# AGE AT FIRST SEXUAL INITIATION AND HIV RISK PERCEPTION AMONG NIGERIAN YOUTHS

BY

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## CERTIFICATION

I certify that this project was carried out under my supervision by Shittu,RahmanAkorede in the department of Epidemiology and Medical statistics, faculty of Public Health, College of Medicine, University of Ibadan, Ibadan

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# DEDICATION

This Dissertation is dedicated to the memory of late parent Alhaji Shittu Onilewura and Alhaja Mariam Onilewura. May Almighty Allah save them from the torment of the grave.

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# ABSTRACT

**Background**: Many young people do not receive adequate preparation about the dangers associated with early sexual initiation which leaves them vulnerable to coercion. abuse. exploitation, unintended pregnancy and sexually transmitted infections. including HIV/AIDS. Therefore. the aim of this study was to examine the age pattern of youth sexual initiation and its predictors among a nationally representative sample.

**Methods**: This study was a secondary analysis of data from National HIV/AIDS and Reproductive Health Survey (NARHS) .A total of 4366 records of youth aged 15-24 years were extracted. Kaplan Meier survival analysis and Log rank test was used to identify factors associated with sexual initiation, Cox proportional hazards models to identify the predictors of sexual initiation and multinomial logistic regression was used to examine youth HIV self-risk perceptions.

**Results:** There were 2359 (50.9%) males and 2274 (49.1%) females with male: female ratio of 1.03:1. The mean age of the respondents was 17.01 ±2.7yrs.The cumulative rate of sexual initiation was 76.2% at 24 years of age. The risk of sexual initiation was lower for youths in South East (HR = 0.44; 95% C.I= 0.37 – 0.52. p<0.05) compared to the South South. The risk of sexual initiation was lower in male respondents (HR = 0.49; 95% C.I= 0.45 – 0.53. p<0.05) compared with female respondents. Urban respondents (HR = 0.809; 95% C.I= 0.735 – 0.891. p<0.05) commenced sexual intercourse later than rural counterparts.

A higher proportion of the respondents 2632(63.2%) perceived no risk of HIV infection. 34.1% perceived low risk and 2.6% perceived high risk. HIV risk perception was about 2 times higher among the respondent with primary level of education (OR = 2.44; 95% C.I= 1.10 – 5.43, p<0.05) compared with those with no formal level of education .Also. the odds of high HIV risk perception is lowest in the North West (OR =0.12; 95% C.I= 0.05 – 0.30. p<0.05) and highest in the North East region (OR = 0.94; 95% C.I= 0.50 – 1.76, p<0.05) compared with South South.

The odds of low HIV risk perception reduced by 3.6%. Also, the odd of low risk perception is about 1.6 times higher among respondents with higher level of education (OR = 1.61; 95% C.I=

1.16 – 2.23, p<0.05) compared with respondents with no formal education. The North West (OR =0.42: 95% C.I= 0.33 – 0.54, p<0.05) respondents were about 58.1 % less likely to perceive low HIV risk.

**Conclusion:** The findings from this study showed that substantial geographical variation exists in the rate of first sexual initiation within Nigeria. Also, majority of Nigerian youths perceived themselves as having low risk for HIV infection. There is strong evidence that the risk of early intercourse was associated with respondents' sex, education attainment, residence and geopolitical zone.

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background

Nigeria is a youthful and populous nation where age group 15-24 years constitutes about 20% of the population. Youths are defined by the United Nations as persons between the ages 15-24yrsThese groups of people are energetic, dynamic and adventurous. They are more likely to experiment with dangerous behaviors such as early sexual initiation (United Nations, 1992).

The development of cognitive, emotional, and social capacities during early adolescence and the emergence of sexual feelings and curiosity occur at a time of intense socialization into gendered sexual attitudes and behaviors (Barker 2000; Breinbauer and Maddaleno 2005; Patton and Viner 2007). By the time of their 15th birthdays, a substantial number of boys and girls in some developing countries have already engaged in risky sexual activities, including but not limited to unprotected heterosexual vaginal intercourse() .Early sexual initiation among youth is associated with increase in exposure to sexually transmitted diseases, including HIV/AIDS, and pregnancy. An estimated 8,300 young people aged 13–24 years in the 40 states reporting to CDC had HIV infection in 2009 .Nearly half of the 19 million new STDs each year are among young people aged 15–24 years .More than 400,000 teen girls aged 15–19 years gave birth in 2009 (CDC. Youth risk behavior surveillance—United States, 2009).

Early sexual initiation also increases the risk of Human papillomavirus (HPV) infection, due to cervical immaturity which leads to cervical cancer increases. Additionally, given the risk of pregnancy, early sexual initiators are less likely to complete their schooling thereby limiting their social and vocational futures. To reduce sexual risk behaviors and related health problems among youth, schools and other youth-serving organizations can help young people adopt lifelong attitudes and behaviors that support their health and well-being—including behaviors that reduce their risk for HIV, other STDs, and unintended pregnancy.

Currently, few young people are receiving adequate preparation about the danger associated with earlier sexual initiation which leaves them vulnerable to coercion, abuse, exploitation, unintended pregnancy and sexually transmitted infections, including HIV. The UNAIDS 2008

Global Report on the AIDS ~~Epidemic~~ reported that only 40% of young people aged 15-24yrs had accurate knowledge about HIV and transmission. This knowledge is essential for youths because young people aged 15-24 years account for 45% of all new HIV infections (UNAIDS 2008).

The ~~choice~~ is whether to leave the children to find their own way through the clouds of partial information. misinformation and outright exploitation that they will find from media. the Internet, peers and the unscrupulous, or instead face up to the challenge of providing clear. well informed, and scientifically-grounded sexuality education based in the universal values of respect and human rights. Comprehensive sexuality education can radically shift the trajectory of the epidemic. and young people are clear in their demand for more and better sexuality education. services and resources to meet their prevention needs.

An understanding of virginity survival among Nigerian youth is important for effective intervention, even though a lot of studies have been done on sexual behavior of youth in the country; few have used all states of the country. Therefore. the aim of the present study is to examine the age pattern of youth sexual initiation among a nationally representative sample.

## 1.2 Problem statement

The social meaning and significance of sexual initiation varies by culture, however, it remains a milestone in the physical and psychological development of both men and women throughout the world. The age of a person is another factor that may influence sexual behaviour and the level of perceived risk of HIV infection. Men and women in their teens are at increased risk of HIV infection because they often engage in unprotected sexual intercourse (Hulton et al., 2000). Entry in first sex is the entry point to subsequent risk behaviour.

Youth who initiate sex at an early age and those who delay sex spend different lengths of their lives at risk of HIV infection. Sometimes there is pressure for girls to prove their fertility before marriage. Similarly, boys may face pressure to prove manhood by impregnating a girl, or by having many sexual partners (Meekers&Calvès, 1997; Nzioka, 2001). Young people perceive themselves as being at low risk of HIV infection (Pettifor et.al 2004), although the risk of HIV

infection is high among young men and women because they do not perceive their risk to be high (Prohaska et al., 1990; Cleland, 1995).

The question falls on whether sexually inexperienced youth have any risk perception of HIV infection despite Nigeria being a populated country with HIV prevalence estimated to 18 to 26 % and no surveillance system to assess young adults' sexual experience or attitudes about sex. There is need to find out if timing of first sexual intercourse is influenced by factors such educational level, zone etc.

## 1.3 Significance of the study

This study will add to the knowledge about the dynamics of sexual initiation among Nigerian youths.

It will also explore their perceptions about risk of HIV perception. This information can help to sharpen HIV prevention programs.

## 1.4 Objective:

General objective is to determine the rate and predictors of sex initiation and assess its relationship with self-risk perception of HIV among Nigerian youth

**Specific objectives:**

1. Estimate the rate of sexual initiation among Nigerian youth using Kaplan-Meier survival analysis techniques.
2. Identity predictors of sexual initiation among Nigeria youth
3. Examine the effect (if any) of timing of sexual initiation on self-risk perception of HIV/AIDS

# CHAPTER TWO

# LITERATURE REVIEW

## 2.1 Age at first sexual intercourse

For many youth, because their first sexual experience is secret or rushed, there are often limited opportunities to take precautions. Additionally, a profound lack of correct information about sexual and reproductive health often leads youth to initiate sex with a false or exaggerated sense of safety concerning infection and pregnancy. In Nigeria, as in many other developing countries, the common method of HIV transmission is by sexual intercourse and most youth know that HIV can be transmitted this way.

Shisana O et al (2005) made an argument that although not all sex is risky sex for instance the probability of HIV infection is reduced if condoms are used consistently or if individuals have only one, uninfected sexual partner among South Africans aged 15–24 yrs, more than half have had sex by age 18 yrs (Eaton and Flisher, 2000). However engaging in first sex is the entry point to subsequent risk behaviour. Thus, compared with youth who initiate sex at an early age, youth who delay sex spend fewer years of their lives at risk of HIV infection. For this reason, first sexual intercourse is considered as an HIV risky behaviour.

The circumstances and reasons why young people engage in early sexual activity are varied. In Actionable Governance Indicators (AGIs) study in Uganda, youth generally described sex as happening under one of several circumstances: as part of an intimate relationship (boyfriend/girlfriend); in exchange for money or material goods; as something you are forced or pressured into; or as something you 'just do' (Amuyunzu-Nyamongo, et al, 2004). The National HIV/AIDS and Reproductive Health Survey (NARHS) report from Nigeria found that the proportion of respondents who had received or given some kind of gifts or favour for sex was higher among the younger age group (15-29 years), in the urban areas and among those with primary, secondary and higher education. The proportion that had accepted or given gifts or some kind of favour in exchange for sex was highest in the South- South for both females 10%

and males 14%. (NARHS report 2007). According to NARHS report 2007, the median age at first sex for respondents aged 15-24 years was 16years for females and 17 years for males.

## 2.2 Risks perception of HIV

Among Nigerian youth, studies point to the fact that awareness of HIV/AIDS has not translated to behavioural change. Adedimeji (2003) observed a 100 per cent HIV/AIDS awareness rate among undergraduates in a Nigerian University. It is worrisome to find that only five per cent of the respondents reported having used condoms during casual sexual intercourse with persons they were meeting for the first time. Nigerian youths between the ages of 15 and 24 are the most affected because of their sexual behaviour especially college and University students due to unsafe sexual behaviour, experimentation with alcohol and drugs, and failure to see themselves as at risk of infection, and are particularly vulnerable to the disease. Makinwa et.al (1991).

