

Geo-Spatial Analysis of Adolescents' Access to and Use of Contraceptives in Osun State, Nigeria

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Abstract

Against the background of high and progressively increasing unprotected sexual activities among adolescents generally, this study analyzes the spatial pattern of adolescents' access to and use of contraceptives in Osun State, Nigeria. It analyses inter and intra-city variations in the distribution of contraceptive outlets and varying levels of access and use of contraceptives by adolescents. Also factors that affect access to and use of contraceptives are analyzed. Primary and secondary data were used for the study. Primary data involved the use of handheld GPS to obtain the geographic coordinates of the contraceptive outlets and those of secondary schools. Secondary data include the analogue map of the State collected from the State's Ministry of Land and Physical Planning, the list of all registered pharmacies in the study area from the State's Ministry of Health. Also, a total of 1,440 questionnaires were administered to randomly selected adolescents to collect data on the socio-demographic characteristics of respondents, degree of access to contraceptives, and varying types and levels of use of contraceptives. Variation in the distribution of outlets and adolescents' use of contraceptive was analyzed using GIS tools. The patterns of outlets and secondary schools were mapped. The results showed that there was concentration of contraceptive outlets in the high density residential areas (60%) than in the medium (30%) or low (10%) density residential areas and that with R_n Values of 0.86 and 1.48 respectively for Outlets and schools, there was no spatial causation between pattern of outlets and distribution of schools. Forty-four per cent of adolescents claimed use of contraceptive devices, while 56% did not. Fifty percent of the adolescents stated that societal disapproval is a factor that hinders their use of contraceptives. Further result showed that there was a direct but weak relationship ($r = 0.449$; $p = 0.561$) between the pattern of outlets and use of contraceptive in the study area. The study concluded that to reduce the problems associated with adolescents' reproductive health, there is the need to improve access and right usage of contraceptives.

Keywords: Geo-spatial, Analysis, Adolescents, Contraceptives Usage

Introduction

Among the most perplexing public phenomena and a major concern to the society, is the increasing complexity of the socio-economic, demographic implications and health consequences of adolescents' sexuality and fertility behavior. The all-encompassing nature of issues such as teenage child bearing, teenage pregnancy and abortions, against the milieu of a generally poor knowledge and societal negative mindset towards contraceptive methods among adolescents, have occupied the front burners in health and population cycles. The adolescents' early exposure to unprotected sexual activities with its evident implications for the spread of STIs, HIV and the demographic impact on people with early marriage culture are also recurrent themes in literature (Adebeyejo et al, 2005; Oringanje, et al, 2009; Nancy et,al 2013). This therefore suggests the

need to articulate and assess adolescents' use of contraceptives in relation to the pattern of contraceptive's outlets in their immediate environment. Examining the sway of the service provision on the pattern of adolescents' access to and use of contraceptives will definitely shed more light on contraceptives use and its associated problems in Nigeria (Adebeyejo et al, 2005; Erica et al, 2014).

Also, many problems associated with premarital and other interpersonal relationships are in no doubt directed towards sex and sexual practices (Okpani and Okpani 2000; Hassan and Creastas, 2000; Lisa et al, 2009). For instance, in Nigeria, a person that commits an offence of defilement with a child between age 16 and 18 years is liable upon conviction to life imprisonment- section 137 of the Criminal Law of Lagos State Nigeria 2011. Also, Okpani and Okpani

African Population Studies Vol 30, No 2, (Supp.), 2016 (2000) observed that, out of 605 respondents used for a study in Port Harcourt, Nigeria, 51% had been exposed to more than one sexual partner, while 21.5% admitted that their sexual involvement had resulted into pregnancy and 11.3% admitted that they had been pregnant more than once. Thus in order to improve reproductive health particularly maternal health and reduce child mortality and also eradicate extreme poverty, empirically based pragmatic policies should be geared towards ensuring that women (adolescents inclusive) have access to safe and effective methods of fertility control. This is important because observations revealed that, in developing countries, 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 that this age group is twice as likely to die in childbirth as women aged 20 or above (WHO, 2010). Further estimates show that 90% of abortion and 20% of pregnancy-related morbidity and mortality, along with 32% of maternal deaths could be prevented by use of effective contraceptives, In sub-Saharan Africa, 14 million un-intended pregnancies occur every year, with almost half occurring among women aged 15–24 years. (WHO, 2010).

The point is, pre-marital exposure to pregnancy risk is increasing, with a widening gap between access and use of contraceptives and pre-marital sexual activity, 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). This therefore necessitates the use of GIS in this study in order to achieve effective data storage, retrieval and display. In sub-Saharan Africa, 75% of young women were reported to have had sex by age 20 (Guttmacher, 2007). 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 pandemic is to be reversed (UNEPFA,2013).

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, 2009). For example, 69% of adolescent women in a UK study were reported to use modern contraceptive methods during sex, compared with 12% in Mali. In the US, 54% of 15–19-year-old females reported contraceptive 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 (WHO, 2010). Hubacher et al, (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.

Furthermore, it has been reported that Nigeria has an estimated population of one hundred and seventy million people and that One third of her population constitutes young people between the ages of 10 to 24 years (UNEPFA, 2010). Thus, issues of adolescents' health should be given intensive and comprehensive empirical attention. In particular, the relationship between the pattern of contraceptives' outlets and adolescents' access to and use of contraceptives have not been given adequate research attention. The impact of lack of access to and use of contraceptives among sexually active adolescents could compound demographic problems and slow down development or exclude the adolescent group, a vital component of the society, from dividends of democracy. Hence, this research focuses on the spatial pattern of access and contraceptives use among adolescents in the study area.

The study of adolescents' sexual and reproductive behaviour in Nigeria and in Osun State in particular is important and necessary for many reasons. First, Osun State is the cradle of the Yoruba race, one of the three largest ethnic groups in Nigeria. Also, urbanism as a way of life in the State predates European colonization of Nigeria. With high level of urbanization and rapid population growth rate, all within the context of widespread culture of western education, marriage time is widely prolonged while the adolescents remain sexually active. Secondly, improving the reproductive health of young women in developing countries requires safe and effective methods of fertility control, but most adolescents rely on traditional rather than modern contraceptives such as condoms or oral/injectable hormonal methods (William et al 2009). Thirdly, against the observed low uptake of contraceptives in developing countries generally, there is the need to unravel the mystery so as to evolve pragmatic policies that should be made effective for promotion of modern methods. Furthermore, the sheer size of the adolescents' population commands attention. The demographic impact of this large number of adolescents in a country with a tradition of early marriage is tremendous. From the point of view of policy formulation and programme implementation, the study of the spatial variation of the factors affecting the adolescents' use of contraceptives will help to determine what to do in different spatial units to solve existing problems. Finally, the use of GIS tools in this

study will allow easy storage, retrieval, analysis and display of both spatial and non-spatial data on the subject under investigation.

