FACTORS INFLUENCING EXPOSURE TO HIV-PREVENTIVE INFORMATION AND SERVICES AMONG FEMALE SEX WORKERS IN NIGERIA: 2010 IBBSS

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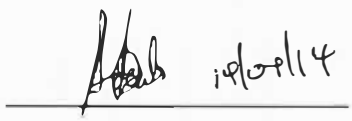
CERTIFICATION

This is to certify that FADAIRO, Mojirade Temitayo carried out this project in the Department of Epidemiology and Medical Statistics, Faculty of Public Health, College of Medicine, University of Ibadan.



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DEDICATION

This work is dedicated to the Almighty God who has given me the grace to start, who is also faithful to bring it to completion.

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ABSTRACT

Despite continuous HIV programming and interventions, Nigeria still ranks third among those with the highest burden in the world. Female sex workers are important in sexual transmission of HIV because they serve as a bridge population to infect the general population. Exposure to HIV-preventive information is thus essential to control the transmission of HIV among this group.

The exposure to intervention data on FSWs from IBBSS 2010 were evaluated in eight states and FCT. It is a cross sectional survey. 4459 FSWs were interviewed in Nigeria. Data was analyzed using SPSS version 16.0. Logistic regression was used to identify predictors of exposure to HIV-preventive information and services.

The age of the sex workers was 26.5±5.8 years. Respondents were mostly single (61.8%), Christians (90.4%) and secondary education (67.5%). About 72% entered sex work for financial reasons. Majority (42.2%) had spent 1-2 years in sex work. More than half (57.7%) was exposed to HIV-preventive information (BBFSW: 68.3%, NBBFSW: 46.7%), Provision of free condoms (BBFSW: 84.9%, NBBFSW: 71.3%), Referrals for STI services (BBFSW: 5.7%, NBBFSW: 9.3%), Referrals for VCT services (BBFSW: 6.8%, NBBFSW: 7.9%). The mass media (radio and television) was the major channels of HIV information. Exposure to HIV-preventive information was significantly associated with type of sex work ($p<0.001$), Age ($p<0.001$), Level of education ($p<0.001$), Marital status ($p=0.002$), Duration of sex work ($p=0.027$) and Number of clients per week ($p<0.001$). The overall predictors of exposure to HIV-preventive information were: Non-brothel based FSWs [OR: 0.3 (0.3-0.4)], those aged 20-29 years [OR: 1.8 (1.1-2.9)], divorced/separated/widowed FSWs [OR: 1.7 (1.1-2.5)], Level of Education, Number of clients per week. Exposed FSWs used condom more consistently than unexposed ones.

Current efforts at improving exposure to HIV-preventive information/services among non-brothel based FSWs need to be strengthened. Innovative methods of capturing non-brothel based FSWs need to be employed in reaching this peculiar group as they are hardly found in one particular location, thereby defeating the peer education method.

Key words: HIV-preventive information/services, Female sex workers, Nigeria.

Word count: 319

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AIDS	Acquired immunodeficiency syndrome
ANC	Antenatal Clinic
AOR	Adjusted Odds Ratio
BBFSW	Brothel-based Female Sex Worker
CI	Confidence Interval
CDC	Centre for Disease Control
FCT	Federal Capital Territory
FHI	Family Health International
FMoH	Federal Ministry of Health
FSWs	Female sex worker(s)
HIV	Human immunodeficiency virus
IBBSS	Integrated Biological and Behavioural Surveillance Survey
IDU	Injecting Drug Users
MARPs	Most at risk populations
MSM	Men who have sex with men
NACA	National Agency for the Control of AIDS
NARHS	National HIV/AIDS and Reproductive Health Survey
NBBFSW	Non-brothel-based Female Sex Worker
NDHS	Nigerian Demographic and Health Survey
NGO	Non-Governmental Organization
NPC	National Population Commission
PPS	Probability proportionate to size
SAPC	States AIDS Program Coordinator
SPSS	Statistical Package for Social Science
STI	Sexually Transmitted Infections
TLS	Time-location sampling

UNAIDS	United Nations Program on HIV/AIDS
UNICEF	United Nations Children's Funds
USAID	United States Agency for International Development
VCT	Voluntary Counseling and testing
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

An estimated 21.8million people were lost to the global HIV/AIDS epidemic, another 36.1million were living with HIV infection in 2001 (UNAIDS, 2002). As at 2008, it was estimated that there were 2.7million new infections worldwide (UNAIDS, 2008) and 34million people were reportedly living with HIV by the end of 2011. Although, the number of new infections globally continues to decline, national epidemics continue to expand in many parts of the world (UNAIDS, 2012). Of all the regions in the world, sub-Sahara Africa carries the greatest burden of HIV, having about 70% of HIV infected people (UNAIDS/WHO, 2002). In sub-Sahara Africa, Nigeria - the most populated country with total population estimated at about 170million people (NPC, 2012) carries the region's heaviest burden of HIV/AIDS, having about 3.5 million people infected with HIV. This also ranks the country second in the continent behind South Africa and third among the countries with the highest burden of HIV/AIDS globally after India and South Africa (NACA, 2012). The Integrated Biological and Behavioural Surveillance Survey, IBBSS (2010) reported that over the last two decades, the HIV epidemic in Nigeria has gone from affecting only a few populations with higher-risk behaviours ('concentrated' epidemic) to a 'generalized' epidemic in all states with about two-third of new infections among low-risk population (FMoH, 2008).

Studies (World bank, 2008; IBBSS, 2010) have shown that the spread of HIV infection has been facilitated by some sub-group of the population who are particularly more vulnerable as a result of their lifestyles, behaviors and occupation; such are called the **most-at-risk populations (MARPs)** and they include the female sex workers (FSW), men who have sex with men (MSM), injecting drug users (IDU), transport workers and armed forces. FSWs act as an important core population in sexual transmission of HIV and their clients (mostly married men) act as a bridge population to infecting the general population. Though HIV prevalence in Nigeria as stated by NACA (2012), has decreased over the years from 5.4% (1995) to 4.1 % (2010), the prevalence among FSWs-who are said to be the major reservoir of HIV infection has remained consistently

among non-brothel-based), education/information about HIV was on the average (about 55%). In addition, risk perception to HIV infection was equally low (39.4% in BBFSW; 36.2% in NBBFSW). Condom use with regular clients was (40.3% in BBFSW; 26.1% in NBBFSW) and boyfriends (20.7% in BBFSW; 15.7% in NBBFSW) was generally low, this low condom use with boyfriends continues to be a potential source of transmission between FSWs and the general population.

Only about 55% of FSWs reported receiving any HIV/AIDS information or education in the last 12 months preceding the IBBSS. However, non-brothel based FSWs were difficult to reach with preventive services. Referral to STI and HCT services in the past 12 months prior to the survey was very low among both groups of FSWs (2.5% and 3.6% for BBFSWs and NBBFSWs respectively). This has necessitated the need for studies to show the effect of demographic and behavioural factors on HIV-preventive information/services among female sex workers in order to improve on means to reach out to this population.

JUSTIFICATION

Although HIV seroprevalence rates are currently on the decrease in Nigeria, high risk sexual and behavioural activities still exist, putting FSWs and their clients at great risk of infection. Exposure to HIV-preventive interventions was also reported to be generally low especially among non-brothel based FSWs and there has been no information on the factors responsible for the low exposure to information and services in Nigeria. Exposure to preventive interventions increases the level of knowledge of female sex workers and helps them know how to keep themselves from getting infected with HIV. It also promotes their reproductive and sexual rights. Also, if barriers to access are fully comprehended, it will enhance the promotion of interventions, resulting in a reduction of HIV transmission and incidence of HIV among FSWs, thereby, achieving a decrease in HIV prevalence in the general population.

1.4 BROAD OBJECTIVE:

To determine the factors influencing exposure to HIV-preventive information and access to services among female sex workers in Nigeria.

1.5 SPECIFIC OBJECTIVES:

1 To determine the proportion of female sex workers exposed to HIV-preventive information and services,
2 To determine association between HIV-preventive information and socio-demographic factors,
3 To determine association between channels of HIV-preventive information and services received among female sex workers
4 To determine association between condom use among female sex workers and exposure to HIV-preventive information.

1.6 RESEARCH QUESTIONS

1 What proportion of female sex workers are reached by HIV-preventive information and services?
2 Is there a significant association between HIV-preventive information and socio-demographic factors?
3 Is there a significant association between HIV-preventive information received and type of FSWs?
4 Is there a significant association between condom use among FSWs and HIV-preventive services?

CHAPTER TWO
LITERATURE REVIEW

Globally, 34.0 million [31.4 million–35.9 million] people were living with HIV at the end of 2011. An estimated 0.8% of adults aged 15-49 years worldwide are living with HIV, although the burden of the epidemic continues to vary considerably between countries and regions. Sub-Saharan Africa remains most severely affected, with nearly 1 in every 20 adults (4.9%) living with HIV accounting for about 69% of the people living with HIV worldwide. After sub-Saharan Africa, regions most heavily affected are the Caribbean and Eastern Europe and Central Asia, where 1.0% of adults were living with HIV in 2011 (NACA, 2012).

During the past decade, many national epidemics have changed dramatically. In 39 countries, the incidence of HIV infection among adults fell by more than 25% from 2001 to 2011. Twenty-three of the countries with steep declines in HIV incidence are in sub-Saharan Africa, where the number of people acquiring HIV infection in 2011 (1.8 million [1.6 million–2.0 million]) was 25% lower than in 2001 (2.4 million [2.2 million–2.5 million]). Despite these giant strides, sub-Saharan Africa accounted for 71% of the adults and children newly infected in 2011, underscoring the importance of continuing and strengthening HIV prevention efforts in the region (UNAIDS 2012).

Nigeria's epidemic is generalized (above 1% prevalence among ANC attendees), with wide variation of prevalence within the country. An analysis of the 2010 prevalence rates shows that the prevalence varies across the country's six geopolitical zones with the highest concentration in the North Central (7.5%) and the lowest prevalence rate in the North Western zone (2.1%). HIV epidemic in Nigeria also vary between and within urban (2.7% - 18.0%) and rural areas (0.7% - 21.3%). Socio-demographic differences in the HIV prevalence are also observable with women, youths, and people with low level of formal education being worst affected by the epidemic.

With an estimated population of 160million, Nigeria is the most populated country in sub-Saharan Africa, a region which carries the globe's heaviest burden of HIV/AIDS. In estimated numbers this represents about 3.5 million people (NPC, 2009), still keeping Nigeria as the country with the third highest burden of HIV in the world, behind South Africa and India.

As reported by NACA, 2012, the key drivers of the HIV epidemic in Nigeria include low personal risk perception, multiple concurrent sexual partnerships, intense transactional and inter-generational sex, ineffective and inefficient services for sexually transmitted infections (STIs), and inadequate access to and poor quality of healthcare services. Entrenched gender inequalities and inequities, chronic and debilitating poverty, and stubborn persistence of HIV/AIDS-related stigma and discrimination also contribute significantly to the continuous spread of the infection.

Sexual transmission is by far the most common mode of transmission globally. Heterosexual transmission accounts for up to 82% of all HIV infection in Africa (Nasidi and Harry, 2005). The probability of a person being infected via sexual intercourse depends on the likelihood of unprotected sex with an infected partner who makes sexual behaviour patterns and the background prevalence of HIV of major importance. Onwuliri and Jolayemi, as written in their book-'reaching vulnerable and high-risk groups in Nigeria' said HIV epidemic is being driven by ignorance, fear, stigma, poverty, the low status of women, and socio-cultural practices that include high-risk sexual behavior. However, in developing interventions, policy makers and program designers must take into account the deep-seated, complex factors that fuel the epidemic in terms of what makes people vulnerable and places them at higher risk for contracting HIV. In 2002, Morison stated that interventions to change sexual behaviour and to promote condom use are a vital component of any HIV control program. The main thrust of HIV prevention strategies in Nigeria is based on: information, education and communication; condom promotion; behaviour change. Interventions currently being used to limit transmission include promoting sexual abstinence before marriage, encouraging through a combination of mass media campaigns and counseling, faithfulness to one partner and various HIV education programs. Poverty, enormous cultural/religious diversity and an increased allocation of funds to AIDS treatment threatens the maintenance of effective prevention and control strategies. Studies have shown that the most effective interventions are those that focus on population groups with the highest transmission rates. These groups are referred to as the 'most-at –risk' groups.

MOST-AT-RISK GROUPS OF TRANSMITING HIV

Within populations, there are sub-groups who are more vulnerable to HIV infection due to their involvement in risky lifestyles and behaviours. The virus is often found predominantly within these groups at the beginning of an epidemic when prevalence is extremely low in the general

population. These groups are female sex workers, injecting drug users and men who have sex with men. These most-at-risk groups act as a bridge population to transmitting HIV to the general population (Morison, 2002).

FEMALE SEX WORKERS

As defined by IBBSS (2010) and some related articles, a female sex worker (FSW) refers to any female aged 15 years and above who receives money or valuable gifts in exchange for sex. This is similar to the conventional definition stated by Vandepitte et al., 2006—may do very well in most parts of the world, but may not be valid for populations where sex in exchange for money or goods is commonly accepted in sexual transactions by a wide range of women, irrespective of their socioeconomic status. FSWs are generally marginalized, stigmatized and hard-to-reach subpopulation. Since sex work is illegal in most countries including Nigeria; many FSW prefers not to disclose their sex work activities (Vandepitte et al., 2006). They lack both formal education and empowerment. Frequency of sex with multiple partners and a high burden of STIs place them at high risk of HIV infection. They often engage in unprotected sex and other risky behaviors, such as substance abuse (Onwuliri and Jolayemi). Sex work is usually classified as ''direct'' (open, formal) or ''indirect'' (hidden, clandestine, informal). Direct FSW are typically women who do define themselves as sex workers and earn their living by selling sex. Indirect FSW are women for whom sex work is not the first source of income. They may work as waitresses, hairdressers, tailors, massage girls, street vendors, or beer promotion girls and supplement their income by selling sex on a regular basis or occasionally. They do not consider themselves as sex workers and often work outside of known venues for sex work. Therefore they are even more difficult to reach than women known as direct sex workers.

FSWs could be **brothel-based (BB-FSW)**; a brothel is an establishment with a number of rooms that acts as a base for sex workers. Sex clients visit the brothel to make contact with the sex workers. The sex client may use a room at the brothel or may take the sex worker to another place. The brothel owner takes a good share of the money paid to each sex worker in the house. They worked eight-hour shifts at an establishment, mostly at night; Most reportedly paid a sum of money to the establishment owner to compensate for their partial absenteeism when they departed with clients during working hours; The majority were rural to urban migrants between 18 and 25 years old; Most sex workers wanted their profession to remain unknown when they

were not working. Usually, their residences were far away from the establishments where they worked; in this way, their professions remained unknown in their residential areas. Some sex workers wanted to continue sex work because the income was very attractive; the number of clients differed with the age and physical appearance of the sex worker (FHI, 2002).

The **non- brothel based (NBB-FSW)** are found on streets, bars, night clubs or restaurants. Women who sell sex directly on the streets actively solicit clients and are picked up from the street. They tend to work in the evenings from selected streets and are not based at their residences. They are difficult to contact and question about their way of life and general behavior because they were suspicious of the police and other people who might hurt them; Most of them were young (18-25 years old); no report of any above 30 years; Most of them suffer adverse conditions as violent actions from certain people and health problems.