A review of quantitative and qualitative studies (Nzioka, 2001; Aggleton et al., 1994) showed that individuals are more likely to underestimate than to overestimate their risk of HIV infection regardless of the nature of their sexual behaviour. Despite high HIV prevalence and high rates of sexual risk behaviours in South Africa and other Sub-Saharan African countries, young people in these countries often perceive themselves as being at low risk of HIV infection (Sarker et.al, 2005; Maswanya et.al, 1999; Pettifor et.al, 2004)

According to Asekun-Olarinmoyeet.al (2009) in their study, reported that the respondents had very low levels and poor perception of their own risk of HIV/AIDS infection as >2/3 perceived the risk of their ever contracting HIV infection to be nil. Worryingly, the prevalence rate is highest among young people: 4.7 per cent of 20-24 year-olds and 4.9per cent of 25-29 year-olds are infected with the HIV virus (UNICEF, 2007)

Ulysses et.al (2005) observed that AIDS has devastated the lives of citizens of the United States of America to the extent that the incidence rate of the disease for young Americans between the ages of 13 to 25 years rose nearly 20% and approximately 50% of new infections are among individuals who are younger than 25 years old.

A study by Sarah et.al (2007). reported that a respondent who professed having multiple sexual partners and expressed high self-perception of risk least utilized HIV testing services. In another study among the youth in the United States reported as high as 89 per cent of respondents who professed high or very high self-perception of risk of infection did not undergo HIV testing. (Banerjeaand Baer, 2006).

## 2.3 Education

Education plays an important role in shaping a person's outlook, behavioural general and health-seeking behaviour in particular. In addition to the skills gained through formal school curriculum, education provides an opportunity for young people to gain self-understanding, self-esteem and develop relationships with peers and adults outside of their families and this increases their sources of information and skills. This is particularly important for young girls in asserting their rights, and protecting their sexual and reproductive health (UNFPA, 2003)

Sex education that works starts early, before young people reach puberty, and before they have developed established patterns of behaviour. The precise age at which information should be provided depends on the physical, emotional and intellectual development of the young people as well as their level of understanding. What is covered and also how, depends on who is providing the sex education, when they are providing it, and in what context, as well as what the individual young person wants to know about. It is important for sex education to begin at a young age and also that it is sustained. Giving young people basic information from an early age provides the foundation on which more complex knowledge is built up over time. For example, when they are very young, children can be informed about how people grow and change over time, and how babies become children and then adults, and this provides the basis on which they understand more detailed information about puberty provided in the pre-teenage years. They can also when they are young, be provided with information about viruses and germs that attack the body. This provides the basis for talking to them later about infections that can be caught through sexual contact. Although people of all age groups can benefit from sexuality education, this pays particular attention to sexuality education among young persons in Nigeria. This justifies the

need for sexuality education in young persons and provides evidence of the benefits of sexuality education in this population.

There has been a good deal of debate about the benefits of sexuality education. Some people claim that sexuality education enables young people to make informed choices about sexual relationships and to protect their sexual health. Others disagree, claiming that sexuality education may have harmful effects by. for example, hastening the onset of sexual activity. Until recently this debate took place in the absence of reliable evidence to support either view. The review of sexuality education in European countries has shown that systematic evaluation of programmes is all too rare. However, there is now strong international evidence that school-based sexuality education can be effective in reducing sexual risk behaviour and is not associated with increased sexual activity or increase sexual risk taking. as some have feared (Kirby. Laris and Rolleri. 2005).

AIDS education for young people plays a vital role in global efforts to end the AIDS epidemic. Education may be an important protective factor (Magnani et.al. 2002) and despite the fact that HIV transmission can be prevented. each year hundreds of thousands of young people become infected with the virus. In 2009 alone, there were 890,000 new HIV infections amongst young people aged 15-24 (UNAIDS/UNICEF. 2010) and in 2010. 5 million 15-24 year olds were living with HIV (WHO/UNAIDS/UNICEF. 2011). In Kenya for instance Kenya's education sector has taken an active role in the country's response to the AIDS epidemic. having a particularly positive effect on HIV and AIDS awareness and leading to a reduction of risk behaviour among young people (Action Aid. 2003). Kenya has integrated AIDS education into all subjects at school. and introduced a weekly compulsory HIV and AIDS lesson into all primary and secondary curricula. An evaluation of 2000 schools found that AIDS education is effectively promoting healthy behaviour and reducing the risk of infection. (Kenya National AIDS Control Council; 2009).Access to sexuality education for young persons is not yet universal in Nigeria. The challenge is in developing creative ways of meeting the unmet needs of young persons. Programme managers need to devote more effort to disseminating the benefits of sexuality to persuade policy makers and donors to provide greater resources for implementing good quality sexuality education programmes for young persons in Nigeria

## 2.4 Mass media exposure

Early sexual intercourse among American adolescents represents a major public health problem. Although early sexual activity may be caused by a variety of factors, the media are believed to play a significant role. In film, television, and music, sexual messages are becoming more explicit in dialogue, lyrics, and behavior. In addition, these messages contain unrealistic, inaccurate, and misleading information that young people accept as facts. Teens rank the media second only to school sex education programs as a leading source of information about sex. (CDC. Youth risk behavior surveillance—United States, 2009. MMWR 2010).

The role of media in teens' lives has raised concerns in many areas; however, aggression/violence and sexuality are two key areas of research.

When examining the research on TV and sexuality, one concern is that television characters serve as role models for young adults. (Bandura's 1977) .Social learning theory states that new behaviours seen by individuals are likely to be observed, and reproduced. Researchers argue that television provides adolescents with models whose sexual attitudes and behaviours are learned and replicated (Chapin, 2000).

The sexual content in television programming and commercials has a great impact on youth. Television can be a tool for educating youth about sexually transmitted diseases and teen pregnancy. However, it can also stimulate interest in sexual activity at an early age. The Media Awareness Network states that three out of four prime time shows contain sexual references. In shows that portray teen sex situations, only 17 percent included a message about responsible sex. Parents-tv.org states that 62 percent of youth say that sex on TV influences them to have sex when they're too young. In addition to providing role models, television conveys "sexual scripts that establish norms and expectations concerning how to be sexual, why to have sex, whom to have it with, and what the appropriate sequence of activities is" (Ward, 1995)

Media exposure involves unlimited access to images and the media is present in a minor's everyday life. This is evidenced by their access to computers at home, school, libraries or friends' houses. Magazines with scantily dressed individuals in sexual poses are in stores, gas

stations and many homes. Billboard advertisements are also sources of media, which are viewed daily and can feature sexual content. Radio and other electronic devices, such as ipods, that can store, record and play hundreds of hours of music, videos and movies, are vehicles by which the media can deliver sexual messages to the adolescent.

Sexual intercourse among adolescents has become a prevalent activity, which can produce lifelong consequences. Literature on intercourse among adolescents reveals the bulk of adolescents from the United States and Canada between the ages of 15 and 19 had intercourse at least once (Hall, Holmqvist & Sherry, 2004). There are many concepts to explore when one examines the repercussions of adolescents engaging in intercourse. The most obvious of the repercussions are STDs and pregnancy.

# CHAPTER THREE

# METHODOLOGY

## 3.1 Study area

Nigeria is in the West African sub-region, lying between latitudes 4°16' and 13°53' north and longitudes 2°40' and 14°41' east. It is bordered by Niger in the north, Chad in the northeast, Cameroon in the east, and Benin in the west. The National HIV/AIDS and Reproductive Health Survey (NARHS) was carried out in all the 36 states of the federation and the Federal Capital Territory, grouped into six geo-political zones: North Central, North East, North West, South East, South South, and South West in 2007.

## 3.2 Study design

The study is an analysis of data from the 2007 National AIDS & Reproductive Health the Survey (NARHS). The 2007 NARHS was a cross-sectional study containing data sources that address the nexus of HIV/AIDS and related areas of reproductive health.

## 3.3 Description of NARHS 2007

The 2007 National HIV/AIDS and Reproductive Health Survey (NARHS) was designed to generate data that provide reasonable estimates of HIV prevalence among the general population especially at national and zonal levels. 2007 NARHS is the third survey in the series which included a biological component thereby earning the name NARHS plus. NARHS Plus is a naturally representative sample of females aged 15-49years and male aged 16-64years.

It was designed in order to obtain accurate HIV prevalence estimate and information on risk factors related to HIV infection at the national, zonal and to some extent at the state levels. It also provided information on the situations of reproductive and sexual health in Nigeria and variety of factors that influence reproductive and sexual health

### 3.4 Sampling technique

The sampling procedure was a four-level multi-stage cluster sampling which aimed at selecting eligible persons with known probability. The first stage involved the selection of rural and urban localities then selection of Enumeration Area (EA) within the selected rural and urban localities. The third stage involved listing of eligible individuals within households and lastly selection of actual respondents for interview and testing. Within a state (the administrative division), all eligible persons irrespective of type of residence (rural or urban) had equal chance of being included in the final sample, hence, the sample selected was self – weighted within state but weighting was required for combination of zonal or national analysis

### 3.5 Study population

The study used extracted data of 4,615 respondents, 2,357 males and 2,259 females from National HIV/AIDS and Reproductive Health Survey (NARHS) plus 2007 for youths aged 15-24 years old across the six geo-political zone and FCT of Nigeria

### 3.6 Data management and Data Analysis

Data analysis was performed with SPSS version 15.Descriptive statistics were presented with the aid of tables to summarize demographic characteristics. Thereafter, bivariate analysis was conducted using Kaplan Meier survival analysis and Log rank test to establish an association between the dependent variable (Time of first sexual initiation) and independent variables such as location, zone ,religion, education and sex of the respondents. The analysis was considered to show significant association when the P value was less than 0.05.

Multivariate analysis was carried out using Cox's Proportional Hazard model to determine the predictors of sexual initiation.

Multinomial logit model was fitted using the dependent variable (HIV risk perception) which is categorized as high, low and no risk at all to examine youth HIV self-risk perception.

### 3.7 Variable description

Ages at the time of interview of those who have not yet had sex as well as age at first sex for those who have started were used to obtain the survival time.

The respondents who never had intercourse are considered censored at their current age

This study used reported age at first sex as the event time and first sex as the event.

### 3.8 Analysis of Time-to-Event Data

Time-to-event data are generated when the response measurement of interest is the time from a well-defined origin of measurement to occurrence of an event of interest.

Three basic requirements define time-to-event measurements

1. Agreed scale of measurement for time (e.g. time since diagnosis, attained age)
2. Unambiguous origin for the measurement of 'time'
3. Precise definition of 'response,' or occurrence of the event of interest

Time-to-event analysis is also known as failure time analysis (primarily in engineering), lifetime analysis, and survival analysis.

Epidemiological cohort studies are time-to-event studies and are analysed in the framework of survival analysis.

Examples of time-to-event data can be found in almost every discipline. In some studies, the event of interest (e.g. death) is bound to occur if we are able to follow-up each individual for a sufficient length of time. However, whether or not the event of interest is inevitable has no consequence for the design, analysis, or interpretation of the study.

In some studies the time-to-event (or survival probability) is of primary interest whereas in epidemiological cohort studies we may be primarily interested in comparing the event rates between the exposed and unexposed.

