



Spatial Distribution and Accessibility to Post Primary Educational Institution in Ogun State, Southwestern Nigeria: Case Study of Yewa South Local Government Area, Nigeria

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Authors' contributions

This work was carried out in collaboration between the two authors. Author OOF designed the study, wrote the proposal, author SAO collected the data, authors OOF and SAO analyzed data and wrote the first draft of the manuscript. Author OOF reviewed the relevant literatures. Both authors read and approved the final manuscript.

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ABSTRACT

Access to post-primary school education plays significant role in the future prospect of children in any nation. However the accessibility to post-primary education depends on availability of school within minimum spatial distance to children of different economic divide in the society. Spatial distribution of post-primary school has been generally uneven in most developing countries and thus limits the level of accessibility to that level of education. The study examined the spatial distribution of post-primary education in Yewa South local government area, in the southwestern Nigeria. The locations of post-primary schools in the study area were captured through handheld Global Positioning systems (GPS) receivers and the spatial analyses were carried out in the GIS platform. The results showed a dispersed pattern for the overall assessment of spatial distribution in the areas. However a clustered pattern was obtained for 9 electoral wards while a dispersed

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pattern was obtained in Ilaro ward (a relatively urban ward). Some students in the public post-primary schools travel as much as 5 kilometers mostly on foot to school every working day. The paper concludes that spatial reengineering and reorganization of post-primary school is necessary in the study area if the access to educational facilities would be enhanced.

Keywords: Spatial accessibility; post-primary education; spatial analysis.

1. INTRODUCTION

In Today rapidly advancing economy human qualifications and education are crucial for the information- and economy driven civilisation [1,2]. The development of any nation depends primarily on its ability to effectively utilise the intellectual resources available to her. The provision of broad and fair access to education is strongly advocated by both the promoters of social equality, social justice and modern day democracy, who view education as a precondition for advanced development and competitive edge. Therefore accessibility to post primary education can be considered as both human right issues and development programme for economic transformation. Accessibility to the educational opportunities can be measured and evaluated in terms of spatial, social, political and economic dimensions. In the past Nigeria, South Africa and other sub-Saharan African countries accessibility to education has been used as political and economic weapon by the elite to suppress and as instruments to uplift a section of the population in their political and economic re-engineering for nation's building, nation's reconstruction and restructuring. The income inequalities that exist in these sub-Saharan African countries are direct consequences of selective access to different flavours of educational system in the past by the political elites. The same social and economic engineering is still subtly taking place in Nigeria and other sub-Saharan African countries today.

Accessibility to educational facilities refers to the spatial (distance) and economic distances (*Spatial distance relate to physical barrier that have to be overcome by student between home and school facilities, while the economic distance refers to the cost to be incurred by the students to access education, including cost of school travel and cost of tuition*) which people have to cover to benefit or receive the services available at the location of educational institutions. The services available in such facilities include teaching, information, moral and mental development, skill acquisition among others. The services available and accessed at the

educational institutions are also based on the level of society technological development. Technology development can provide various brand of distance learning; web-school and other technology assisted learning platforms which may reduce physical distance between teachers and students.

United Nations Educational, Scientific, and Cultural Organization [3] posited that the development of education is important to the development of economy all over the world. The World Bank report also opined that GDP (Gross Domestic Product) of a country will increase 3% every year with increasing level of education [4]. Education is a means for accessing broader social, economic, political and cultural benefits because of its transformative and empowering potentials [5].

Taiwo [1] elucidated that education system is a complex organization of interactions between interdependent bodies, groups and individuals, all aimed at the achievement of educational goals. Post Primary education serves as a link between the primary education and higher education, and plays critical roles in molding the future of children. A child's future can depend on the type of education he/she receives at the Post-primary level. Apart from grounding the roots of education of a child, Post-primary education can be instrumental in shaping and directing the child to a bright future. The Universal Basic Education (UBE) report (2003) indicated that the transition rate from Primary schools to post primary schools in Nigeria is almost 85 per cent under Universal Basic Education programme of the which is very impressive but most of these pupils that make their way to post- primary schools often drop out of school due to several factors including disproportionate spatial and economic distances to post- primary schools education. The spatial barrier of post primary education is often neglected and thus little understood by state actors, policy makers and researchers. This is responsible for a number of policy inconsistencies that often characterise post

primary education in Nigeria and other countries with similar economic outlook.

The study examined the spatial and economic accessibility to Post-primary school education in Ogun State Nigeria with specific focus on Yewa South Local government of Ogun state. The local government was selected because it has both rural and urban components and were used to examine rural and urban dichotomy of spatial, social and economic accessibility of the population to secondary school education in the study area. Though the population of the state and the local government is growing at the rate of 2.5 percent per annum, with huge number of the population of the school age, the school facilities are not increasing at the same rate. In fact, between 2003 and 2007 the number of Post-primary school in Ogun state increased from 265 to over 396 to serve about 4 million population [6].

