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SPATIAL ANALYSIS OF ADOLESCENTS' ACCESSIBILITY TO CONTRACEPTIVES IN OSUN STATE, NIGERIA

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Abstract

This study analyzed the spatial patterns of adolescents' access to contraceptives and examined the relationship between the patterns of outlet and access to contraceptives among secondary school adolescents in three urban and three rural Local Government Areas (LGAs) in Osun State, Nigeria. Primary and secondary data were used for the study. Primary data involved the use of handheld GPS to obtain the geographic coordinates of all the secondary schools and contraceptive outlets in the study area. Also, questionnaire was administered to collect data on the socio-demographic characteristics of students and their access to contraceptives. Multi-stage sampling procedure was used to select respondents. The rural-urban variation in the distribution of outlets and adolescents' access to contraceptive was analyzed using statistical analysis tools. The results showed that there are more contraceptive outlets in the urban LGAs (70%) than in the rural LGAs (30%). Ninety percent of the adolescents affirmed that they had either full or partial access to contraceptives, while 10% had no access to contraceptives. Fifty percent of the adolescents reported that societal disapproval is a factor that hinders their access to contraceptives. Furthermore, results showed that correlation between the patterns of outlet and accessibility to contraceptive in study area is ($r2 = 0.580$; $p>0.05$), this shows that there is no relationship between the pattern of outlets and access to contraceptive in the study area. The study concluded that to reduce the problem of teenage pregnancy, there is a need to address the problem of societal disapproval of modern contraceptives among adolescents.

Keywords -Spatial, Analysis, Adolescents, Accessibility, Contraceptives

Introduction

Amidst the most enigmatic public occurrences and a major concern to the society, is the snowballing involvedness of the socio-economic implications and the health and demographic consequences of adolescents' sexuality and fertility behavior. The inclusive nature of such issues as teenage child bearing, teenage pregnancy and abortions, against the ambiance of a typically poor knowledge of and negative mind-set towards contraceptive methods among adolescents, and their premature introduction to unprotected sexual activities with its apparent implications for the spread of STIs and HIV are intermittent themes in literature (Adeniji *et al,* 1998; Adeboyejo *et al,* 2005). This therefore suggests the need to articulate and assess adolescents' access to contraceptives in relation to the patterns of contraceptive's outlets in their immediate environment. (Erica *et al*, 2014; Darroch *et al,* 2016).

Pre-marital exposure to pregnancy risk has increased, with a widening gap between sexual debut and age of marriage, and increased sexual activity prior to marriage; placing adolescents at increased risk when they are most socially and economically vulnerable. Reported sexual activity among adolescents in developing countries is generally high, and data validity is often poor (Chandra-Mouli *et al*, 2014). In sub-Saharan Africa, 75% of young women are reported to have had sex by age 20 (Guttmacher, 2007). Half of the world's population of about 7 billion people are adolescents, hence addressing the critical challenges facing the largest youth generation in

history is an urgent priority if social and economic development efforts are to succeed and the reproductive health endemic is to be reversed (UNEFPA, 2013). Nigeria has a population of 170 million people (NPC 2006) which makes her the most populated nation in Africa. One third of the population which is over 56 million constitutes young people between the ages of 10 to 24 years (UNEFPA, 2015). Many of the works done on adolescents' reproductive behaviour and access to contraceptives in Nigeria dwell much on the demographic and sociological aspects of the study. The relationship between the pattern of contraceptives' outlets and adolescents' access to contraceptives have not been given enough attention. Hence, this Research focuses on the spatial pattern of access to contraceptives among adolescents in the study area (Osun State). The Research concentrated on secondary school adolescents because they constitute the largest percentage of adolescents. The Research examined the spatial pattern of secondary schools, the spatial variation of the contraceptives' outlets and the relationship between the outlets' pattern and adolescents' access to contraceptives in the rural and urban areas of Osun State. This is important in order to determine what problem is peculiar to a certain group in a specific place and suggest solutions based on such finding.