The basic statistical methodology is similar for randomized and observational studies, although some methods are more appropriate for some designs than others (e.g. need to control for confounding in observational studies).The characteristic of time-to-event data that renders standard statistical methods inappropriate is censoring — unobserved values of the response measurement of interest

### 3.8.1 Censoring

Censoring refers to the situation where individuals cannot be observed for the full time to event. In studying the survival of cancer patients, for example, patients enter the study at the time of diagnosis (or the time of treatment in randomized trials) and are followed up until the event of interest is observed. Censoring may occur in one of the following forms:

1) Termination of the study before the event occurs;

2) Death due to a cause not considered to be the event of interest (in cause-specific survival analyses); and

3) Loss to follow-up, for example, if the patient emigrates the survival time is censored.

These are examples of right censoring, which is the most common form of censoring in medical studies. With right censoring, that the event has not occurred during follow-up, but we are unable to follow-up the patient further. The true survival time of the patient is greater than a given value.

### 3.8.2 The survivor function S(t)

The survivor function, S(t), gives the probability of surviving until at least time t. S(t) is a non-increasing function with a value 1 at the time origin and a value 0 as t approaches infinity.

Note that: S(t) is a function (the survivor function) which depends on t and should not be referred to as the survival rate.

### 3.8.3 Hazard function, H(t)

The term 'hazard rate' is the generic term used in survival analysis to describe the 'event rate'. If, for example, the event of interest is disease incidence then the hazard represents the incidence rate.

The hazard function, h(t), is the instantaneous event rate at time t, conditional on survival up to time t. The units are events per unit time. In contrast to the survivor function, which describes the probability of not failing before time t, the hazard function focuses on the failure rate at time t among those individuals who are alive at time t. That is, a lower value for h(t) implies a higher value for S(t) and vice-versa.

### 3.8.4 The Kaplan-Meier method for estimating S(t)

Also known as the product-limit method but is more commonly known as the Kaplan-Meier method. In essence, the Kaplan-Meier method is the life table method where the interval size is decreased towards zero so that the number of intervals tends to infinity. Each life table interval is of infinitesimal length, just enough for one event or time increment.

In practice, survival time is measured on a discrete scale (e.g. minutes, hours, days, months, or years) so the interval length is limited by the accuracy to which survival time is measured.

The Kaplan-Meier method was developed for applications where survival time is measured on a continuous scale. We should therefore use as accurate a time scale as possible. That is, don't base the estimate on time in days if time in minutes is also known.

In practice, only those intervals containing an event contribute to the estimate, so we can ignore all other intervals.

-To obtain Kaplan-Meier estimates of survival, the patient survival times are first ranked in increasing order.

-The times where events (deaths) occur are denoted by $t_i$, where $t_1 < t_2 < t_3 < \ldots$

-The number of deaths occurring at $t_i$ is denoted by $d_i$.

- If both censoring(s) and death(s) occur at the same time, then the censoring(s) are assumed to occur immediately after the death time.

That is, individuals with survival times censored at ti are assumed to be at risk at ti.

- The Kaplan-Meier estimate of the cumulative survivor function at time t is given by

$$\hat{S}(t) = \prod_{t_i < t} \frac{n_i - d_i}{n_i}.$$

Censorings do not affect the estimate of S(t), but contribute in Equation by decreasing ni, the number of persons at risk, at the next death time.

If the largest observed survival time (which we will call tz) is a censored survival time, then S(t) is undefined for t >tz, otherwise ˆ S(t) = 0 for t >tz.

### 3.8.5 Ties in survival data

If two individuals have the same survival time (time to event or time to censoring), we say that the survival times are 'tied'. Many of the standard methods for survival analysis, such as the Kaplan-Meier method and the Cox proportional hazards model, assume that survival time is measured on a continuous scale and that ties are therefore rare.

### 3.8.6 Estimating the standard error of S(t)

The most widely used method for estimating the standard error of the estimated survival proportion is the method described by Greenwood (1926).

$$\widehat{\mathrm{Var}}(\hat{S}(t)) = \hat{S}(t)^2 \sum_{t_i<t} \frac{d_i}{n_i(n_i - d_i)}.$$

Appropriate for both the actuarial and Kaplan-Meier methods. Also, appropriate for both observed and cause-specific survival.

### 3.8.7 Confidence intervals for estimated survival proportions

Confidence intervals can be calculated for any estimated survival proportion in order to provide a measure of uncertainty associated with the point estimate. A 95% confidence interval (CI) is an interval, i.e. a range of values, such that under repeated sampling, the true survival proportion will be contained in the interval 95% of the time.

The CI is often called an interval estimate for the true survival proportion, while the estimated survival proportion is called the point estimate.

Estimated confidence intervals provide an indication of the level of statistical uncertainty in the estimated survival proportions. They do not represent the range of possible prognoses for an individual patient.

A confidence interval for the true survival proportion can be obtained by assuming that the estimated survival proportion is normally distributed around the true value with estimated variance given by the square of the standard error.

A two-sided 100(1 − α) % confidence interval ranges from p − zα/2SE(p) top + zα/2SE(p),

where p is the estimated survival proportion (which can be an interval-specific or cumulative

observed, cause-specific, or relative survival), SE(p) the associated standard error, and $z\alpha/2$ the upper $\alpha/2$ percentage point of the standard normal distribution.

For a 95% confidence interval, $z\alpha/2 = 1.96$, and for a 99% confidence interval, $z\alpha/2 = 2.58$.

The standard error of the observed and cause-specific survival proportion can be obtained using Greenwood's method.

### 3.8.8 The Cox proportional hazards model

The most commonly applied model in medical time-to-event studies is the Cox proportional hazards model.The Cox proportional hazards model does not make any assumption about the shape of the underlying hazards, but makes the assumption that the hazards for patient subgroups are proportional over follow-up time. We are usually more interested in studying how survival varies as a function of explanatory variables rather than the shape of the underlying hazard function.

In most statistical models in epidemiology (e.g. linear regression, logistic regression, and Poisson regression) the outcome variable (or a transformation of the outcome variable) is equated to the 'linear predictor', $\beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k$.

$X_1, \ldots, X_k$ are explanatory variables and $\beta_0, \ldots, \beta_k$ are regression coefficients (Parameters) to be estimated. The Xs can be continuous (age, blood pressure, etc.) or if there are categorical predictor variables a series of indicator variables (Xs with values 1 or 0) to represent each category can be created.Interest is in modelling the hazard function, h(t;X), for an individual with covariate vector X, where X represents $X_1, \ldots, X_k$.

The hazard function should be non-negative for all $t > 0$; thus, using

$h(t;X) = \beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k$ may be inappropriate since we cannot guarantee that the linear predictor is always non-negative for all choices of $X_1, \ldots, X_k$ and $\beta_0, \ldots, \beta_k$.

However, $\exp(\beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k)$ is always positive so another option would be log

$$h(t;X) = \beta_0 + \beta_1 X_1 + \cdots + \beta_k X_k.$$

In this formulation, both the left and right hand side of the equation can assume any value, positive or negative.

This formulation is identical to the Poisson regression model. That is,

Log no. events person-time = $\beta_0 + \beta_1 X_1 + \cdot \cdot \cdot + \beta_k X_k$

The one flaw in this potential model is that h(t;X) is a function of t, whereas the right hand side will have a constant value once the values of theβs and Xs are known.This does not cause any mathematical problems, although experience has shown that a constant hazard rate is unrealistic in most practical situations. The remedy is to replace β0, the 'intercept' in the linear predictor, by an arbitrary function of time — say log $h_0(t)$; thus, the resulting model equation is log h(t) = logh0(t) + β1X1 + · · · + βkXk.

The arbitrary function, h0(t), is evidently equal to the hazard rate, h(t;X), when the value of X is zero, i.e., when X1 = · · · = Xk = 0.

The model is often written as

**$h(t) = h_0(t) \exp(X\beta)$.**

Where

$h_0(t)$ represents a reference point that depends on time, just as β0 denotes an arbitrary reference point in other types of regression models.

$X_i$ is the set of independent variables

ß is the vector of coefficients of the independent variables xi

Dependent variable h (t) = Hazard of sexual initiation

This regression model for the hazard rate was first introduced by Cox (Cox DR. Regression models and life tables (with discussion). Journal of the Royal Statistical Society Series B 1972), and is frequently referred to as the Cox regression model, the Cox proportional hazards model, or simply the Cox model.

Estimates of β1, . . . , βk are obtained using the method of maximum partial likelihood . As in all other regression models, if a particular regression coefficient, say βj, is zero, then the corresponding explanatory variable, Xj, is not associated with the hazard rate of the response of interest; in that case, we may wish to omit Xj from any final model for the observed data.

As with logistic regression and Poisson regression, the statistical significance of explanatory variables is assessed using Wald tests or, preferably, likelihood ratio tests. The Wald test is an

approximation to the likelihood ratio test. The likelihood is approximated by a quadratic function, an approximation which is generally quite good when the model fits.

### 3.8.9 Proportional hazards assumption

The proportional hazards assumption is a strong assumption and its appropriateness should always be assessed.

1. The model assumes that the ratio of the hazard functions for any two patient subgroups (i.e. two groups with different values of the explanatory variable X) is constant over follow-up time.
2. The censoring should be independent of an event happening. Thus in a survival study, one should ensure that patients are not removed from the study just before they die.

## 3.9 Multinomial Logistic Regression

Multinomial logistic regression is employed when the response variable is polytomous, i.e. taking $r > 2$ categories. Where $r$ = number of responses.

In fitting the multinomial logit model, the outcome variables; (0= No risk, 1=Low; 2 =High) were used.

For a dependent variable with $K$ categories, the existence of $K$ unobserved continuous variables, $Z_1, \ldots\ldots Z_k$, are considered, each of which can be thought of as the "propensity toward" a category. Here, $Z_k$ represents a respondent's propensity toward selecting the $K^{th}$ risk perception, with larger values of $Z_k$ corresponding to greater risk of HIV (assuming all other $Z's$ remain the same).

Mathematically, the relationship between the $Z's$ and the probability of a particular outcome is described in this formula.

$$\prod_{ik} = \frac{e^{Z_{ik}}}{e^{Z_{i1}} + e^{Z_{i2}} + \ldots\ldots\ldots + e^{Z_{iK}}}$$

Where

$\prod_{ik}$ is the probability that $i^{th}$ case falls in category $k$

$Z_{ik}$ is the value of the $k^{th}$ unobserved continuous variable for the $i^{th}$ case

$Z_k$ is also assumed to be linearly related to the predictors.

$$Z_{ik} = b_{k0} + b_{k1}x_{i1} + b_{k2}x_{i2} + \ldots\ldots\ldots\ldots + b_{kJ}x_{iJ}$$

Where

$x_{ij}$ is the $j^{th}$ predictor for the $i^{th}$

$b_{kj}$ is the $j^{th}$ coefficient for the $k^{th}$ unobserved variable.

$J$ is the number of predictors.