FSWs are of diverse backgrounds and they exhibit different socio-demographic and economic characteristics. They are however mostly in their reproductive ages of 15-49 years. FSWs may also be more prone to becoming infected because of their relatively young age with a mean age of 26years (Addu-Oppong et al., 2007). This is almost similar to the study conducted in Port Harcourt, Benin, Ibadan and Jos cities of Nigeria by Ankomah et al., 2011, whose reported age of FSWs ranged between 18 and 42years, with the majority in their twenties. This is in line with surveys that report the mean age of Nigerian FSWs as being 27 years. In a study conducted in Kenya by Nyagero et al., 2012, FSWs ranged from 15 to 55 years with a mean age of 31.4years. Studies have shown that adolescent females are more susceptible to certain sexually transmitted infections (STIs). One of the reasons for this increased susceptibility is the thin layer of cells (columnar epithelium) covering the cervix of a young female. As they become adults, this thin layer is largely replaced by a multilayered (squamous epithelium) covering, reduces the risk of infection compared with the single layer. Therefore, young women are more likely to be infected when exposed to HIV (Addu-Oppong et al., 2007).

Addu-Oppong (2007) summarized that seventy percent of the respondents were single and had never been married. This is supported by a study conducted by Ankomah et al., 2011. Forty-four percent had completed primary school education, 31% secondary school education, and 25% had post-secondary education. A majority of the participants (54%) identified themselves as Catholics; 32% of them identified with the Muslim faith. The vast majority (95%) of the respondents reported that they were doing this because of financial reasons. Oyefara (2012)

reported 35% joined the sex industry because of lack of other means of getting daily food- a factor hindering safe sex practice. Nyagero et al., 2012 reported in line with this. 65% of the participants worked 3–4 days a week and 50% of the respondents saw an average of 4 to 7 clients a day.

The charge "per round of sex" varied, and depended on several indicators including level of sophistication, which could be based on whether it was a "high-class" or "low-class" brothel, or type of dress and general appearance. Sex workers who were young, better educated, and spoke good English charged more (Ankomah et al., 2011).

FACTORS THAT INCREASE THE VULNERABILITY OF FSWs TO HIV INFECTION

Studies have shown that interventions among female sex workers can be successful in significantly reducing the spread of HIV. However, for these interventions to be most effective, problems that sex workers may encounter in their lives which make them vulnerable to HIV infection must be examined and understood.

BEHAVIOURAL FACTORS

These factors include multiple partners and inconsistent condom use. In general, sex workers have relatively high numbers of sexual partners. This in itself does not necessarily increase their likelihood of becoming infected with HIV – if they use condoms consistently and correctly then they will probably be protected no matter how many people they have sex with (UNAIDS, 2010). The reality however is that sex workers and their clients do not always use condoms. Of 86 reporting countries, less than a third reported that 90 percent of sex workers used a condom with their last client, while more than half reported condom use by less than 80 percent of sex workers (UNAIDS, 2010). In some cases, this is because sex workers have no access to condoms, or are not aware of their importance. In other cases, sex workers are simply powerless to negotiate safer sex, even if they try to do so. Clients may refuse to pay for sex if they have to use a condom, and use intimidation or violence to enforce unprotected sex. They may also offer more money for unprotected sex – a proposal that is almost always difficult to refuse. According to Nyagero et al (2012), behaviour change among FSWs was possible and is associated with the

level of education, religious affiliation, number of years in sex work, level of HIV prevention knowledge, social support and perception of outcomes including cost and benefits of condoms use.

SOCIAL AND ECONOMIC FACTORS

Sex workers are generally marginalized and criminalized in the society. Around the world, there is a severe lack of legislation and policies protecting sex workers from the actions of clients that can put them at risk. For example, a sex worker who is raped will generally have little hope of bringing charges against their attacker. The lack of protection in such cases leaves sex workers open to abuse, violence and rape making HIV transmission easier in such an environment (WHO, 2005). Non-governmental organizations report that almost two thirds of the countries they work in have laws that make it difficult for them to provide services to sex workers. Munoz et al., 2010 reports that in view of the illegality of sex work, law enforcement agents often target FSWs for harassment, extortion and intimidation. The illegality of commercial sex means that brothels are often raided by law enforcement agents and in some cases, sex workers are beaten or blackmailed. Participants in several focus group discussions and individual interviews were quick to report on the indignity and violence they suffered at the hands of law enforcement agents, 'who have made a habit of raiding brothels when they are in need of free sex or cash'. They are disadvantaged by a lack of self-esteem and adequate negotiation skills, which compromise their ability to manage the situation and to seek legal action (Onyeneho, 2009). In some countries, police use the possession of condoms as evidence that somebody is involved in sex work, further impeding sex workers' efforts to protect themselves. In addition, the stigma that sex workers face often make it hard for them to access health, legal, and social services. They may either be afraid to seek out these services for fear of discrimination, or physically blocked from accessing them (UNAIDS, 2011).

Psychosocial and economic factors exert enormous influence on the extent of risk taking among FSWs. Among others, the emotional pressures from intimate and stable boyfriends who desire unprotected sex, and more importantly, the financial incentives from clients willing to pay 16

times the normal fee for unprotected sex renders FSWs vulnerable to HIV infection. It was found that sex workers underestimated their risk of infection and rationalized, defended, or justified their behaviors, a typical psychological response to worry, threat, and anxiety arising from the apparent discrepancies between beliefs and behaviors. To reduce dissonance, many sex workers had a strong belief in fatalism, predestination, and faith-based invulnerability to HIV infection. Many believed that one will not die of acquired immune deficiency syndrome (AIDS) if it is not ordained by God (Ankomah et al., 2011). These daunting challenges contribute to the vulnerability, risk, and rising trend of infection among FSWs. Yet targeting interventions to FSWs remains one of the most effective ways to reduce the spread of HIV.

PREVALENCE OF HIV AMONG FEMALE SEX WORKERS

HIV prevalence among female sex workers in sub-Saharan Africa varies widely but in some countries it is more than 20 times higher than the HIV prevalence of the general population. This is particularly the case in West Africa, where HIV prevalence is much lower among the general population than in Eastern and Southern Africa, but where more than a third of sex workers are reported to be living with HIV (UNAIDS/WHO, 2009). As many as a fifth of men in West Africa had visited sex workers in 2007 which means that they can act as a potential 'bridge' for HIV transmission to the rest of the population, either through their wives or other sexual partners. Although the impact of sex work on rate of new HIV infections varies widely in sub-Saharan Africa, it impacts significantly on the HIV/AIDS epidemics of a number of countries in this region. In Ghana, for example, female sex workers, their clients and the sexual partners of clients made up a third of all new HIV infections in 2009, 10% of all new HIV infections in Uganda, and 14% of HIV infections in Kenya in the same year (UNAIDS 2010).

Surveys have consistently shown a high and rising HIV prevalence among sex workers, who are said to be the major reservoir of HIV infection. The infection rate is heterogeneous across Nigeria, ranging from as high as about 50% in Kano state and the Federal Capital Territory to as low as 24% in Lagos state among brothel-based FSW in 2007 (IBBSS 2007). Studies have shown that targeting most-at-risk groups is a more cost-effective strategy for reducing population level HIV incidence and prevalence, irrespective of whether the type of HIV epidemic is concentrated or generalized. Characterizing the HIV epidemic among FSWs at national and

regional level is especially important because the number of HIV-positive FSWs is the best predictor of country-level HIV prevalence (Eluwa et al., 2012). Available evidence suggests that in most countries with high HIV prevalence, infection rates are significantly higher among FSWs than other groups. A behavioural surveillance survey in 2000 reported that knowledge of HIV prevention methods was low among FSWs and consistent condom use varied from 24% in Jigawa to 89% in Lagos (15). In Nigeria, among an estimated one million FSWs operating in the country, existing studies estimate a prevalence of between 50% and 70%, compared with a prevalence of 2.3 - 3.8% in the general population (Munoz, 2010). The illegality of sex work makes a legal protection of FSWs impracticable and HIV interventions for them difficult, this is part of the factors militating against HIV/AIDS control, yet targeting interventions to FSWs remain an effective way to reduce the spread of HIV (Onwuliri and Jolayemi).

HIV-PREVENTIVE INTERVENTIONS AMONG FSWs

Since sexual transmission of HIV constitutes about 80% of all HIV infections and it is enhanced by the presence of another sexually transmitted infection (STI). STI control programs are therefore, an important component of HIV-preventive programs and have been shown to be effective in reducing incidence of HIV in the early stages of an HIV epidemic where a substantial proportion of STIs are treatable (Morison, 2001).

Various prevention programs have been implemented for FSWs by both government and nongovernmental organizations in Nigeria. These include programs designed to increase their knowledge of HIV, increase condom use through provision of free condoms and condom negotiation skills, free HIV voluntary counseling and testing (VCT) through venue-based outreach and linkages to dedicated VCT centers, application of peer education plus prevention activities for brothel-based FSWs (BB-FSWs) and Priority for Local AIDS Control Efforts, an intervention outreach program for non–brothel-based FSWs (NBB-FSWs). These activities have been implemented since 2007 and are usually implemented by trained peer educators who may or may not be sex workers (Eluwa et al., 2012). Integrated Biological and Behavioral Surveillance Surveys (IBBSS) has been conducted in 2007 and 2010 in Nigeria to determine whether HIV prevalence among FSWs had changed between 2007 and 2010 and whether FSWs in specific states or venues were more or less likely to be HIV infected. Such information is

useful for informing, planning, and providing targeted programming for HIV prevention among FSWs in Nigeria.

EFFECT OF INTERVENTIONS AMONG FEMALE SEX WORKERS.

Though, the impact of previous interventions to reduce the risk of HIV infection among FSWs has been limited by personal and structural factors, a mix of interventions have proved effective in reaching the largest possible number of female sex workers to achieve maximum impact. Shahmanesh et al., 2008 reported that combining sexual risk reduction, condom promotion and improved access to STI treatment reduces HIV and STI acquisition in sex workers receiving the intervention. The comprehensive HIV-preventive interventions empowering FSWs has resulted in striking increases in reported condom use and a concomitant reduction in the prevalence of curable STI. Significant increases in sex workers' verbal rejections of unsafe sex and participating sex establishments' ability to achieve the goal of no STIs in routine monthly screenings of sex workers was reported (Reza-Paul et al., 2008; Kerrigan et al., 2006).

CHAPTER THREE

METHODOLOGY

3.1 STUDY DESIGN

The study is a secondary analysis of the 2010 Integrated Biological and Behavioural Surveillance Surveys (IBBSS). IBBSS provides critical information to monitor the progress of HIV epidemic in selected high-risk groups in 2010 as a follow-up to the 2007 IBBSS in eight selected states of Nigeria such as Lagos, Kano, Kaduna, Benue, Nasarawa, Edo, Anambra, Cross River and FCT. This group include FSW (both brothel and non- brothel-based), men who have sex with men (MSM), injecting drug users (IDU), members of the armed forces, police and transport workers (TW).

3.2 DESCRIPTION OF THE 2010 IBBSS

The survey was a cross sectional survey of high risk groups for HIV and was administered for all target groups through one-to-one, face-to-face interviews in private settings that guaranteed the confidentiality of information provided by the respondent.

A minimum sample size of 250 for the target population of FSW was calculated to detect differences of 15% in key behaviours to provide reliable estimates for each variable at State level. For the purpose of this study, only FSWs were analyzed. IBBSS defined a FSW as any female 15years and above who receives money or other valuable gifts in exchange for sexual favours in areas as brothel, bars, restaurants, night clubs, and hotel or on the street.

The brothel-based FSWs were recruited using a two-stage cluster sampling procedure (PPS). This was done by using the information on the list of brothels FSWs work based on the 2007 IBBSS, updated by National Population Commission (NPC) mapping officers to collect the approximate number of FSWs permitted to have a fixed measure of size. The cluster size of the brothel-based FSWs was five and 50 clusters were selected in each state where available. Individual participants were selected from the total number of FSW in the site.

The non-brothel-based FSWs were recruited using the time location sampling (TLS) approach. This is a form of cluster sampling that contains both time (hour of the day to recruit) and location (bars, streets, restaurants) dimensions. Working through relevant Non-Governmental Organizations (NGOs) and States AIDS Program Coordinators (SAPC) in different cities/towns, a list of streets, bars, night clubs and hotels where non-brothel-based FSWs usually congregate was generated. The cluster size of the NBBFSW was five and 50 clusters were selected in each state in order to reach the sample size of 250.

When the estimated number of FSWs in each state was less than 250, a 'take-all' approach was used where all the consenting FSWs in the State's urban centre were recruited for the survey. In all, 4459 female se workers were used.

The survey team for both brothel and non-brothel-based FSWs in each state consisted of three or four interviewers, one supervisor and one counselor-tester. The respondents were assured of confidentiality and that participation was voluntary. Data collection flow was consistent across target populations and included basic ethical procedures for carrying out a research. Detailed and signed consent was obtained by a counselor or supervisor before the commencement of the interview. After receiving pretest and post-test counseling, they were referred to appropriate medical and social services for follow up in accordance with local Ministry of Health guidelines. (IBBSS, 2010)

3.3 STATISTICAL ANALYSIS

Data was analyzed using SPSS version 16.0. Descriptive statistics was used to describe the data. Univariate analysis was done to show the distribution of respondents by the key variables. Chi square test was used to measure the association between the exposure to interventions and socio-demographic and behavioural factors. Logistic regression of information received on HIV, STIs or condom, information on HIV received from outreach worker and religious organization on socio-demographic and sex work characteristics that were significant at 1% on chi square test was performed to show the factors influencing their exposure to HIV-preventive information. A p-value <0.05 was considered to indicate statistical significance.

3.4 VARIABLES USED IN THE ANALYSIS

INDEPENDENT:

- Socio-demographic factors:

Age: This was an open-ended question, response ranged from 15 to 49 years. It was transformed and recoded into four groups of 15-19 years as first category, 20-29 years as second category, 30-39 as the third category and 40-49 as the fourth category.

Level of education was coded into seven groups: Never attended school, Quranic, Some primary, Completed primary, Some secondary, Completed secondary, Tertiary education. It was recoded into four groups by combining the former first and second group into group one, the third and fourth group into group two, fifth and sixth group into group three, seventh group into group 4.

Religion was also coded into 'no religion', 'christianity', 'islam', 'traditional', 'others', 'no response'. It was transformed into two categories, the first and second group. All other groups were stated as system missing because of their insignificant proportions.

Marital status was derived from two variables- 'have you ever been married' which was a 'yes' or 'no' question and 'your marital status now', coded into currently married, divorced, widowed, separated and others.

State of residence was used as it was. No recoding was made

- Sex work characteristics:

Type of sex work was categorized into brothel-based and non-brothel based

Duration spent in sex work is a numeric variable, open-ended variable which was recoded into four categories of 'less than a year', '1-2years', '3-4years', '5years and above'. No response was coded as system missing

Number of clients per week was also open-ended and was transformed into three groups: '0-19' as the first, '20-39 as the second, '40 and above' as the third group.

Other source of income was a yes/no response. Any other response was recoded as system missing

- Sexual and Social behaviour:

Condom use with sexual partners: These sexual partners were spouse/live-in, boyfriends, casual partners and clients. The frequency of condom use was derived from a transformation of the old values of six groups into three groups of 'consistent', 'inconsistent' and 'never'

Alcohol and psychoactive drug use. This was a yes/no response. Any other value was considered system missing.

