure that intends to have higher order of coverage in its services to the people. It also justifies the benefit of interdisciplinary study between medical field and urban and regional planners in health infrastructure provision and its ultimate satisfaction.

References

- Abumere, S. I.; Okafor, S. I. & Oluwasola O. (2002). *Rural infrastructure and the development process in rural Nigeria; research report number. 36*. Ibadan, Nigeria. Development Policy Centre (DPC).
- Adedigba, M.A., Afon A.O., Abegunde, A.A. Nwhator, S.O. & Bamise, C.T. (2007). Assessment of dental waste management in a Nigerian tertiary hospital. *Waste Management and Research*, 29 (3).
- Adeyinka, S. A.; Abegunde, A.A. Omisore, E.O. & Olawuni, P.O. (2006). An Evaluation of informal sector activities and urban land use management in Southwestern Nigeria. *Shaping the Change*. Munich, Germany. xxiii FIG Congress.
- Ajakaiye, O. & Ncube, M. (2010). Infrastructure and economic development in Africa: An Overview. *Journal of African Economies*, 19 (1). Oxford Journals Publication.
- Akinola, S.R. (1997). *The impact of rural roads on physical development in Ife Region, Osun State, Nigeria*. An unpublished Ph.D thesis. Ile-Ife, Obafemi Awolowo University, Obafemi Awolowo University.
- Bhalla B., (2000). Evaluation of infrastructural interventions for poverty alleviation. *Economic and Social Commission for Asia and the Pacific (ESCAR)*. New Delhi, India. Asian Institute of Transport Development.
- Buowari, Y.D. (2010): Pediatric care at general hospital, Aliero, Kebbi State, Nigeria. *The Internet Journal of Family Practice* 2010, 9 (1). Retrieved December 15, 2010 from http://www.ispub.com/journal/the_internet_journal_of_family_practice/volume_9_number_1_18/article/paediatric-care-at-general-hospital-aliero-kebbi-state-nigeria.html.

- Christaller, Walter. (1933): *Central places in southern Germany*. Englewood Cliffs, New Jersey. Prenticehall Inco.
- Coory, M., Scott, I.A. & Baade, P. (2002). Differential effect of socioeconomic status on rates of invasive coronary procedure across the public and private sectors in Queensland, Australia. *Journal of Epidemiology and Community Health*. 56:233-234.
- Ebehichalu, N.O. & Abegunde, A.A. (2007). Adequacy of infrastructural facilities in Nigerian rural areas: the case of Esan Region in Edo State, Nigeria. *Journal of Environmental Sciences*, Nigeria, Faculty of Environmental Science, University of Jos,
- Hall, S., Holman, C.D.J., Sheiner H. & Hendrie, D. (2004). The influence of socio-economic and locational disadvantage on survival after a diagnosis of lung or breast cancer in Western Australia. *Journal of Health Services Res. Policy*.
- Hall, S., Holman, C.D.J., Platell, C., Sheiner, H., Threlfall, T. & Semmens, J. (2005). Colorectal cancer surgical care and survival: do private health insurance, socioeconomic and locational status make a difference?" *ANZ of Surgery*.
- Idachaba, J. (1985). *Rural infrastructures in Nigeria*. Ibadan, Federal Department of Rural Development, University Press.
- Hammer, L. Booth, D. & Lovell, E. (2000). *Poverty and transport: A report prepared for the World Bank in collaboration with DFID*, Overseas Development Institute.
- Jones, A.P. & Bentham, G. (1988). Health service accessibility and deaths from asthma in 401 local authority districts in England and Wales 1988 – 92. *Thorax*. 52:218-222.
- Jong, K.E., Smith, D.P., Yu, X.Q., O'Connell, G.D. & Armstrong, B.K. (2004). Remoteness of residence and survival from cancer in New South Wales. *Medical Journal of Anaesthetic*. 180:618-622.
- Love, D., & Lindquist, P. (1995). The geographical accessibility of hospitals to the aged: A geographical information system analysis within Illinois. *A Wealth Services Research*. USA, Illinois Press.
- Mcarthur, J.W., Guido S.T., Kruk, M., Bahadur, C., Faye, M. & Mccord, G. (2004). *Ending Africa's poverty trap*. United Nations Millennium Project Brookings Papers on Economic Activity. Columbia University and UN Millennium Project Publication.
- Mitropoulos, P., Mitropoulos, I., Gianmikos, I., & Sissouras, A. (2006). A objective model for the locational planning of hospitals and health centres. *A Journal of Health Care Management Science*. Springer Netherlands Press.
- Ogunbodede, E.O & Jeboda, S.O. (1994). Integration of oral health into existing primary health care services in Nigeria. *Nigeria Dental Journal* Vol. 11, No. 1. 21-26.
- Onyeiwu, S., Iorgulescu, R. & Polimeni, J.M. (2009). Structural adjustment intensity, vulnerability and poverty in Africa: Evidence from a Nigerian village. *Journal of Developing Societies*. Vol. 25 (1), 27-55.
- Oppong ,J.R. & Hodgson, M.J. (1994). Spatial accessibility to health care facilities in Suhum district, Ghana. *Professional Geographer*, Volume 46 (2).
- Owoola, M.A. (2002). *Between policy and practice: A spatial decision support system-based assesment of facility location planning in Nigeria*. Ottawa: Symposium on geospatial theory, processing and applications.
- Pick, W., Rispel, L. & Naidoo, S. (2008). Poverty, health and policy: A historical look at the South African experience. *Journal of Public Health Policy*, 29, 165–178.
- Rahman, S.U. & Smith, D.K. (1999). Deployment of rural health facilities in a developing country. *Journal of the Operational Research Society*, 50, 892-902.
- Rahman, S.U. & Smith, D.K. (2000). Use of location-allocation models in health service development planning in developing nations. *European Journal of Operational Research*, 123, 437-452.

- Sexton, P. & Sexton, T.L.H. (2000). Excess coronary mortality among Australian men and women living outside the capital city statistical divisions. *Medical Journal of Australia*, 172. 370 – 374
- Wimberly, R.C. (1993). Policy perspective on social, agricultural and rural sustainability. *Rural Sociology*, 58, 1-29.
- World Health Organisation. (2004). *The world health report*. Retrieved July 6. 2006 from <http://www.who.int/whr/2004/annex/country/nga/en/>.

Appreciation

The authors want to appreciate the contributions of Mrs. Ifeoma Ezike and her friends for the assistance rendered in coordinating other indigenous research assistants and seeing to successful collection of the data used for this study. Without them, it would have been impossible to administer and interpret the questionnaire originally designed in English language to indigenous residents that fell within the sample size for the study.

Albert Ayorinde ABEGUNDE (Ph.D., M.Sc., RTP)*

abebert@oauife.edu.ng, abajesulo@yahoo.com

Department of Urban and Regional Planning
Obafemi Awolowo University
Ile-Ife, Nigeria

Adewole Michael ADEDIGBA (MSc.DentSc., MCommH., B Ch.D., FWACS)

adedigba@oauife.edu.ng, ademich2002@yahoo.com

Department of Preventive and Community Dentistry
Obafemi Awolowo University
Ile- Ife, Nigeria

* Correspondence Author.