



Environmental Technology & Science Journal [ETSJ]

VOLUME 6 No.1 JUNE 2015

ISSN NO: 2006-0459



PUBLISHED BY:
School of Environmental Technology (SET),
Federal University of Technology,

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E-mail: etsjournal2006@yahoo.com
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Environmental Technology & Science Journal (ETSJ)
Volume 6 No.1, June, 2015. ISSN-2006-0459

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ISSN: 2006-0459

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TRANSPORT AND ACCESS TO RURAL HEALTH CENTRES IN ILORIN EAST LOCAL GOVERNMENT AREA, KWARA STATE, NIGERIA

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Abstract

This study examines the role of rural road transport in determining physical access to primary health centres in Ilorin East Local Government Area of Kwara State, Nigeria. Data were collected from a sample of 207 rural households using structured questionnaire. In addition to the use of descriptive statistics, principal component analysis and stepwise multiple regression technique were used to analyze the data. About 49% of the respondents were found to travel to health centre by foot while, 23% travelled by commercial motorcycle. The result further indicates that travel time to health facilities is generally low in the areas as 55.6% of the sample spends less than 40 minutes to seek medical services. By jointly explaining 75.5% of variance in access; distance, means of transport, road distance to Local Government Headquarter and level of income can be used to predict level of access to health centres in the area. It is suggested that access to rural health centres can be improved by improving rural roads, introduction of interventions to improve provision of rural transport services and introduction of mobile clinics to ensure that modern medical care is made available to the generality of the people.

Keywords: Rural Roads; Transport Services; Physical Access; Health Centre; travel time.

Introduction

Gross disparities exist in the level of mobility between developed and developing countries; while the developed world has witnessed a transport revolution in recent years, transport infrastructures remain inadequate in the developing world, with a large part of the population experiencing gross immobility. Many areas of the developing world are characterized by unreliable, expensive and labour intensive means of movement (Hilling, 1996). For instance, in Africa significant time and effort is spent on transport for essential needs by rural households (Berwell, 1996). The use of facilities in a community depends to a large extent on the level of access to such services. Better mobility helps improve people's welfare by providing better access to such socio-economic facilities. Level of physical access to any facility is known to depend on the cost, time and

effort required to reach the facility. On the other hand the cost, time and effort required depend on distance and the ease of mobility (Halseth and Ryser, 2006). The role of transport in increasing access to health services include facilitating the movement of individuals to health facilities and that of health workers for outreach activities. Also, it enables the provision of timely emergency services and allows improved distribution of drugs and other services to health outposts (Linke *et al*, 2008). Distance and lack of transport have however continued to be major constraints to health services in Africa. For instance, distance and the ease and cost of transport to health facilities are important to people's willingness and ability to seek health services (Linke *et al*, 2008; World Bank, 1993; Global Action on Aging (GAA), 2008 and Poku-Boansi *et al*, 2010).

Several rural studies have shown that long distance to health facilities tend to have negative effect on frequency of visits to seek health care (Goodman *et al*, 1997; Namet and Bailey, 2000; Winters *et al*, 2006., Benjamin, 2006 and Baker and Liu, 2006). Utilization of family planning services and children vaccination is also known to reduce with distance to health facilities. For instance, long distance to health centres has been identified as one of the factors responsible for incomplete vaccination and missed opportunities for children in Nigeria (Abdulraheem, *et al*, 2011). Thaddeus and Maine (1994) identified delay in reaching health care due to poor mobility as one of the three major barriers preventing access for pregnant women with complication to health care. The other barriers are delay in seeking health care and delay in receiving health care. Relationship has also been observed between poor transport and child and maternal mortality. For instance, Poku-Boansi *et al* (2010) noted that longer travel time to health facility was linked to greater risk of experiencing maternal mortality among pregnant women in rural Ghana. Long, slow or expensive journeys serve as constraints to health care seeking behaviour especially in rural areas (International Forum for Rural Transport and Development (IFRTD), 2005). Transport might be taken for granted in the developed countries but, in Nigeria it is a major factor inhibiting physical access to health services especially in rural areas. Poor transport inhibits vaccination distribution and ability of pregnant women to access emergency transfer and it is also a very important factor in maternal mortality in the country. For instance, maternal mortality rate in the country remains high at 540 per 100,000 live births and as high as 1,100 in some rural areas in the northern part of Nigeria (Trans aid, 2011 and Usman, 2013). Against this background, this study aims at examining the role of rural road transport in

determining physical access to primary health centres in Ilorin East Local Government Area (LGA) of Kwara State.