Literature Review

Adolescents and Contraception

Adolescents' contraceptive use is growing, and compared with adult use, is characterized by shorter periods of consistent use with more contraceptive failure and more stopping for other reasons. Use through the reproductive years is likely to grow, fueled further by growth in the number of young people. An expanded demand for contraceptive supplies, services and information can be expected to challenge the preparedness, capacity and resources of existing family planning programs and providers (Guttmacher 2009). In nine national surveys conducted in South and Southeast Asian countries between 1996 and 1999, contraceptive prevalence among married female adolescents ranged from 6% in Nepal and Pakistan to 43–44% in Thailand and Indonesia. According to a study of nearly 34,000 15-year-old male and female students in 23 European countries and Canada, 14–38% was sexually experienced; 82% of sexually active students reported using condoms or pills at last intercourse. Another study of 18 Demographic and Health Surveys conducted in Africa between 1993–2001 found that two out of five unmarried females aged 15–24 were sexually active; unlike the results from Europe and Canada, however, the median proportion reporting any contraceptive use by 2001 was just 37%. (Ann K et.al 2009)

Although levels of sexual activity and contraceptive use are both substantial among adolescents in the developing world, the upward shift in the former tends to be faster than in the latter. According to a study of 27 Sub-Saharan countries, there was no pervasive shift toward early (before age 18) sexual initiation between 1994 and 2004, although the prevalence of premarital sex before age 18 increased significantly in 19 countries. Condom use for pregnancy prevention rose significantly during the period, from 5% to 19%. Similar trends in condom use are found in the reproductive and contraceptive histories of single female adolescents aged 15–24 in eight Latin American countries, where use of condoms increased faster than reliance on any other method used by this group. (WHO 2010)

Contraceptive continuation over sustained periods of time is not assured, and discontinuation occurs for reasons of failure, method features, such as side effects or convenience of use, or change in need. Some adolescents stop using contraceptives

altogether or immediately switch to another method. Discontinuation is a particularly important issue for adolescents because they tend to have more limited access than older individuals to family planning, as well as more unpredictable and irregular sexual activity, and are probably less knowledgeable about how to use contraceptive methods effectively. According to a study of six developing countries, women younger than 25 years are more likely than others to stop using their contraceptive method after 24 months. Unplanned pregnancies among adolescents happen despite the best of contraceptive intentions, and the effectiveness of adolescent pregnancy prevention programs remains below desired levels. (Ann K, et. al 2009; Finer L B, et. al 2012; Mosher W D, et. al 2010).

Among 2,460 secondary school students surveyed in two southeastern Nigerian states, only 36% could correctly identify the most likely time for conception to occur. Female students were considerably more likely than males to understand the timing of conception (46% vs 25%); less dramatic differences emerged by students' residence and grade in school.

Among students who supplied information about their sexual activity, 40% had had intercourse; the proportion which is sexually experienced climbed from 26% of 14-year-olds to 54–55% of 18–19-year-olds. While 36% of the young women had had sexual partners who are roughly their age, 25% had been involved with older adults; the young women said they had 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 boyfriends of their own age. Only 17% of sexually active students had ever used a contraceptive method other than abstinence (Guttmacher Institute 2010)

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). A high proportion of young urban Nigerians, both male and female, are currently sexually active—as many as 78% of males sampled and 86% of females sampled aged 20–24 are sexually active. According to the survey of more than 5,500 males and females aged 12–24, sexual intercourse appears to be sporadic and unstable; many of these young people, particularly males, have more than one sexual partner. Only around 15% of these young adults currently practice contraception. They also possess little information (or incorrect information) about reproductive biology:

About three in five do not know that pregnancy is possible at first intercourse, and even fewer know that a woman's pregnancy risk varies during the menstrual cycle. Friends, schoolmates and the media are the most common sources of information about sexual or reproductive matters, while parents and guardians are the least common sources (Guttmacher Institute 2012). The majority of young women in each study reported receiving little sex or contraceptive education from parents, health services or elsewhere. Any education they did receive often simply reinforced common misperceptions of modern contraceptives. (William et al 2009)

WHO (2010) reviewed the medical eligibility and criteria for use of contraceptives, offering guidance on the safety of use of different methods for people with specific characteristics or known medical conditions. The recommendations are based on systematic review of available clinical and epidemiological research. It is a companion guideline to selected practice recommendations for contraceptive use. This implies that the adolescents in highly populated areas characterized by poor medical facilities may not have access to such opportunity. Also Lisa et al,(2009) reported that the use of hormonal methods was limited by lack of knowledge, obstacle to access and concern over side effects, especially fear of infertility. This could also mean that such contraceptive methods will be out of reach of the uneducated adolescents of the highly populated areas of the urban centers or in the rural areas.

Factors that affect contraceptives use among adolescents.

Previously identified limits to contraceptive use among adolescents in developing countries include lack of knowledge, poor sex education and access to services; risk misperceptions; and negative social norms around premarital sexual activity and pregnancy (Reproductive Health Matters 2009). These factors are briefly discussed.

1. Knowledge of pregnancy risks, prevention, and access to modern contraceptives. In a Vietnamese study, it was observed by Health Care Women Int'l (2011) that, young women were rarely provided with adequate information about modern contraceptives, or even sex in general, which was considered too sensitive a topic to talk about, and only two of the twelve young women in the study had ever used a modern method. Thus given the reported barriers to service use, access to contraceptives was therefore often through unofficial or commercial channels. Although these outlets were thought more discreet and confidential, contraceptive's provision was unlikely to be accompanied by accurate information

on use or side effects. The expense could also be prohibitive, (Reproductive health matters 2010).

2. Hormonal contraceptive side effects, menstrual disruption and fertility fears: Many of the studies showed that concerns over experienced and perceived side effects of hormonal contraceptive methods, particularly menstrual disruption, were central to young women's non-use of contraceptives. Fear of infertility was the most often cited (Health Care Women Int'l 2011).

3. Partner relationships, sex and pressure: Many studies made reference to partners' attitudes towards contraception, which were often crucial. Partners were reported to manipulate, force, threaten, and use violence to get young women not to use contraception (Reproductive Health Matters 2010).

4. Reputations and social status: Studies identified young women's reputations and social status as a limit to contraceptive use. The synthesis indicates that there was considerable social disapproval of premarital sex and pregnancy (Health Care Women Int'l 2011). "Community members do not accept teenage pregnancy; they even scold us randomly when they meet a pregnant girl." (Young Woman, South Africa, page 64). For many, accessing contraceptives, particularly by going to a clinic, constituted a public admission of having had sex, and was linked to being promiscuous or a prostitute.