Attitudes towards HIV: Ever had HIV test. This was only a yes/no response

DEPENDENT:

Exposure to HIV-preventive information was derived from a combination of three variables;

1. Ever received any information about HIV, AIDS, STDs or condoms within the last 12 months
2. Have any outreach workers/peer educators discussed HIV/AIDS with you in the last 12 months
3. Ever attended any religious meeting or been visited by anyone from a religious organization to discuss HIV/AIDS within the last 12 months

CHAPTER FOUR

RESULT

Socio-demographic characteristics of female sex workers

The total number of female sex workers interviewed was 4,459. About 50.8 percent of these were brothel-based, while 49.2 percent (2194) were non-brothel based. Only 2157 of NBBFSWs reported their base of sex work of which 45.4 percent were street-based. More than half of the FSWs were in their twenties with a mean age of 27years. Those aged 20-24 years (32.1%), 25-29 years (35.5%) while that of other age groups ranged between 0.9% - 14.2%. Majority of these FSWs have their highest level of education as secondary education (67.5%). Just about 10 percent of them have tertiary education. 90 percent claimed to be Christians. More than half of the respondent was never married (about 62%). Only 3 percent were currently married, while 34 percent had one time been married. Respondents were evenly distributed among the 9 states with Lagos reporting 11.8% of respondents; Kano (11.6%); Kaduna (11.3%); Anambra, Benue and FCT each having 11.2% of respondents; Nasarawa (11.1%) and Cross River (10.8%). Edo State had the lowest number of respondents with a value of 9.8%. Few of the respondents (29.3%) had other source of income.

Table 1: Socio-demographic characteristics of female sex workers

Characteristics	Frequency N (%)
Type of sex work	
Brothel-based	2265 (50.8%)
Non- brothel based	2194 (49.2%)
Age	
15-19	364 (8.2%)
20-24	1432 (32.1%)
25-29	1584 (35.5%)
30-34	634 (14.2%)
35-39	295 (6.6%)
40-44	111 (2.5%)
45-49	39 (0.9%)
Level of Education	
None/qur'anic	226 (5.1%)
Primary	760 (17.0%)
Secondary	3011 (67.5%)
Tertiary	462 (10.4%)
Religion	
Christianity	4031 (90.4%)
Islam	377 (8.5%)
Others	22 (0.4%)
No response	29 (0.7%)
Marital status	
Single (never married)	2758 (61.8%)
Currently married	138 (3.1%)
Divorced	605 (13.6%)
Widowed	304 (6.8%)
Separated	596 (13.4%)
Others	3 (0.1%)
No response	55 (1.2%)
State of residence	
Anambra	499 (11.2%)
Benue	498 (11.2%)
Cross-river	487 (10.9%)
Edo	436 (9.8%)
FCT	498 (11.2%)
Kaduna	503 (11.3%)
Kano	516 (11.6%)
Lagos	526 (11.8%)
Nasarawa	496 (11.1%)
Other source of income	
Yes	1259 (29.3%)
No	3034 (70.7%)

Sex work characteristics of Female sex workers

About 93% of the respondents reported their duration of sex work of which four in ten had been in sex trade for at most 2years, 21% had spent 21% in sex trade while 12 percent had been in sex work for over 5years. 72.1 percent of them went into sex work for financial gains, other reasons for going into sex work were unemployment (9.2%) and marital frustration (5.9%). About three-quarter of the respondents had worked in 1-4 brothels, while just 5 percent had worked in over five brothels. The mean number of clients FSWs had per week was 27 and 24% of them had over 40 clients per week. About 9% was reported to have been forced to have sex mostly by client (51%) and boyfriends (25%)

Table 2: Distribution of FSWs by sex work characteristics

Characteristics	Frequency N (%)
Duration of sex work (years)	
Less than 1	941 (21.1%)
1-2	1881 (42.2%)
3-4	784 (17.6%)
5 and above	529 (11.9%)
No response	324 (7.3%)
Main reason for going into sex work	
Financial gains	3217 (72.1%)
Unemployment	412 (9.2%)
Pleasure	145 (3.3%)
Marital frustration	263 (5.9%)
Divorced/Separated	90 (2.0%)
Widowed	62 (1.4%)
Abused	26 (0.6%)
Others	41 (0.9%)
No response	203 (4.6%)
Number of brothels worked	
None	564 (12.6%)
1	1900 (42.6%)
2	923 (20.7%)
3-4	587 (13.2%)
5 and above	223 (5.0%)
No response	262 (5.9%)
Number of clients per week	
0-4	723 (16.2%)
5-9	873 (19.6%)
10-19	861 (19.3%)
20-29	493 (11.1%)
30-39	374 (8.4%)
40 and above	1068 (24.0%)
No response	67 (1.5%)
Ever been forced to have sex	
Yes	386 (8.7%)
No	3966 (89.0%)
No response	107 (2.4%)

Forced to have sex by (Multiple Response)	
Spouse/live-in partner	9 (2.3%)
Casual partner	42 (10.9%)
Boyfriend	97 (25.1%)
Client	198 (51.3%)
Family member	17 (4.4%)
Policeman	21 (5.4%)
Others	30 (7.8%)

Sexual behaviour of FSWs

11.4 percent of the female sex workers had spouses/live-in partners, 65% had boyfriends and 15% had casual partners. 27.5% had neither of the partners; 54.4% had at least one; 16.9% had at least two; 1.2% had all the categories of sexual partner

Table 3: Distribution of FSWs by their sexual partners

Characteristics	Frequency N (%)
Had sex with spouse/live-in partner last 12months	
Yes	508 (11.4%)
No	3926 (88.0%)
No response	25 (0.6%)
Had sex with a boyfriend last 12months	
Yes	2912 (65.3%)
No	1522 (34.1%)
No response	25 (0.6%)
Had sex with a casual partner last 12months	
Yes	676 (15.2%)
No	3758 (84.2%)
No response	25 (0.6%)

Condom use with sexual partners

Nearly all of the respondents (98%) had used condom with any of their sexual partners. Consistent condom use with clients was high (83.5%) and those who did not use condom with their clients last sexual act was very low (3.2). About 4 percent of the respondent did not respond to this. Condom use with spouses/live-in partners was reported to be very low among FSWs. About 31percent claimed never to have used condom last 12 months and 60.8 percent did not use condom last sexual act.

Table 4: Distribution of FSWs by condom use with sexual partners

Characteristics	Frequency N (%)
Ever used condom with any sexual partner (N=4459)	
Yes	4319 (98.0%)
No	90 (2.0%)
Frequency of Condom use with client last 12 months	
Consistent	3724 (83.5%)
Inconsistent	507 (11.4%)
Never	51 (1.1%)
No response	177 (4.0%)
Condom use last sexual act with client	
Yes	4141 (92.9%)
No	143 (3.2%)
No response	175 (3.9%)
Frequency of Condom use with spouse last 12 months (N=508)	
Consistent	113 (22.2%)
Inconsistent	192 (37.8%)
Never	157 (30.9%)
No response	46 (9.1%)
Condom use last sexual act with spouse	
Yes	165 (32.5%)
No	309 (60.8%)
No response	34 (6.7%)
Frequency of Condom use with boyfriend last 12 months (N=2912)	
Consistent	678 (23.3%)
Inconsistent	1417 (48.7%)
Never	718 (24.7%)
No response	99 (3.4%)
Condom use last sexual act with boyfriend	
Yes	1108 (38.0%)
No	1726 (59.3%)
No response	78 (2.7%)
Frequency of Condom use with casual partner last 12 months (N=676)	
Consistent	428 (63.3%)
Inconsistent	149 (22.0%)
Never	26 (3.8%)
No response	73 (10.8%)
Condom use last sexual act with casual partner	
Yes	506 (74.9%)
No	109 (16.1%)
No response	61 (9.0%)

Social behaviour of Female sex workers

About 77 percent of the respondents had taken alcohol in the last 4weeks preceding the survey, out of which 27.3% of them took alcohol every day. 15 percent of them had used a type of psychoactive drug or the other. The most common type used among them was marijuana (81.6%). An insignificant number of them had injected drugs in the last 12months (0.1%).

Table 5: Distribution of FSWs by their social behavior

Characteristics	Frequency N (%)
Alcohol use last 4 weeks	
Everyday	1218 (27.3%)
At least once a week	844 (18.9%)
Occasionally	1298 (29.1%)
Never	1034 (23.2%)
No response	65 (1.5%)
Psychoactive drug use	
Yes	678 (15.2%)
No	3781 (84.8%)
Type of psychoactive drug used (multiple response)	
Cocaine	39 (5.8%)
Heroine	54 (8.0%)
Marijuana	553 (81.6%)
Glue	12 (1.8%)
Pethidine	4 (0.6%)
Pentazocine	7 (1.0%)
Chinese capsules	16 (2.4%)
Amphetamines	9 (1.3%)
Others	76 (11.2%)
Ever injected drug last 12 months	
Yes	6 (0.1%)
No	4417 (99.1%)
No response	36 (0.8%)

Female sex workers' attitude towards HIV

Just about 59% of FSWs had knowledge of HIV counseling and testing facility. A higher proportion of the respondents had been tested for HIV (64%) out of which about 95% found out their HIV status. More than half of the respondents (53.5%) felt they were not at risk of HIV infection.

Table 6: Distribution of FSWs by attitude towards HIV

Characteristics	Frequency N (%)
Know of HIV counseling and testing facility	
Yes	2625 (58.9%)
No	1745 (40.1%)
No response	89 (2.0%)
Ever had an HIV test	
Yes	2854 (64.0%)
No	1502 (34.4%)
No response	72 (1.6%)
Found out the result of your test	
Yes	2698 (94.5%)
No	116 (4.1%)
No response	40 (1.4%)
Feel at risk of HIV infection	
Yes	1722 (38.6%)
No	2385 (53.5%)
No response	352 (7.8%)

Proportion of FSWs exposed to HIV-preventive information and services in the last 12months preceding the survey in Nigeria, IBBSS 2010

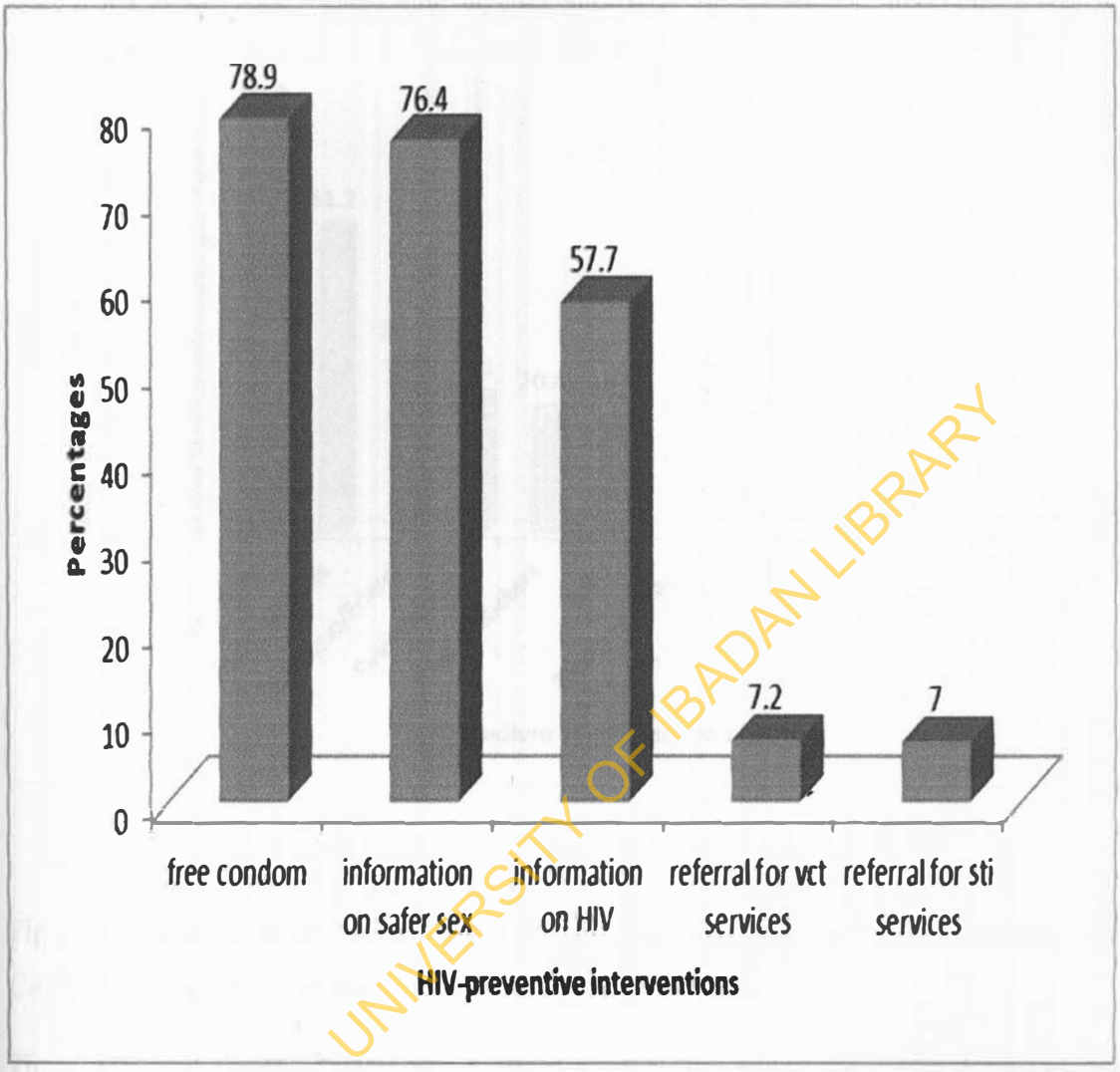

Fig 1: Distribution of FSWs exposed to HIV-preventive information/services in the last 12 months preceding the survey

Of all the respondents, about 58% had received information about HIV, STDs or Condoms of any sort, 79% had received free condoms while those that got referrals for VCT and STI services were about 7% each.

Distribution of FSWs by their channels of HIV-preventive information received in the last 12 months preceding the survey, IBBSS 2010.

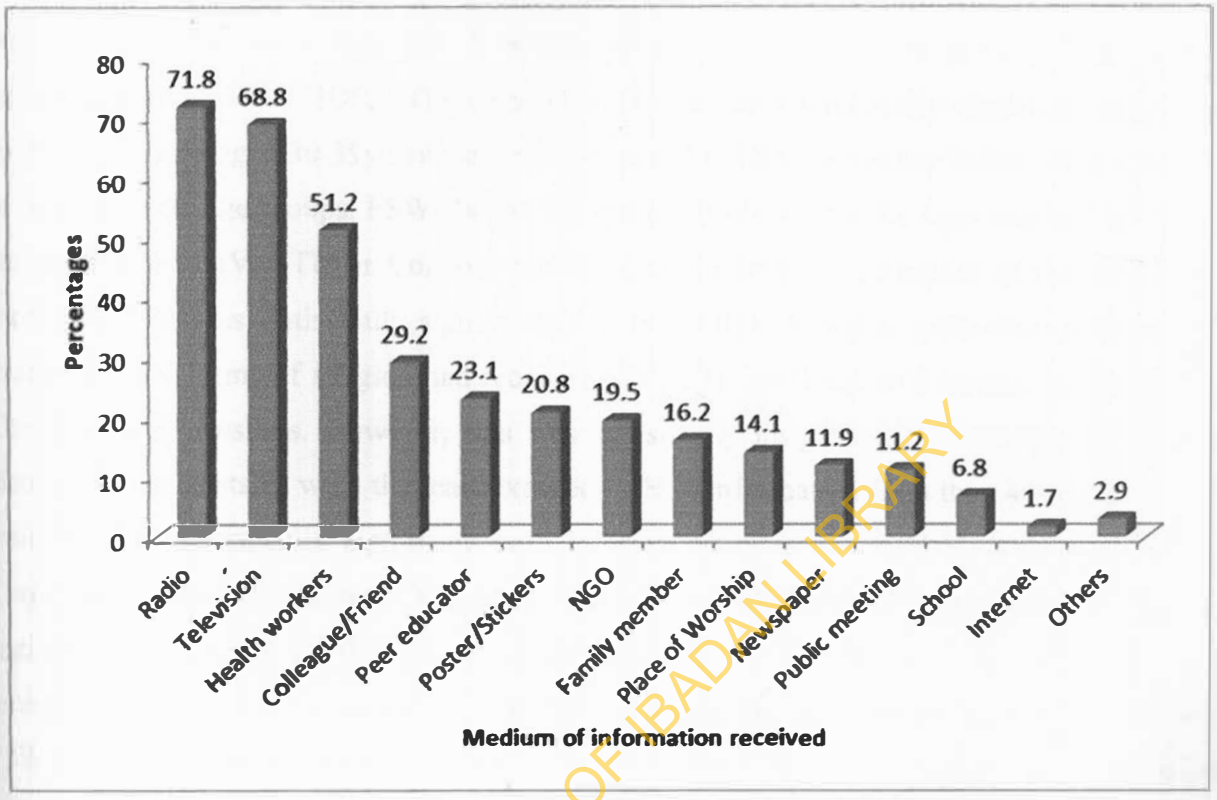

Fig 2: Percentage distribution of FSWs by their channels of information on HIV, STI or Condom received in the last 12 months

Those who had received information about HIV, STDs or Condoms got the information mostly from radio (71.8%), television (68.8%) and health workers (51.2%). An insignificant number of the respondents received information on HIV from school (6.8%) and internet (1.7%).