2. OBJECTIVE OF THE STUDY

The central objective of the study is to examine the spatial, social and economic accessibility levels of residents to post primary educational institutions in Yewa South Local government area in Ogun state, Nigeria and identify the factors associated with the observed pattern.

The specific objectives of the study were to identify spatial distributions of Post-primary schools in Yewa South local government;, to examine the nature of accessibility to Post-primary schools and to identify the factors associated with spatial accessibility of residents to post primary institutions

2.1 The Study Area

Yewa South Local Government in Ogun State lies between Longitudes 2°47'24"E and 3°6'48"E, and Latitudes 6°37'46"N and 6°55'42"N. The area is bounded on the East by Ifo and Ado – Odo/ Ota local Government and on the West by Ipokia Local Government and north by Yewa North. The Local government area is inhabited predominantly by the Yoruba speaking people of South Western Nigeria. It has a total land area of 629.38 square kilometers, with population of 150,850 [6]. There are (15) fifteen public Post-primary schools and (10) Ten private Post-primary schools in the study area (Ogun State Education [7]. The Local Government is divided into Ten (10) wards as shown in Fig. 1. These

are Ilaro I, Ilaro II, Ilaro III, Iwoye, Idogo, Owode I, Owode II, Ilobi/Erinja, Oke – Odan and Ajilete administrative wards from which the data for this study was collected.

2. METHODOLOGY

Primary data for this study was collected through questionnaire and a hand-held GPS receiver to capture the location of schools. Post-primary data include administrative map, demographic statistics from teachers and students and statistics of schools' facilities. All maps and spatial data were captured in the GIS platform for geospatial analysis. The data obtained from the administered questionnaire were coded and integrated in the GIS platform for geo-statistical analysis. Analyses were done in the ArcGIS platform to obtain the Nearest Neighborhood analysis and the spatial inequalities of Post-primary schools. Geospatial analyses performed on the geodatabases include spatial concentration analysis and the use of nearest neighbor geo-statistical analysis to test the significance of the result of spatial concentration of schools in the wards [8]. Simple statistics was also performed on the data collected through questionnaire to examine the cost, mode of travel and travel time of students to schools.

2.1 Analysis of Spatial Distribution of Post Primary Schools

Nearest Neighbor Analysis was used to evaluate the spatial accessibility of population to Post-primary Schools in the study area. The average Nearest Neighbor analysis and Manhattan distance method were also used to ascertain the spatial distribution and accessibility of Post-primary Schools.

3. RESULTS AND DISCUSSION

3.1 Spatial Distribution Pattern of Post-Primary Schools

A total of 25 post primary schools were identified in the study area which comprises of fifteen (15) public and Ten (10) private Post-primary schools. It was observed that though the six of the wards are not equal in terms of land area yet there is obvious concentration of post primary schools among the urban wards in the north eastern and south eastern parts of the study area as shown in Fig. 2.