If $Z_k$ were observable, linear regression to each $Z_k$ would simply be fit, and be done. However, since $Z_k$ is unobserved, the predictors to the probability of interest must be related by substituting for $Z_k$.

$$\prod_i = \frac{e^{b_{k0}+b_{k1}x_{i1}+\ldots\ldots\ldots+b_{kJ}x_{iJ}}}{e^{b_{10}+b_{11}x_{i1}+\ldots\ldots+b_{1J}x_{iJ}} + \ldots\ldots + e^{b_{K0}+b_{K1}x_{i1}+\ldots\ldots+b_{KJ}x_{iJ}}}$$

As it stands, if a constant is added to each $Z$, then the outcome probability is unchanged. This is the problem of non-identifiability. To solve this problem, $Z_K$ is (arbitrarily) set to 0. The $K^{th}$ category is called the reference category or "standard" category to which others would be compared, because all parameters in the model are interpreted in reference to it (for convenience sake).

$$\prod_{ik} \text{ (With constants added to } z\text{'s)} = \frac{e^{Z_{ik}+c}}{e^{Z_{i1}+c} + e^{Z_{i2}+c} + \ldots\ldots + e^{Z_{iK}+c}}$$

$$= \frac{e^{Z_{ik}}e^{c}}{e^{Z_{i1}}e^{c} + e^{Z_{i2}}e^{c} + \ldots\ldots + e^{Z_{iK}}e^{c}}$$

$$= \frac{e^{Z_{ik}}}{e^{Z_{i1}} + e^{Z_{i2}} + \ldots\ldots + e^{Z_{iK}}}$$

$$= \prod_{ik}$$

The coefficients are estimated through an iterative maximum likelihood method.

Since the parameter estimates are relative to the referent group, the standard interpretation of the multinomial logit is that for a unit change in the predictor variable, the logit of outcome m relative to the referent group is expected to change by its respective parameter estimate (which is in log-odds units) given the variables in the model are held constant.

### 3.10 Study Limitation

The major limitation of this study, however, is that it is cross-sectional, which necessarily limits causal conclusions.

# CHAPTER FOUR

## RESULTS

### 4.1 Demographic characteristics of respondents.

A total of 4633 records were analysed.2359 (50.9%) were males and 2274(49.1%) were females with male: female ratio of 1.03:1. The mean age of the females was 19.11 ±2.85 years, while the males had a mean age of 19.08 ±2.83 yrs. ($p<0.05$). Majority of respondents fall between the age group 15-19 years (53.5%). A higher proportion of the respondents (65.8%) were from rural areas while 34.2% were from urban areas. Out of the 4633 respondents, the highest number 1175 (26.1%) were from the North-western region and lowest were from South-East (11.7%). About 23.2% have no formal education, only 14.1% attained primary education, 56% attained secondary education and 6.8% have higher level of education. Half of the respondents practice Islam (50.6%) while 45.9% were Christians and only 0.5% practice other forms of religion. (Table 4.1)

**Table4.1: Frequency distribution of demographic characteristics of respondents.**

| Characteristics | Frequency (N=4633) | Percentage |
|---|---|---|
| **AGE (Years)** | | |
| 15-19 | 2470 | 53.3 |
| 20-24 | 2163 | 46.7 |
| **SEX** | | |
| Male | 2359 | 50.9 |
| Female | 2274 | 49.1 |
| **ZONE** | | |
| North West | 1175 | 26.1 |
| North East | 615 | 13.5 |
| North Central | 802 | 13.9 |
| South West | 789 | 19.9 |
| South East | 538 | 11.7 |
| South South | 705 | 14.8 |
| **EDUCATION** | | |
| Primary | 651 | 14.1 |
| Secondary | 2594 | 56.0 |
| Higher | 315 | 6.8 |
| No formal | 1073 | 23.2 |
| **LOCATION** | | |
| Urban | 1583 | 34.2 |
| Rural | 3050 | 65.8 |
| **RELIGION** | | |
| Islam | 2342 | 50.6 |
| Christianity | 2264 | 48.9 |
| Other | 21 | 0.5 |

## 4.2 Kaplan-Meier Rate of sexual initiation among respondents.

The mean age at first sexual initiation was 19.11 ±0.07 years .The cumulative rate of sexual initiation of the respondents was 21% at 15 years of age, while more than half (62.7%) of the respondents had initiated sex at age 20 yrs. The rate increased to 76.2% at 24 years of age.(Table 4.2)

**Table 4.2 Sexual initiation rate among Nigerian youths**

| Time(year) | Cumulative sexual initiation rate | Std. Error | 95% CI |
|---|---|---|---|
| 8 | 0.002 | .001 | 0.0000 - 0.0039 |
| 9 | 0.004 | .001 | 0.0020 - 0.0059 |
| 10 | 0.010 | .001 | 0.0080 - 0.0119 |
| 11 | 0.015 | .002 | 0.0110 - 0.0189 |
| 12 | 0.041 | .003 | 0.0351 - 0.0468 |
| 13 | 0.068 | .004 | 0.0601 - 0.0758 |
| 14 | 0.121 | .005 | 0.1112 - 0.1308 |
| 15 | 0.210 | .006 | 0.1982 - 0.2217 |
| 16 | 0.279 | .007 | 0.2652 - 0.2927 |
| 17 | 0.367 | .008 | 0.3513 - 0.3826 |
| 18 | 0.473 | .008 | 0.4573 - 0.4886 |
| 19 | 0.544 | .009 | 0.5263 - 0.5616 |
| 20 | 0.627 | .009 | 0.6093 - 0.6446 |
| 21 | 0.673 | .010 | 0.6534 - 0.6926 |
| 22 | 0.711 | .011 | 0.6894 - 0.7325 |
| 23 | 0.747 | .012 | 0.7234 - 0.7705 |
| 24 | 0.762 | .014 | 0.7345 - 0.7894 |

## 4.3 Kaplan-Meier Rate of sexual initiation according to selected characteristics.

1) **Sex:** the graph below shows that sexual initiation rate is higher among females with cumulative sexual initiation rate of 87.7% at 24 years of age and was 98.6% among males. ($p < 0.05$). Figure 4.1

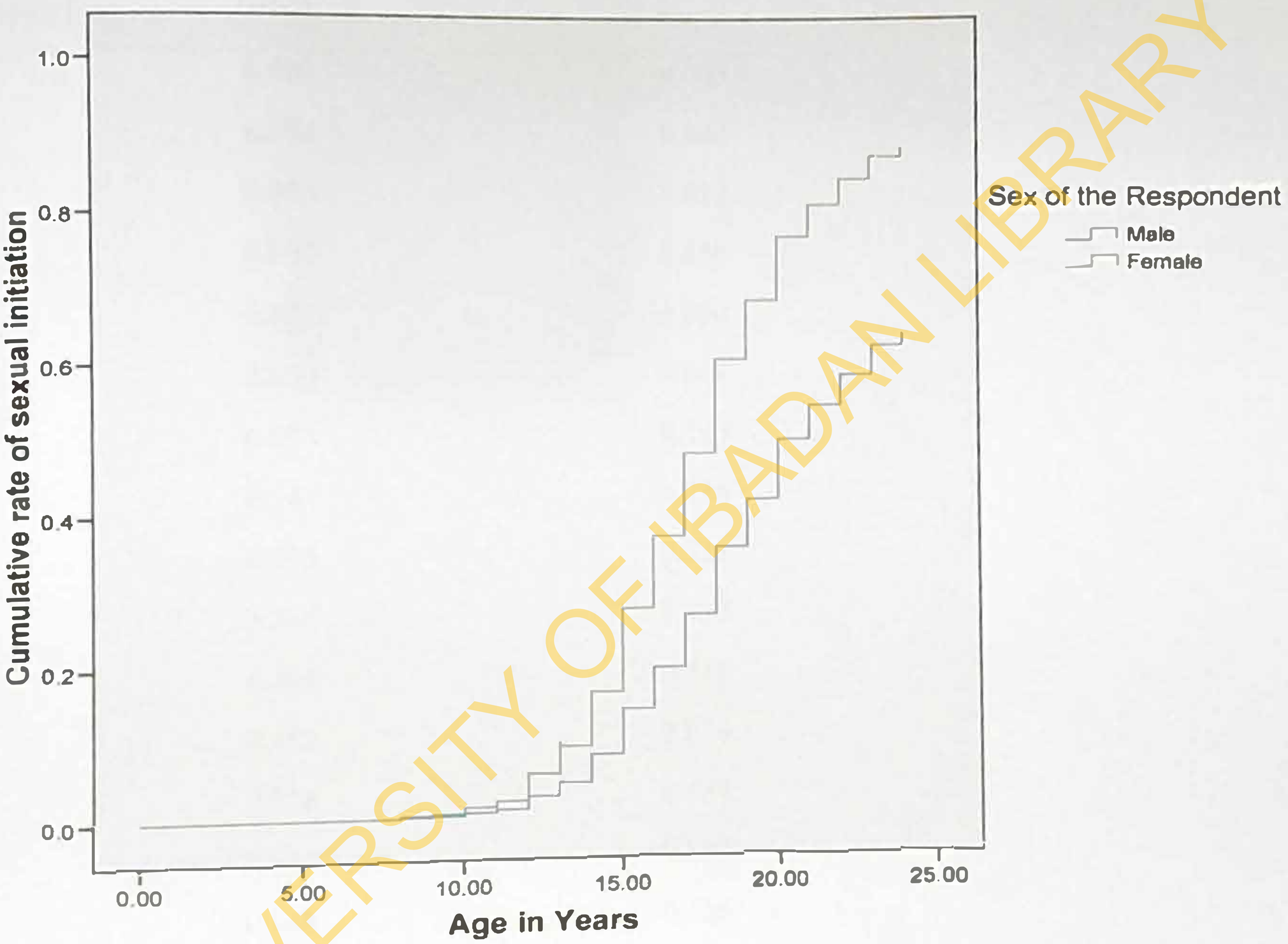



**Figure 4.1: Graph showing gender distribution of sexual initiation rate**

2) **Location:** Sexual initiation rate is consistently higher across the ages among rural respondents. At 15 yrs. the rates were 23.3% and 14.1% in rural and urban settings respectively. The rate increased to 57.5 %( urban) and 65.4 %( rural) at age 20 years. The gap between the rural and urban narrowed as from about 21 years. (Table 4.3)

**Table 4.3 Kaplan Meier Estimate of sexual initiation according to location of respondents**

| | Cumulative sexual initiation rate | |
|---|---|---|
| Time(year) | Urban | Rural |
| 8 | 0.002 | 0.003 |
| 9 | 0.004 | 0.004 |
| 10 | 0.005 | 0.012 |
| 11 | 0.007 | 0.020 |
| 12 | 0.023 | 0.050 |
| 13 | 0.039 | 0.083 |
| 14 | 0.073 | 0.145 |
| 15 | 0.141 | 0.238 |
| 16 | 0.195 | 0.322 |
| 17 | 0.285 | 0.410 |
| 18 | 0.401 | 0.511 |
| 19 | 0.483 | 0.576 |
| 20 | 0.575 | 0.654 |
| 21 | 0.639 | 0.688 |
| 22 | 0.668 | 0.735 |
| 23 | 0.707 | 0.770 |
| 24 | 0.724 | 0.785 |