Previous studies in the field

Lots of glitches associated with marriage and other interpersonal relationships are in no doubt directed towards sex and sexual inadequacies. Myles (1981) opined that in Hong Kong, it is illegal under the Sexual Offences Act of 1956 for a boy to have sexual intercourse with a girl under the age of 16 years. She further stated that it is logical for a person to do away from prescribing contraceptive pills to girls at puberty and that if pregnancy should occur; both the boy and the girl are embarrassed and disturbed. The girl bears the brunt of abortion or child birth, her career and future marriage prospects may be jeopardized. Okpani and Okpani (2000) discovered that out of six hundred and five (adolescent) respondents used for a study in Port Harcourt, 51% had been exposed to more than one sexual partner: 6% respondents had had five or more sexual partners: 21.5% admitted that they had been pregnant before, 11.3% admitted that they had been pregnant more than once. Cadelina (1998) reported that as age at marriage rises, opportunity increases for pre-marital friendships, dating and more serious partnership between young males and females (Hassan and Creastas, 2000). Lisa et al, (2009) observed that there is the need for the Health system to overcome the lack of communication in many families on matters of sexuality. Improving reproductive health is central to achieving the Millennium Development Goals on improving maternal health, reducing child mortality and eradicating extreme poverty. This requires that women have access to safe and effective methods of fertility control (adolescents inclusive). The improvement of family planning, in order for women to be able to avoid unwanted pregnancy, is fundamental to the World Health Organisation's work on improving maternal health and is core to achieving the Millennium Development Goal.

In developing countries, maternal mortality is high, with 440 deaths per 100,000 live births; in sub-Saharan Africa, this figure reaches 920. One in three women gives birth before age 20 and pregnancy-related morbidity and mortality rates are particularly high in this group. One quarter of the estimated 20 million unsafe abortions and 70,000 abortion related deaths each year occur among women aged 15–19 years, and this age group is twice as likely to die in childbirth as women aged 20 or above. It is estimated that 90% of abortion-related and 20% of pregnancy-related morbidity and mortality, along with 32% of maternal deaths could be prevented by use of effective contraceptives (WHO, 2014). In sub-Saharan Africa, it is estimated that 14 million un-intended pregnancies occur every year, with almost half occurring among women aged 15–24 years (WHO, 2010)

Pre-marital exposure to pregnancy menace has been amplified with a broadening gap between sexual introduction and age of marriage, and increased sexual activity prior to marriage, placing young women at increased risk when they are most socially and economically vulnerable. However, few sexually active adolescents in developing countries use modern contraceptive methods such as oral contraceptives and condoms, and although there is considerable variation between countries, uptake is generally much lower than in developed countries (Guttmacher, 2010). For example, 69% of adolescent women in a UK study are reported to use modern contraceptive methods during sex, compared with 12% in Mali, and in the US, 54% of 15 – 19 year old females reported condom use, compared with 21% in Tanzania. Overall, it is estimated that 37% of un-married, sexually active women aged 15–24 years in sub-Saharan Africa use contraceptive but only 8%

use a non-barrier method. Hubacher, Mavranezouli and McGinn (2008) suggest that the choice of implant rather than oral or injectable contraceptives could have a big impact on un-intended pregnancy in this age group. However, greater promotion of any modern method has to be informed by better understanding of why uptake is so low among adolescents in the first place.

Most students in the Secondary schools in Nigeria are at the adolescent age. Among students who supplied information about their sexual activity, 40% had had intercourse; the proportion of those who were sexually experienced climbed from 26% of 14-year-olds to 54-55% of 18-19year olds. While 36% of the young women had had sexual partners who were roughly their age, 25% had been involved with older businessmen; the young women said they have intercourse more frequently and are less likely to restrict intercourse to the safe period of their cycle when they are involved with older partners than when they have boy friends of their own age. Only 17% of sexually active students had ever used a contraceptive method other than abstinence (Guttmacher Institute, 2007)

Improving the reproductive health of young women in developing countries requires access to safe and effective methods of fertility control, but most rely on traditional rather than modern contraceptives such as condoms or oral/injectable hormonal methods (William *et al*, 2009).