The need to examine the varying levels of access to and use of contraceptives by sexually active adolescents in the study area is among others to analyse the smoothening or constraining factors of access and commodity usage in a predominantly conservative society, with puritanical view of sexuality issues particularly among unmarried youths. The outcome should inform research based policies and programmes that would promote adolescents reproductive health. This is the goal of this study.

Theoretical and Conceptual Models

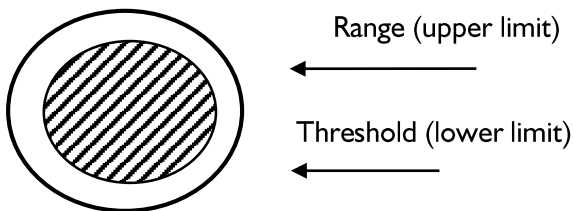
Several theories, models and concepts such as diffusion theory, location-allocation theory, growth pole theory and urban-rural interactions concepts are relevant to the discussion of adolescents' sexuality and reproductive behavior, particularly the distribution and accessibility of contraceptives. However, the Central Place Theory (CPT) of Walter Christaller (1933) and behavioral theories such as the Bandura's (1986) Social Learning theory and Fisbein and Ajzen's (1980) theory of Reasoned Action are briefly reviewed so as to provide the discussion with a consistent notation.

The Central Place theory

One of the earliest theoretical formulations and perhaps the most orchestrated attempt at

understanding factors of location, distribution, size and spacing of central places (cities) is that provided by the German geographer, Walter Christaller in his 1933 Central Place Theory. In response to the theoretical question of what are cities, Christaller opined that cities are points in space where trading economy takes place. Put differently, cities are locations for goods and services which must be centrally produced for the surrounding areas i.e cities are central places while the goods and services they provide are central goods and services. In this discussion, central places are the contraceptive outlets while the goods and services to be provided are conceptualized as contraceptive commodities. Also two of the major assumptions of CPT which are relevant to this discussion are that: (i) Central places are located on the plane or in a region to provide goods, services and administrative functions to their hinterlands and, Consumers minimize distance by travelling to nearest central place that provide the functions they demand.

Again of particular importance to this study are concepts of "Threshold" and "Range" of goods and services which are basic to the idea of Central Place Theory. The threshold of a good is the minimum population of certain purchasing power needed to keep a business functioning. It therefore defines the minimum or lower limit of market area of a good. The Range of a good on the other hand is the maximum distance consumers are prepared to travel in order to purchase a good or service. It defines the upper limit of a market area.



The Threshold and Range of different services vary considerably depending on the nature of services and the frequency of their demand and use. Low order goods and services are those with small Threshold and Range e.g condom, bread, paraffin, pry school etc.. High order services are those with extensive range and a large Threshold e.g banks, vasectomy, Universities etc. Christaller identified central places of different sizes in Western Germany. He also measured their average distances apart and the extent of their hexagonal tributary areas. Based on their number and variety of functions performed, he graded or arranged in a hierarchical order central places in the region.

The concept of hierarchy therefore is central to its formulation. The main features of the hierarchy and some of the salient points of its formulations are that:

- a. The size of central places is related to the number or variety of functions performed. That is, large or high order central places offer more central services than lower order centres.
- b. Trade areas or area of influence are largest for high order central places and smallest for low order ones.
- c. Low order central places are more closely spaced and tend to be more in number than high order ones.

Although CPT has been criticized on a number of issues, however, the most enduring criticisms of the theory are that: it is static as it does not take into consideration the fact of changes in the cities and also that, most of its assumptions are unrealistic. Nevertheless, Ayeni (1979) explained that the theory has been used by planners for the location and distribution of facilities within cities and other human settlements. We observe here that the "threshold" and "range" constituents of the CPT are relevant in this study as they help in conceptualizing and explaining the location and distribution pattern of contraceptive outlets and the behavior of adolescents with respect to the distance they have to travel to purchase commodities. The threshold of an outlet is the minimum population required to sustain the business while the range is the maximum distance that adolescents would be willing to go to purchase commodities.

Behavioral Theories

Two of the behavioural theories commonly used to explain adolescents' sexual and fertility behavior and to develop fertility control programs are: The Social Learning theory by Bandura, (1986) and, Fishbein and Ajzen's (1980) Theory of Reasoned Action. Bandura (1986) explained that whether an individual will engage in or avoid a behaviour is determined by a sequence of factors. First, the individual must understand the association of a behaviour with an outcome, for example, that unprotected sex carries a high risk of pregnancy. Second, the person must believe that he or she is capable of either engaging in or avoiding the behavior and that the specific strategy chosen can be implemented effectively. For instance, individuals must believe that they have the capacity to abstain from sex and that they can effectively employ contraceptives methods to prevent sexual problems. Finally, people must believe that avoiding the outcome is beneficial, for example, that delaying sex will make their lives better in ways that matter to them.

Individuals develop their specific attitudes and feelings about behavior for themselves by observing the behaviours of others, by observing the rewards and punishment the behaviour (and the avoidance of the behaviour) elicits, and then by developing the necessary skill through practice that enable them to behave in accordance with the beliefs they develop. This will help to explain the consequence of access to correct sources and right pieces of information on sexuality and contraceptives use on the adolescents 'sexual life. For instance, an adolescent that has access to correct information about sexuality is likely to have good sexual behaviour.

The Theory of Reasoned Action (Fishbein and Ajzen, 1980), on the other hand emphasizes individual perception and the importance of an intention to engage in a behavior. The theory explains the factors that determine intention to include; (1) one's belief regarding the outcome of the behavior in question; (2) one's assessment that the outcome of the behavior is good or desirable; (3) one's assessment that the outcome is desired by significant others; and (4) the individual's motivation to comply with the preferences of these significant others.

According to this model, an adolescent would have to believe that avoiding sex will prevent pregnancy and sexually transmitted diseases, that avoiding pregnancy and STDs is desirable, that the significant persons in their lives want them to avoid pregnancy and STDs, and that they want to comply with the views of the significant person in their lives. The perceptions and beliefs of people generally influence their attitude to life, including sex. Therefore, the perception, as well as the belief of the adolescents can influence their male/female relationship and the extent of their involvements in sexual activities.

There is no shortage of opinion about what will reduce adolescents' pregnancy, nor is there a shortage of program models (Kristin et al 2000; Born L, 2007). What is in short supply, however, is objective empirical evidences identifying specific programs or policies that will reduce teen pregnancy, either through delaying sexual intercourse or improving contraceptive use among sexually active adolescents. Furthermore, not only has no one found a single silver-bullet program, but observations by previous researches and theories suggest that a single model solution is unlikely. Researchers, however, should take time to consider several factors before implementing a pregnancy prevention initiative, irrespective of the desired behavioral outcome. First, it is important to define clearly what behavior is desired (for example, no sex until marriage; no sex until mid-twenties), the program's underlying assumptions about the behavior desired and the factors that influence the behavior, and which key

factors the program will address. Secondly, one should decide the group of people that the intervention should target. Will the intervention focus on adolescents, pre-adolescents or children of elementary school age? Will the intervention also include other individuals who may be important to the teen's behavior, such as peers, the teen's family, or the teen's potential sexual partners? Will the intervention address the larger community or neighborhood context in which the adolescent lives, either by collaborating with local institutions such as youth service organizations or local churches or by addressing socio-economic or other opportunities that may influence the adolescent?