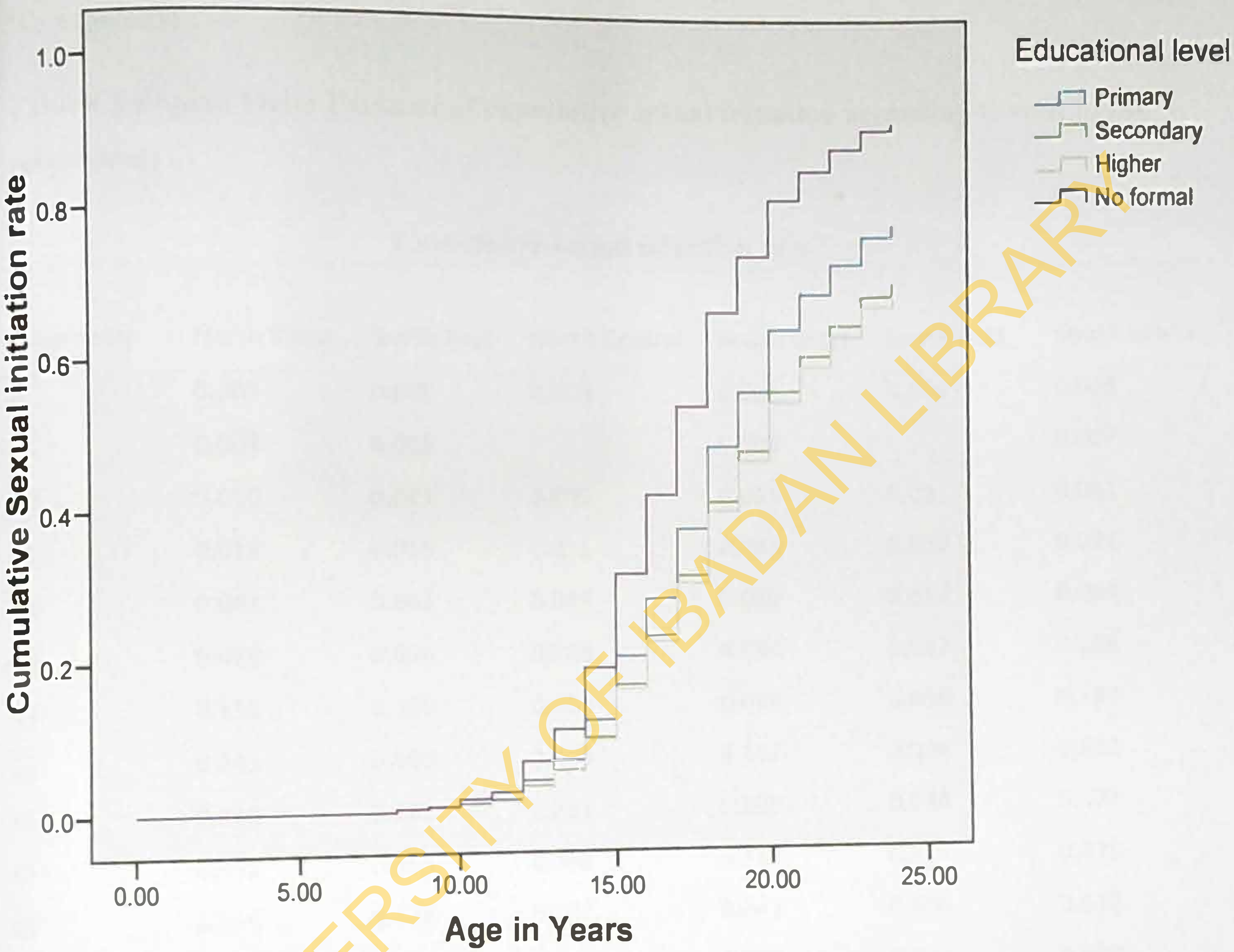
Log Rank (Mantel-Cox): Chi-Square 51.964; p value: ≤0.0001

**3) Education**: Table 4.4 and figure 4.3 show that, sexual initiation rate varies across the ages for educational level. Table 4.4 shows higher rate for respondents with higher level of education at age 8yrs and 9 yrs. The respondents who had no formal education had highest rate of sexual initiation across all ages starting from age 10 yrs.. The log rank test showed that there was a statistically significant difference in educational level. (p value < 0.05)

**Table 4.4 Kaplan Meier Estimate of cumulative sexual initiation rate of respondents according to highest level of education**

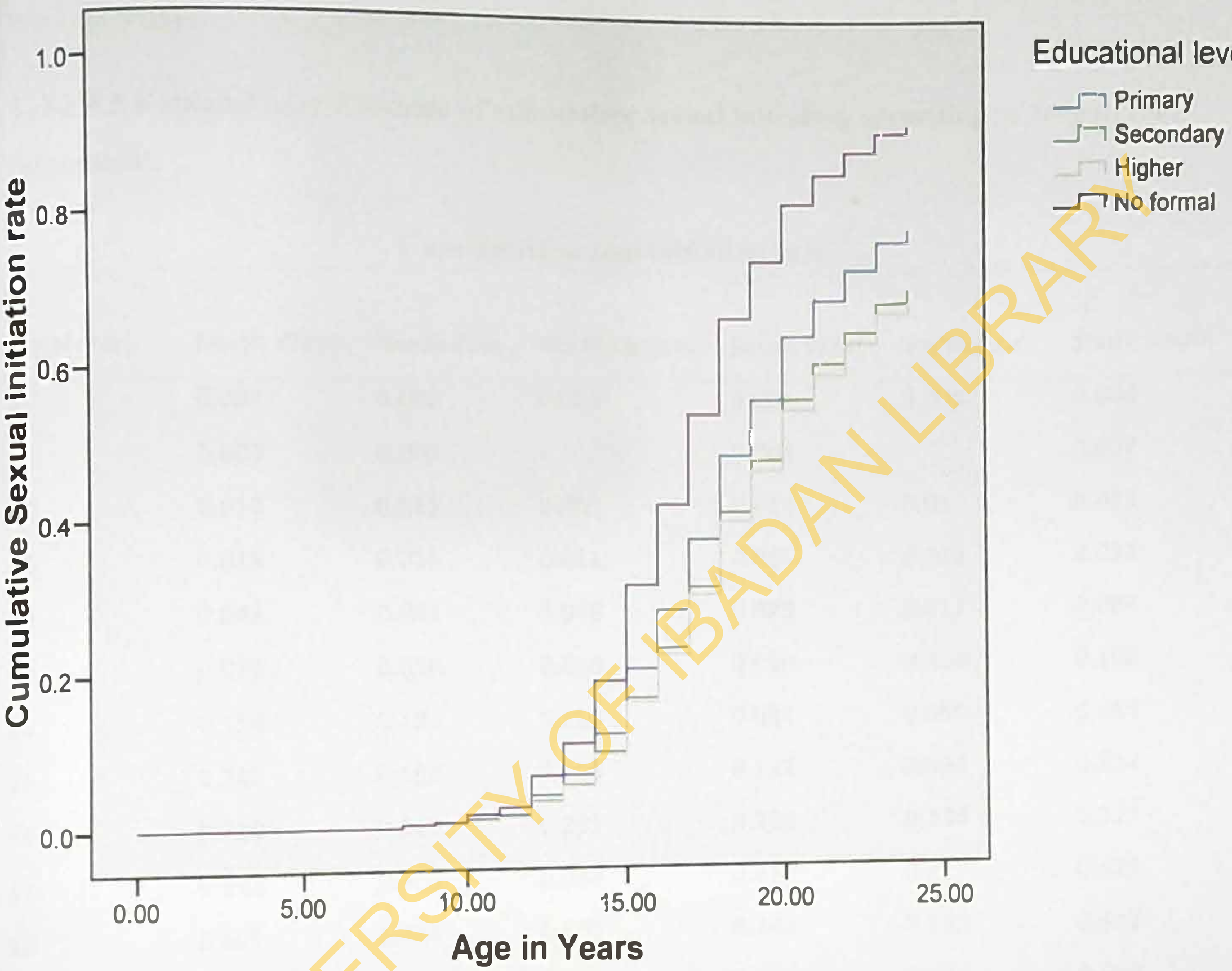
| | Cumulative sexual initiation rate | | | |
|---|---|---|---|---|
| Time(year) | No formal | Primary | Secondary | Higher |
| 8 | 0.004 | - | 0.002 | 0.010 |
| 9 | 0.007 | - | 0.003 | 0.013 |
| 10 | 0.018 | 0.003 | 0.008 | 0.017 |
| 11 | 0.029 | 0.014 | 0.010 | - |
| 12 | 0.077 | 0.035 | 0.028 | 0.040 |
| 13 | 0.131 | 0.060 | 0.045 | 0.053 |
| 14 | 0.255 | 0.107 | 0.074 | 0.076 |
| 15 | 0.389 | 0.200 | 0.140 | 0.113 |
| 16 | 0.514 | 0.286 | 0.196 | 0.162 |
| 17 | 0.593 | 0.402 | 0.287 | 0.229 |
| 18 | 0.664 | 0.479 | 0.409 | 0.362 |
| 19 | 0.711 | 0.542 | 0.491 | 0.436 |
| 20 | 0.751 | 0.644 | 0.581 | 0.561 |
| 21 | 0.775 | 0.667 | 0.633 | 0.628 |
| 22 | 0.803 | 0.696 | 0.681 | 0.664 |
| 23 | - | 0.813 | 0.723 | 0.693 |
| 24 | 0.852 | - | 0.740 | - |

Log Rank (Mantel-Cox): Chi-Square 51.964; p value: ≤0.0001






**Graph showing Education level distribution of sexual initiation rate**




Graph showing Education level distribution of sexual initiation rate

**4) Zone:** Table 4.5 showed that the North East and North West zone reported the lowest rate of sexual initiation with cumulative rate of 65.1% and 67.5% respectively while the South South zone reported the highest rate of sexual initiation of 88.3% at 24 yrs. of age .The South East had the lowest rate at 15 years and 20 yrs. At 24 yrs., sexual initiation was least common in the North West.($p<0.05$)