The permeating nature of adolescents' problems has been attributed to biological and social reasons. The early commencement of menarche among female is the most important biological reason (Akinnubi, 2005). Socio-economic reasons include rapid urbanization and modernization and increased rural to urban migration in search of jobs, proliferation of institutions of higher learning or opportunities for apprenticeships which enable young people to break away from constraints traditionally imposed by their families and village communities. In times of rapid social change, external forces such as the mass media and peer groups are more influential on adolescents' behaviour than parents and traditional community leadership. The alarming rate and escalating intensity of the health and socio-economic repercussions of adolescents' sexuality and reproductive health are some of the terrifying social phenomena of concern to society (Nancy *et al,* 2013). The persistent nature of such issue as unprotected heterosexual activities among youngsters with the related health implications are some of the persistent themes in the literature (Makinwa, 1981, 1991; Nicholas *et al,* 1986; Oringanje, *et al,* 2009).

The study of adolescents' behaviour which has consequences on rapid social and economic changes in recent years in Nigeria and in Osun State in particular is important and necessary for many reasons. The sheer size of the adolescents' population commands attention. The large number of adolescents is a result of high fertility which is being complicated on daily basis. The demographic impacts of this large number of adolescents in a country with a tradition of early marriage is tremendous. A study of the spatial variation of the factors affecting the adolescents' access to contraceptives will help to determine what to do to solve existing problems. Finally, the use of GIS tools in this study will allow easy storage, analysis and display of both spatial and non-spatial data of the study.

Study area

Osun State came into being on August 27, 1991, along with eight other states. The State is located in the South Western part of Nigeria. It covers an area of approximately 14,875 square kilometers. It lies between latitudes 7°00N and 8°10′N and longitudes 4°03′E and 5°05′E. It is bounded by Ogun, Kwara, Oyo, Ondo and Ekiti States in South, North, West and East respectively. The State lies within the Tropical Rain Forest vegetation zone.

The 2006 National Population Census puts the population of the State at 3,416,959. Osun State is made up of 30 LGAs. The indigenes of the States are Yorubas who comprises of Ifes, Ijesas, Igbominas and Oyos. There are 246 registered private secondary schools, 581 public secondary schools, two Federal Institutions, five State-owned Institutions of higher learning and other privately owned Institutions in the State. Osun State is one of the Western States in Nigeria where priority is given to Western Education. This therefore, leads to elongation of Adolescence period that also has effects on the reproductive behaviour of their adolescents.

Politically, the State is divided into three senatorial districts namely: Osun Central, Osun West, and Osun East Senatorial Districts. Each Senatorial district is made up 10 LGAs.

Research methodology

Both primary and secondary data were sourced and used for the study. The geographic coordinates of selected Secondary Schools and contraceptive outlets were obtained with a handheld GPS Garmin Map 76CSX. Questionnaires were used to obtain attributes of the selected schools such as population of the students, ages, sex, parental background of students, sexual activities and access to contraceptives among students.

The analogue map of the State was obtained from the State's Ministry of Lands and Physical Planning, Osogbo and the Record of Secondary Schools in each local government area obtained from the State's Ministry of Education (Planning, Research and Statistics Department), Osogbo. Multi Stage sampling procedure was employed in selecting respondents to the questionnaire. First, Osun State was stratified into the three existing senatorial districts. Second, two LGAs were purposively selected from each senatorial district; one rural and one urban. Third, two schools -one public and one private were selected randomly from the selected LGAs, using the list of schools as data frame. Also, in each selected School, 5% of students were randomly selected for interview from each level of the Senior Secondary Schools class i.e SSS 1-3 using the school register as data frame. In all, 360 questionnaires were administered.

The analogue map of Osun State was scanned and added to views in Arcview 3.3a software, where it was geo-referenced using the Universal Transverse Mercator, Zone 31N (Minna). Thereafter, layers of spatial entities such as LGA boundary, roads, rivers, railway tracks) of the map were created through onscreen digitizing, attribute tables were also created for each spatial entity. Thereafter, the coordinates for each school were downloaded as shapefiles, the attribute of each school was linked to the theme for the school. GIS analysis (in the form of spatial and non-spatial queries) was carried out to determine the relationship between the schools' adolescents' access to contraceptives and contraceptives outlets. The level of accessibility of the students to the contraceptives was determined through proximity analysis. Attribute data collected was analysed using descriptive and inferential statistics.