Data Sources and Methodology

Types and sources of data

The types of data used for this study were mainly: the socio-economic characteristics of the adolescents, their sexual behaviour including access to and use of contraceptives, their parental background and lists of schools and contraceptive outlets in the state. Data on adolescent socio-economic characteristics were obtained mainly with the aid of questionnaires administered to the adolescents. Adolescents' opinion on issues being investigated was obtained from randomly selected adolescents used as Key Informants. The lists of contraceptive outlets and schools were first compiled from information obtained from relevant sections of Ministries of Health and Education in the State. Questions such as the following were asked: have you used contraceptive devices before? Are you using it presently? Which of the devices are you using presently? Have you changed from any to another one? If yes, why? Where are your sources of information about contraceptive devices?

Sampling Procedure

Multi Stage sampling was employed in selecting respondents to the questionnaire. First, Osun State was stratified into the three existing Senatorial districts. Secondly, two LGAs were purposively selected from each senatorial district; one rural and one urban. Thirdly, two schools -one public and one private were selected randomly from the selected LGAs, using the list of schools obtained from Ministry of Education as data frame. Also, in each selected School, 5 % of students were randomly selected for interview from each level of the Senior Secondary School classes i.e SSS 1 to 3 using the School register as data frame. In all, 1440 questionnaires were administered to obtain attributes of the adolescents. A total of 24 adolescents (Two adolescents, male and female per school) were randomly selected as Key

Informants from the selected schools for opinion on issues being investigated.

Data Analysis

The geographic coordinates of the contraceptive outlets were obtained directly from the field with a handheld Garmin GPS Map 76CSX with 3metre accuracy. The analogue map of the State was obtained from the State’s Ministry of Lands and Physical Planning, Osogbo, 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 (Local Government Areas boundaries, roads, rivers, railway tracks) of the map were created through onscreen digitizing, while attribute tables were also created for each spatial entity. GIS analysis (in the form of spatial and non-spatial queries) was carried out to determine the relationship between the adolescents’ use of contraceptives and contraceptives outlets. Correlation analysis was carried out to analyse the nature of relationship between the use of contraceptives and the contraceptives outlets available in the study area.

In order to evaluate the relationship between distribution of outlets and schools, the study employed Nearest Neighbor Analysis (Rn1...n) where values ranged from 0 for a perfectly clustered distribution to 2.15 for a perfectly dispersed distribution.

Ethical consideration

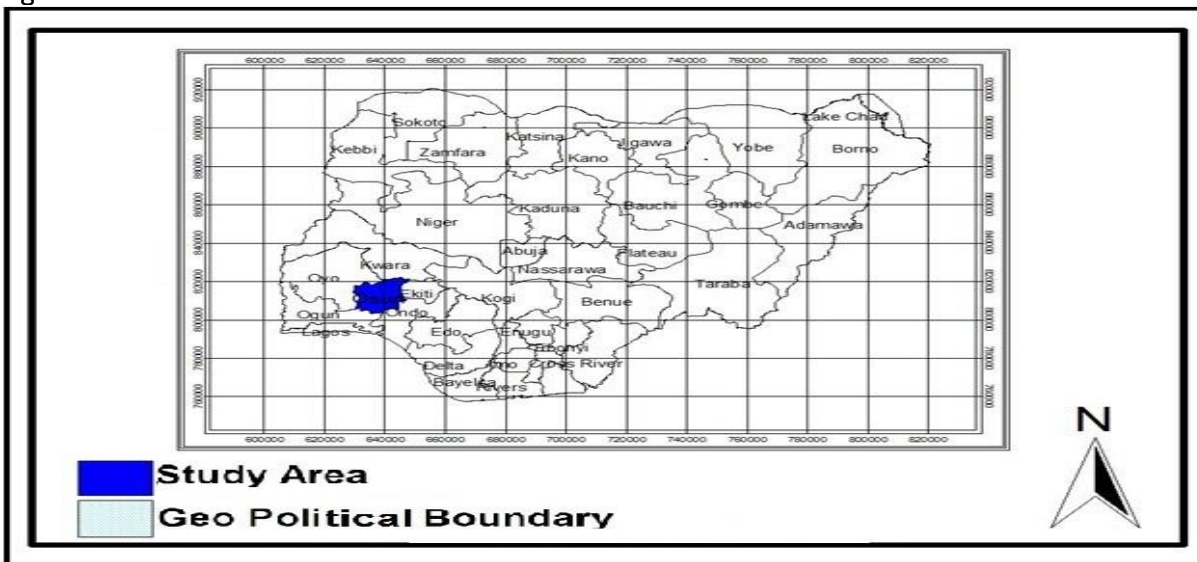
In order to ensure that ethical issues were not violated since the respondents were mainly under 18 years, a letter of introduction from the researchers’ Department to the heads of selected schools were obtained. Permission was sought and obtained from the affected schools after submission of relevant documents including research proposal and copy of questionnaire and the interview guide.

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, within the Tropical Rain Forest, covering an area of approximately 14,875 square kilometers between longitudes 4°03’E and 5°05’E and latitudes 7°00’N and 8°10’N. It is bounded by Ogun, Kwara, Oyo, Ondo and Ekiti States in South, North, West and East respectively (Fig. 1).

The 2006 National Population Census puts the population of the State at 3,416,959. Osun State is made up of 30 Local Government Areas. The indigenes of the States are Yorubas who comprises of Ifes, Ijesas, Igbominas and Oyos. Education in Osun State, just like in other States in South Western Nigeria, is a major industry. This therefore, leads to elongation of period adolescents spend in school with obvious effects on the reproductive behaviour of their adolescents. 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 Local Government Areas.

Figure 1: Osun State in National Context



Results
Socio-Demographic Characteristics of Adolescents

The socio-demographic characteristics of the respondents as summarized in Table I shows that

there were almost equal proportion of female (45.8%) and male (54.2%) respondents. Similarly, the percentage distribution of the respondents by age showed that the bulk of the secondary school students were between 16 and 18 years (45%), followed by those between ages 14-15 (40.3%). Significant proportions (10% and 4.2%) of the respondents belonged to the older adolescents (19-20 and 20-22 yrs). Also there were few respondents (8 or 0.5%) older than secondary school age. Further result as summarized in Table I also shows that more than half of the respondents (52.5%) were adherents of Christian religion and close to half (45.6%) were Muslims. The study area is sparsely populated by traditionalists (1.9%). The above implies that construction of sexuality, particularly access to and

use of contraceptive may have religious coloration as the two largest religious bodies; Christianity and Islam teach chastity and have puritanical view on boy/girl relationship and issues on use of contraceptives. The varying levels of access and utilization of contraceptive, if any is expected to be influenced by the degree to which adherents of the two religions are obedient to the tenets of their religion.