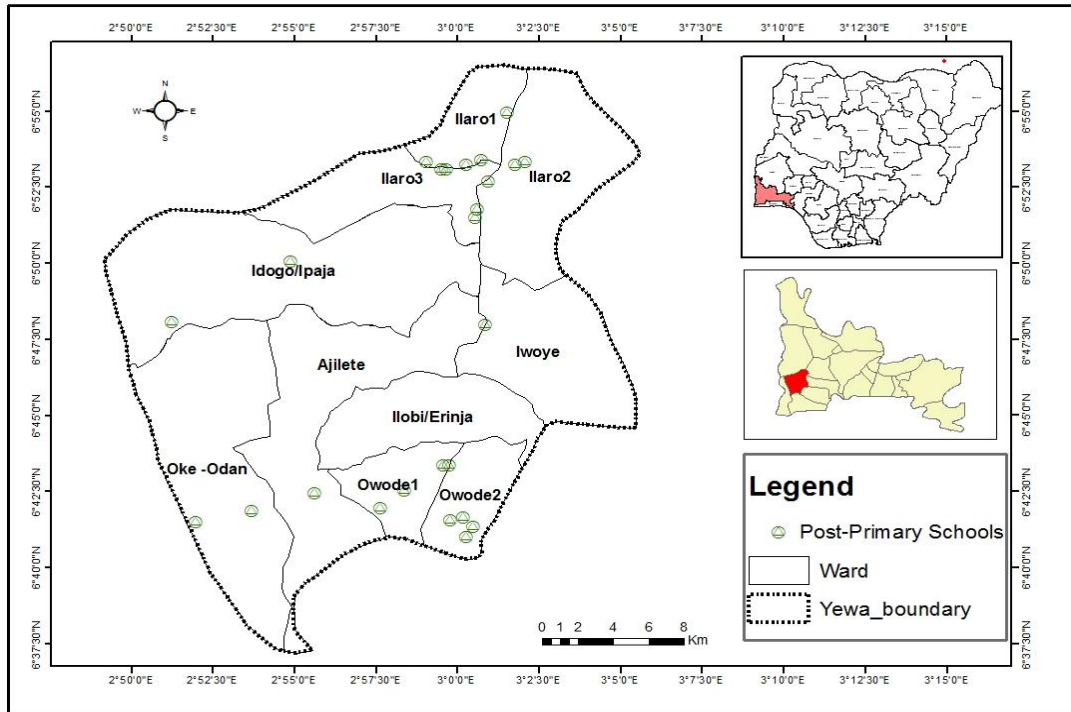


Fig. 1. Yewa south Local Government Area, Ogun State, Nigeria

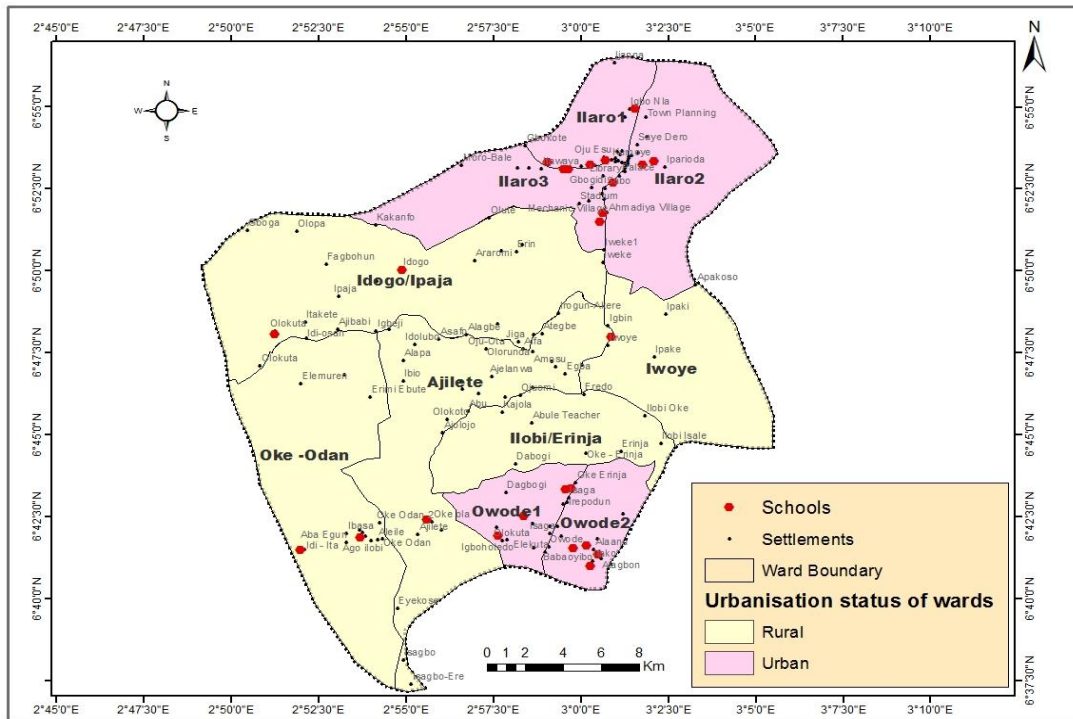


Fig. 2. Urban status of electoral wards in the study area.

Though Urban areas have high concentration of population than the rural hinterland in the study area shows high higher numbers of Post-primary schools in urban areas than the rural areas indicating that rural population have to cover longer distances to access Post-primary school education sometime more than 3 kilometers.

3.2 Spatial Accessibility Index

Spatial accessibility indexing is a procedure to categorize the differential levels of access to a facility or resources based on distance or physical barriers that prevents or hinder access. This is a function of Geography and political and economic inhibitions imposed by nature or state actors. Spatial accessibility index has been used by several research works ([9,10,11] Weston, [12,13], Toulmin, [14], Wyatt, [15]) with impressive results. In Ogun State, accessibility to Post-primary education has persistently remained low (Ogun state Ministry of Education, 2007). The state has a population of about 4 million and has 396 Post-primary schools. It is noted that more than 50 percents of this Figure are below or within the Post-primary school age [6]. It therefore translates to an average of one school for a population of 10,000. The distribution of the school has favored the urban area than the rural area (see Fig. 2). The private educational institutions also appear to favour the urban area than the rural areas despite the fact that close to 70% of the population in the LGA live in the rural area. In essence the access to Post-primary education services and facilities in the state is generally poor.