Correlation analysis was carried out to determine the nature of relationship between the level of accessibility of the students to contraceptives and the contraceptives outlets available in the study area.

Table 1: Distribution of Respondents

Name of School	Frequency	Percent	School ID	LGA's
Islamic comprehensive high sch Osu	21	5.8	OSESD/Pr	Rural
O.A.U International Sch Ife	29	8.1	OSESD/Pr	Urban
Apara Memorial Sch Atakunmosa	25	6.9	OSESD/Pu	Rural
Moreemi High Sch Ife	36	10.0	OSESD/Pu	Urban
Muslim comprehensive high sch Iwo	13	3.6	OSWSD/Pr	Urban
Vico hope International college Kuta	15	4.2	OSWSD/Pr	Rural
Iwo Grammar School	53	14.7	OSWSD/Pu	Urban
Kuta community high school	49	13.6	OSWSD/Pu	Rural
Royal ambassador Int'l college Otan	14	3.9	OSCSD/Pr	Rural
Divine inter'l group of sch Osogbo	14	3.9	OSCSD/Pr	Urban
Community high school Eripa	34	9.5	OSCSD/Pu	Rural
Fakunle comprehensive high sch Osogbo	57	15.8	OSCSD/Pu	Urban
Total	**36**	**100**		

Source: Author's Field Survey, 2012

OSESD/Pr- Osun East Senatorial district Private school
OSESD/Pu- Osun East Senatorial District Public school
OSWSD/Pr- Osun West Senatorial District Private school
OSWSD/Pu- Osun West Senatorial District Public school
OSCSD/Pr- Osun Central Senatorial District Private school
OSCSD/ Pu- Osun Central Senatorial District Public school

Research findings and discussion

Since the focus of the Research is the spatial pattern of secondary school adolescents' access to contraceptives in the study area; presentation of finding focused on the distribution of contraceptives outlets in the rural and urban Local Government Areas, pattern of access to contraceptives and factors affecting access to contraceptives in the study area.

Research findings in this study are discussed under: socio-economic characteristics of adolescents; distribution of contraceptives outlets; pattern of access to contraceptives and factors affecting access to contraceptives.

Table 2 reveals that 45.8% and 54.2% constitute male and female adolescents respectively. The percentage distribution of the respondents by age as at the time of the survey showed that 40.3% were between ages 14-15, 45% were 16-18, 10% were 19-20, 4.2% were 20- 22 and 0.5% were > 22 years. Statistics showed that 52.5% of the respondents were Christians while 45.6% were Muslims, 1.9% were neither Christian nor Muslim. The table also presents an overview of the number of respondents per each level of class. 28.1% were in SSS1, 38.9 % were in SSS2 while 33.1% were in SSS3. Majority of the respondents are in SS1 and SS2 which are likely to be sexually experienced adolescents.

Locational pattern of contraceptive outlet

The location pattern of the contraceptive outlets in the selected LGAs of Osun State shows that the outlets are not evenly distributed. There are more outlets in the three urban LGAs (Osogbo, Ife Central and Iwo) compared with the rural LGAs (Atakunmosa, Ayedire and Boluwaduro)

Figure 1 reveals that Osogbo has 35%, Ife Central 20%, Iwo 15%, Boluwaduro 12%, Atakunmosa West 10% and Ayedire 08%. In figure 2 the result shows further that a heuristic view of pattern of contraceptive outlets in the study area showed a higher concentration (70%) of contraceptive outlet in the urban LGAs) and (30%) in the rural LGAs., This is expected since a locational factor of outlet is market orientation or population concentration where threshold population is required to sustain sales.

Pattern of access to contraceptive

Pattern of access to contraceptives can be influenced by a number of factors such as societal disapproval, high cost of the product, cost of transport to the place of sale and so on. Table 3, shows that 33.9% of the population sampled had full access to contraceptives while 56.1% had partial access to contraceptives though access is mainly from illegitimate sources and only 10% has no access at all.