The respondents were almost equally distributed among the three levels of study covered (38.9 % in SSS2, 33.1% in SSS3, 28.1% in SSS1). The decrease in number of respondents in the final year SSS3, may be due to fact that many students drop out and are unable to complete secondary school education apparently because of finance or reproductive related problems.

Table I: Socio-demographic Characteristics of the Respondents

Characteristics	No	%
Sex of Respondents		
Male	780	45.8
Female	660	54.2
Age Group of Respondents		
14-15	580	40.3
16-18	648	45
19-20	144	10
20-22	60	4.2
>22	8	0.5
Respondents Religion		
Christianity	756	52.5
Islam	656	45.6
Traditional	28	1.9
Level of study of Respondents		
SSS1	404	28.1
SSS2	560	38.8
SSS3	476	33.1

Relationship between patterns of Contraceptive Outlets and Location of Schools

In line with expectation, an heuristic view of pattern of contraceptive outlets in the study area shows a higher concentration in the urban Local Government Areas (70%) than the rural areas (30%). In order to evaluate the relationship between distribution of

outlets and schools, the study employed Nearest Neighbor Analysis (RnI...n) where values ranged from 0 for a perfectly clustered distribution to 2.15 for a perfectly dispersed distribution. The result of analysis is summarized in Table 2.

Table 2: Result of Nearest Neighbour Analysis

SN	Observations	R values
1	Mean Nearest Neighbour Index of Contraceptive Sales Points	1.5km
2	Mean Random Distance of Contraceptive Sales Points	1.74km
3	First Order Nearest Neighbour Index of Contraceptive Sales Points	0.86
4	Second Order Nearest Neighbour Index of Contraceptive Sales Points	1.5
5	Mean Nearest Neighbour Index of Schools	2.8km
6	Mean Random Distance of Schools	1.88km
7	First Order Nearest Neighbour Index of Schools	1.48
8	Second Order Nearest Neighbour Index of Schools	1.16

Source: Authors' survey, 2015

From Table 2, First Order Rn value of 0.86 reveals that contraceptive sales point was clustered in the study area while the First Order Rn value of 1.48 informs that schools were randomly distributed though with a tendency towards dispersion in the

study Area. The diverging spatial characteristic of these phenomena (Contraceptives sales point and schools) informs that there is no spatial causation between the two phenomena.

Figure 2: Distribution of Contraceptive outlets and Schools in the study area

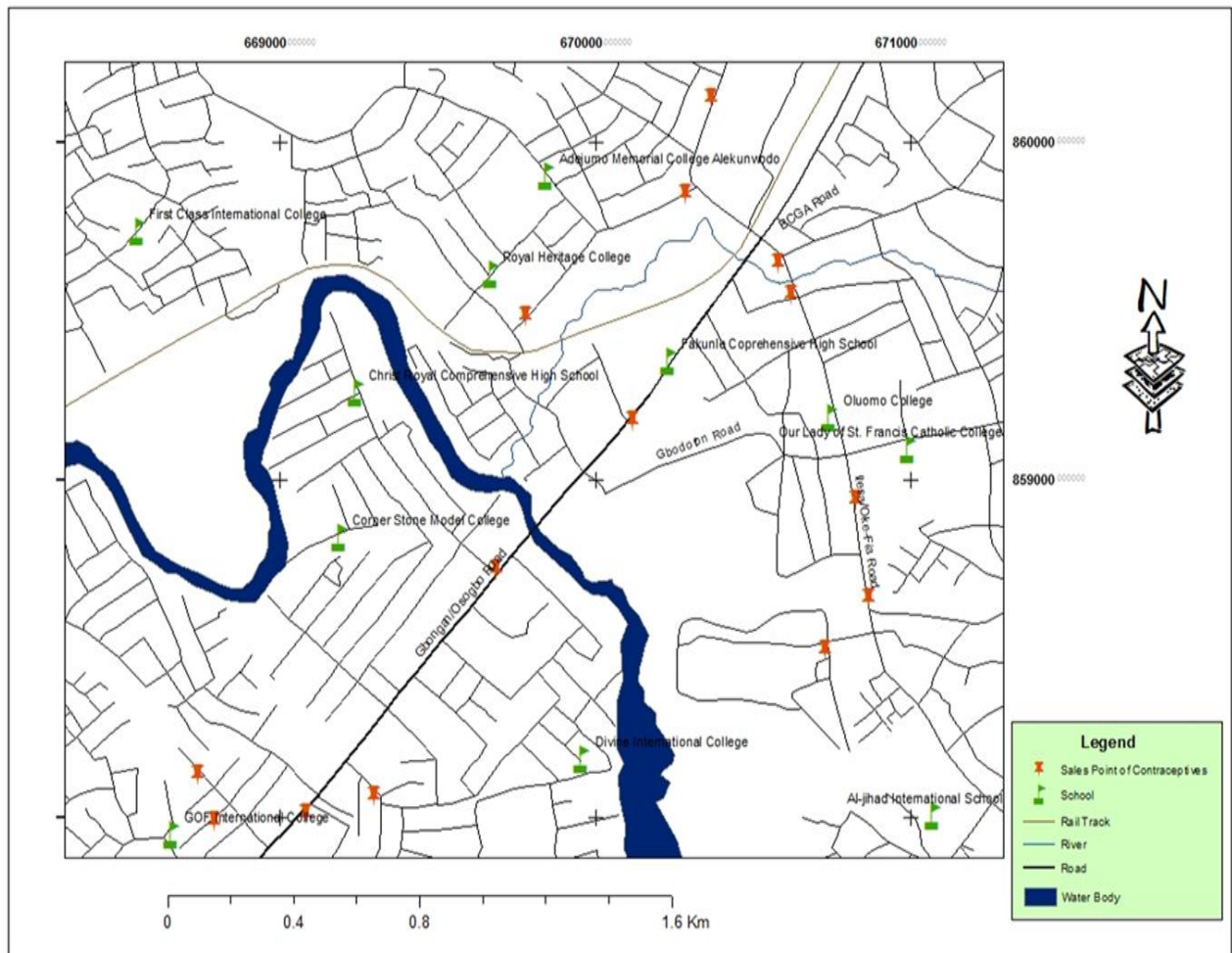


Table 3: Relationship Between Population size and number of Contraceptive outlets