**Table 4.5 Kaplan Meier Estimate of cumulative sexual initiation according to zone of the respondents**

| | Cumulative sexual initiation rate | | | | | |
|---|---|---|---|---|---|---|
| Time(year) | North West | North East | North Central | South West | South East | South South |
| 8 | 0.002 | 0.002 | 0.003 | 0.001 | 0.006 | 0.003 |
| 9 | 0.003 | 0.003 | - | 0.003 | - | 0.007 |
| 10 | 0.010 | 0.011 | 0.005 | 0.011 | 0.01 | 0.013 |
| 11 | 0.018 | 0.015 | 0.011 | 0.015 | 0.012 | 0.021 |
| 12 | 0.041 | 0.041 | 0.049 | 0.029 | 0.017 | 0.064 |
| 13 | 0.079 | 0.056 | 0.066 | 0.050 | 0.033 | 0.108 |
| 14 | 0.158 | 0.126 | 0.110 | 0.082 | 0.050 | 0.164 |
| 15 | 0.249 | 0.198 | 0.208 | 0.137 | 0.094 | 0.292 |
| 16 | 0.320 | 0.287 | 0.291 | 0.209 | 0.134 | 0.374 |
| 17 | 0.392 | 0.355 | 0.398 | 0.312 | 0.217 | 0.475 |
| 18 | 0.455 | 0.444 | 0.502 | 0.443 | 0.360 | 0.612 |
| 19 | 0.508 | 0.521 | 0.570 | 0.530 | 0.432 | 0.690 |
| 20 | 0.540 | 0.575 | 0.665 | 0.650 | 0.520 | 0.813 |
| 21 | 0.577 | 0.588 | 0.726 | 0.725 | 0.587 | 0.830 |
| 22 | 0.603 | 0.604 | 0.789 | 0.776 | 0.630 | 0.856 |
| 23 | 0.620 | 0.645 | 0.812 | 0.814 | 0.718 | 0.883 |
| 24 | 0.651 | 0.675 | - | 0.832 | - | - |

Log Rank (Mantel-Cox): Chi-Square 114.717; p value : ≤0.0001

**5) Religion**: Sexual initiation rate varies across the religions .Other religions showed a higher rate of sexual initiation across all ages up to 20 years of age with cumulative sexual initiation rate of 69.6%.The rate was higher for those that practice Islamic religion up to 18 years of age with cumulative sexual initiation rate of 47.3%, Christianity religion showed higher rate from 19 years of age up to 23 years with cumulative sexual initiation rate of 80.9%. (p>0.05)

**Table 4.6 Kaplan Meier Estimate of cumulative sexual initiation rate according to religion of the respondents**

| | Cumulative sexual initiation rate | | |
|---|---|---|---|
| Time(year) | Islam | Christianity | Other |
| 8 | 0.003 | 0.002 | 0.053 |
| 9 | 0.004 | 0.003 | - |
| 10 | 0.011 | 0.008 | - |
| 11 | 0.018 | 0.012 | 0.105 |
| 12 | 0.048 | 0.034 | - |
| 13 | 0.077 | 0.058 | 0.158 |
| 14 | 0.144 | 0.095 | 0.211 |
| 15 | 0.232 | 0.175 | 0.316 |
| 16 | 0.314 | 0.242 | 0.392 |
| 17 | 0.387 | 0.346 | - |
| 18 | 0.473 | 0.472 | 0.493 |
| 19 | 0.534 | 0.553 | - |
| 20 | 0.583 | 0.667 | 0.696 |
| 21 | 0.618 | 0.722 | - |
| 22 | 0.645 | 0.770 | - |
| 23 | 0.676 | 0.809 | - |
| 24 | 0.718 | - | - |

Log Rank (Mantel-Cox): Chi-Square 0.733; p value: 0.693

## 4.4 Independent Predictors of sexual initiation

Multivariate analysis was done using Cox proportional Hazard model using covariates that were statistically significantly associated with sexual initiation in the bivariate analysis. Table 4.8 shows the results of the cox proportional hazard model on variables associated with timing of sexual initiation. The Hazard of sexual initiation was lower for youths in South East (HR = 0.44; 95% C.I= 0.37 – 0.52 p<0.05,) compared to the South South. The risk of sexual initiation was lower in male respondents (HR = 0.49; 95% C.I= 0.45 – 0.53, p<0.05) compared with female respondents. Urban respondents (HR = 0.809; 95% C.I= 0.735 – 0.891, p<0.05) commence sexual intercourse later than rural counterparts. The Higher the level of education attained, the lower was the risk of sexual initiation. The risk actually reduced with increasing levels of education.

**Table 4.7 Hazard ratios of sexual initiation according to associated variables**

| Variable | Hazard Ratio | 95% CI | P-value |
|---|---|---|---|
| **Zone** | | | |
| North West | 0.438 | 0.379-0.506 | <0.0001 |
| North East | 0.438 | 0.374-0.514 | <0.0001 |
| North Central | 0.591 | 0.515-0.679 | <0.0001 |
| South West | 0.666 | 0.578-0.767 | <0.0001 |
| South East | 0.436 | 0.369-0.515 | <0.0001 |
| *South South | 1.000 | | |
| **Sex**: | | | |
| Male | 0.489 | 0.448-0.533 | <0.0001 |
| *Female | 1.000 | | |
| **Location** | | | |
| Urban | 0.809 | 0.735-0.891 | <0.0001 |
| *Rural | 1.000 | | |
| **Education** | | | |
| Primary | 0.572 | 0.494-0.662 | <0.0001 |
| Secondary | 0.408 | 0.363-0.460 | <0.0001 |
| Higher | 0.404 | 0.337-0.485 | <0.0001 |
| *No formal | 1.000 | | |

HR. Hazard ratio; CI. Confidence Interval;* Reference category

## 4.5 Distribution of HIV risk perception

Of the 4164 respondents, 2632(62.0%) reported no risk, 35.6% reported low risk and 2.4% reported high risk of HIV self- risk perception. Figure 4.3

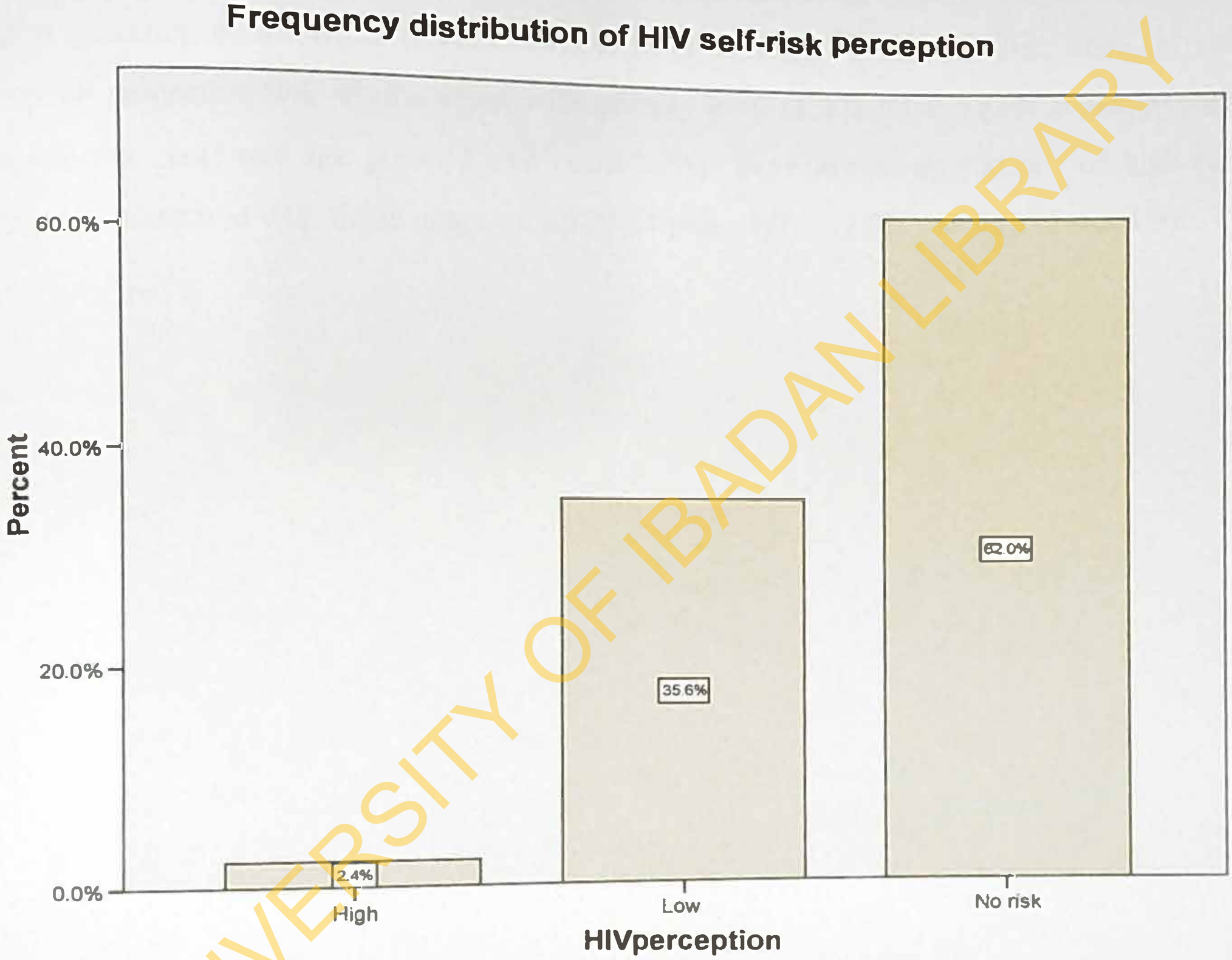



**Figure 4.3: Graph showing distribution of HIV risk perception**

## 4.6 Independent predictors of youths HIV risk perception

A similar proportion of males (2.6%) and females (2.7%) perceived themselves as having a high risk of HIV infection ($\chi2 = 0.67$; $p>0.05$). Also, similar proportions were observed between urban and rural youths.($\chi2 = 0.01$; $p>0.05$). Risk perception proportion varies across geopolitical zones with respondents from the South South zone having highest risk (5.0%) compared with those from North West (0.7%). ($\chi2 = 183.25$; $p<0.05$). Furthermore, respondents with no formal level of education do not perceive themselves to be at high risk of HIV infection while the risk perception proportion was 4% for those with primary level of education. ($\chi2 = 26.06$; $p<0.05$) .Respondents between age group 15-19 years(2.2%) have lowest proportion of high risk perception compared with those in age group 20-24 years. ($\chi2 = 12.07$; $p<0.05$). (Table 4.9)