Table 2: Socio-demographic Characteristics of the Respondents

Characteristics	**Frequency**	**%**
Male	165	45.8
Female	195	54.2
Age of Respondent		
14-15	145	40.3
16-18	162	45
19-20	36	10
20-22	15	4.2
>22	2	0.5
Religion		
Christian	189	52.5
Islam	164	45.6
Others	7	1.9
Class		
SSS1	101	28.1
SSS11	140	38.8
SSS111	119	33.1

Source: Author's Field Work (2012)

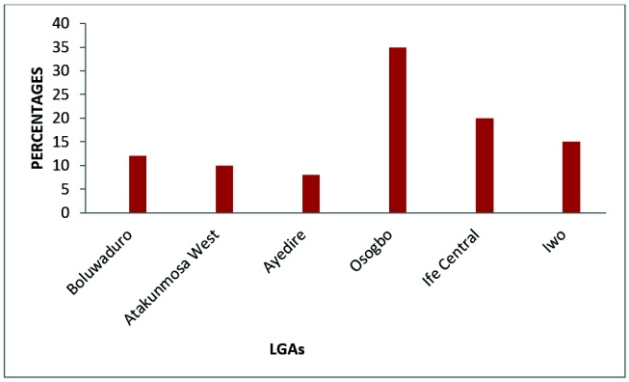

Figure 1: Pattern of Contraceptive Outlets

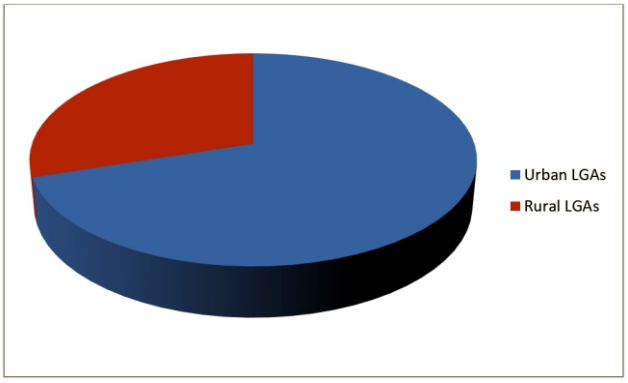

Figure 2: Proportion of Contraceptive Outlets in Urban and Rural LGAs

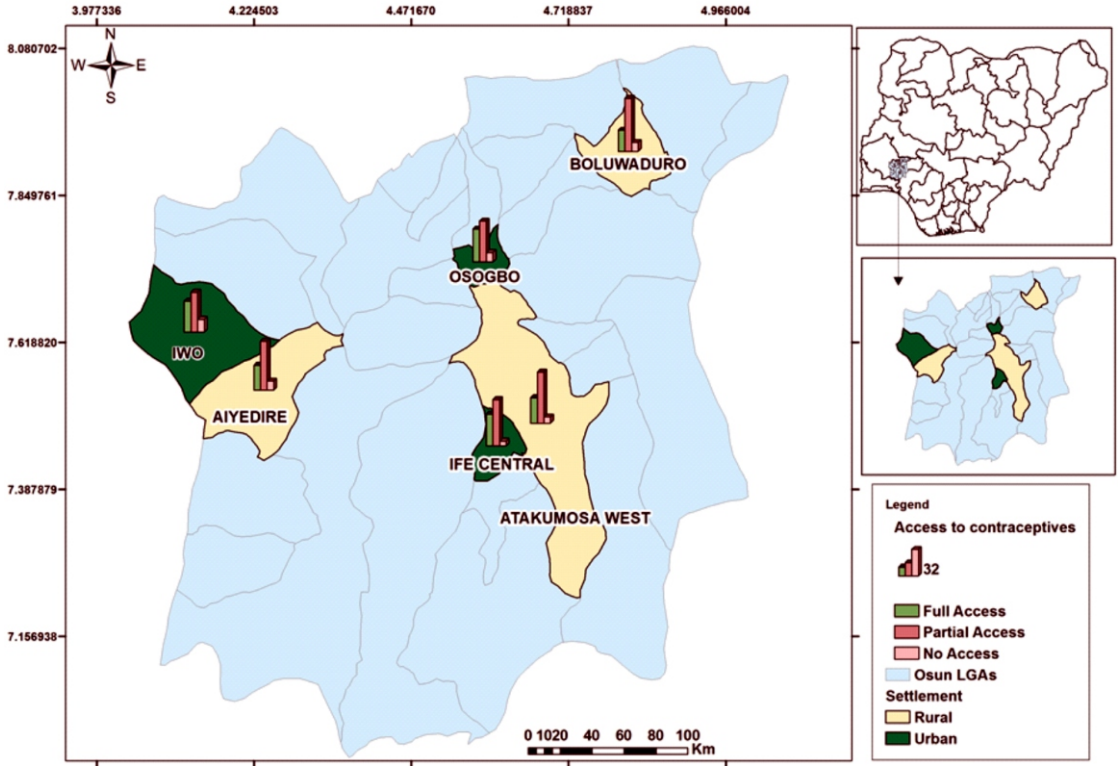

Figure 3: Pattern of access to contraceptives among adolescents in the study area

Figure 3 also expressed the pattern of access to contraceptive in each selected LGAs. Higher percentage of partial access to contraceptives was seen across the selected LGAs. Boluwaduro (rural LGA) has the highest followed by Ife Central (urban LGA) with 63.8 and 61.5 respectively. Atakunmosa (rural LGA) has the least with 47.8, followed closely by 49.3 in Osogbo (urban LGA). Majority of the respondents actually claimed partial access to contraceptive. Furthermore Osogbo has the highest percentage of full access to contraceptive followed by Iwo with 39.4 and 38.2 respectively both are urban LGAs although, this was followed closely by Atakunmosa (rural LGA) with 37 percent. In view of the above expression, It could be stated that partial access to contraceptive is generally higher in the study area whether in rural or urban areas. This may be due to the high level of societal disapproval of contraceptive among adolescent.

Relationship between pattern of contraceptive outlets and access to contraceptives

Table 4 shows that there is no significant relationship between pattern of contraceptives outlets and accessibility ($p>0.05$). This suggests that across the

LGAs, access to contraceptives is not determined by pattern of contraceptive outlets. That is, contraceptive accessibility is not a function of pattern/ number of contraceptive outlets. Hence, whether the number of outlets increase nor decrease does not improve access to contraceptives among the adolescents, based on the available data from the study. The above findings may be traceable to the fact that many of the adolescents does not have courage to obtain the products from nearby or authorized sources, hence their access to contraceptives is hindered.