SN	LGAs	LGAs Identity	Population	No of Outlets	Outlet/ Population Ratio	Rural/ Urban differentials
1	Ayedire	Rural	76,309	18	4,219	
2	Boluwaduro	Rural	70,775	25	2,831	1:3013
3	Atakunmosa	Rural	68,643	22	3,120	
West						
4	Osogbo	Urban	155,507	75	2,073	1:3427
5	Ife Central	Urban	167,204	43	3,888	
6	Iwo	Urban	191,348	32	5,980	
Total			729,786	215	22,111	1:3,685

Analysis of Efficiency of Service provision

Further analysis of distribution pattern of outlets computes efficiency of service provision, which relates total number of outlets to the total population to be served. This is because it is not only the adolescents' population that the outlets cater for, but the entire Local Government area population, under the assumption that, clients would patronize nearest outlets to their school or home in the local government. The result of analysis as summarized in Table 3 shows high level of inadequacy of service provision as on the average the efficiency ratio was 1:3,685 population. This implies one outlet serves about 3,685 population. The rural/urban differential shows similarly high ratio of about 1: 3000 even though there were great differentials in their population distribution.

The profile of the local government areas on the relationship between population size and number of outlets shows that level of inefficiency in the distribution of Outlets was highest in Iwo with a ratio of 1:5,980 followed by Aiyedire and Ife Central local governments with a ratio of 1:4219 and 1:3888 respectively. The implication of low level of service availability is possible high cost of service and resort to non-conventional sources or methods of fertility control.

Intra-Urban Variations in Distribution of Outlets

As illustrated in figure 3, the high density residential areas have the highest concentration of contraceptive outlets (60%), followed by the medium (30%) and low density areas (10%). This is in line with the general pattern of urban population distribution

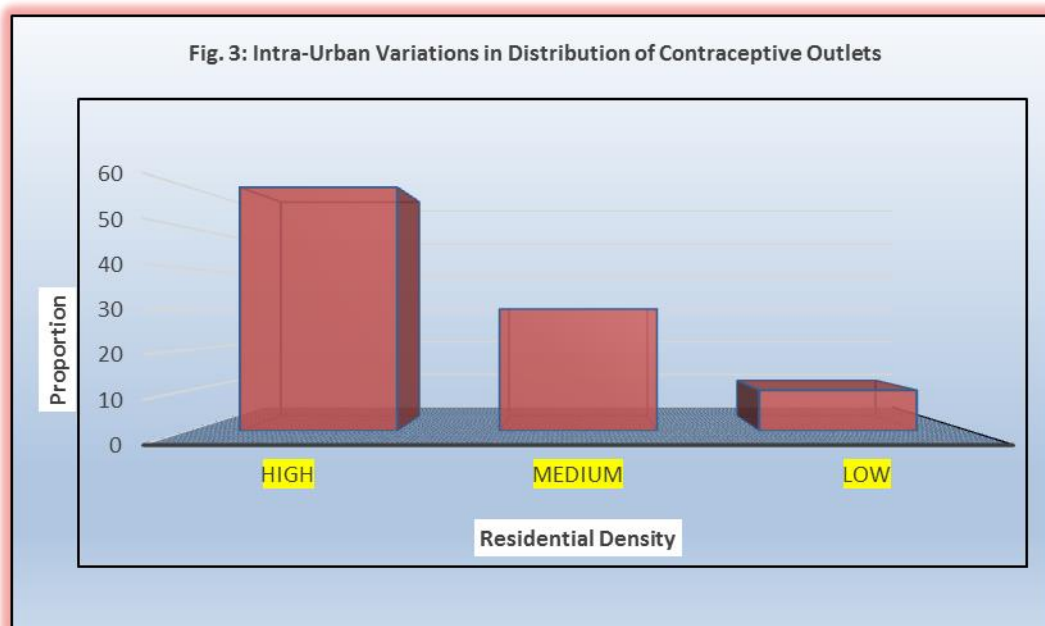


Table 4: Sources of information about contraceptives among adolescents

Sources of information	Frequency	Percentages
Family Planning Clinic	228	15.8
Hospital	272	18.9
Chemist shop	520	36.1
Patient medicine store	76	5.3
Friends	264	18.3
Herbalist	08	0.6
None	72	5.0
Total	1440	100

Sources of Information about contraceptive among Adolescents

Table 4 shows that majority of the adolescent (65.3%) access information about contraceptives from unofficial sources such as Chemist shops, Patient Medicine Stores, friends and herbalists, while only 34.7% get information from Family Planning Clinic and Hospitals. Less than 50% of adolescents made use of information gotten about contraceptives.

Pattern of Usage of Contraceptives

A general observation in Table 5 is the relatively low level of usage of contraceptives with a total of only 44% of the sampled population. Highest proportion of users was found in Ayedire Local Government with 24%, followed by Osogbo with 22%. Boluwaduro and Ife Central Local Governments each had 15% of users.

Table 5: Variations in Level of usage of contraceptives by Local Government Area

S/N	LGA	Pop Sampled	No of usage	No of non-usage	% of Non - usage	% of Usage
1	Boluwaduro	188	96	92	11	15
2	Osogbo	284	136	148	18	22
3	Atakumosa	184	68	116	14	11
	West					
4	Ife Central	260	96	164	20	15
5	Ayedire	252	150	102	13	24
6	Iwo	272	88	184	22	13
7	Total	1440	634	806	56%	44%

Source: Authors' Field Work (2015).

Figure 4 shows the relationship between the level of service provision and pattern of usage within the spatial framework of local Government areas. The following observations emerged:

- (1) In all the LGAs, except Oshogbo, the State capital, level of contraceptive usage was higher than that of service provision.
- (2) In Rural Areas, Ayediire and Boluwaduro LGAs, the level of usage was higher than that of service provision
- (3) Relatively, usage level was higher than service provision only in Iwo, an urban LGA even though it is a predominantly Muslim community.
- (4) The implication of the above is possible shortage of service where it is required.
- (5) A quantitative evaluation of the relationship using correlation technique shows a low and non-significant correlation between pattern of service provision and usage of contraceptives with $r = 0.449$ and $p = 0.561$