Transport and Access To Basic Facilities

One important way, in which transport help to improve people's welfare is by providing access to socio-economic facilities (Fromm, 1965; Aderamo and Magaji, 2010). The use of facilities in a community depends on access to the facility. People undertake journeys to satisfy social and economic needs. Such trips include those undertaken to markets, schools, health centres, water sources, government offices and even those undertaken to visit family and friends. Improving personal travel is known to bring social benefits by raising quality of life, flow of information, labour mobility and marketing efficiency (Ellis, 1997). For instance, using data from Africa, Latin America and Asia, the International Fund for Agricultural Development (IFAD) (2001) found that, improvement in transport improves access to basic facilities in rural areas. Similarly, Global Action on Aging (GAA) (2008) noted that, inadequate transport in developing countries limit access to basic facilities like health and education and reduces opportunities for improving income in rural areas. Problems with transport provision can increase social exclusion in relation to access to public services. Annually, millions of people miss or even chose not to seek medical help as a result of transportation problem (House of Commons Environmental Audit Committee, 2013). Distance to health facilities and the ease and cost of transport are very important in people's willingness and ability to seek health services (World Bank, 1993). In the case of educational facilities, distance and ease of transport to school is known to have an impact on school enrolment, especially in the case of female education (Avotri *et al*; 1999).

According to Khandker *et al* (1994) in a study on schooling and cognitive achievement in Morocco, the presence of a paved road raised the probability of female attending school by 40 percent and lowered the probability of dropping out by 7.0 percent. Road improvement also, reduced probability of boys dropping out of school by 36 percent. In a similar study in Morocco, Levy (1996) found that rural road improvements increased agricultural output and improved access to social facilities. Improvement was recorded in school enrolment rate, frequency of visit to hospitals and attraction of professionals to hospitals and schools. In Zambia, Howe (1983) found that distance has great impact on hospital attendance. For instance, 50 percent attendance was recorded for people living within distance of less than 5 kilometres. On the other hand, only 2.0 percent attendance rate was recorded for those residing within 33-40 kilometres of medical facilities. In Ghana, Using data from the world's Living Standard Measurement Study (LSM), Glewwe and Jacoby (1992) also observed that higher travel time has negative impact on school enrolment. While emphasizing the high rate of rural poverty in Nigeria, the World Bank (1996) observed that, roads are very vital to improving access to basic services and developing the rural economy. The report further concluded that, in communities with paved roads 80 percent of the people have access to health services. On the other hand, 70 percent of residents of communities without paved roads do not have access to modern health facilities. In a study of the Nsukka region of Nigeria, Madu (2007) identified provision of roads as a strong underlying factor of rural development in the region. Areas with high road density and communities with high magnitude of link to other communities have better access to basic facilities and recorded higher levels of socio-economic development.

Aderamo (2007) revealed that in Kwara State, those areas with high road density have more basic facilities than those areas with low road network density. Aderamo and Magaji (2010) also concluded that, there is a relationship between road network density and distribution of public facilities in Edu LGA of Kwara State. They emphasized that well maintained transportation system promote socio-economic development and concluded that, improving rural roads will bring basic facilities closer to the people, improve economic opportunities and reduce rural poverty.

Study area

The study area is Ilorin East LGA. The Local Government Area is located between Latitudes 8⁰ and 15⁰ N and Longitudes 4⁰ and 5⁰ E and shares boundary with Ilorin South, Ilorin West, Moro and Ifelodun Local Government Areas (Kwara State Government, 2013) (see Figure 1). According to the 2006 population census Ilorin East LGA has a population of 207,462 (Federal Republic of Nigeria Official Gazette, 2009). Majority of the people in the area are farmers who engage in the production of crops like melon, groundnuts, beans, pepper, cassava, yams, soya bean, maize, locust bean and Shea nuts (Raw Material Research and Development Council, 2009). There are thirty three primary health centres in the LGA. Seven of these health centres are located within Ilorin metropolis while the remaining twenty-six centres are spread across the other parts of the LGA. As is generally the case in Kwara State the rural parts of the LGA are grossly deficient in provision of infrastructural facilities. For instance, the problem of deficiency of rural road transport in the state has been noted by various scholars (Ogunsanya and Ojetola, 1993 and Aderamo 2007). Most of the available roads in the study area are in

deplorable condition resulting in difficulty of movement of people.