The nearest neighbor analysis for the spatial distribution of Post-primary schools in the study areas revealed two major spatial patterns, that is the overall general pattern and specific pattern within wards. The overall distribution pattern in the Local Government area shows dispersion (see Fig. 3a.). The within ward spatial distribution pattern in Ilaro Ward also showed dispersed pattern. However the spatial distributions in the remaining electoral wards showed clustered pattern as shown in Fig. 3c-3h. The implication of these two patterns (the overall and within pattern) is that spatial accessibility is uneven (clustered in most of the ward) but fair (dispersed) in the entire study area and Ilaro Ward 3. Spatial concentration in the remaining local government areas which shows that a large percentage of the population is disadvantaged or totally lack access to Post-primary education to all inhabitants. Since the location of Post-primary

school appears urban bias threshold population seem to play certain role in the location of Post-primary school especially the private school in the study. It can also be inferred that Post-primary school education in the study area is considered as economic goods rather than social or public goods. Poor students have to travel than normal to overcome the friction of distance which is obvious by locating in places where people are concentrated. Students in places of low population density have to travel than normal to access Post-primary education sometimes 4 to 5 kilometers. The NNR in most of the wards is higher than the Z score.

The implication of the NNR value higher than the Z score is that the pattern is more dispersed than clustered. There is uneven and unsystematic spatial distribution of the school in the study area. Similar patten could be observed in in Ilaro Ward 3 where the value of NNR is 606.02 while the z score is 2588.13 (see Fig. 3a). In other political wards of the study area, however, there is spatial concentration of post-primary schools for instance in Ilaro Ward 1 NNR is 0.217 while the Z score is -3.24 (Fig. 3.c), Ilaro Ward 2 has NNR 0.005 and Z score -3.29(Fig 3.d). Other showing spatial concentration of Post-primary schools include Owode ward1 and Owode ward 2 that have (NNR0.25, Z= -2.48) and NNR 0.11 and z= -4.29) respectively. There is also high concentration of Post-primary schools in limited place in Idogo-Ipaja ward of the study area having NNR =0.038 and z. -2.60.

Further analysis of within distance spatial pattern at the political ward level revealed unequal accessibility of the population to available Post-primary school. Most of the schools are concentrated in small area within the wards. The limitation of the NNR in measuring the spatial pattern of Post-primary schools in the study are is however acknowledged as some wards have only one or two Post-primary schools which will show high spatial concentration of schools, the wards with this type of data were dropped from the analysis. Nevertheless the result shows that though a general pattern may reveal a near random situation across the local government, the ward have spatial concentration of the schools with urban political wards having higher more clustering in location school than normal.

The Spatial concentration of post-primary school in the ward also reveals urban bias of the distribution. Fig. 4 shows the average density per

square kilometers of the number of schools and the number of classrooms available in the wards. The highest density of schools per unit area in the local government was found in Ilaro 1, Ilaro 3 and Owode 2 which are main urban centres in

the local government. The least Post primary school density is found in Ajilete, Idogo-Ipaja and Ilobi Erija that has no school at all. These wards are have rural status (see Fig 2).