Association between Information received on HIV/AIDS, STI or Condom in the last 12 months and Socio demographic/behavioural characteristics of FSWs

Table 7 below shows cross tabulation between exposure to information on HIV and socio-demographic characteristics of FSWs. Significant relationships were established for most of the socio-demographic characteristics. A higher proportion of BBFSWs (68.3%) had received information about HIV/AIDS, STDs or condom. There was a statistically significant association ($p<0.001$). Those aged 30-39years were more exposed to HIV-preventive information compared to those of other age groups. FSWs below the age of 20 years were the least exposed ($p<0.001$). Information on HIV, STIs or Condom increased as the level of education of the respondents increased. This was statistically significantly at ($p<0.001$). A higher proportion of those who practiced other forms of religion had received HIV, STIs or Condom information compared to Christians and Muslims. However, this was statistically insignificant ($p=0.189$). FSWs from Benue and Lagos states were the least exposed to HIV information (less than 40%); the state of residence was statistically significant with information received on HIV, STIs at ($p<0.001$). Currently married FSWs were the least exposed to HIV-preventive information, this was statistically significant ($p=0.002$). A higher proportion of FSWs who had other sources of income had received information on HIV, STIs or Condom. This was not significant ($p=0.186$) FSWs who had spent between 3-4 years in sex work were the most exposed to HIV-preventive information and this was statistically significant ($p=0.024$). Though a higher proportion of those who had been on psychoactive drugs and had taken alcohol last 4 weeks preceding the survey had received information on HIV, STIs or Condom, the association was insignificant at ($p=0.069$ and 0.117 respectively)

Table 7: Association between Information received on HIV/AIDS, STI or Condom in the last 12 months and Socio demographic/behavioural characteristics of FSWs

Characteristics	Ever received information on HIV/AIDS, STIs or Condoms		Chi sq value	P value
	Yes n (%)	No n (%)		
Target group				
Brothel-based	1536 (68.3)	712 (31.7)	2.112	**<0.001**
Non-brothel-based	1018 (46.7)	1160 (53.3)		
Age				
15-19	165 (45.3)	199 (54.7)	32.128	**<0.001**
20-29	1724 (57.6)	1267 (42.4)		
30-39	577 (60.7)	344 (39.3)		
40-49	88 (58.7)	62 (41.3)		
Level of Education				
None/qur'anic	104(46.8)	118 (53.2)	23.910	**<0.001**
Primary	406 (53.8)	349 (46.2)		
Secondary	1750 (58.5)	1240 (41.5)		
Tertiary education	294 (64.1)	165 (35.9)		
Religion				
Christianity	2323 (58.0)	1683 (42.0)	1.311	0.252
Islam	206 (54.9)	169 (45.1)		
Current Marital status				
Never married	1591 (58)	1151 (42.0)	12.864	**0.002**
Currently married	59 (42.8)	79 (57.2)		
Others (separated/divorced/widowed)	871 (58.2)	626 (41.8)		
State of Residence				
Anambra	306 (61.4)	1921 (38.6)	3.354	**<0.001**
Benue	167 (33.5)	331 (66.5)		
Cross-river	309 (63.8)	175 (36.2)		
Edo	351 (81.4)	80 (18.6)		
FCT	288 (57.9)	209 (42.1)		
Kaduna	316 (62.9)	186 (37.1)		
Kano	340 (65.9)	176 (34.1)		
Lagos	192 (37.4)	321 (62.6)		
Nasarawa	285 (58.5)	202 (41.5)		

Other sources of income				
Yes	745 (59.5)	507 (40.5)	1.745	0.186
No	1732 (57.3)	1290 (42.7)		
Duration of sex work (years)				
Less than 1	548 (58.4)	391 (41.6)	9.441	**0.024**
1-2	1076 (57.4)	797 (42.6)		
3-4	497 (63.8)	282 (36.2)		
5 and above	311 (59.0)	216 (41.0)		
Number of clients per week				
0-19	1306 (53.3)	1142 (46.7)	81.811	**<0.001**
20-39	611 (71.1)	249 (29.0)		
40 and above	616 (58.1)	445 (41.9)		
Alcohol use last 4 weeks				
Yes	1951 (58.3)	1396 (41.7)	2.452	0.117
No	572 (55.5)	458 (44.5)		
Psychoactive drug use				
Yes	411 (60.9)	264 (39.1)	3.309	0.069
No	2143 (57.1)	1608 (42.9)		
Number of brothels worked				
1	1026 (54.2)	866 (45.8)	1.011	0.603
2	517 (56.2)	403 (43.8)		
3 and above	576 (54.5)	481 (45.5)		

Association between Information received on HIV/AIDS from outreach workers/peer educators in the last 12 months and Socio demographic/behavioural characteristics of FSWs

A higher proportion of BBFSWs (61.1%) had received information about HIV/AIDS from an outreach worker. There was a statistically significant association ($p<0.001$). Those aged 30-39 years had been reached by outreach workers on HIV-preventive information compared to those of other age groups with a significant association ($p<0.001$). FSWs who had primary level of education were the least to be reached by outreach workers for discussion on HIV, this was not statistically significantly at ($p=0.663$). Those who practiced other forms of religion had received HIV, STIs or Condom information from outreach workers, however, the least proportion of those who were informed about HIV from outreach workers were Muslim respondents. This was statistically insignificant ($p=0.002$). FSWs from Kano state were the least exposed to HIV information from outreach workers (22.8%) compared to other states; this was statistically significant at ($p<0.001$). A higher proportion of those who were married (62.5%) had received HIV information from outreach workers compared to their unmarried counterparts (56%), this was not statistically significant ($p=0.640$). A higher proportion of FSWs who did not have other source of income (57.2%) had received information on HIV, STIs or Condom from outreach workers compared to those who had other sources of income (54.2%). This was not significant ($p=0.174$). FSWs who had spent between 1-2 years and 3-4 years in sex work were the most exposed to outreach workers for HIV-preventive information than those who had been less a year and over 5 years into sex work and this showed a marginal significance ($p=0.054$). A higher proportion of those who had been on psychoactive drugs ($p=0.700$) and had taken alcohol last 4 weeks preceding the survey ($p=0.019$) had received information on HIV from outreach workers compared to those who did not. There was significant association between the number of brothels FSWs had worked and having received HIV information from outreach workers ($p=0.002$), those who had in more than 2 brothels had been more exposed to discussions from outreach workers.

Table 8: Association between Information received on HIV/AIDS, STI or Condom in the last 12 months and Socio demographic/behavioural characteristics of FSWs

Characteristics	Received HIV information from outreach workers		Chi sq value	P value
	Yes n (%)	No n (%)		
Target group				
Brothel-based	892 (61.1)	568 (38.9)	36.774	**<0.001**
Non-brothel-based	444 (48.4)	473 (51.6)		
Age				
15-19	62 (41.3)	88 (58.7)	18.605	**<0.001**
20-29	888 (55.9)	701 (44.1)		
30-39	338 (60.9)	217 (39.1)		
40-49	48 (57.8)	35 (42.2)		
Level of Education				
None/qur'anic	58 (57.4)	43 (42.6)	1.582	0.663
Primary	205 (54.4)	172 (45.6)		
Secondary	916 (56.1)	718 (43.9)		
Tertiary education	157 (59.2)	108 (40.8)		
Religion				
Christianity	1237 (57.2)	926 (42.8)	11.948	**0.001**
Islam	84 (44.2)	106 (55.8)		
Current Marital status				
Never married	830 (56.3)	645 (43.7)	0.893	0.640
Currently married	35 (62.5)	21 (37.5)		
Others (separated/divorced/widowed)	458 (56.1)	359 (43.9)		
Other sources of income				
Yes	381 (54.2)	322 (45.8)	1.808	0.179
No	916 (57.2)	685 (42.8)		
Duration of sex work (years)				
Less than 1	264 (51.8)	246 (48.2)		
1-2	585 (58.3)	418 (41.7)	7.638	0.054
3-4	266 (58.7)	187 (41.3)		
5 and above	161 (54.0)	137 (46.0)		
Number of clients per week				
0-19	624 (52.3)	568 (47.7)	13.840	**0.001**
20-39	349 (59.8)	235 (40.2)		
40 and above	350 (60.1)	232 (39.9)		

Alcohol use last 4 weeks				
Yes	1040 (57.3)	776 (42.7)	5.522	**0.019**
No	275 (51.7)	257 (48.3)		
Psychoactive drug use				
Yes	217 (57.1)	163 (42.9)	0.149	0.700
No	1119 (56.0)	878 (44.0)		
Number of brothels worked				
1	512 (52.1)	471 (47.9)	12.043	**0.002**
2	250 (51.2)	238 (48.8)		
3 and above	299 (60.8)	193 (39.2)		
State				
Anambra	169 (75.8)	54 (24.2)	2.377	**<0.001**
Benue	118 (74.7)	40 (25.3)		
Cross-river	199 (65.0)	107 (35.0)		
Edo	232 (65.9)	120 (34.1)		
FCT	171 (60.2)	113 (39.8)		
Kaduna	149 (47.5)	165 (52.5)		
Kano	73 (22.8)	247 (77.2)		
Lagos	100 (54.6)	83 (45.4)		
Nasarawa	125 (52.7)	112 (47.3)		

Association between Information on HIV/AIDS received from religious organizations in the last 12 months preceding the survey and Socio-demographic/behavioural characteristics of respondents

From table 9 below, Non-brothel based FSWs (38.0%) had received information about HIV from religious organization compared to brothel-based respondents (31.0%). There was a statistically significant association (p=0.001). Those aged 30-39years were more exposed to HIV-preventive information from religious organization compared to those of other age groups (p=0.468). Being exposed to information on HIV form religious organization was less frequent among respondents with no/qur'anic level of education as against those who have higher levels of education. This was statistically significantly at (p=0.013). Christian respondents had been more informed about HIV from a religious organization than Muslims and those who practiced other forms of religion. This was statistically significant (p=0.007). Married FSWs got more informed on HIV from religious organization (43.4%) than their unmarried counterparts (32.5% and 35.3%), this was not significant (p=0.134). FSWs who had spent between 1-2 years in sex work were the most exposed to HIV-preventive information from religious settings and this was statistically significant (p<0.001).

Table 9: Association between Information on HIV/AIDS received from religious organizations in the last 12 months preceding the survey and Socio-demographic/behavioural characteristics of respondents

Characteristics	Received HIV information from a religious organization		Chi sq value	P value
	Yes n (%)	No n (%)		
Target group				
Brothel-based	455 (31.0)	1014 (69.0)	12.088	**0.001**
Non-brothel-based	327 (38.0)	533 (62.0)		
Age				
15-19	42 (29.6)	100 (70.4)	2.540	0.468
20-29	513 (33.1)	1036 (66.9)		
30-39	198 (35.9)	353 (64.1)		
40-49	29 (33.3)	58 (66.7)		
Level of Education				
None/qur'anic	27 (26.5)	75 (73.5)	10.811	**0.013**
Primary	130 (35.0)	241 (65.0)		
Secondary	521 (32.4)	1085 (67.6)		
Tertiary education	104 (41.6)	146 (58.4)		
Religion				
Christianity	725 (34.3)	1387 (65.7)	5.143	**0.023**
Islam	51 (26.3)	143 (73.7)		
Current Marital status				
Never married	469 (32.5)	973 (67.5)	4.017	0.134
Currently married	23 (43.4)	30 (56.6)		
Others (separated/divorced/widowed)	284 (35.3)	521 (64.7)		
Other sources of income				
Yes	262 (37.5)	437 (62.5)	7.062	**0.008**
No	494 (31.8)	1061 (68.2)		
Duration of sex work (years)				
Less than 1	155 (30.6)	351 (69.4)	22.134	**<0.001**
1-2	365 (37.7)	604 (62.3)		
3-4	154 (34.9)	287 (65.1)		
5 and above	70 (23.8)	224 (76.2)		

Number of clients per week				
0-19	430 (37.7)	710 (62.3)	20.776	**<0.001**
20-39	158 (27.0)	427 (73.0)		
40 and above	187 (32.0)	398 (68.0)		
Alcohol use last 4 weeks				
Yes	581 (33.0)	1178 (67.0)	1.424	0.233
No	193 (35.8)	346 (64.2)		
Psychoactive drug use				
Yes	120 (32.8)	246 (67.2)	0.121	0.727
No	662 (33.7)	1301 (66.3)		
Number of brothels worked				
1	294 (30.0)	685 (70.0)	18.065	**<0.001**
2	172 (36.4)	300 (63.6)		
3 and above	189 (41.0)	272 (59.0)		
State				
Anambra	60 (37.0)	102 (63.0)	2.666	**<0.001**
Benue	63 (39.1)	98 (60.9)		
Cross-river	53 (17.3)	254 (82.7)		
Edo	49 (14.0)	301 (86.0)		
FCT	159 (55.8)	126 (44.2)		
Kaduna	129 (40.8)	187 (59.2)		
Kano	87 (26.1)	246 (73.9)		
Lagos	45 (23.3)	148 (76.7)		
Nasarawa	137 (61.7)	85 (38.3)		

Association between Exposure to HIV-preventive information/services and Socio-demographic and behavioural factors FSWs

In table 10 below, a higher proportion of BBFSWs (68%) had been exposed to HIV-preventive information than NBBFSWs (46.5%). There was a statistically significant association ($p<0.001$). Those aged 30-39years were more exposed to HIV-preventive information compared to those of other age groups. This is significant at ($p<0.001$). Exposure to HIV-preventive information increased with increase in level of education of the respondents. This was statistically significantly at $p<0.001$. Those who practiced other forms of religion (72.7%) were more exposed to HIV-preventive information than Christians and Muslims (57.8% and 54.9% respectively). However, this was statistically insignificant ($p=0.197$). FSWs from Benue and Lagos states were the least exposed to HIV information (33.5% and 36.7% respectively); the state of residence was statistically significant with exposure to information at ($p<0.001$). Currently married FSWs (42.8%) were the least exposed to HIV-preventive information compared to those who were never married and others (about 58% each). However, this was statistically significant ($p=0.002$). Being exposed to HIV-preventive information was more frequent among respondents who have other sources of income (59.4%) than those who do not (57.3%) and this showed an insignificant association at ($p=0.192$). FSWs who had spent between 3-4 years in sex work were the most exposed to HIV-preventive information (63.6%) and this was statistically significant ($p=0.027$). A higher proportion of FSWs that have 20-39 clients per week had received information on HIV/AIDS than those who have less than 20 clients (53.3%) and more than 40 clients per week (57.9%). This was statistically significant at ($p<0001$). Those who used alcohol last 4 weeks before the survey ($p=0.104$) and those who use psychoactive drugs ($p=0.048$) were more exposed to HIV-preventive information compared to those who did not.