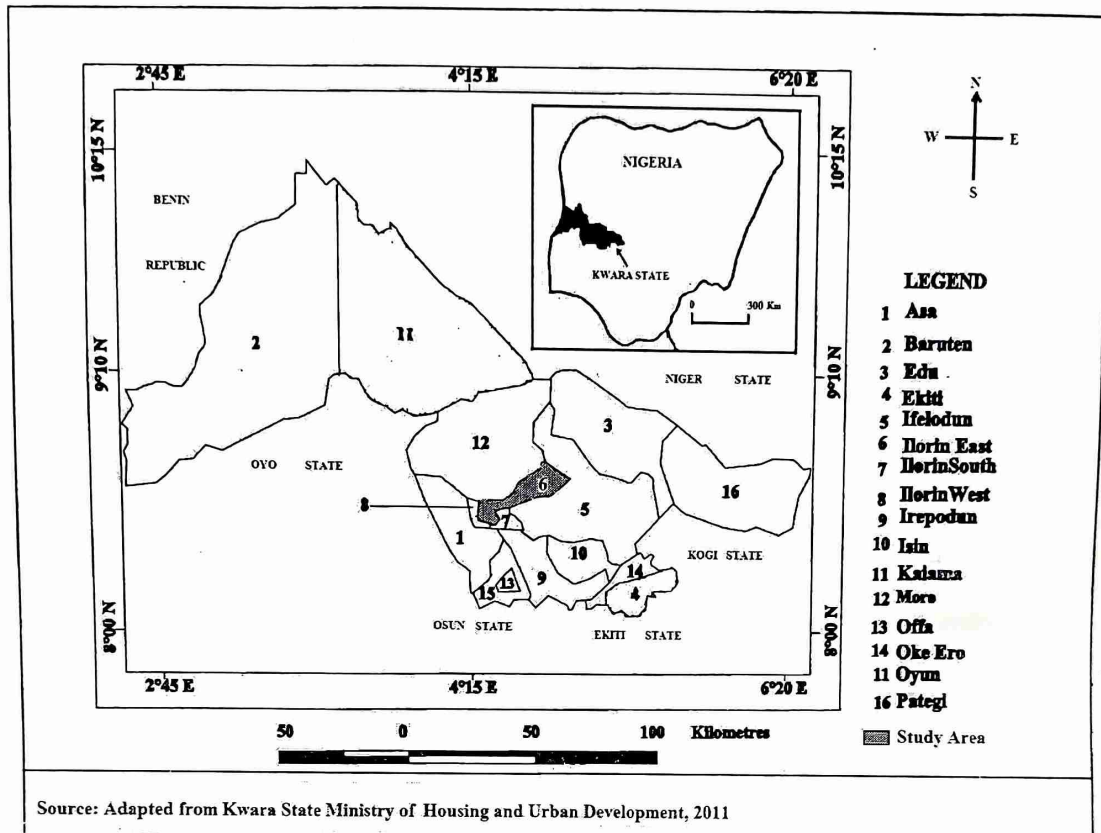


Figure 1: Kwara State showing Ilorin East Local Government Area

Methodology

The study depends mainly on primary data obtained at household level. Multistage sampling procedure was used to derive a sample size of 207 respondents in ten settlements spread across the LGA. The Federal Government defines rural settlements as settlements with population of below 20,000 and this definition was adopted for this study. The first stage involved the use of both stratified and systematic sampling techniques whereby all the rural settlements in the LGA were separated into those located on the main

(Trunk A) road and those found along the other roads in the area (see Figure 2). The settlements were then arranged in an array of descending order based on their population and the first five settlements in each group were selected for the study. Copies of the questionnaire were applied to 5 percent of households in each of the selected settlements. The average size of rural households in Nigeria is 5 persons (National Bureau of Statistics, 2006 and National Population Commission, 2009). The questionnaire distribution of the households is shown in Table 1.