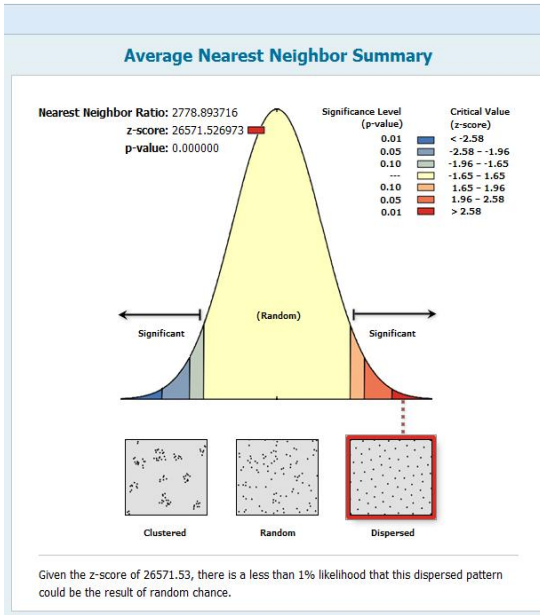


Fig. 3a. NNA of Post primary Sch. In the study area

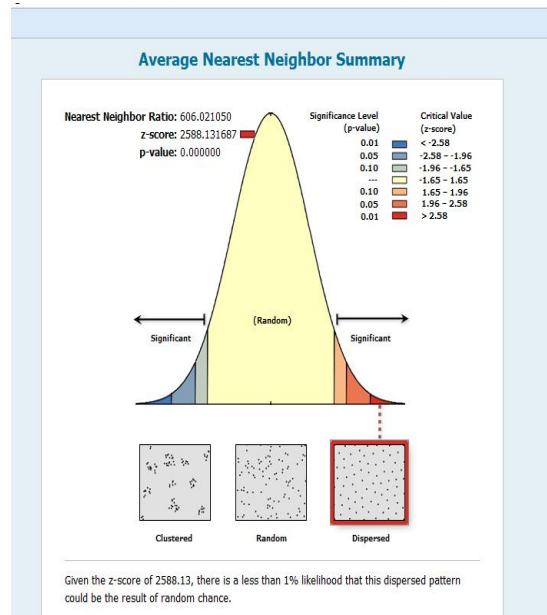


Fig. 3b. NNA of Post primary Sch. in Ilaro Ward 3

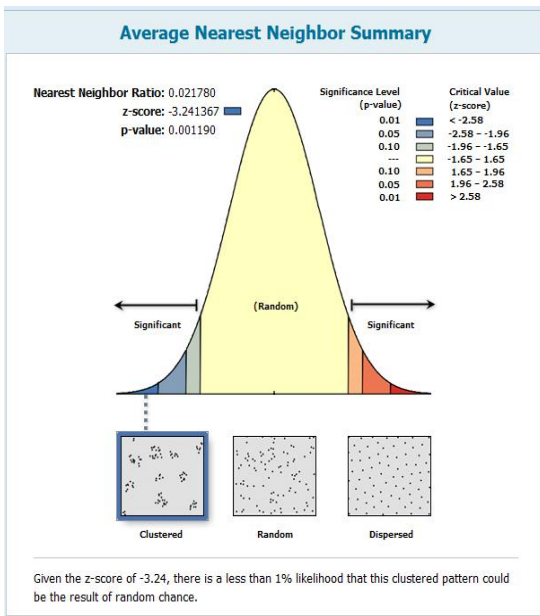


Fig. 3c. NNA of Post primary Sch. In Ilaro Ward 1

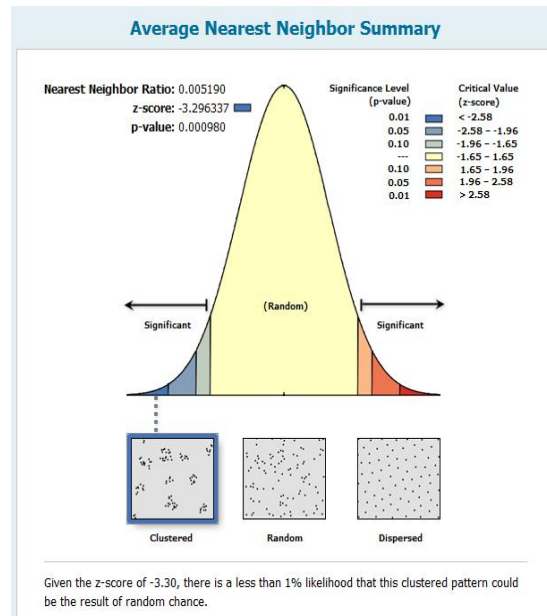


Fig. 3d. NNA of Post primary Sch. In Ilaro Ward 2

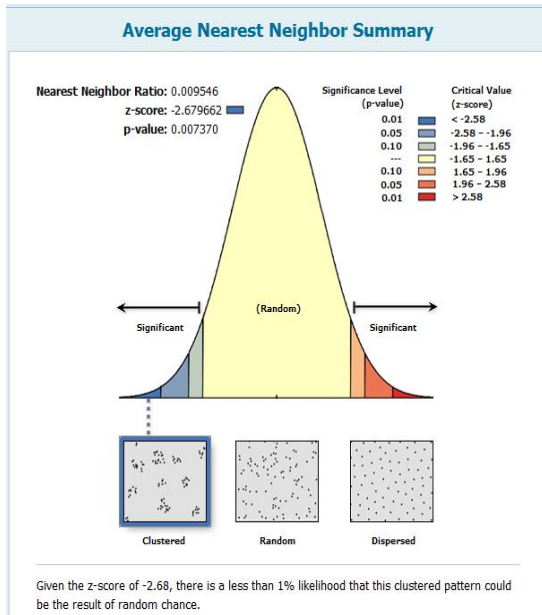


Fig. 3e. NNA of Post primary Sch in Oke - Odan Ward

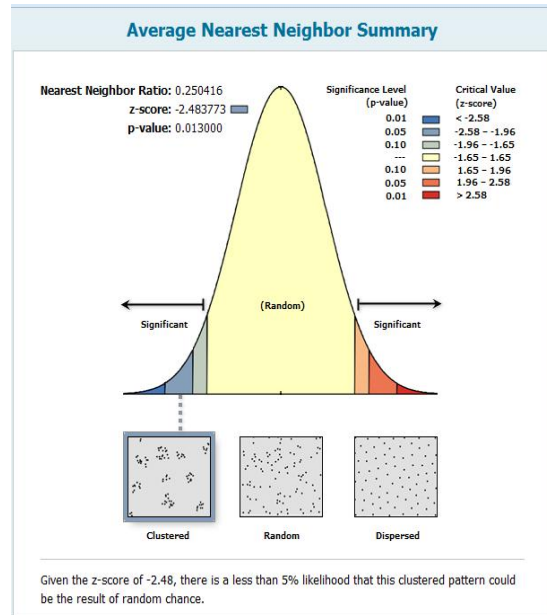


Fig. 3f. NNA of Post primary Sch in Owoode Ward 1

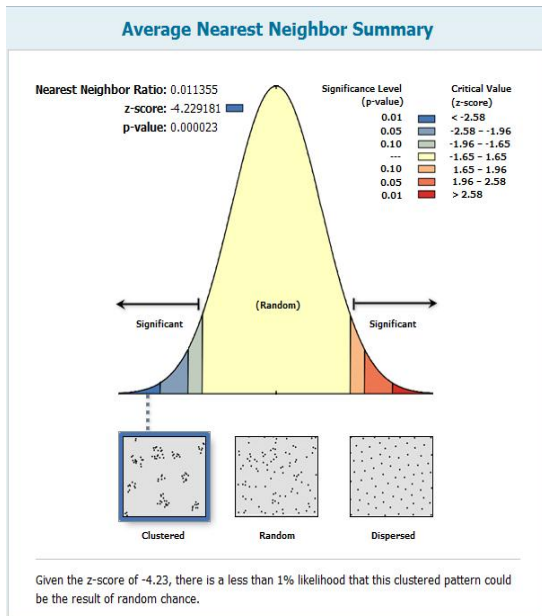


Fig. 3g. NNA of Post primary Sch.in Owoode Ward 2

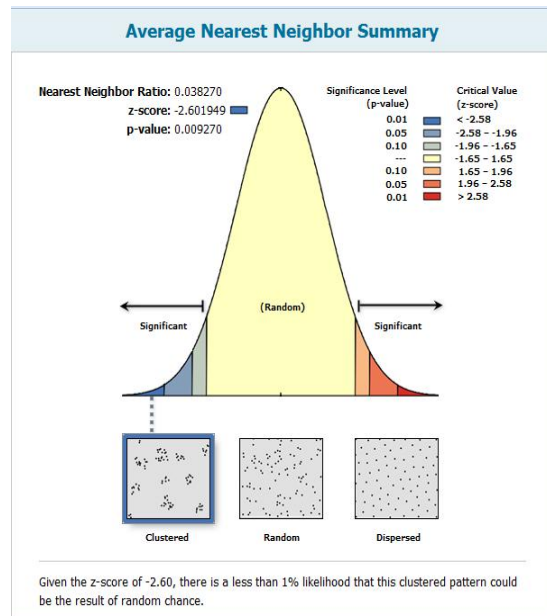


Fig. 3h. NNA of Post primary Sch.in Idogo/lpaja Ward

3.3 The Nature of Access to Post-primary Education

The nature of access to Post-primary schools was examined through the questionnaire and responses were documented in the Tables 1, 2 and 3. The questions include category of school

the student attend, compare to category of the nearest school to their home, mode of transportation and travel time.

The Table 2 showed that out of the 372 students in public Post-primary school, 82.2% confirmed that their school is nearest to their homes while

all the students in private schools claimed that the school is not the nearest Post-primary school to their residence. This indicates that most parents send their wards to private Post-primary schools outside their vicinity which can be a pointer to citizens' loss of confidence in the public Post-primary schools or may be a display of enhanced status by parents who prefer expensive schools for their children. Majority of the respondents in the private Post-primary schools have public schools nearest to them yet they did not attend those schools. Most students in the study area however accepted there is a fair distribution of Post-primary schools in the study area and they are used to distance covered every day from home to school.

The study further observes that 82.2% of students claimed that public school is the closest school to them while 17.83% claimed that private school is the closest school to them. This means

majority of children that attend public school education chose the schools that are closest to them while the students in private schools have other considerations for choosing the schools to attend. Distance is a major factor of choice in public Post-primary school while quality or amount consideration is the factor considered by parents of children in private schools.

3.4 Travel Time to school

The day students were asked on the travel time to school and the travel time to the first bus stops on a typical day journey to school. Students with travel time below 1hour in public day schools account for 84.3%, students in private day schools account for 14.2%. Students whose travel time is within 1hour in public day school students account for 0.96% while private day school students account for 0.48%.