Table 10: Association between exposure to HIV-preventive interventions and factors related to FSWs

Characteristics	Exposure to HIV-preventive information		Chi square	P value
	Yes	No		
Target group				
Brothel-based	1541 (68.0)	724 (32.0)	2.107	**<0.001**
Non-brothel-based	1021 (46.5)	1173(53.5)		
Age				
15-19	165 (45.3)	199 (54.7)	30.220	**<0.001**
20-29	1728 (57.3)	1288 (42.7)		
30-39	577 (62.1)	352 (37.9)		
40-49	88 (58.7)	62 (41.3)		
Level of Education				
None/qur'anic	106 (46.9)	120 (53.1)	23.497	**<0.001**
Primary	406 (53.4)	354 (46.6)		
Secondary	1756 (58.3)	1255 (41.7)		
Tertiary education	294 (63.6)	168 (36.4)		
Religion				
Christianity	2330 (57.8)	1701 (42.2)	1.183	0.277
Islam	207 (54.9)	170 (45.1)		
Current Marital status				
Never married	1594 (57.8)	1164 (42.2)	12.577	**0.002**
Currently married	59 (42.8)	79 (57.2)		
Others (separated/divorced/widowed)	876 (58.1)	632 (41.9)		
Other sources of income				
Yes	748 (59.4)	511 (40.6)	1.705	0.192
No	1737 (57.3)	1297 (42.7)		
Duration of sex work(years)				
Less than 1	548 (58.2)	393 (41.8)	9.178	**0.027**
1-2	1080 (57.4)	801 (42.6)		
3-4	499 (63.6)	285 (36.4)		
5 and above	312 (59.0)	217 (41.0)		
Number of clients per week				
0-19	1310 (53.3)	1147 (46.7)	79.452	**<0.001**
20-39	613 (70.7)	254 (29.3)		
40 and above	618 (57.9)	450 (42.1)		
Alcohol use last 4 weeks				
Yes	1958 (58.3)	1402 (41.7)	2.644	0.104
No	573 (55.4)	461 (44.6)		

Psychoactive drug use				
Yes	413 (60.9)	265 (39.1)	3.911	**0.048**
No	2149 (56.8)	1632 (43.2)		
Number of brothels worked				
1	1027 (54.1)	873 (45.9)	1.199	0.549
2	517 (56.0)	406 (44.0)		
3 and above	577 (53.8)	495 (46.2)		
State				
Anambra	307 (61.5)	192 (38.5)	3.453	**<0.001**
Benue	167 (33.5)	331 (66.5)		
Cross-river	309 (63.4)	178 (36.6)		
Edo	356 (81.7)	80 (18.3)		
FCT	288 (57.8)	210 (42.2)		
Kaduna	316 (62.8)	187 (37.2)		
Kano	340 (65.9)	176 (34.1)		
Lagos	193 (36.7)	333 (63.3)		
Nasarawa	286 (57.7)	210 (42.3)		

HIV-preventive information/services received by type of sex worker.

There was a statistical significant association ($p<0.05$) between the HIV-preventive information/services received and type of sex worker, though, referral to VCT services showed no significant association ($p=0.459$). Female sex workers who were brothel-based were more likely to have received these information/services than non-brothel-based FSWs. The reverse is however the case with referral for STI and VCT services where a higher proportion of non-brothel based FSWs (9.3% and 7.9% respectively) received such services as compared to BBFSWs (5.7% and6.8% respectively).

Table 11: Association between HIV-preventive Information/Services received in the last 12 months and type of sex worker

HIV-preventive interventions	BBFSW	NBBFSW	Chi-square	P value
Information on HIV,STI or Condom				
Yes	1536 (68.3)	1018 (46.7)	2.112	**<0.001**
No	712 (31.7)	1160 (53.3)		
Total (n)	2248	2178		
Provision of free condoms				
Yes	837 (84.9)	390 (71.3)	40.673	**<0.001**
No	149 (15.1)	157 (28.7)		
Total (n)	986	547		
Information on safer sex practice				
Yes	740 (79.0)	393 (72.0)	9.368	**0.002**
No	149 (21.0)	153 (28.0)		
Total (n)	937	546		
Referral for STI services				
Yes	49 (5.7)	49 (9.3)	6.772	**0.009**
No	818 (94.3)	476 (90.7)		
Total (n)	867	525		
Referral for VCT services				
Yes	59 (6.8)	41 (7.9)	0.549	0.459
No	806 (93.2)	479 (92.1)		
Total (n)	865	525		

Channels of HIV-preventive information received by type of female sex worker

A higher proportion of BBFSWs received HIV information through television, health workers, peer educators, colleague/friend, public meeting compared to NBBFSWs while a higher proportion of NBBFSWs received such information from newspapers, posters, internet, school, family members, NGO. Those channels of information that were statistically significant ($p<0.05$) with type of FSWs were television, health worker, peer educator, newspaper, poster, place of worship and school.

Table 12: Association between Channels of HIV information received and type of FSW

Channels of HIV information received	Type of female sex worker		Chi square	P value
	BBFSW	NBBFSW		
Radio				
Yes	1042 (71.8)	706 (71.7)	0.001	0.972
No	409 (28.2)	278 (28.3)		
Television				
Yes	1022 (72.1)	614 (63.9)	18.079	<0.001
No	395 (27.9)	347 (36.1)		
Newspaper				
Yes	143 (10.5)	130 (13.8)	5.825	0.016
No	1218 (89.5)	811 (86.2)		
Posters/Stickers				
Yes	202 (14.7)	277 (29.8)	75.904	<0.001
No	1169 (85.3)	654 (70.2)		
Health workers				
Yes	832 (56.7)	407 (42.6)	46.002	<0.001
No	635 (43.3)	548 (57.4)		
Peer educator				
Yes	367 (26.2)	174 (18.6)	18.200	<0.001
No	1036 (73.8)	763 (81.4)		
Colleague/Friend				
Yes	410 (29.7)	272 (28.5)	0.384	0.535
No	972 (70.3)	683 (71.5)		

Internet				
Yes	20 (1.5)	20 (2.1)	1.457	0.227
No	1339 (98.5)	913 (97.9)		
Place of worship				
Yes	175 (12.8)	148 (15.9)	4.290	0.038
No	1190 (87.2)	784 (84.1)		
School				
Yes	59 (4.3)	98 (10.4)	32.076	<0.001
No	1303 (95.7)	847 (89.6)		
Family member				
Yes	210 (15.3)	164 (17.4)	1.845	0.174
No	1163 (84.7)	778 (82.6)		
NGO				
Yes	261 (19.1)	187 (20.0)	0.338	0.561
No	1108 (80.9)	746 (80.0)		
Public meeting				
Yes	159 (11.7)	97 (10.4)	0.919	0.338
No	1198 (88.3)	833 (89.6)		
Others				
Yes	34 (2.7)	27 (3.3)	0.762	0.383
No	1237 (97.3)	782 (96.7)		

Association between Condom use and information received on HIV, STI or Condom in the last 12months preceding the survey

Table 13 below showed that information received on HIV, AIDS, STDS or Condoms among FSWs showed a statistical significant association with FSWs behavioural factors (p value ranging from p<0.001-0.040). FSWs use condoms more consistently with casual partners (76%) and clients (89.4%) after receiving HIV information than with spouses/live-in (30.8%) and boyfriends (22.7%). A higher proportion of FSWs who had been exposed to HIV-preventive information had tested for HIV compared to those who had not. This showed a significant association (p<0.001). Having received HIV-preventive information from outreach workers was not significant with Condom use with boyfriends (p=0.101) and casual partners (p=0.140). Out of those reached by outreach workers, only 29% used condom consistently with spouses; about 23% consistently with boyfriends. However, after being reached by outreach workers on discussion about HIV, a higher proportion of FSWs used condom consistently with casual partners (72.8%) and clients (91.5%). Exposure to HIV-preventive information from religious organizations showed a statistical significance only with condom use with boyfriends and clients (p<0.001)

Table 13: Association between Condom use and Information on HIV, STI or Condom received in the last 12 months

Behavioural factors	Ever received information on HIV, STI		Chi-square	P value
	Yes	No		
Condom use with spouse/live-in				
Consistent	81 (30.8)	32 (16.2)	13.361	**0.001**
Inconsistent	97 (36.9)	95 (48.0)		
Never	85 (32.3)	71 (35.9)		
Total	263 (100)	198 (100)		
Condom use with boyfriends				
Consistent	385 (22.7)	291 (26.3)	6.440	**0.040**
Inconsistent	854 (50.4)	556 (50.2)		
Never	456 (26.9)	261 (23.6)		
Total	1695 (100)	1108 (100)		
Condom use with casual partners	278 (76.0)	150 (63.6)	17.905	**<0.001**
Consistent	81 (22.1)	67 (28.4)		
Inconsistent	7 (1.9)	19 (8.1)		
Never	366 (100)	236 (100)		
Total				
Condom use with clients				
Consistent	2220 (89.4)	1487 (83.5)	35.546	**<0.001**
Inconsistent	232 (9.3)	273 (15.3)		
Never	30 (1.2)	21 (1.2)		
Total	2482 (100)	1781 (100)		
Ever had HIV test				
Yes	1872 (73.8)	974 (53.1)	2.016	**<0.001**
No	665 (26.2)	862 (46.9)		
Total	2537 (100)	1836 (100)		

Table 13.1: Association between Condom use and HIV-preventive information received from peer educator

Behavioural factors	Received information from peer educators		Chi-square	P value
	Yes	no		
Condom use with spouse/live-in				
Consistent	42 (29.0)	35 (36.5)	8.216	**0.016**
Inconsistent	44 (30.3)	39 (40.6)		
Never	59 (40.7)	22 (22.9)		
Total	145 (100)	96 (100)		
Condom use with boyfriends				
Consistent	201 (23.3)	142 (19.7)	4.576	0.101
Inconsistent	439 (51.0)	364 (50.6)		
Never	221 (25.7)	213 (29.6)		
Total	861 (100)	719 (100)		
Condom use with casual partners				
Consistent	118 (72.8)	113 (75.3)	3.933	0.140
Inconsistent	43 (26.5)	32 (21.3)		
Never	1 (0.1)	5 (3.3)		
Total	162 (100)	150 (100)		
Condom use with clients				
Consistent	1187 (91.5)	880 (87.0)	12.617	**0.002**
Inconsistent	98 (7.6)	113 (11.2)		
Never	12 (0.9)	18 (1.8)		
Total	1297 (100)	1071 (100)		
Ever had HIV test				
Yes	1092 (81.9)	664 (64.0)	97.180	**<0.001**
No	242 (18.1)	374 (36.0)		
Total	1334 (100)	1038 (100)		

Table 13.2: Association between Condom use and HIV-preventive information received religious organization

Behavioural factors	Attended religious meetings on HIV, STI		Chi-square	P value
	Yes	no		
Condom use with spouse/live-in				
Consistent	43 (39.1)	36 (28.6)	3.395	0.183
Inconsistent	38 (34.5)	46 (36.5)		
Never	29 (26.4)	44 (34.9)		
Total	110 (100)	126 (100)		
Condom use with boyfriends				
Consistent	140 (26.7)	197 (19.5)	18.027	<0.001
Inconsistent	268 (51.0)	497 (49.3)		
Never	117 (22.3)	315 (31.2)		
Total	525 (100)	1009 (100)		
Condom use with casual partners				
Consistent	89 (73.6)	143 (75.7)	0.394	0.821
Inconsistent	29 (24.0)	43 (22.8)		
Never	3 (2.5)	3 (1.6)		
Total	121 (100)	189 (100)		
Condom use with clients				
Consistent	647 (85.5)	1370 (91.3)	17.787	<0.001
Inconsistent	97 (12.8)	115 (7.7)		
Never	13 (1.7)	16 (1.1)		
Total	757 (100)	1501 (100)		
Ever had HIV test				
Yes	607 (78.2)	1104 (71.8)	11.102	0.001
No	169 (21.8)	434 (28.2)		
Total	776 (100)	1538 (100)		

Association between Condom use and Exposure to HIV-preventive information.

Table 13.3 below showed that exposure to HIV-preventive information among FSWs showed a statistical significant association with behavioural factors (p value ranging from p<0.001-0.040). FSWs use condoms more consistently with casual partners (76%) and clients (89.4%) after receiving HIV information than with spouses/live-in (30.8%) and boyfriends (22.7%). A higher proportion of FSWs who had been exposed to HIV-preventive information had tested for HIV (73.8%) compared to those who had not (26.2%). This showed a significant association (p<0.001).

Table 13.3: Association between exposure to HIV-preventive information/services and some selected behaviours

Behavioural factors	Exposed to HIV information/services		Chi-square	P value
	Yes	No		
Condom use with spouse/live-in				
Consistent	81 (30.8)	32 (16.1)	13.743	**0.001**
Inconsistent	97 (36.9)	95 (47.7)		
Never	85 (32.3)	72 (36.2)		
Total	263 (100)	169 (100)		
Condom use with boyfriends				
Consistent	385 (22.7)	293 (26.3)	6.870	**0.032**
Inconsistent	856 (50.4)	561 (50.3)		
Never	457 (26.9)	261 (23.4)		
Total	1698 (100)	1115 (100)		
Condom use with casual partners				
Consistent	278 (76.0)	150 (63.3)	18.188	**<0.001**
Inconsistent	81 (22.1)	68 (28.7)		
Never	7 (1.9)	19 (8.0)		
Total	366 (100)	237 (100)		
Condom use with clients				
Consistent	2228 (89.5)	1496 (83.5)	36.304	**<0.001**
Inconsistent	232 (9.3)	275 (15.3)		
Never	30 (1.2)	21 (1.2)		
Total	2490 (100)	1792 (100)		
Ever had HIV test				
Yes	1876 (73.8)	978 (53.1)	2.021	**<0.001**
No	665 (28.7)	864 (46.9)		
Total	2541 (100)	1842 (100)		

Predictors of information received on HIV, STI or Condoms in the last 12months

After adjusting for all other variables, BBFSWs were about 3 times more likely to have been exposed to information about HIV, STDs or Condoms than NBBFSWs (95%CI=2.437-3.403). Those aged 15-19years were about 2 times less likely to have been exposed to information about HIV, STDs or Condom compared to those aged 25-49years. This was statistically significant (95%CI 0.386-0.829), while those between 20-24years were about 1.2 times less likely to have received information about HIV, STDs or Condom than those aged 25-49years. This showed no statistical significance (95%CI 0.694-1.049). FSWs who had none/qur'anic, primary and secondary levels of education were all less likely than those with tertiary education to have received HIV information and they are all significantly less likely (p=0.001). Those who had never married were 1.05 times more likely, while those currently married were 0.66 times more likely to have received HIV information but there was no significant association (95%CI 0.853-1.292; 0.396-1.113)

Table 17: Predictors of Exposure to information about HIV/AIDS, STDs or Condom on FSWs in the last 12 months preceding the survey