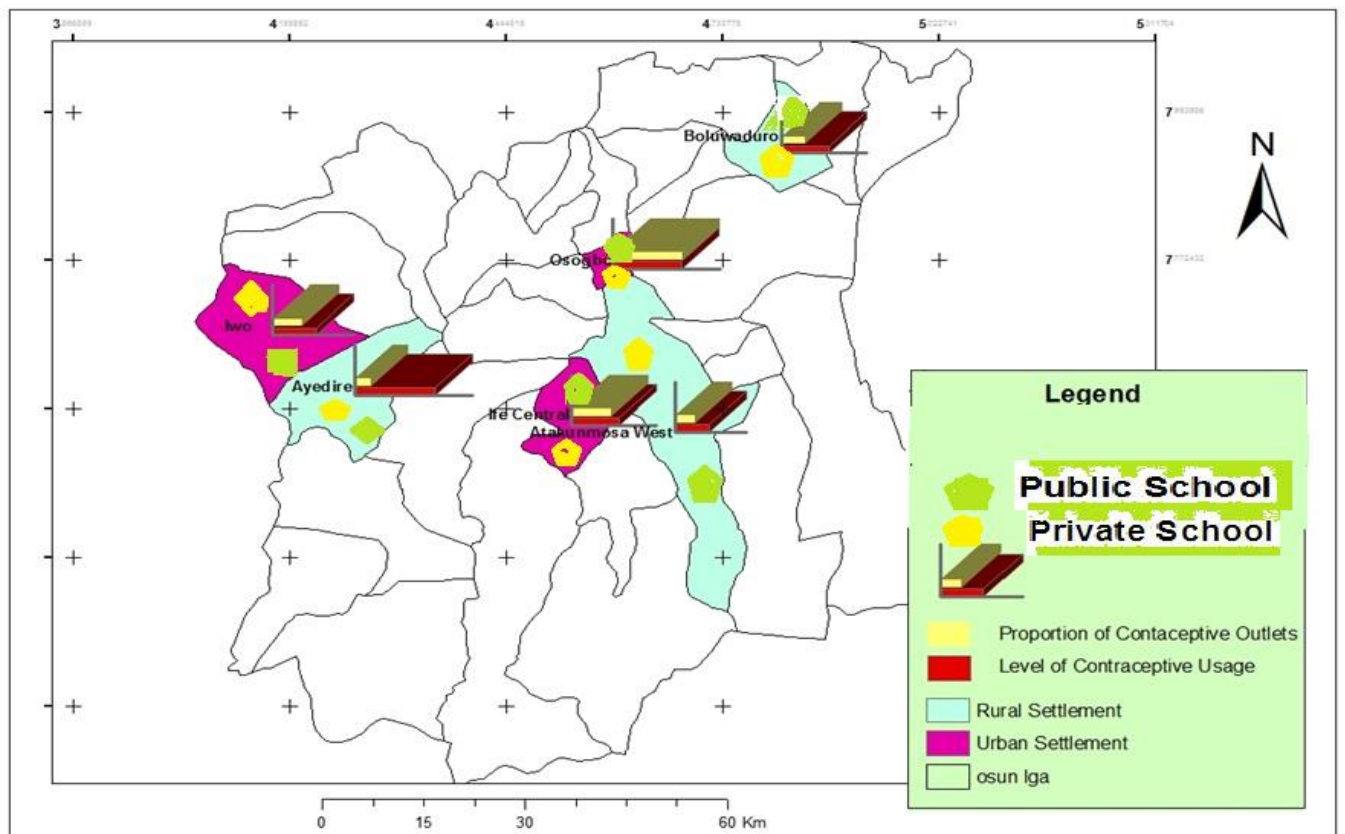


Fig.4: Relationship between contraceptive outlets and contraceptive Usage

Determinants of Contraceptive Usage

Table 6 shows that the bulk of the respondents claimed that societal disapproval of usage was a major factor militating against the use of contraceptive. The level of societal disapproval was highest in Iwo LGA (58.8%), followed by Ife Central and Oshogbo each with about 55%. Aiyediire, a rural LGA had the lowest level of 41.3%. According to a male adolescent who volunteered to comment on the how of societal disapproval.

“the reason is that the major buyers of the products were known to be the prostitutes and their customers and that there was always a castigating view of any adolescent who dared to pick up the product at the centre where it is sold”.

SSS3 Male student, Oshogbo, June 2015
Another adolescent had this to say.

“the owner of the shop where they sell the products is Mumsy’s friend”
SSS 2 Male student, Ile Ife, June 2015

“even when you buy condom from a nearby store, the seller may not say anything, but the news would soon go round that you are a prostitute”
SSS1 Female student, Iwo, June 2015

The complaint of societal disapproval is understandable in the above context. The fact is, since the sellers and prospective buyers are well known to each other, being members of the same community and or possibly of the same religious faith. A significant proportion of adolescents claimed that the cost of contraceptives (27.8%) and or that cost of transportation (21.9%) were too high for them.

Table 6: Factors that affect use of Contraceptives

S/N	LGA	Frequency	Societal Disapproval %	High Cost of Contraceptive (%)	Cost of Transport	of %
1.	Boluwaduro	188	80 (42.6)	60 (31.9)	48	(25.5)
2.	Osogbo	284	156 (54.9)	72 (25.4)	56	(19.7)
3.	Atakunmosa	184	80 (43.5)	60 (32.6)	44	(23.9)
West						
4.	Ife Central	260	144 (55.4)	64 (24.6)	52	(20)
5.	Ayedire	252	104 (41.3)	72 (28.6)	76	(30.1)
6.	Iwo	272	160 (58.8)	72 (26.5)	40	(14.7)
Total		1440 %	724 (50.3)	400 (27.8)	316	(21.9)

Source: Authors' Field work (2012).

The spatial pattern of factors of low usage of contraceptives is shown in table 6. A major observation from the table is the fact that, whether rural or urban, factor of societal disapproval of use of contraceptive by adolescents was highest in all the Local Government Areas, followed by costs of products and cost of transportation to locations of sale of products.

Adoption of Contraceptives Methods among the Adolescents

The result summarized in Table 7 shows that the largest percentage (30%) of the adolescents adopted traditional method of contraceptives; about 22% used withdrawal method, Condoms and pills had 14.2 and 13.5 percent of usage respectively, while safe period, foaming tablets and cervical cap had 5.3, 2.7 and 2.2 respectively.

Table 7: Adoption of contraceptive methods among the adolescents

SN	Contraceptive Methods	No of use	% of use
1	The pills	86	13.5
2	Condom	90	14.2
3	Cervical cap	14	2.2
4	Foaming tablets	17	2.7
5	Safe period	34	5.3
6	Withdrawal	141	22.2
7	Injectables	55	8.6
8	Intra- uterine device	03	0.6
9	Traditional	190	30.0
10	Others specify	04	0.7

Discussion

As shown in table 1, the sex distribution of the respondents is balanced, hence it was not likely to have a negative effect on the findings. The bulk of the respondents were within the age range of sexual activeness (14 to 18 years). Also the two major religions in the country were actively represented. Table 2 reveals that contraceptive sale points were clustered in the study area while schools were randomly distributed though with a tendency towards dispersion. The diverging spatial characteristics of contraceptives sales points and distribution of schools

implies no spatial causation between the two phenomena. This is to be expected since locational factors of outlets is market orientation or population concentration where threshold population is required to sustain sales, whereas for schools, availability of space in less populated areas is a major consideration. Hence, contraceptive sales points were at spatial proximity to each other in areas of population concentration, while schools could evolve randomly without cognizance of the former. As illustrated in figure 3, there was higher concentration of contraceptive outlets in the high density residential

African Population Studies Vol 30, No 2, (Supp.), 2016 areas. This is in line with the general pattern of urban population distribution and the fact that contraceptive outlets are market oriented services since patronage is not limited to adolescents only, it is only logical for the distribution to be concentrated in populated areas as confirmed by (Ayeni 1978; Baloye 2008; Olamiju et.al 2011).