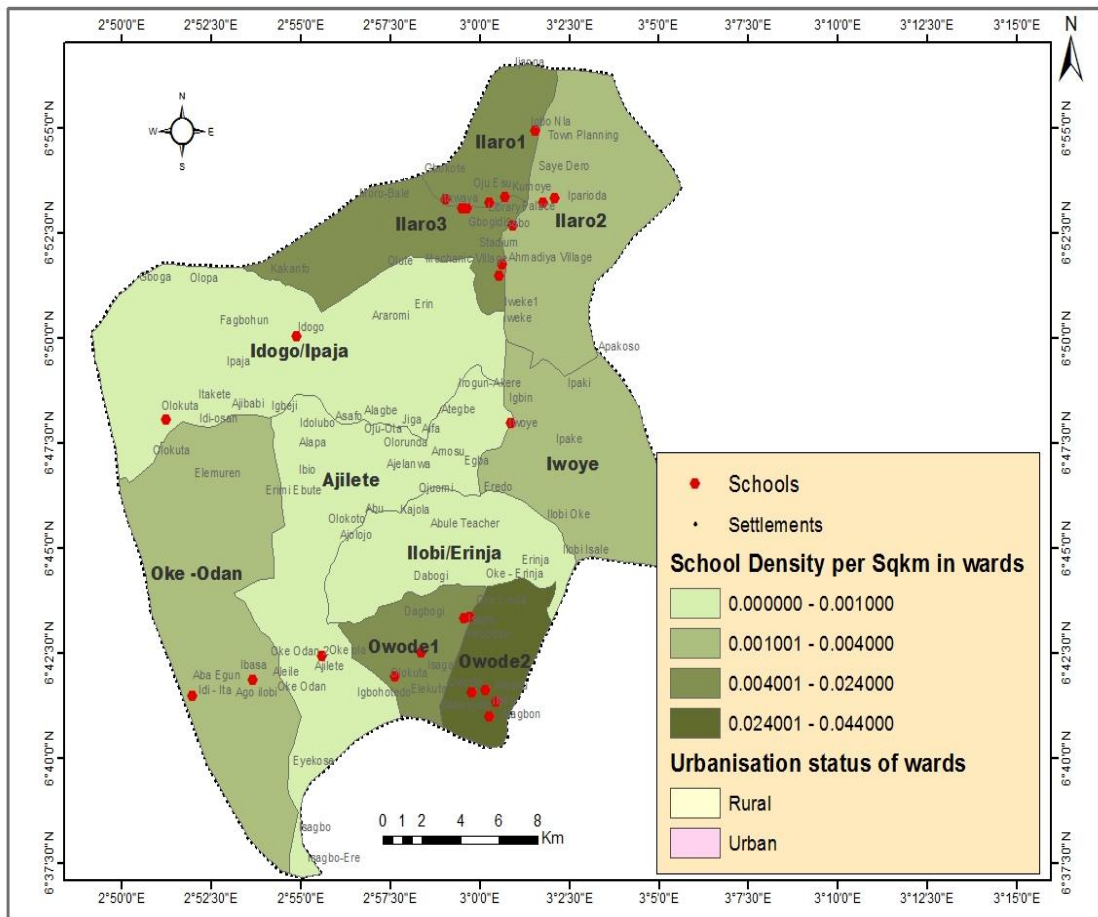


Fig. 4. Spatial Density per square kilometer in Wards of the study area

The implication of the result is that though there is considerable spatial distance to cover by students to get to school, the mode of transportation used and the nature of travel corridors considerably reduce travel time to school in the study area. The trekking time to the bus stop is generally below 5 minutes for most students in the day and public Post-primary schools (82.2%).

3.5 Mode of Transportation to School

The mode used by students to travel to school influence to a great extent the ability to concentrate in school and it serves as a measure of access to school. A student that travels between 4 to 5 kilometers on foot will rather be too tired to concentrate in the first few hours of class work; this can affect the level of assimilation. The travel corridor also relate to the travel time for any type of mode [16,17] used. In the study area majority of the students in Public Post-primary schools walk to schools (73%) while only a few go to school in cars(0.72%) and significant proportion go to school on commercial motor cycle (11.6%) as shown in Table 2.

The mode of transportation used by students on school trip shows that 73% trek to school while 11.6% go on motor cycle which is an indication that majority of the students in public Post-primary school are from poor homes thus why majority cover long distance on foot, others manage to go by the cheapest means of transportation in the country which is commercial motor bus The computation of average distance from residents to school showed an average distance of 52 km which means students cover

considerable distance the cost of their distance are borne by the already impoverished population.