Factors that affect access to contraceptive

Similarly, the Research opined that 50.3% of the adolescents' sampled emphasized societal disapproval was a factor that militates against easy access to contraceptive among them. 27.8% claimed that the cost of contraceptives was too high for them to afford and 21.9% said the cost of transportation to the sources of contraceptive outlet was their problem. See Table 5 for the spatial pattern of factors that affect access to contraceptives in the study area.

It was also revealed in Table 5 that factor of cost of transportation to the place of purchase was actually noted to be higher in the rural LGAs with highest in Ayedire followed by Boluwaduro and Atakunmosa with 30.1, 25.5 and 23,9 respectively. Meanwhile the highest percentage of high cost of transportation to the place of purchase in the urban LGAs was 20% in Ife Central followed by Osogbo (19.7) and Iwo (14.7). This is not strange for the fact that contraceptive outlets are more concentrated in the urban LGAs compared to the rural LGAs. Many of the adolescents in the rural areas may have to travel through far distance, sometimes to the urban centers to acquire contraceptive (the fear of being seen by people that know them) due to the homogenous setting of most rural settlements coupled the societal disapproval of contraceptive use among adolescents.

Furthermore, the Research revealed that the percentage of the factors of societal disapproval was higher in the urban LGAs. Iwo has the highest followed by Ife Central and Osogbo with 58.8, 55.4 and 54.9 respectively. Among the rural LGAs, Atakunmosa has the highest followed by Boluwaduro and Ayedire with 43.5, 42.6 and 41.3 respectively. This however looks strange, one will expect the level of the societal disapproval of use of contraceptive to be higher in the rural area than the urban area, meanwhile this may be as a result of the fact that many of the secondary school adolescents in the urban areas are younger adolescents within the range of 14 to 16 years while the majority of the secondary school adolescents in the rural areas are older adolescents.