Characteristics	Odds Ratio	95% CI	P value
Target code			
BBFSW	2.880	**2.437-3.403**	**<0.001**
NBBFSW	1		
Age			
15-19	0.548	**0.344-0.873**	**0.011**
20-29	0.772	0.515-1.158	0.211
30-39	1.033	0.685-1.557	0.879
40-49	1		
Level of Education			
None/Qur'anic	0.313	**0.216-0.453**	**<0.001**
Primary	0.383	**0.291-0.503**	**<0.001**
Secondary	0.603	**0.482-0.755**	**<0.001**
Tertiary	1		
Marital status			
Never married	1.182	1.011-1.383	0.036
Currently married	0.594	0.400-0.884	0.010
Others (divorced/separated/widowed)	1		
Duration of sex work (years)			
Less than 1	0.966	0.746-1.221	0.771
1-2	0.951	0.748-1.177	0.643
3-4	1.252	0.984-1.593	0.068
5+	1		
Number of clients per week			
0-19	1.366	1.135-1.645	0.001
20-39	1.576	1.282-1.937	<0.001
40 and above	1		
Psychoactive drug use			
Yes	1.117	0.931-1.340	0.715
No	1		

Predictors of Exposure to HIV-preventive information from outreach workers/peer educators

Predictors of exposure to HIV-preventive information from peer educators were type of sex work (OR: 0.678, 95%CI: 0.529-0.870) and young age (OR: 1.949, 95%CI: 1.032-3.681)

Table 18: Predictors of Exposure to HIV-preventive information from peer educators

Characteristics	Odds ratio	95% CI	P value
Target code			
BBFSW	0.678	0.529-0.870	0.002
NBBFSW	1		
Age			
15-19	1.949	1.032-3.681	0.040
20-29	1.069	0.631-1.811	0.803
30-39	0.911	0.529-1.570	0.738
40-49	1		
Religion			
Christianity	0.893	0.272-2.935	0.852
Islam	0.551	0.159-1.903	0.346
Others	1		
Duration of sex work (years)			
Less than 1	1.378	0.991-1.917	0.057
1-2	1.024	0.759-1.381	0.878
3-4	1.154	0.831-1.603	0.393
5+	1		
Number of clients per week			
0-19	1.067	0.813-1.400	0.640
20-39	1.157	0.889-1.505	0.280
40 and above	1		
Alcohol use last 4 weeks			
Yes	0.822	0.662-1.020	0.075
No	1		

Predictors of Exposure to HIV-prevention information from religious organization

The contributory risk factor for exposure to information from religious organization was type of sex work (OR: 0.651, 95%CI: 0.456-0.930)

Table 19: Predictors of Exposure to HIV-prevention information from religious organization

Characteristics	Exp(B)	95% CI	P value
Target code			
BBFSW	1.089	0.834-1.422	0.529
NBBFSW	1		
Level of Education			
None/Qur'anic	1.577	0.893-2.787	0.117
Primary	0.876	0.598-1.283	0.496
Secondary	1.040	0.762-1.420	0.803
Tertiary	1		
Religion			
Christianity	0.208	0.026-1.637	0.136
Islam	0.326	0.040-2.651	0.295
Others	1		
Other source of income			
Yes	0.911	0.738-1.123	0.381
No	1		
Duration of sex work (years)			
Less than 1	0.651	0.456-0.930	0.018
1-2	0.520	0.377-0.717	<0.001
3-4	0.539	0.377-0.769	0.001
5+	1		
Number of clients per week			
0-19	0.784	0.591-1.041	0.093
20-39	1.126	0.846-1.499	0.414
40 and above	1		

Predictors of Exposure to HIV-preventive information

After adjusting for other variables, exposure to HIV-preventive information was significantly associated with brothel-based female sex workers who were 3 times less likely than non-brothel based FSWs (OR: 0.295; 95%CI: 0.248-0.351). Those aged 15-19 years were about 1.6 times more likely than those aged 40-49 years (OR: 1.642; 95%CI: 1.016-2.654). Other predictors of exposure were level of education, duration of sex work (OR: 0758; 95%CI: 0.592-0.971) and number of clients per week (OR: 0.731; 95%CI: 0.600-0.889)

Predictors of Exposure to HIV-preventive information

After adjusting for other variables, exposure to HIV-preventive information was significantly associated with brothel-based female sex workers who were 3 times less likely than non-brothel based FSWs (OR: 0.295; 95%CI: 0.248-0.351). Those aged 15-19 years were about 1.6 times more likely than those aged 40-49 years (OR: 1.642; 95%CI: 1.016-2.654). Other predictors of exposure were level of education, duration of sex work (OR: 0758; 95%CI: 0.592-0.971) and number of clients per week (OR: 0.731; 95%CI: 0.600-0.889)

Table 20: Predictors of Exposure to HIV-preventive information

Characteristics	Exp(B)	95% CI	P value
Target code			
BBFSW	0.295	0.248-0.351	**<0.001**
NBBFSW	1		
Age			
15-19	1.642	1.016-2.654	**0.043**
20-29	1.244	0.820-1.887	0.305
30-39	0.970	0.636-1.480	0.889
40-49	1		
Level of Education			
None/Qur'anic	3.108	2.119-4.558	**<0.001**
Primary	2.590	1.953-3.434	**<0.001**
Secondary	1.620	1.284-2.043	**<0.001**
Tertiary	1		
Marital status			
Currently married	0.868	0.737-1.023	0.091
Ever married, not currently	1.550	1.028-2.337	0.037
Not currently married	1		
Duration of sex work (years)			
Less than 1	1.086	0.848-1.391	0.514
1-2	0.986	0.790-1.229	0.898
3-4	0.758	0.592-0.971	0.029
5+	1		
Number of clients per week			
0-19	0.731	0.600-0.889	**0.002**
20-39	0.822	0.659-1.024	0.080
40 and above	1		
Psychoactive drug use			
Yes	1.086	0.898-1.314	0.396
No	1		

CHAPTER FIVE

DISCUSSION

This study analyzed relationship between exposure to HIV-preventive information/services and socio-demographic and how exposure influence behaviour (condom use) among FSWs. About 76.4% had been exposed to information on safe sex [BBFSW: 79.0%; NBBFSW: 72.0%], 7% got referral for STI services [BBFSW: 5.7%; NBBFSW: 9.3%], 7.2% were referred for VCT services [BBFSW: 6.8%; NBBFSW: 7.9%], 57.7% were exposed to information on HIV, STI or Condoms [BBFSW: 68.2%; NBBFSW: 46.7%]. About 80% received free condoms. Age, education, marital status, type of sex work, duration of sex work, number of clients per week was the factors significantly associated with exposure. Female sex work got exposed to HIV-preventive information majorly from the radio and television. A higher proportion of FSWs who had been exposed to information fail to consistently use condom with sexual partners.

While a high proportion of FSW had been exposed to HIV-preventive information and free condoms, a very low proportion (about 7%) got referrals for VCT and STI services. This could be because of intense stigma and discrimination which are barriers to access health services. This is consistent with the study conducted by Izugbara (2005). However, non-brothel based FSWs got more referrals for STI and VCT services than brothel-based FSWs which could be due to the fact that brothel-based FSWs may be considered professional sex workers and as a result , adhere to s strict use of condom unlike those working in bars and streets (Nagot et al., 2005). Thus, condom use among non-brothel based FSWs may not be as strict which leaves them more vulnerable to STI acquisition. Also, since non-brothel based FSWs have no organized work setting like the brothel-based, it was found by Scorgie et al., 2012, that when sex takes place in client's space, sex workers' vulnerability to violence or forced unprotected sex is often magnified.

This study found that older FSWs were more likely to have received HIV-preventive information/services compared to younger ones. This could be due to their level of maturity and experience gained as a result of the time spent in sex work; it could also be because of risks taken in time past.

There was a positive relationship between level of education of FSWs and exposure to HIV-preventive information/services. The higher their level of education, the more exposed they are to preventive information. This could be because those with higher level of education are aware of being at a higher risk of HIV infection; it could also be due to the fact that they know their rights as a sex worker to be provided with prevention interventions. Therefore, they do not face as much violence or discrimination as those with little or no education. Christian FSWs were also more likely to have received HIV-preventive information/services than Muslims. This finding is in line with the study by Namazzi (2005) which reported that Christians are more open to discuss and tend to have a better understanding of health issues, believing that Muslims and other religions live in denial due to lack of education and exposure. Those with other sources of income reported higher exposure to HIV-preventive information/services. This shows a positive correlation between socio-economic status and access to general health care services (Simbayi et al., 2004). Since several studies reported main reason for going into sex work as financial gains, it could prevent FSWs from making use of the prevention services because most times, they place the benefits of having unsafe sex practice which attracts more money, to seeking health services.

Those with larger number of clients per week were more likely to have been exposed to HIV-preventive information/services than those with fewer numbers of clients. This could be because they have a high self-risk perception which has improved their health seeking behaviours, especially if they had engaged in unsafe sex. This possibly also due to the fact that the longer they stay at their posts daily, the higher the probability of outreach workers meeting them and providing information on sexual and reproductive health.

Brothel-based FSWs were also more likely to have been exposed to HIV-preventive information/services compared to non-brothel based FSWs. This could be as a result of the organized settings from which brothel-based FSWs operate from, which makes it easier for outreach workers or non-governmental organizations to reach. As reported by WHO, 2005, it could also be as a result of the harassment of outreach service providers by law enforcement authorities which may reduce sex workers' (especially non-brothel based) access or exposure to prevention information/services.

LIMITATIONS OF THE STUDY

Due to the sensitive nature of this study, the information received from the participants may not be accurate. This cannot be easily ignored because it is uncultured for women to talk freely about their sex life in the open. In addition, the respondents may choose to report what the interviewer considers to be right lifestyle even if they do not practice such. Samples used for the study were obtained from nine states of the country which may not be representative of the general population. This breaches the external validity of conclusion.

CONCLUSION AND RECOMMENDATION

The study found the main factors that influence exposure to HIV-preventive information/services to be type of sex worker, age of sex work, education and number of clients per week. This suggests that HIV-preventive information/services exposure still needs more attention on the part of the respondents, gate keepers, the government and the community at large. Exposure to preventive information was also associated with brothel-based sex workers, time spent in sex work, number of clients per week and drug use.

To improve the exposure rates to preventive information/services, there is need for more strategies to reach out to female sex workers especially the non-brothel based. This can be made possible by:

1. Creating awareness on preventive services and benefits which includes improving the quality of life
2. Develop educational materials and resources for sex workers on their legal rights and on how to prevent, reduce and respond to violence and make advocacies to promote the human rights of sex workers.
3. Organize workshops with law enforcement authorities to stop harassment and interference in outreach programmes.
4. Mobile outreach programmes should be established to encourage female sex workers to improve their health seeking behaviours.

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LIST OF TABLES

ACRONYMS

ACE-I Angiotensin Converting Enzyme Inhibitors

ADA: American Diabetes Association

DM: Diabetes mellitus

ARBs: Angiotensin Receptor Blockers

GDM: Gestational Diabetes Mellitus

IDDM: Insulin-Dependent Diabetes Mellitus

IDF: International Diabetes Foundation

LADA: Latent Autoimmune Diabetes of Adults

NCD: Non Communicable Disease

NIDDM: Non Insulin-Dependent Diabetes Mellitus

WHO: World Health Organization

CHAPTER ONE

INTRODUTION

1.0 Background

The number of diabetic cases worldwide has increase significantly in the last decade and it is the fifth leading cause of death worldwide (Wild et al., 2004). It has been noted that one in twenty adult deaths in developing countries is diabetic related (Gojka et al., 2005). The World Health Organisation in 2010 reported an incidence rate of 300 million people with diabetes in the world and is projected to increase to 366 million by 2030. There is an increase in the incidence of Diabetes Mellitus in the African population. In 2006, International Diabetes Federation estimates that over 5 million people suffer from diabetes in Africa and the number is expected to increase to 15 million by 2025. Oguntola in 2011 submitted that the Africa region experience the incidence rate of 3.8 per cent of diabetes mellitus which amount to a total of 13.1 million people. Diabetes has been increasing steadily in Nigeria over the past three decades. In 2008, Nigeria had an incidence rate of over 12 million diabetic patients (PRB, 2008), while the incidence rate was 4.7 per cent of the population in 2011 (Oguntola, 2011). The prevalence in Nigeria varies from 0.65% in rural Mangu to 11% in urban Lagos (Akinkugbe, 1997). In absolute terms, Nigeria has the largest number of people with diabetes in Africa and it is one of the countries with the highest mortality rate due to diabetes (IDF, 2011).

Diabetes is a metabolic disorder of multiple aetiologies characterized by chronic hyper-glycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion or insulin action or both. Diabetes causes diseases in many organs, the severity of which may be related to how long the disease has been present and how well it has been controlled (IDF, 2011). The effects of diabetes mellitus include long-term damage, dysfunction, and failure of various organs. Diabetes is a major public health problem as it causes considerable amount of other medical comorbidities, disabilities, premature mortality as well as demands on health care facilities. It could also cause cascading other medical complications. Among its acute complications are diabetic ketoacidosis, hyper-osmolar non-ketotic coma and hypoglycaemia (Gupta, 2003). Chronic complications include macro-vascular and microvascular diseases. The macro-vascular diseases are cardiovascular disease, cerebrovascular disease and peripheral vascular disease. The microvascular diseases are diabetic retinopathy, nephropathy and neuropathy. Diabetic patients are at risk of ischemic heart disease, cardiomyopathy and heart failure (Chiasson et al., 1998).

Perceived risk, an integral factor in the decision to adopt preventive behaviours, is part of an individual's beliefs or "mental model" which, in turn, may be based in part on misconceptions and not necessarily scientific evidence. An individual's perceived risk with regard to a specific health condition, such as diabetes, is based upon a multitude of factors including individual health beliefs, past experiences, culture, and interactions with healthcare professionals. Adoption of health-protective behaviours, such as diabetes self-management, has been associated with recognition of significant health risk (DPPRG, 2000). An accurate perception of one's risk for, or susceptibility to, a condition is necessary to motivate one to take protective action (Hivert et al., 2009).

Inadequate awareness on diabetes symptoms and their risk factors may also limit access to health care. Many researches have shown that healthier lifestyles leading to modest weight loss can prevent diabetes in population at risk, but changing behaviour in real-life patients remains a challenge (DPPRG, 2000). This study evaluated two distinct but intertwined concepts: an individual's assessment of their risk of currently having or developing diabetes, and his or her risk-score determined likelihood of having or developing the disease. Identifying areas with a lack of concordance between actual and perceived risk may help improve health promotion by enabling educational efforts to focus on areas with less concordance. Improving identification and subsequent care for these conditions in the population may help decrease health challenges arising from diabetes.

1.1 PROBLEM STATEMENT

The World Health Organisation in 2010 reported an incidence rate of 300 million people with diabetes in the world and is projected to increase to 366 million by 2030. The prevalence is increasing rapidly, partly through case ascertainment and diagnostic criteria, but mainly through lifestyle changes in developing countries like Nigeria (King et al., 1998). Diabetes is also associated with an increased risk of premature death due to cardiovascular disease, stroke, and renal diseases (Genuth 1995). Diabetes causes diseases in many organs, the severity of which may be related to how long the disease has been present and how well it has been controlled. An individual's perceived risk with regard to a specific health condition, such as diabetes, is based upon a multitude of factors including individual health beliefs, past experiences, culture, and interactions with healthcare professionals. An accurate perception of one's risk for, or susceptibility to diabetes is necessary to motivate one to take protective

action. A lack of awareness regarding diabetes symptoms and their risk factors may also limit access to health care (Olaitan, 2012).