3.4 Cost of Transportation

The costs incurred by students on transportation to schools are shown in Table 3. Public day students that walk to school and thus incur no transportation cost account for 73%, while those spending between ₦20 - ₦ 40 account for 1.2%, ₦40 - ₦ 60 account for 3.4% while ₦60 - ₦ 100 account for 0.7%. In private day students we have 11.3% no cost, ₦20- ₦ 40 2.2%, ₦40 - ₦60 2.4% and ₦60 - ₦ 100 1.7%. Those going by private car account for 1.2% while boarding student account for 2.9%. Those with private car and boarding students are categorized under “no costs”. In all, there is a total of 88.3% no cost, 3.4% with ₦ 20 - ₦ 40, 5.8% with ₦ 40 - ₦ 60 and 2.4% ₦ 60 - ₦ 100.

Judging from the average distance that students have to cover to get to school and these distances are covered by foot showed the effort students have to put to get education and also revealed the low economic status of parents. Only very few parents could afford the cost of motor cycle which is an average of N50 per trip in the study area. This low cost being expended on school trips and the considerable distances which students need to cover per day an average of 10 kilometers to and from schools only translate to poor access to education as only committed children will brave the challenges for schooling in the study area.

Table 1. Students' responses to the nature of accessibility to Post-primary education

Travel time	Category of school									
	Public day %		Public boarding%		Private day %		Private boarding		Total %	
Nearest school to home	341	82.2	-	-	74	17.83	-	-	415	100
Travel time below 1h to school	350	84.3	-	-	59	14.2	-	-	409	98.5
1hour	4	0.96	-	-	2	0.48	-	-	6	1.5
above 1h	-	-	-	-	-	-	-	-	-	-
Travel time below 5min to bus stop	341	82.2	-	-	22	5.3	-	-	363	87.47
10 min	26	6.3	-	-	7	1.63	-	-	33	7.96
15 min	5	1.2	-	-	2	0.48	-	-	7	1.63
No travel time	-	-	12	2.89	-	-	-	-	12	2.89
Total	372	89.64	12	2.89	31	7.47	-	-	415	100

Source: Authors' field work

Table 2. Mode of transportation of students to school

	Mode of transportation									
	Walk	%	Motor cycle	%	Bicycle	Public bus	Private car	Total	%	
Public day	303	73	48	11.6	-	-	3	0.72	354	85.3
Public boarding	-	-	-	-	-	-	-	-	-	-
Private day	47	11.3	12	2.9	-	-	2	0.48	61	14.7
Private boarding	-	-	-	-	-	-	-	-	-	-
Total	350	84.3	60	14.5	-	-	5	1.2	415	100

Source: Author's field work

Table 3. Cost of Transportation for school journey

	Cost of transportation											
	No cost	%	₦ 20 - ₦ 40	%	₦ 40 - ₦ 60	%	₦ 60 - ₦ 100	%	above ₦100	%	Total	%
Public day	303	73	5	1.2	14	3.4	3	0.7	-	-	325	78.31
Private day	47	11.3	9	2.2	10	2.4	7	1.7	-	-	73	17.59
Private car	5	1.2	-	-	-	-	-	-	-	-	5	1.2
Public boarding	12	2.9	-	-	-	-	-	-	-	-	12	2.9
Total	367	88.4	14	3.4	24	5.8	10	2.4	-	-	415	100

Source: Author's field work

The study area also fall within the economic zone where majority of the population live at the bare survival level, therefore despite the fact that Post-primary education is free in the study area during the study, yet the cost of transportation of wards to and from school which is estimated to be in the range of N6, 500 per term per child is heavy for most families in the study area.

4. CONCLUSION

The study showed that there is unequal accessibility of residents to Post-primary school education in the study area it also showed disproportionate spatial, economic and social distances of residents to Post-primary school education in the study area especially in the rural areas and this could be addressed through a critical analysis of the underserved areas where students cover about 5 kilometers distance to get to school. The approached used in this study about spatial accessibility was limited to the potential availability of educational facilities rather than the actual utilisation of that facilities. Accessibility is regarded as a site feature in these study therefore further studies would be required to examine the percentage of the population accessing Post-primary education. Spatial redistribution of Post-primary education has the long term potential for restructuring and

re-engineering the spatial system and economy of the society. The quality of education available at the nearest spatial and economic distance to people in the study are is low weak and incomparable to those available in the private Post-primary schools. This was inferred from the results that showed that most students in the private schools attend schools very far from home despite the fact that they have other schools (mostly public schools) closer to their homes. The above-average family will be willing to pay extra to ensure their children have better education. The poor class who attend public school that was relatively free of school fees during the study, still have to part with transport fare for children to go to school. The transport fare is outside the reach for extremely poor families' especially if they have more than one child in the school. Many wards from poor home go to school on foot covering an average of 8 kilometres to and from school a day. The high spatial and cost distances to school can lead to mass dropout from Post-primary education from poor families.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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