Table 3: Pattern of access to contraceptives among adolescents in the study area

S/N	LGA	Frequency	Full Access %		Partial Access %		No Access %		Total % of Access
1.	Boluwaduro	47	12	(25.5)	30	63.8	05	10.7	89.3
2.	Osogbo	71	28	(39.4)	35	49.3	08	11.3	88.7
3.	Atakunmosa West	46	17	(37)	22	47.8	07	15.2	84.8
4	Ife Central	65	20	(30.8)	40	61.5	05	7.7	92.3
5	Ayedire	63	19	(30.2)	37	58.7	07	11.1	88.9%
6	Iwo	68	26	(38.2)	38	55.9	4	5.9	94.1%
	Total	360	122		202		36		90%
		100	33.9%		56.1%		10%		

Source: Author's Field Work (2012)

Table 4: Correlations between pattern of contraceptive outlets and access to contraceptives correlations

		Contraceptives outlets	Accessibility
Contraceptives	Pearson correlations	1	.580
	Sig. (2-tailed)		.277
	N	6	6
Accessibility	Pearson correlations	.580	1
	Sig. (2-tailed)	.227	
	N	6	6

Table 5: Factors that affect access to Contraceptives

S/N	LGA	Frequency	Societal Disapproval	%	High Cost of Contraceptive	%	Cost of Transport	%
1.	Boluwaduro	47	20	(42.6)	15	(31.9)	12	(25.5)
2.	Osogbo	71	39	(54.9)	18	(25.4)	14	(19.7)
3.	Atakunmosa West	46	20	(43.5)	15	(32.6)	11	(23.9)
4.	Ife Central	65	36	(55.4)	16	(24.6)	13	(20)
5.	Ayedire	63	26	(41.3)	18	(28.6)	19	(30.1)
6.	Iwo	68	40	(58.8)	18	(26.5)	10	(14.7)
		360 %	181	(50.3)	100	(27.8)	79	(21.9)

Source: Author's Field work (2012)

Conclusion

This study has shown the distribution and characteristics of contraceptives' outlets in the selected LGA's of Osun State in order to provide a framework for the efficient location and distribution of facilities for Adolescents' use in the State. Specifically, the study analyzed the spatial patterns and characteristics of contraceptives' outlets; examined rural-urban variation in the distribution.

The spatial analyses of the phenomena of interest were carried out on the basis of the LGAs. Two schools; a public and a private school from a rural and an urban LGA selected from the 3 existing senatorial districts of the State were targeted for the study. Twelve secondary schools; six public and six private Schools were purposively selected for the study.

Also, the level of accessibility of the students to the contraceptives was determined through proximity analysis and attribute data collected were analysed using descriptive and inferential statistics.

The study discovered that there are greater numbers of contraceptives' outlets in the urban LGA's of the State compared to the rural LGA's. This may be as a result of their population demand. The three urban Local Government Councils; Ife Central, Iwo and Osogbo have 70% of the total number of contraceptive outlets in the six selected Local Government Councils while the three rural LGA'S, Atakunmosa West, Ayedire and Boluwaduro have 30%.

Contraceptive outlets are spread widely in the three urban LGA'S than the rural. About 90% of the adolescents claimed they have partial or full access to contraceptive. The Result shows that there is no relationship between distribution of contraceptive outlets and adolescents access to contraceptives in study area. Societal disapproval of contraceptive was the major factor that affects access to contraceptives among the respondents, followed by cost of transportation to the place of purchase especially in the rural LGAs.

Recommendations

Health workers and the entire society should stop looking down on adolescents that seek for contraceptives knowledge and usage in order to reduce the problem of societal disapproval of contraceptives among adolescents.

Government at all levels should pay greater attention and commit more resources to the sexual health needs of adolescents in Nigeria, particularly in the rural areas where access to information about contraceptive is limited.

Finally, increasing modern contraceptive methods and access require governmental and communal interventions and support. The provision of information, life skills, support and access to youth-friendly services by Government and non-Government agencies will further aid access to contraceptives among adolescents. Interventions should aim to counter negative perceptions of modern contraceptive methods

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