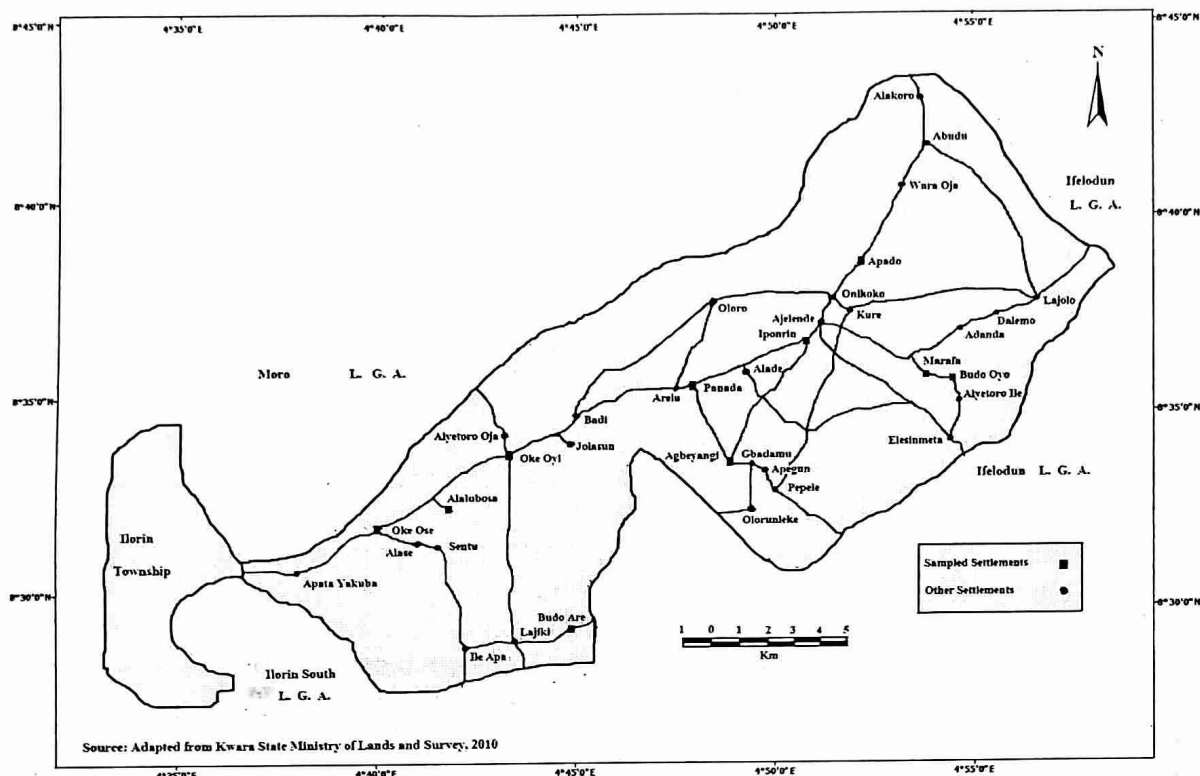


Figure 2: Ilorin East Local Government Area showing the sampled settlements

The heads of household were targeted in the survey. The households in which copies of questionnaire were applied were chosen through systematic random sampling. The use of systematic random sampling involved determining the sampling frame (N) and the sample size

(n). After selecting the first household, every K^{th} household was selected for questionnaire administration. For instance for Oke Oyi with a total number 1,785 households and a sample size (n) of 89, K is given by:

$$K = N/n = 1,789/89 = 20$$

Table 1: Sampled settlements and number of households for questionnaire administration

SN	Settlements		Population (2006) Projection	Estimated number of Households	5 Percent of Households
1	Oke Oyi	(m)	8,927	1,785	89
2	Iponrin	(m)	2,464	493	25
3	Panada	(m)	2,162	432	22
4	Apado	(m)	1,239	248	12
5	Oke Ose	(m)	663	133	7
6	Agbeyangi	(r)	1,993	399	20
7	Budo Oyo	(r)	965	193	10
8	Marafa	(r)	793	159	8
9	Alalubasa Isale	(r)	756	152	7
10	Budo Are	(r)	668	134	7
Total			20,632	4,128	207

Note: (m) Settlements on major roads, (r) Remote settlements.