Table4.9 **HIV risk perception by selected variables**

| Variables | HIV RISK PERCEPTION | | | TOTAL | $\chi^2$ | p |
|---|---|---|---|---|---|---|
| | No risk (%) | Low risk (%) | High risk (%) | N (%) | | |
| **SEX** | | | | | | |
| Male | 1356(62.7) | 751 (34.7) | 56 (2.6) | 2163(51.9) | | |
| Female | 1276(63.8) | 671 (33.5) | 54(2.7) | 2001(48.1) | 0.667 | p>0.05 |
| Total | 2632(63.2) | 1422 (34.1) | 110 (2.6) | 4164 (100.0) | | |
| **Location** | | | | | | |
| Urban | 946 (63.2) | 511 (34.2) | 39 (2.6) | 1496 (35.9) | | |
| Rural | 1686(40.5) | 911(34.1) | 71(2.7) | 2668(64.1) | 0.011 | p>0.05 |
| Total | 2632(63.2) | 1422 (34.1) | 110(2.6) | 4164 (100.0) | | |
| Educational level | | | | | | |
| No formal | 535(67.6) | 245 (31) | 11 (1.4) | 791 (19.0) | 26.058 | p<0.05 |
| Primary | 350(60.3) | 207 (35.7) | 23 (4.0) | 580 (13.9) | | |
| Secondary | 1579(63.5) | 838 (33.7) | 70 (2.8) | 2487 (59.7) | | |
| Higher | 168(54.9) | 132(43.1) | 6 (2.0) | 306 (7.3) | | |
| Total | 2632(63.2) | 1422(34.1) | 110(2.6) | 4164(100) | | |
| **Zone** | | | | | | |
| North West | 751(77.7) | 209(21.6) | 7(0.7) | 967 (23.3) | 183.254 | P<0.05 |
| North East | 269(47.6) | 276 (48.8) | 20(3.5) | 565 (13.6) | | |
| North Central | 434(62.4) | 236 (34.0) | 25(3.6) | 695 (16.7) | | |
| South West | 488 (66.1) | 236 (32.0) | 14 (1.9) | 738 (17.8) | | |
| South East | 304 (57.8) | 211 (40.1) | 11(2.1) | 526 (12.7) | | |
| South South | 381(57.4) | 250(37.7) | 33(5.0) | 664(16.0) | | |
| **Total** | 2627(63.2) | 1418(34.1) | 110(2.5) | 4155(100) | | |
| **age at first sex** | | | | | | |
| 15-19 | 1428(65.5) | 706(32.4) | 47(2.2) | 2151(52.4) | 12.074 | P<0.05 |
| 20-24 | 1204(60.7) | 716(36.1) | 63(3.2) | 1983(47.6) | | |
| Total | 2632(63.2) | 1422(34.1) | 110(2.6) | 4164(100) | | |

## 4.7 Multinomial Logistic Regression for predictors of HIV risk perception among Nigerian Youths

Table 4.9 shows that the risk of high HIV risk perception was about 2 times higher among the respondent with primary level of education (OR = 2.44; 95% C.I= 1.10 – 5.43, p<0.05) compared with those with no formal level .Also, the odds of high HIV risk perception is lower in the North West (OR =0.12; 95% C.I= 0.05 – 0.30, p<0.05) and higher in the North East region (OR = 0.94; 95% C.I= 0.50 – 1.76, p<0.05) compared with South South region.

Furthermore, for each unit increase in age at first sex (OR = 0.96; 95% C.I= 0.94 – 0.99, p<0.05), the odds of low HIV risk perception reduced by 3.6%. Also, the odds of low risk perception is about 1.6 times higher among respondents with higher level of education (OR = 1.61; 95% C.I= 1.16 – 2.23, p<0.05) compared with respondent with no formal education. The North West (OR =0.42; 95% C.I= 0.33 – 0.54, p<0.05) respondents were about 58.1 % less likely to perceive low HIV risk.

**Table 4.10 Multinomial logistic analysis for HIV risk perception**

| Variables | Coefficient | P-value | OR | 95% Confidence Interval |
|---|---|---|---|---|
| **HIV High risk perception** | | | | |
| Constant | -3.127 | 0.000 | | |
| Age at first sex | 0.014 | 0.728 | 1.014 | 0.939 – 1.094 |
| **Education** | | | | |
| Primary | 0.893 | 0.028* | 2.442 | 1.099 – 5.431 |
| Secondary | 0.419 | 0.277 | 1.520 | 0.715 – 3.230 |
| Higher | 0.310 | 0.587 | 1.363 | 0.445 – 4.174 |
| No formal | 1.000 | | | |
| **Zone** | | | | |
| North West | -2.092 | 0.000* | 0.123 | 0.052 – 0.296 |
| North East | -0.063 | 0.844 | 0.939 | 0.503 – 1.755 |
| North Central | -0.410 | 0.153 | 0.664 | 0.378 – 1.165 |
| South West | -1.071 | 0.001* | 0.343 | 0.177 – 0.662 |
| South East | -0.880 | 0.015* | 0.415 | 0.203 – 0.845 |
| South South | 1.000 | | | |
| **HIV Low risk perception** | | | | |
| Constant | 0.163 | 0.492 | | |
| Age at first sex | -0.037 | 0.006* | 0.964 | 0.939 – 0.990 |
| **Education** | | | | |
| Primary | 0.096 | 0.459 | 1.100 | 0.854 – 1.417 |
| Secondary | -0.053 | 0.637 | 0.949 | 0.762 – 1.181 |
| Higher | 0.477 | 0.004* | 1.612 | 1.164 – 2.232 |
| No formal | 1.000 | | | |
| **Zone** | | | | |
| North West | -0.870 | 0.000* | 0.419 | 0.327 – 0.536 |
| North East | 0.442 | 0.001* | 1.556 | 1.212 – 1.997 |
| North Central | -0.228 | 0.056 | 0.796 | 0.630 – 1.006 |
| South West | -0360 | 0.002* | 0.698 | 0.553 – 0.881 |
| South East | 0.052 | 0.674 | 1.054 | 0.825 – 1.346 |
| South South | 1.000 | | | |

OR=Odd ratio,*indicates the variables of which estimated coefficient are statistically significant at 0.05

# CHAPTER FIVE

# DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

## 5.1 Discussions

### Sexual Initiation Rate

Sexual activity is an important component of sexual health however unsafe sexual practices may lead to ill health and disease, including HIV and AIDS, other sexually transmitted diseases as well as unwanted pregnancy .This study set out to determine age at first sexual initiation using data from the 2007 NARHS. The results obtained show that the majority (76.2%) of Nigerian youths are sexually experienced and the onset of sexual activity is early; 11 of the 4633 youths had their first sexual debut when they were just 8 years of age and by the time they were 19 more than half of the youths were sexually active. The results revealed that there is delay in age at sexual initiation among Nigerian youth till late adolescent age of 19 years compared with other countries in sub-Sahara Africa. In Kenya, mean age at sexual initiation was 16.8yrs, in Ghana it was 18.2yrs and in South Africa it was 18.7yrs.(Basia Zaba et al 2002, Lawrence D.E et al 2007, Fekadu Mazengia and Alemayebe Worku, 2009).The reasons for the delay in the Nigerian sample may be due to religious injunction against premarital sex. Nigerian society is dominated by two religions: Islam and Christianity. They are the main source of the Nigerian religious value systems, which affect sexual attitude and behavior. Christianity, for instance, expects men and women to hold in high esteem the religious value of sexual purity. Girls are expected to be virgins at the time of marriage. Islam allows female children to be given in marriage before the age of puberty. These practices ensure that the female child is a virgin at marriage. Similarly, Christianity and Islam emphasize that adultery is unacceptable (Anette Agardh et al, 2011) .Also, the fear of pregnancy and, alongside this, the fear of dropping out of school, and the fear of bringing shame to the family, which would lead to the inability to get a "good" husband in future are some of the reasons for the late sexual initiation.

## Independent Predictors of Sexual Initiation

Sexual initiation varied by a number of selected characteristics. For instance, education was found to be positively associated with the timing of first sex i.e. being educated delays the onset of sexual activity. The results found in this study support the fact that youths in urban areas are less likely to initiate sexual activity early compared to those in rural areas, it can be as a result of early marriage custom among rural dwellers. These results are in conformity with those found in an earlier study in Nigeria where 29% of rural females had had first sex at ages less than 15 years compared to 13% of urban females (Adedini et al, 2007).

Nigeria is made up of six major geopolitical zones. It is ethnically and religiously diverse and economic development and education levels vary widely across the country As expected regional variation exist in sexual initiation among youths in Nigeria. Result showed that youths in North West, North East, North Central, South West and South East zone are less likely to initiate sexual activity early, compared to those in South South. Also, being a male is also a protective factor to sexual intuition which differs from other study in Nigeria, Onipede Wusu, (2010) found out that higher proportion of boys indicated involvement in virtually all the risky sexual behaviours irrespective of their risk perception and reasons.

## HIV risk perception

Educational level was found to be associated with youths HIV self-risk perception. Those with primary level of education have a greater likelihood of having higher risk perception of HIV. whereas those with higher level of education are less likely to perceive low HIV risk. This positive influence of education status supports the result from other studies in Nigeria. Iyaniwura and O.Olotede (2006) reported that higher educational levels positively influence youth perception. These similar results may be due to the fact that educated youth may have access to factual information and thereby dispel with the misconception surrounding HIV. Also; an increase in age at first sex reduces low risk perception by 3.6%.

Geopolitical zone was significantly associated with risk perception, suggesting a need to identify the contextual and ethnicity factors that influence behavior among Nigerian youths. Public health education must aim at creating awareness among those who have low self-perception of risk on the necessity of adoption of safer sex and on the benefits of knowing their HIV status.

## 5.2 Conclusion

The findings from this study showed that substantial geographical variation exists in the rate of first sexual initiation within Nigeria. Also, majority of Nigerian youths perceived themselves as having low risk for HIV infection. There is strong evidence that the risk of early intercourse was associated with respondents' sex, education attainment, residence and geopolitical zone.

## 5.3 Recommendation

To promote safe and healthy sexuality among Nigerian youth, multifaceted geographically differentiated interventions may represent a potentially effective approach for addressing issues related to youth sexuality.