1.2 JUSTIFICATION

The global health burden of diabetes is of epidemic proportions with the worldwide prevalence projected to reach 366 million in 2030 (WHO, 2010). Diabetes has emerged as a major medical and public health issue worldwide and is important risk factors for coronary artery disease, heart failure, and cerebrovascular disease. Data on diabetes risk perception among adults in Ibadan North Local Government Area of Oyo State are very limited. Risk perception is a major component of most health behaviour theories. An individual's perceived risk with regard to a specific health condition, such as diabetes, is based upon a multitude of factors including individual health beliefs, past experiences, culture, and interactions with healthcare professionals. An accurate perception of one's risk for, or susceptibility to, diabetes is necessary to motivate one to take protective action. Many researches have shown that healthier lifestyles leading to modest weight loss can prevent diabetes in population at risk, but changing behaviour in real-life patients remains a challenge. Adoption of health-protective behaviours, such as diabetes self-management, is also associated with recognition of significant health risk (Knowler, et al., 2002). These data is an invaluable resource for advocacy, program evaluation, planning resource allocation, and improving health care services thus reduction in the diabetes incidence.

1.3 OBJECTIVE

Broad objective

The main objective of this study was to determine diabetes risk perception among adults in Ibadan North local government area of Oyo State.

Specific objective

The objectives are to:

1. Assess knowledge of diabetes and its causes among adults in the local government.
2. Determine the prevalence of known risk factors of diabetes among adults in the local government.
3. Determine the factors affecting diabetes risk perception.

1.4 RESEARCH QUESTIONS

1. What is the level of knowledge of diabetes and its causes among adults in the local government?
2. What is diabetes self-risk perception of adults in Ibadan North local government?
3. What is the prevalence of known risk factors of diabetes among adults in the local government?
4. What factors affect diabetes risk perception?

CHAPTER TWO

LITERATURE REVIEW

2.0 WHAT IS DIABETES MELLITUS

Diabetes mellitus also known as simply ***diabetes***, is a group of metabolic diseases in which there are high blood sugar levels over a prolonged period. This high blood sugar produces the symptoms of frequent urination, increased thirst, and increased hunger. Untreated, diabetes can cause many complications. Acute complications include diabetic ketoacidosis and non ketotic hyperosmolar coma. Serious long-term complications include heart disease, stroke, kidney failure, foot ulcers and damage to the eyes (WHO, 2013).

Diabetes is due to either the pancreas not producing enough insulin, or the cells of the body not responding properly to the insulin produced (WHO, 2014).

2.1 TYPES OF DIABETES MELLITUS

There are three main types of diabetes mellitus:

i. Type 1 diabetes mellitus results from the body's failure to produce enough insulin. This form was previously referred to as "insulin-dependent diabetes mellitus" (IDDM) or "juvenile diabetes". The cause is unknown.

ii. Type 2 diabetes mellitus begins with insulin resistance, a condition in which cells fail to respond to insulin properly. As the disease progresses a lack of insulin may also develop. This form was previously referred to as non insulin-dependent diabetes mellitus (NIDDM) or "adult-onset diabetes". The primary cause is excessive body weight and not enough exercise.

iii. Gestational diabetes, is the third main form and occurs when pregnant women without a previous history of diabetes develop a high blood glucose level (WHO, 2013).

Globally, as of 2013, an estimated 382 million people have diabetes worldwide, with type 2 diabetes making up about 90% of the cases. This is equal to 8.3% of the adults population, with equal rates in both women and men. Worldwide in 2012 and 2013 diabetes resulted in 1.5 to 5.1 million deaths per year, making it the 8th leading cause of death. Diabetes overall at least doubles the risk of death. The number of people with diabetes is expected to rise to 592

million by 2035. The economic costs of diabetes globally was estimated in 2013 at $548 billion and in the United States in 2012 $245 billion (IDF, 2013).

Prevention and treatment involves a healthy diet, physical exercise, not using tobacco, and being a normal body weight. Blood pressure control and proper foot care are also important for people with the disease. Type 1 diabetes must be managed with insulin injections. Type 2 diabetes may be treated with medications with or without insulin. Insulin and some oral medications can cause low blood sugar. Weight loss surgery in those with obesity is an effective measure in those with type 2 diabetes mellitus (Picot, 2009) Gestational diabetes usually resolves after the birth of the baby.

2.2 SIGNS AND SYMPTOMS OF DIABETES MELLITUS

The classic symptoms of untreated diabetes are weight loss, polyuria (frequent urination), polydipsia (increased thirst), and polyphagia (increased hunger). Symptoms may develop rapidly (weeks or months) in type 1 diabetes, while they usually develop much more slowly and may be subtle or absent in type 2 diabetes.

Several other signs and symptoms can mark the onset of diabetes, although they are not specific to the disease. In addition to the when known ones above, they include blurry vision, headache, fatigue, slow healing of cuts, and itchy skin. Prolonged high blood glucose can cause glucose absorption in the lens of the eye, which leads to changes in its shape, resulting in vision changes. A number of skin rashes that can occur in diabetes are collectively known as diabetic dermadromes (Cooke and Plotnick, 2008).

2.3 CAUSES OF DIABETES MELLITUS

Type 1

Type 1 diabetes mellitus is characterized by loss of the insulin-producing beta cells of the islets of Langerhans in the pancreas, leading to insulin deficiency. This type can be further classified as immune-mediated or idiopathic. The majority of type 1 diabetes is of the immune-mediated nature, in which a T-cell-mediated autoimmune attack leads to the loss of beta cells and thus insulin. It causes approximately 10% of diabetes mellitus cases in North America and Europe. Most affected people are otherwise healthy and of a healthy weight

when onset occurs. Sensitivity and responsiveness to insulin are usually normal, especially in the early stages. Type 1 diabetes can affect children or adults, but was traditionally termed "juvenile diabetes" because a majority of these diabetes cases were in children (Chiolero et al., 2013).

"Brittle" diabetes, also known as unstable diabetes or labile diabetes, is a term that was traditionally used to describe the dramatic and recurrent swings in glucose levels, often occurring for no apparent reason in insulin-dependent diabetes. This term, however, has no biologic basis and should not be used. Still, type 1 diabetes can be accompanied by irregular and unpredictable hyperglycemia, frequently with ketosis, and sometimes with serious hypoglycemia. Other complications include an impaired counter regulatory response to hypoglycemia, infection, gastroparesis (which leads to erratic absorption of dietary carbohydrates), and endocrinopathies (e.g., Addison's disease). These phenomena are believed to occur no more frequently than in 1% to 2% of persons with type 1 diabetes.

Type 1 diabetes is partly inherited, with multiple genes, including certain HLA genotypes, known to influence the risk of diabetes. In genetically susceptible people, the onset of diabetes can be triggered by one or more environmental factors, such as a viral infection or diet. There are some evidence that suggests an association between type 1 diabetes and Coxsackie B4 virus (Dorner, 1977). Unlike type 2 diabetes, the onset of type 1 diabetes is unrelated to lifestyle.

Type 2

Type 2 diabetes mellitus is characterized by insulin resistance, which may be combined with relatively reduced insulin secretion. The defective responsiveness of body tissues to insulin is believed to involve the insulin receptor. However, the specific defects are not known. Diabetes mellitus cases due to a known defect are classified separately. Type 2 diabetes is the most common type.

In the early stage of type 2, the predominant abnormality is reduced insulin sensitivity. At this stage, hyperglycemia can be reversed by a variety of measures and medications that improve insulin sensitivity or reduce glucose production by the liver.

Type 2 diabetes is due primarily to lifestyle factors and genetics. A number of lifestyle factors are known to be important to the development of type 2 diabetes, including obesity (defined by a body mass index of greater than thirty), lack of physical activity, poor diet, stress, and urbanization. Excess body fat is associated with 30% of cases

in those of Chinese and Japanese descent, 60-80% of cases in those of European and African descent, and 100% of Pima Indians and Pacific Islanders. Those who are not obese often have a high waist–hip ratio.

Dietary factors also influence the risk of developing type 2 diabetes. Consumption of sugar-sweetened drinks in excess is associated with an increased risk. The type of fats in the diet is also important, with saturated fats and trans fatty acids increasing the risk and polyunsaturated and monounsaturated fat decreasing the risk. Eating lots of white rice appears to also play a role in increasing risk. A lack of exercise is believed to cause 7% of cases (Malik et al., 2010).

2.4 GESTATIONAL DIABETES

Gestational diabetes mellitus (GDM) resembles type 2 diabetes in several respects, involving a combination of relatively inadequate insulin secretion and responsiveness. It occurs in about 2-10% of all pregnancies and may improve or disappear after delivery. However, after pregnancy approximately 5-10% of women with gestational diabetes are found to have diabetes mellitus, most commonly type 2. Gestational diabetes is fully treatable, but requires careful medical supervision throughout the pregnancy. Management may include dietary changes, blood glucose monitoring, and in some cases insulin may be required (Hu et al., 2001).

Though it may be transient, untreated gestational diabetes can damage the health of the fetus or mother. Risks to the baby include macrosomia (high birth weight), congenital cardiac and central nervous system anomalies, and skeletal muscle malformations. Increased fetal insulin may inhibit fetal surfactant production and cause respiratory distress syndrome. Hyperbilirubinemia may result from red blood cell destruction. In severe cases, perinatal death may occur, most commonly as a result of poor placental perfusion due to vascular impairment. Labor induction may be indicated with decreased placental function. A Caesarean section may be performed if there is marked fetal distress or an increased risk of injury associated with macrosomia, such as shoulder dystocia (NDIC, 2011).

2.5 OTHER TYPES

Prediabetes indicates a condition that occurs when a person's blood glucose levels are higher than normal but not high enough for a diagnosis of type 2 diabetes mellitus. Many people destined to develop type 2 diabetes mellitus spend many years in a state of prediabetes.

Latent autoimmune diabetes of adults (LADA) is a condition in which type 1 diabetes mellitus develops in adults. Adults with LADA are frequently initially misdiagnosed as having type 2 diabetes mellitus, based on age rather than etiology (Leonid, 2009).

Some cases of diabetes are caused by the body's tissue receptors not responding to insulin (even when insulin levels are normal, which is what separates it from type 2 diabetes); this form is very uncommon. Genetic mutations (autosomal or mitochondrial) can lead to defects in beta cell function. Abnormal insulin action may also have been genetically determined in some cases. Any disease that causes extensive damage to the pancreas may lead to diabetes (for example, chronic pancreatitis and cystic fibrosis). Diseases associated with excessive secretion of insulin-antagonistic hormones can cause diabetes (which is typically resolved once the hormone excess is removed). Many drugs impair insulin secretion and some toxins damage pancreatic beta cells. The ICD-10 (1992) diagnostic entity, *malnutrition-related diabetes mellitus* (MRDM or MMDM, ICD-10 code E12), was deprecated by the World Health Organization when the current taxonomy was introduced in 1999.

Other forms of diabetes mellitus include congenital diabetes, which is due to genetic defects of insulin secretion, cystic fibrosis-related diabetes, steroid diabetes induced by high doses of glucocorticoids, and several forms of monogenic diabetes (Leonid, 2009).

2.6 PATHOPHYSIOLOGY

Insulin is the principal hormone that regulates the uptake of glucose from the blood into most cells of the body, especially liver, muscle, and adipose tissue. Therefore, deficiency of insulin or the insensitivity of its receptors plays a central role in all forms of diabetes mellitus.

The body obtains glucose from three main places: the intestinal absorption of food, the breakdown of glycogen, the storage form of glucose found in the liver, and gluconeogenesis, the generation of glucose from non-carbohydrate substrates in the body. Insulin plays a critical role in balancing glucose levels in the body. Insulin can inhibit the breakdown

of glycogen or the process of gluconeogenesis, it can stimulate the transport of glucose into fat and muscle cells, and it can stimulate the storage of glucose in the form of glycogen.

Insulin is released into the blood by beta cells (β-cells), found in the islets of Langerhans in the pancreas, in response to rising levels of blood glucose, typically after eating. Insulin is used by about two-thirds of the body's cells to absorb glucose from the blood for use as fuel, for conversion to other needed molecules, or for storage. Lower glucose levels result in decreased insulin release from the beta cellsand in the breakdown of glycogen to glucose. This process is mainly controlled by the hormone glucagon, which acts in the opposite manner to insulin.

If the amount of insulin available is insufficient, if cells respond poorly to the effects of insulin (insulin insensitivity or insulin resistance), or if the insulin itself is defective, then glucose will not be absorbed properly by the body cells that require it, and it will not be stored appropriately in the liver and muscles. The net effect is persistently high levels of blood glucose, poor protein synthesis, and other metabolic derangements, such as acidosis.

When the glucose concentration in the blood remains high over time, the kidneys will reach a threshold of reabsorption, and glucose will be excreted in the urine(glycosuria). This increases the osmotic pressure of the urine and inhibits reabsorption of water by the kidney, resulting in increased urine production (polyuria) and increased fluid loss. Lost blood volume will be replaced osmotically from water held in body cells and other body compartments, causing dehydration and increased thirst (polydipsia) (Shoback, 2011).

2.7 DIAGNOSIS

Diabetes mellitus is characterized by recurrent or persistent hyperglycemia, and is diagnosed by demonstrating any one of the following:

i. Fasting plasma glucose level ≥ 7.0 mmol/l (126 mg/dl)

ii. Plasma glucose ≥ 11.1 mmol/l (200 mg/dL) two hours after a 75 g oral glucose load as in a glucose tolerance test

iii. Symptoms of hyperglycemia and casual plasma glucose ≥ 11.1 mmol/l (200 mg/dl)

iv. Glycated hemoglobin (Hb A1C) ≥ 6.5%.

A positive result, in the absence of unequivocal hyperglycemia, should be confirmed by a repeat of any of the above methods on a different day. It is preferable to measure a fasting glucose level because of the ease of measurement and the considerable time commitment of formal glucose tolerance testing, which takes two hours to complete and offers no prognostic advantage over the fasting test. According to the current definition, two fasting glucose measurements above 126 mg/dl (7.0 mmol/l) is considered diagnostic for diabetes mellitus.

Per the World Health Organization people with fasting glucose levels from 6.1 to 6.9 mmol/l (110 to 125 mg/dl) are considered to have impaired fasting glucose. People with plasma glucose at or above 7.8 mmol/L (140 mg/dL), but not over 11.1 mmol/L (200 mg/dL), two hours after a 75 g oral glucose load are considered to have impaired glucose tolerance. Of these two prediabetic states, the latter in particular is a major risk factor for progression to full-blown diabetes mellitus, as well as cardiovascular disease. The American Diabetes Association since 2003 uses a slightly different range for impaired fasting glucose of 5.6 to 6.9 mmol/l (100 to 125 mg/dl) (ADA, 2008).

Glycated hemoglobin is better than fasting glucose for determining risks of cardiovascular disease and death from any cause.

The rare disease diabetes insipidus has similar symptoms to diabetes mellitus, but without disturbances in the sugar metabolism (*insipidus* means "without taste" in Latin) and does not involve the same disease mechanisms (WHO, 2006).

2.8 PREVENTION

There is no known preventive measure for type 1 diabetes. Type 2 diabetes can often be prevented by a person being anormal body weight, physical exercise, and following a healthy diet. Dietary changes known to be effective in helping to prevent diabetes include a diet rich in whole grains and fiber, and choosing good fats, such as polyunsaturated fats found in nuts, vegetable oils, and fish (Hiltunen, 1999). Limiting sugary beverages and eating less red meat and other sources of saturated fat can also help in the prevention of diabetes. Active smoking is also associated with an increased risk of diabetes, so smoking cessation can be an important preventive measure as well (DPPRG, 2000).