Source: Population projected to 2006, from NPC's 1996 projection of the 1991 census figures using 3% annual growth rate

As observed by Sarka and Ghosh (2000) physical accessibility is a measure of the ease or difficulty of reaching a particular service. The time spent in reaching a particular facility depends on the level of mobility, the location of the facility and

the route condition. This present study assumes that the time spent in reaching a particular facility is a good determinant of the level of physical access to the facility in the study area. The regression model for this specific case is of the form:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + \dots + b_{10}x_{10} + e \text{ where}$$

Y = Time spent to reach the facility (TM) (estimated time in minutes)

a, b₁, b₂, b₃, b₄, b₁₀ are constants of the regression equation to be estimated.

x₁ = Category of road to settlement (RDCR) (Route Access Index 0 – 5).

x₂ = Means of transport to health centre (MTR) (by foot = 1, public transport = 2, personal vehicle = 3)

x₃ = Nature (diversity) of transport service (NTSR)

(No transport service = 0, 1 vehicle type = 1 5 vehicle types = 5)

x₄ = Distance to health centre (DS) (estimated distance in metres)

x₅ = Transport cost to facility (TC) (amount in Naira)

x₆ = Total income of household head (TICM) (amount in Naira).

x₇ = Ownership of Intermediate Means of Transport in household (IMT)
(Number of IMTs in household)

x₈ = Road distance to LGA headquarter (RDLG) (distance in kilometres)

x₉ = Education level of respondents (EDL)

(No formal education = 0, primary education = 1 tertiary education = 3)

x₁₀ = Sex of respondents (SEX) (female = 1 male = 2)

e = error terms

Results and Discussion

The classification of roads in the study area into various categories is based on field observation, questionnaire administration and random interview of residents of these villages. It was therefore possible to determine the functionality of the roads throughout the year. The roads connecting seven of the sampled settlements were found to be accessible by two – wheel drive vehicles throughout the year. Roads connecting the other three settlements (Budo Oyo, Marafa and Budo Are) are passable to four-wheel drive vehicles throughout the year but often closed to two-wheel drive vehicles when wet. This implies that vehicular travel is restricted by poor road surface conditions in some of the settlements in the area. This will likely place some restrictions on mobility in the affected settlements with

attendant negative effects on the economy and general wellbeing of the people. Transport services in the area are provided by a variety of vehicles consisting of buses, rural taxis, pick up vans, trucks and commercial motorcycles. Only 18 (8.7%) of the respondents were found to possess personal four wheel vehicles in their household. On the other hand, 52.3% of the sampled households have at least a motorcycle or bicycle. This is in line with the observation of World Bank, (1996) that, ownership of personal cars and other four wheeled vehicles is very low in Africa. Commercial transport services provided by four wheeled vehicles are available in eight of the sampled settlement and unavailable in Alalubosa Isale and Budo Are. Commercial transport service is restricted to that provided by commercial motorcycles in the two

affected villages. The sampled households are located at different distances to the health centres with the minimum distance being less than 50 metres. The maximum distance to a health centre among the sampled households is 12 kms, while the mean distance was found to be about 1 km. For the households that are far away distance may be a constraint to their willingness and ability to use health facilities as observed by World Bank (1993). This will be detrimental to the health and wellbeing of the affected rural dwellers. Furthermore, the difficulty of reaching basic facilities means that, time and efforts that could be used for productive activities are devoted to travelling. This will have a negative effect on the rural economy since less time and energy is available for productive activities. A total of 101 (48.8%) respondents indicated that they usually travel to the health centres to seek medical attention by foot. For 44 (21.2%) of the respondents journeys to the clinics are by personal bicycle or motorcycle, 49 (23.7%) travel by commercial motorcycle

while, the remaining 13 (6.3%) respondents travel by personal four wheeled vehicles. Most of the respondents who travel by foot were found to be those located close to the health facilities in the area. Commercial motorcycles have continued to play an important role in rural areas because few commercial four wheeled vehicles are available to rural dwellers in the country. Travel time to the health facilities also vary among the sampled households. The result shows that for 85 (41%) of the respondents journey to the health facility takes less than 10 minutes. Also, 115 (55.6%) of the sample spends less than 40 minute to travel to seek medical services. When examined on settlement mean travel time to health centres is generally low in the area. For instance as seen in Figure 3, the lowest mean travel time of six minutes are recorded for Oke Oyi and Oke Ose while it is 12 minutes in Marafa and Alalubosa Isale. Figure 3 further shows that the only exception is Budo Are where the mean travel time is 45 minutes to the available rural health centre.