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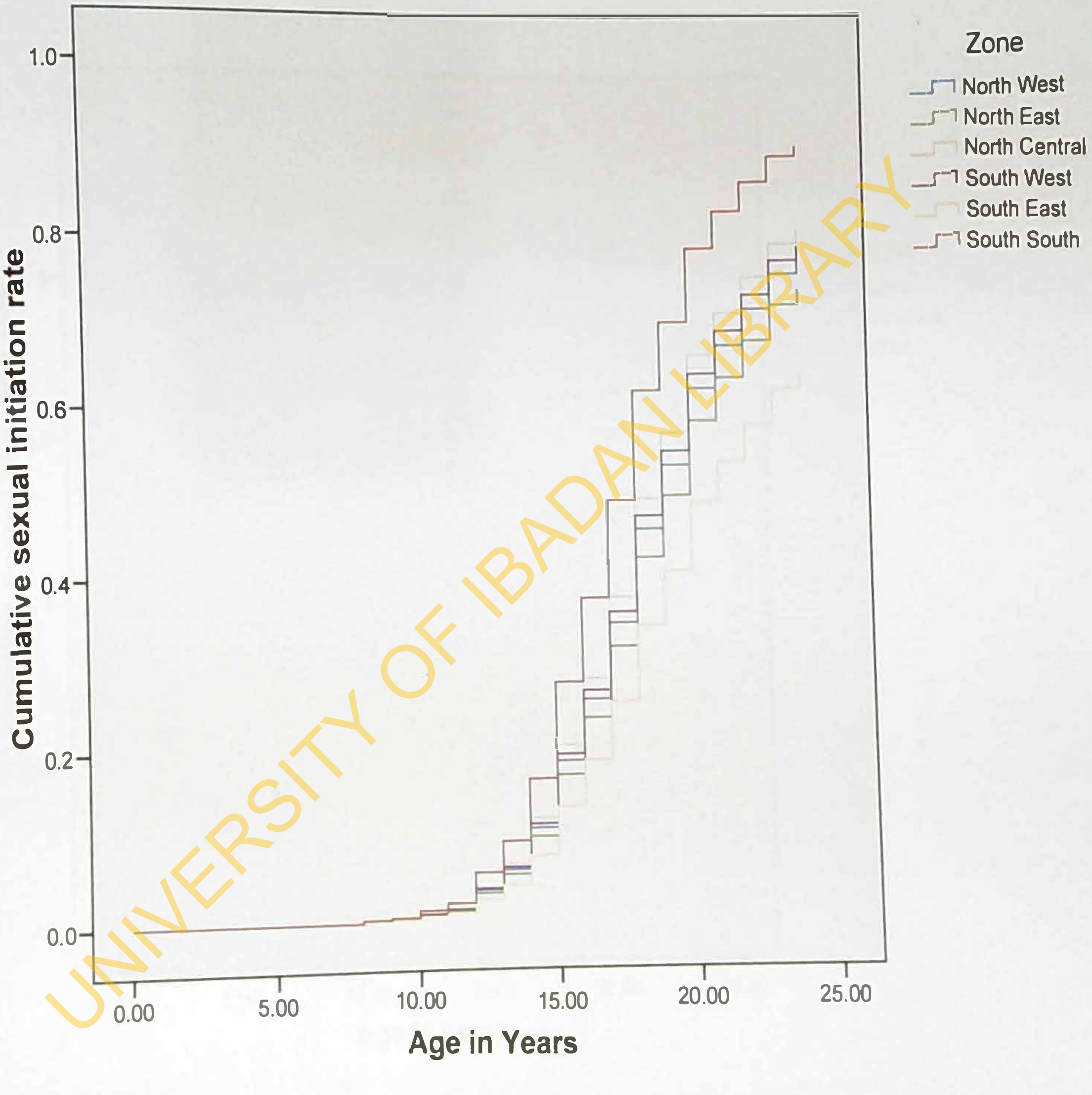
## Appendices

### Kaplan Meier Estimate of sexual initiation according to sex of respondents

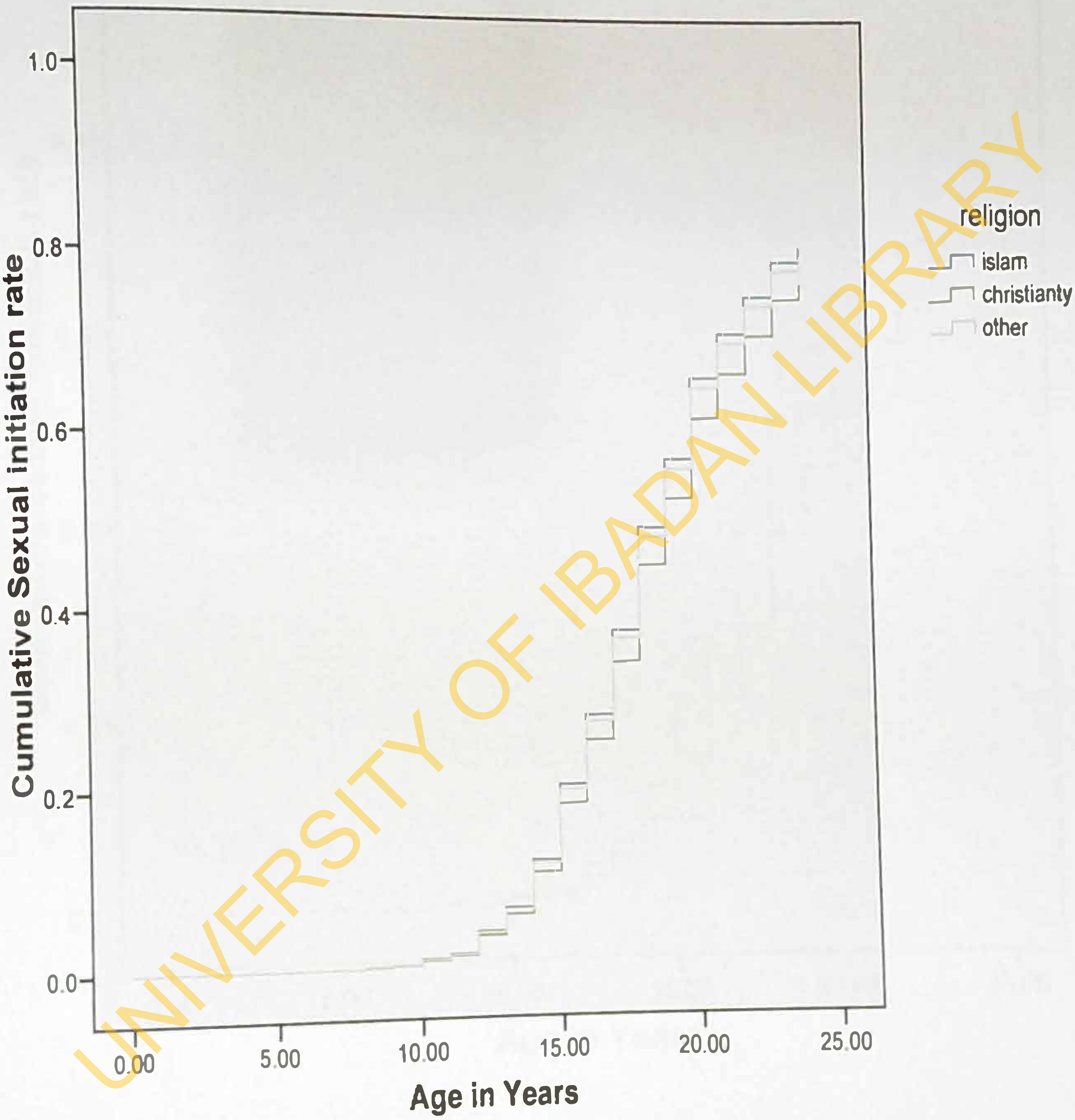
| | Cumulative sexual initiation rate | |
|---|---|---|
| Time(year) | Male | Female |
| 8 | 0.003 | 0.002 |
| 9 | 0.004 | 0.004 |
| 10 | 0.01 | 0.01 |
| 11 | 0.012 | 0.019 |
| 12 | 0.029 | 0.054 |
| 13 | 0.045 | 0.091 |
| 14 | 0.068 | 0.176 |
| 15 | 0.125 | 0.289 |
| 16 | 0.174 | 0.387 |
| 17 | 0.241 | 0.498 |
| 18 | 0.35 | 0.6 |
| 19 | 0.422 | 0.671 |
| 20 | 0.498 | 0.76 |
| 21 | 0.538 | 0.807 |
| 22 | 0.573 | 0.845 |
| 23 | 0.623 | 0.866 |
| 24 | 0.641 | 0.877 |

Log Rank (Mantel-Cox): Chi-Square 51.964; p value: ≤0.0001

## Appendices




Graph showing zonal distribution of sexual initiation rates




Graph showing Religion distribution of sexual initiation rates

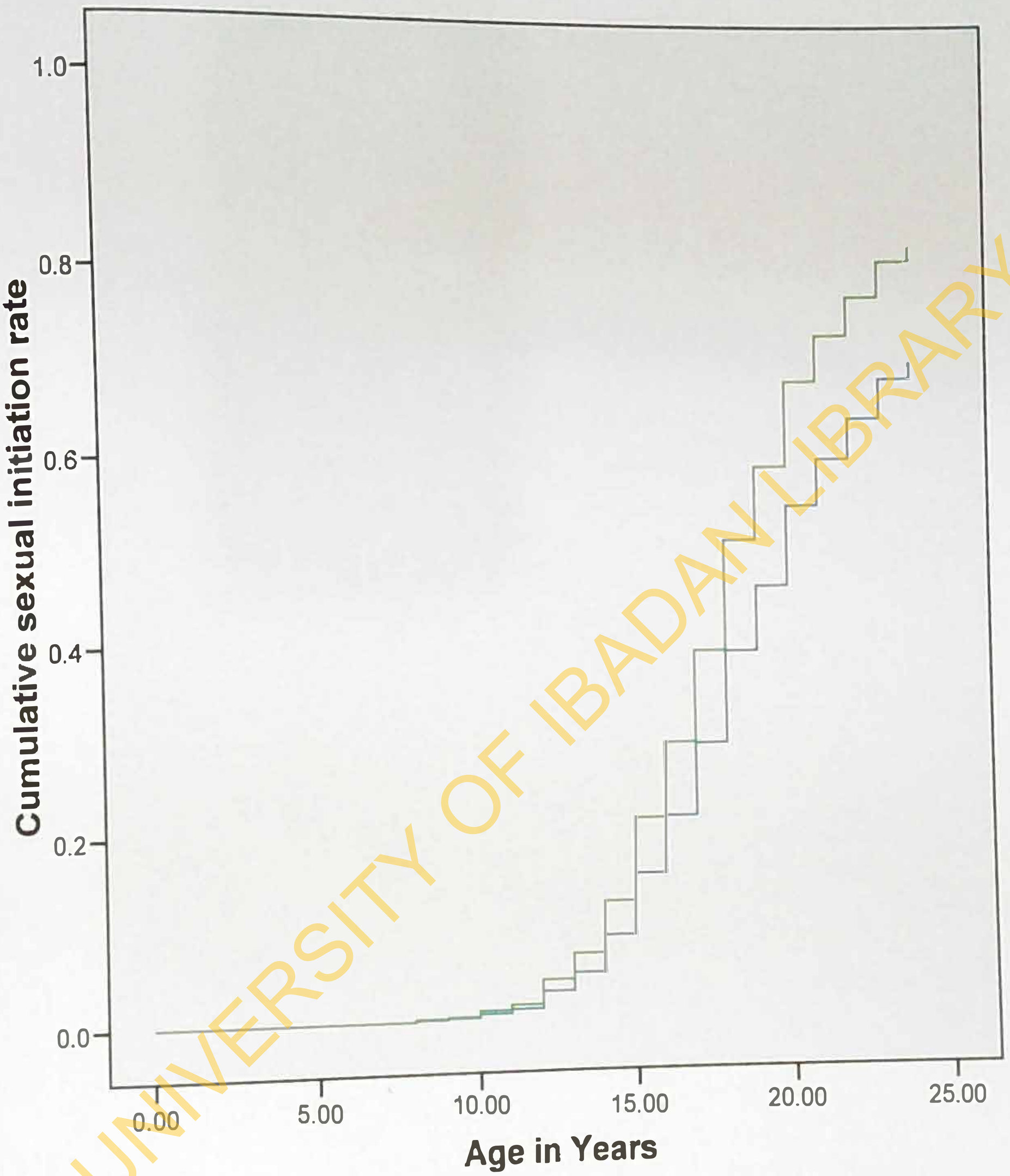



**Figure 4.2: Graph showing Location distribution of sexual initiation rates**