The result of analysis of efficiency of service provisions as summarized in Table 3 shows high level of inadequacy of service provision as on the average, the efficiency ratio was 1:3,685 population. This implies one outlet serves about 3,685 population. This is in line with Adewoyin, (2015) that there is general inadequacy in the provision of health care facilities in Nigeria (sexual health facility included). The implication of the above is possible shortage of service where it was required. The threshold population required for the sustenance of service provision may be responsible for the low availability of services in the rural Local Government areas, apart from the fact of homogeneity of rural population which enhances familiarity possibility between providers and adolescent customers and hence the need for the latter to avoid the former in trading relationship on issues of commodity purchases

The observation that majority of the adolescents (65.3%) accessed information about contraceptives from unofficial or commercial sources confirmed similar findings that access to contraceptives was often through unofficial or commercial channels (Health Care Women Int'l 2006; Hubacher et.al 2008; Gutmacher, 2010). The authors' knowledge of the health seeking behaviour of the people in the study area shows that patient medicine sellers generally constitute the major source of procurement of common drugs and even "off the counter" drugs. This is particularly because they are not only accessible; the drugs being sold are cheaper even though most are of less quality if not out rightly fake and thus dangerous for human consumption.

A general observation in Table 5 is the relatively low level of usage of contraceptives in the study area. The highest proportion of users was found in rural Local governments, where the distribution of contraceptive outlets was low. This confirms the derisory use of contraceptives devices among the adolescents. (Gutmacher, 2009; William et.al, 2009) confirmed that only few adolescents used contraceptives in developing countries.

The low threshold population for the sustenance of service providers may be responsible for the low availability of services in the rural Local Government areas, apart from the fact of homogeneity of rural population which makes it possible for providers and adolescent customers to be familiar with each other.

Table 6 shows that the bulk of the respondents claimed that societal disapproval of usage is a major factor militating against the use of contraceptive, this is confirmed by (Chandra Mouli et.al 2014) that adolescents, especially unmarried ones - face a number of barriers in obtaining contraceptives and in using them correctly and consistently. The societal disapproval should be understood in the context of prevailing socio-cultural attitude and general understanding of sexuality and reproductive behaviour which favours chastity while discouraging premarital sexual activities. Abstinence therefore is a doctrine that is well enshrined in the people's socio-cultural lives and religion, both Islamic and Christian religion. The implication of societal disapproval of use of protective measure for sexually active adolescents has health implications. First, the adolescents are prone to sporadic unprotected sexual activities and are thus exposed to associated risk of contracting Sexually Transmitted Infections including HIV/Aids. Secondly, there is likely to be high level of unwanted pregnancies leading to disruption of education, increase in dropout rate, particularly for female adolescents and uncontrollable population growth. The implications of the above portend great danger for the health, career of the adolescents and might expose the entire society to various problems commonly associated with high population and congestion such as poor standard of living, various crimes, unemployment among others. On the health implications, apart from risk of contracting STI/Aids, occurrence of unwanted pregnancy may compel criminal abortion, resulting in maternal mortality and morbidity.

As a result of societal disapproval of usage of the devices, the usual option left for prospective buyers of contraceptive products is to travel long distances to places where anonymity is guaranteed. This perhaps explains why a significant proportion of adolescents claimed that the cost of contraceptives and or cost of transportation were too high for them.

Furthermore, the result of adoption of Contraceptives Methods among the Adolescents shows that the largest percentage of the adolescents (30%) adopted traditional method or unsafe withdrawal method (22%). This is in line with observations by Williams et al, (2009) that most women in developing countries relied on traditional rather than modern contraceptives. This could be as a result of the problem of societal disapproval (as in the study area) of use of modern method or high cost arising from low level of service provision. Further investigations revealed that adolescents used such traditional methods as spiritual rings worn on fingers or beads tied around their waists. The traditional materials and objects were considered to be cheap,

readily available and perceived to be very reliable, apart from the fact that, they can be purchased without anybody suspecting the motive of the buyer. The issue is that objects are in most cases multipurpose in nature and functioning. They could be for protection and wealth, so using them do not attract any sexuality intention. Nevertheless, the implication of this is that youngsters are more likely to contract STI and equally become pregnant. This is confirmed by (Mosher W D et.al 2010; Finer L B 2012; Mariam R Chacko 2016) that the use of contraceptives among the adolescents is intermittent, improper and very low.

Conclusion

It is concluded that not only was uptake of contraceptives low in the study area, relative to pattern of population distribution, there was low level of service provision both in the urban and rural areas. While there was strong societal disapproval of use of modern methods, a view reinforced by religious beliefs and misconception about usage of contraceptives, the subtle nature of the provision, distribution and usage of traditional method enhanced by its relatively higher level of affordability and availability made it a preferred option of contraception among the populace.

Recommendations

1. Given the various misconceptions about adolescents' sexuality and reproductive health issues, sex education should be made part of the secondary school curriculum and also taught in various adult education programmes for parents with low level of education. In the secondary schools, such subjects as physical and health education can incorporate this aspect.

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

3. Perhaps as a result of their religious and socio-cultural background, there is the tendency for health workers to castigate adolescents patronizing contraceptive outlets. There is therefore the need to promote professionalism among health workers, through mandatory continuous education programmes.

4. There is the need for the government to create a forum for continuous education among religious leaders on the relevance of healthy sexual life among families and adolescents in particular. This it is hoped will change parental views about the strategies

for promoting healthy sexual behavior and reproductive health among adolescents.

5. As a suggestion for further research, it is recommended that, research attention on similar matter should include out-of-school adolescents and compare access to and use of contraceptives among this group with that of in-school adolescents which is the focus and limitation of the current study.

6. Increasing the use of modern contraceptive methods 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 the use of contraceptives among adolescents. Interventions should aim to counter negative perceptions of modern contraceptive methods and the dual role of such method as use of condoms for contraception and STI prevention should be exploited.

7. Promotional programmes should include confidence building on modern contraceptives methods, particularly the additional advantage of protection against STI and HIV/Aids apart from prevention of unwanted pregnancies.

8. This study has demonstrated the possibility of storing and analyzing spatially referenced data about adolescents' access to and use of contraceptives in GIS environment for easy access and processing. This will therefore enhance further research on the subject matter in the study area.

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