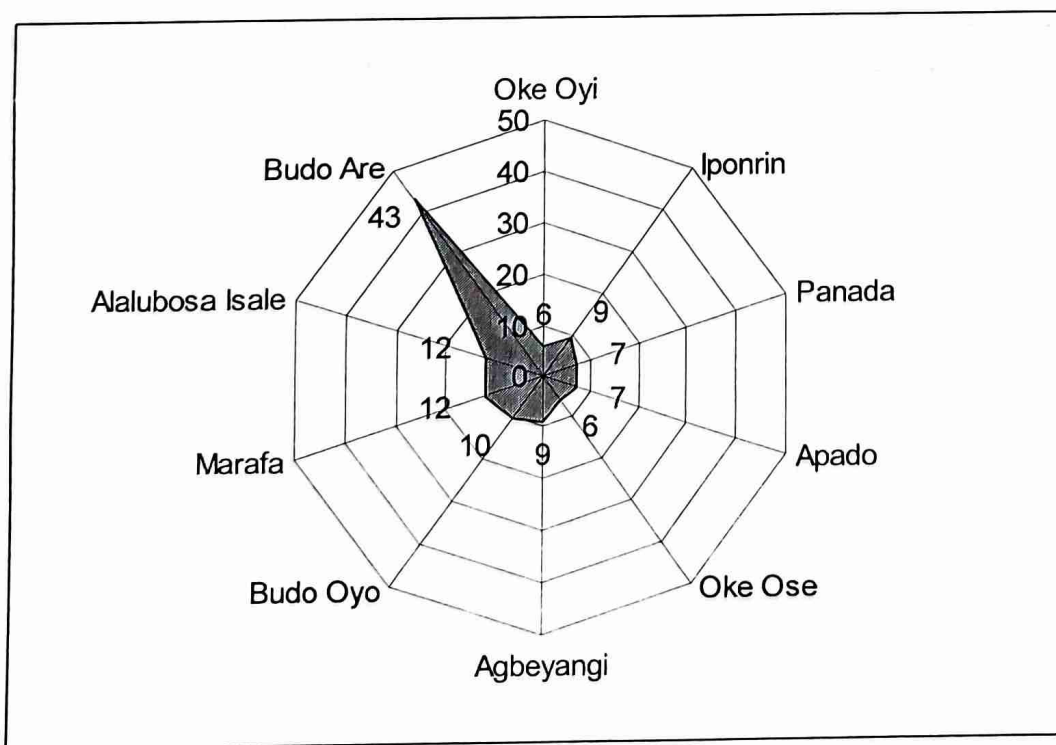


Figure 3: Mean travel time (in minutes) to primary health centres in the sampled settlements

The result of the principal component analysis after varimax rotation yielded four components that accounted for 65.5% of the variance in the selected variables (Table 2).

Table 2: Component loadings on determinants of access to rural primary health centres in Ilorin East LGA

	Components			
	1	2	3	4
Road Category	-.108	.787	-.085	-.245
Means of Transport	.145	.823	-.115	-.074
Nature of Transport Service	-.049	.756	.194	.243
Distance to Health Facility	.960	-.105	-.074	.174
Transport Cost	.911	-.073	-.016	-.025
Total Income	-.001	-.204	.750	.147
Ownership of Intermediate Means of Transport	-.044	.029	.643	.114
Road Distance to LGA Headquarter	.264	-.293	-.073	.856
Education Level	-.042	.138	.610	-.335
Sex	.206	-.149	-.227	-.355
Eigen Values	2.581	2.011	1.468	1.146
% Variance	23.468	18.280	13.350	10.418
% Cumulative Variance	23.468	41.748	55.097	65.515

Source: Computed from field data, 2011

As indicated in Table 2, the first component which accounts for 23.5 of the total variance has the strongest loading on Distance to Health Centre (DS) and Transport Cost (TC). This is understandable as transport cost often varies directly with distance travelled. So this component is labelled 'Transport Cost'. The second component labelled 'Transport Facilities' has strong positive loading on Means of Transport (MTR), Category of Road (RDCR) connecting the settlements and Nature of Transport Service (NTSR). The third component has the strongest loading on Total Income (TICM). It also has a strong loading on Ownership of Intermediate Means of Transport (IMT) and Education Level (EDL). This component is labelled 'Demography' because it embraces the

demographic characteristics of the people. The fourth component has a strong positive loading on Road Distance to Local Government Headquarter (RDLG). It is named 'Remoteness' because it is a measure of level of isolation from the centre of administration or decision making. In order to establish the role of transport in determining access to basic health centres in Ilorin East LGA, the component scores in Table 2 were used as independent variables. The result of the stepwise multiple regression analysis indicates that all the four variables are important in explaining access to health centres in rural areas of the LGA. The summary of the statistics reveal that the combined influence of the four variables could explain just 75.5% of the total variation in access to rural primary health

centres in Ilorin East Local Government Area of Kwara State. Some other factors not considered in this study could be responsible for the unexplained variance (24.5%). As shown in Table 3, 'Transport Cost' (x_1) is the best predictor of access to health centres in the study area because 72.1% of its variance is associated with the variation in access to health centres. This implies that proximity to health centres is very important in terms of using health

facilities in the study area. Those who live far away from health centres require more time and efforts to reach these facilities. Longer distance will also most likely translate into higher cost of transportation. Meanwhile, longer travel time to health facility was linked to greater risk of experiencing maternal mortality among pregnant women in rural Ghana (Poku-Boansi *et al*, 2010).

Table 3: Road transport variables controlling access to rural primary health centres in Ilorin East LGA

List of variables	Parameter estimate	Standard error	R	R ²	% contribution	% cumulative contribution
Intercept	10.099	0.107				
x_1	5.791	0.108	0.849	0.721	72.1	72.1
x_2	-0.938	0.108	0.860	0.740	1.9	74.0
x_4	0.699	0.108	0.866	0.750	1.0	75.0
x_3	-0.446	0.108	0.869	0.755	0.5	75.5

x_1 = Transport Cost, x_2 = Transport Facilities, x_3 = Demography, x_4 = Remoteness.

Source: Computed from field data, 2011

Next in importance is 'Transport Facilities' (x_2) which is responsible for an additional 1.9% explanation of variance in access. 'Remoteness' (x_4) also contributes an additional of 1.0% while 'Demography' (x_3) added another 0.5% to the other three variables. Those who earn higher incomes spend less time to reach the health centres because they are more likely to be able to afford higher transport charges if necessary. Ability to seek timely health services may be limited by high transport cost. For instance, households in Budo Are have to cover about 16Kms to obtain service from the nearest functional health centre at Oke Oyi. This is a journey of about 40 minutes to one hour with motorized transport and at a cost of at least ₦300 round trip. Poor access to transport is known to isolate especially low income families from health care because people are forced to spend large parts of their income on transport charges, at the expense of other basic needs (The Leadership Conference Education Fund,

2011). For instance, in a study in Ghana Heyen-Perschen (2005) noted that 70% of the rural poor sampled cited high transport charges as one of the major reasons for not using health facilities. Similarly, in a study in rural Bangladesh transportation cost was found to be the second most expensive cost after drugs when people visit hospitals (Cockcroft *et al*, 2000).

From the results of the regression analysis the relationship between access to primary health centres and road transport variables in the area can be predicted with the following equation:

$$Y = 10.099 + 5.791 x_1 - 0.938 x_2 + 0.699 x_4 - 0.446 x_3$$

$$(R^2 = 0.755, SE = 0.107)$$

The equation implies that the higher the cost of transport to the health centre the less the access to health services. Also, the better the transport facilities available the less the time required to travel and the greater the access to health services.

Furthermore, people living in remote areas have poor access since they require more time and efforts to travel to obtain health services. On the other hand higher incomes and greater personal mobility enable people have greater access to health services.

Conclusion and Recommendations

Available transport facilities, distance, mode of transportation and travel time to health facilities vary within and among the sampled settlements. Households located far away from health centres and those located in areas with poorer transport facilities were found to have less access to medical services in the area. This has clearly emphasized the important role played by transport in providing physical access to health centres in rural areas.

It is therefore recommended that adequate funds be allocated to improving roads in Kwara State. Priority should be given to construction of new roads and reactivation and improvement of existing roads especially in the rural areas. There is also the urgent need to introduce interventions that will improve the provision of rural transport services. This can be achieved through the provision of credit to rural transport service operators in the State. Such measures will help to improve vehicle supply in rural areas. Since distance has been found to be a major determinant of access to health facilities in the area, the best way of addressing this problem is by finding a way to take health services to the people. Since economic reality will not allow provision of health centres in every community, government can introduce mobile clinics in rural areas of the State. Well equipped mobile clinics would ensure that modern medical care will be available to the generality of the people, including those living in very remote areas.

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