2.9 MANAGEMENT

Diabetes mellitus is a chronic disease, for which there is no known cure except in very specific situations. Management concentrates on keeping blood sugar levels as close to normal ("euglycemia") as possible, without causing hypoglycemia. This can usually be accomplished with diet, exercise, and use of appropriate medications (insulin in the case of type 1 diabetes; oral medications, as well as possibly insulin, in type 2 diabetes) (NHBPEP, 2011).

Learning about the disease and actively participating in the treatment is vital for people with diabetes, since the complications of diabetes are far less common and less severe in people who have well-managed blood sugar levels. The goal of treatment is an HbA1C level of 6.5%, but should not be lower than that, and may be set higher. Attention is also paid to other health problems that may accelerate the deleterious effects of diabetes. These include smoking, elevated cholesterol levels, obesity, high blood pressure, and lack of regular exercise. Specialised footwear is widely used to reduce the risk of ulceration, or re-ulceration, in at-risk diabetic feet. Evidence for the efficacy of this remains equivocal, however (NHBPEP, 2011).

2.10 LIFESTYLE

People with diabetes can benefit from education about the disease and treatment, good nutrition to achieve a normal body weight, and sensible exercise, with the goal of keeping both short-term and long-term blood glucose levels within acceptable bounds. In addition, given the associated higher risks of cardiovascular disease, lifestyle modifications are recommended to control blood pressure (Hiltunen, 1999).

2.11 MEDICATIONS

Metformin is generally recommended as a first line treatment for type 2 diabetes, as there is good evidence that it decreases mortality.Routine use of aspirin, however, has not been found to improve outcomes in uncomplicated diabetes. Angiotensin converting enzyme inhibitors (ACEIs) improve outcomes in those with diabetes mellitus while the similar medications angiotensin receptor blockers (ARBs) do not (ADA, 2008).

Type 1 diabetes is typically treated with a combination of regular and NPH insulin, or synthetic insulin analogs. When insulin is used in type 2 diabetes, a long-acting formulation is usually added initially, while continuing oral medications. Doses of insulin are then increased to effect. In those with diabetes some recommend levels blood pressure levels below 120/80 mmHg; however, evidence only supports less than or equal to somewhere between 140/90 mmHg to 160/100 mmHg (ADA, 2008).

2.12 PANCREATIC TRANSPLANTATION

A pancreas transplant is occasionally considered for people with type 1 diabetes who have severe complications of their disease, including end stage renal disease requiring kidney transplantation (ADA, 2008).

2.13 SUPPORT

In countries using a general practitioner system, such as the United Kingdom, care may take place mainly outside hospitals, with hospital-based specialist care used only in case of complications, difficult blood sugar control, or research projects. In other circumstances, general practitioners and specialists share care in a team approach. Home telehealth support can be an effective management technique.

As at 2013, 382 million people have diabetes worldwide. Type 2 makes up about 90% of the cases. This is equal to 8.3% of the adult population with equal rates in both women and men.

In 2012 it resulted in 1.5 million deaths worldwide making it the 8th leading cause of death. More than 80% of diabetic deaths occurring in low and middle-income countries.

Its rate has increased, and by 2030, this number is estimated to almost double. Diabetes mellitus occurs throughout the world, but is more common (especially type 2) in more developed countries. The greatest increase in rates is, however, expected to occur in Asia and Africa, where most people with diabetes will probably be found by 2030. The increase in rates in developing countries follows the trend of urbanization and lifestyle changes, perhaps most importantly a "Western-style" diet. This has suggested an environmental (i.e., dietary) effect, but there is little understanding of the mechanism(s) at present, though there is much speculation, some of it most compellingly presented (Wild et al., 2004).

2.14 HISTORY

Diabetes was one of the first diseases described, with an Egyptian manuscript from c. 1500 BCE mentioning "too great emptying of the urine". The first described cases are believed to be of type 1 diabetes. Indian physicians around the same time identified the disease and classified it as *madhumeha* or "honey urine", noting the urine would attract ants. The term "diabetes" or "to pass through" was first used in 230 BCE by the Greek Appollonius of Memphis. The disease was considered rare during the time of the Roman empire, with Galencommenting he had only seen two cases during his career (Leonid, 2009). This is possibly due the diet and life-style of the ancient people, or because the clinical symptoms were observed during the advanced stage of the disease. Galen named the disease "diarrhea of the urine" (diarrhea urinosa). The earliest surviving work with a detailed reference to diabetes is that of Aretaeus of Cappadocia (2nd or early 3rd century CE). He described the symptoms and the course of the disease, which he attributed to the moisture and coldness, reflecting the beliefs of the "Pneumatic School". He hypothesized a correlation of diabetes with other diseases and he discussed differential diagnosis from the snakebite which also provokes excessive thirst. His work remained unknown in the West until the middle of the 16th century when, in 1552, the first Latin edition was published in Venice (Laious, 2012).

Type 1 and type 2 diabetes were identified as separate conditions for the first time by the Indian physicians Sushruta and Charaka in 400-500 CE with type 1 associated with youth and type 2 with being overweight. The term "mellitus" or "from honey" was added by the Briton John Rolle in the late 1700s to separate the condition from diabetes insipidus, which is also associated with frequent urination. Effective treatment was not developed until the early part of the 20th century, when Canadians Frederick Banting and Charles Herbert Best isolated and purified insulin in 1921 and 1922. This was followed by the development of the long-acting insulin NPH in the 1940s (Leonid, 2009).

2.15 ETYMOLOGY

The word *diabetes* comes from Latin *diabētēs*, which in turn comes from Ancient Greek (*diabētēs*) which literally means "a passer through; a siphon." Ancient

Greek physician Aretaeus of Cappadocia(fl. 1st century CE) used that word, with the intended meaning "excessive discharge of urine", as the name for the disease. Ultimately, the word comes from Greek (*diabainein*), meaning "to pass through," which is composed of (*dia-*), meaning "through" and (*bainein*), meaning "to go". The word "diabetes" is first recorded in English, in the form *diabete*, in a medical text written around 1425 (Dallas, 2011).

The word *mellitus* comes from the classical Latin word *mellītus*, meaning "mellite"[1] (i.e. sweetened with honey, honey-sweet). The Latin word comes from *mell-*, which comes from *mel*, meaning "honey"; sweetness; pleasant thing, and the suffix *-ītus*, whose meaning is the same as that of the English suffix "-ite". It was Thomas Willis who in 1675 added "mellitus" to the word "diabetes" as a designation for the disease, when he noticed the urine of a diabetic had a sweet taste (glycosuria). This sweet taste had been noticed in urine by the ancient Greeks, Chinese, Egyptians, Indians, and Persians (Laios et al., 2012).

2.16 ASSOCIATED FACTORS FOR DIABETES

Rapid demographic and nutritional changes with increased life expectancy and more elderly population is occuring globally. Most importantly, globalization of diets and consumption of non-traditional fast foods is taking place at a very rapid pace especially in urban areas (Yeni-Komshian et al., 2000). A progression of these transitions and changes in populations of many countries is resulting in high prevalence of non-communicable diseases such as diabetes. In developing countries such as Nigeria, rapid increase in western fast food outlets and increased consumption of fried snacks is taking place (Gupta et al., 2003). Furthermore, migration from villages to cities is increasing in these countries resulting in nutritional imbalance, physical inactivity, stress, and increased consumption of alcohol and tobacco (Misra et al., 2001).

It is important to remember that modifiable risk factors such as overweight and obesity, sedentary lifestyle, unhealthy diet, glucose intolerance, alcohol consumption, and tobacco smoking can be targeted for prevention of disease, and by controlling these risk factors through population based prevention programs we can reduce the disease burden (Alberti et al., 2007).

a) Socio-demographic Factors

These include factors such as age, sex, family history of type 2 diabetes, genetic predisposition, history of gestational diabetes, and ethnicity etc. All of these belong to the non-modifiable risk factors for type 2 diabetes but are mentioned here because they are important. The risk of type 2 diabetes increases markedly with age and unfortunately the age of onset of type 2 diabetes has steadily decreased down into younger adults and even adolescents in recent decades (Alberti et al., 2007).

b) **Overweight and Obesity**

Obesity has been identified as the single most important risk factor for Type 2 diabetes. The WHO estimates that there are currently 1.1 billion people who are overweight with estimations of over 1.5 billion by 2015. Longitudinal studies have shown obesity to be a powerful predictor for type 2 diabetes (WHO, 2006). This is further strenghten by the fact that interventions aimed at reducing obesity also reduce the incidence of Type 2 diabetes (Picot et al., 2009).

c) Nutritional transition

Work pattern is changing from heavy labour to sedentary due to increase in computerization and mechanization, and improved transport have made an impact on human health (Yeni-Komshian et. Al., 2000). These sedentary changes along with easy access to fast foods and empty calories have resulted in increased rates of obesity and type 2 diabetes globally. Although it is difficult to collect accurate dietary data, epidemiological studies indicate that a high calorie and low dietary fibre intake with a high glycaemic load and low polyunsaturated to saturated fat ratio contribute towards developing chronic diseases such as type 2 diabetes. Thus diet is a crucial aspect of lifestyle changes (Zimmet et al., 2001).

d) Physical Activity and Sedentary Lifestyle

Physical activity has decreased over recent decades in many populations, and this is a major contributor to the current global rise of obesity. Physical inactivity has been found to be an independent predictor of Type 2 diabetes in both cross-sectional and longitudinal studies (Alberti et al., 2007).

Increasing sedentary lifestyle is attributed to increased mechanization at workplaces and in household work. Leisure-time activities have also shifted from outdoor play to indoor entertainment such as television and computer games (Hu et al., 2001). Previously adolescents playing outdoor games regularly and doing household activities had lower prevalence of been overweight, compared to 3 times higher in those not participating in

outdoor games. Even for equivalent degrees of obesity, more physically active subjects have a lower incidence of diabetes (Laxmaiah et al., 2007).

2.17 DIABETES RISK PERCEPTION

Increasing the awareness of the people about the diabetes risk factors and the need for modest lifestyle changes or pharmacologic interventions can reduce the risk of progression from pre-diabetes to diabetes or increase the regression to normoglycemia (Omobuwa and Alebiosu, 2014). Modest lifestyle changes remain a significant challenge though diabetes can be delayed or prevented through it (DPPRG, 2000).

Adaptation to a healthier lifestyle requires the implementation of behavioral changes such as diet modification, increase physical exercise and promotion of weight loss (Pan et al., 1997). Perceived risk, an integral factor in the decision to adopt preventive behaviors, is part of an individual's beliefs or "mental model" which, in turn, may be based in part on misconceptions and not necessarily scientific evidence. An individual's perceived risk with regard to a specific health condition, such as diabetes, is based upon a multitude of factors including individual health beliefs, past experiences, culture, and interactions with healthcare professionals (DPPRG, 2000).

Healthcare professionals can also impact significantly on an individual's diabetes perceived risk. It is essential that professionals who educate on diabetes prevention strategies should be familiar with the gaps of knowledge that exist in the society. The enormous burden of diabetes management and its associated complications and disorders has placed diabetes prevention as a major therapeutic priority in high-risk individuals (Raimi et al., 2014).

A poorly controlled diabetes may lead to lifelong complications, which are generally associated with increased morbidity and mortality. For instance, poorly controlled diabetes can cause damage to eyes (leading to blindness), kidneys (leading to renal failure), and nerves (leading to impotence and foot disorders/ possibly amputation) as well as increased risk of heart disease, stroke, and poor blood supply to the limbs. Most of these complications are not only irreversible, but they are also costly to manage as they generally require management in specialized centers with sophisticated infrastructure and equipment, well trained staff and potent medications.

Since managing these complication is costly, community education become a central component in the prevention and control of this disease. Such education lead to diet

modification, increased physical exercise and lifestyle changes including the promotion of weight loss. These educational programs should help people assess their risks of diabetes, motivate them to seek proper treatment and care and inspire them to take charge of their disease (Raimi et al., 2014).

The importance of educational programs in the prevention and control of diabetes in the community cannot be over emphasis as it helps to increase the knowledge of the people on the disease (Olaitan, 2012).

CHAPTER THREE

METHODOLOGY

3.1 STUDY AREA

Ibadan North is one of the thirty three Local Government Areas in Oyo state which was created in 1991 with its Head Quarters at Agodi-Gate where the office of the Executive Governor of the Oyo state Government is located.It is located approximately on longitude 8° 5' East of the Greenwich meridian and latitude 7° 23' North of the equator.It is bounded in the West by Ido and Ibadan North-West Local Governments, bounded in the East by Lagelu, Egbeda and Ibadan South East Local Governments respectively and also bounded in the North by Akinyele Local Government Area. It is located at the heart of the city Ibadan, with a land mass of about 420KM^2 and made up of twelve political wards having an approximated area population of 856,988 according to the 2006 population census (NPC, 2008).

Ibadan North Local Government Area consist of multi-ethnic nationalities, predominantly dominated by the Yorubas, then the Igbos, Edos, Urhobos, Itsekiris, Ijaws, Ibibios, Hausas, Fulanis and foreigners from Europe, Asia, and other parts of the world. The inhabitants are mostly traders (majority of women), university and polytechnic lecturers, civil servants of the Government who work at both the State and Federal Secretariats, out of school teenagers/adolescents and students.

Also, it accommodates important and highly placed educational institutions including the University College Hospital (College of Medicine), the University of Ibadan, The Polytechnic Ibadan, several private and public Secondary and Primary schools and hence this puts the area at an advantage with regards to educational facilities. It also houses commercial, Government administration areas and health institutions like the Bodija market, the Oyo State Government House, the State house of Assembly and various health-care facilities notably the University College Hospital (which houses the unit of the President's Emergency Plan for AIDS Relief-PEPFAR in Nigeria) and the Adeoyo Maternity Hospital among others.

According to the Oyo State Independent Electoral Commission (OYSIEC) from 2011-2014, Ibadan North Local Government is delineated into 12 political wards.

Table 3.1: Code names of political wards in Ibadan North Local Government

Ward Number	Ward Code
WARD 1 N2	LG/01/OY
WARD II N3	LG/02/OY
WARD III N4	LG/03/OY
WARD IV N5A	LG/04/OY
WARD IX N6B PART I	LG/09/OY
WARD V N5B	LG/05/OY
WARD VI N6A PART I	LG/06/OY
WARD VII N6A PART II	LG/07/OY
WARD VIII N6A PART III	LG/08/OY
WARD X N6A PART II	LG/10/OY
WARD XI NWA	LG/11/OY
WARD XII NW	LG/12/OY

3.2 STUDY POPULATION

The study focused on adults 18 years and above in Ibadan North local government area of Oyo State.

3.3 STUDY DESIGN

This study was a cross sectional community-based descriptive study.

3.4 SAMPLE SIZE DETERMINATION

The sample size was calculated using Leslie Kish's formular (Kish, 1995)

Where:

$N=(Z\alpha^2Pq)/d^2$

N= minimum sample size

Z=1.96

P= 50% assumed

q=1-p

d=5% level of significant

$N= (1.96)^2(0.5)\ (0.5)/0.05^2$

Design effect = 2

N =384 * 2

N= 768

NR= 10% non-response rate.

$$NR= 10\% = \frac{n}{1-nr} = \frac{768}{1-0.1} = \frac{768}{0.9} = 850$$

3.5 SAMPLING TECHNIQUE

A three-stage sampling technique was used to select respondents for the study as follows:

Stage 1: 5 wards were randomly selected out of the 12 wards using a simple random sample (Balloting).

Stage 2: 25 communities were proportionately selected out of 114 communities in the 5 wards using balloting method.

Stage 3: Questionnaire was administered to 34 adults (18 years and above) in each community.

Table 3.2: Distribution of communities in the wards of Ibadan North Local Government Area

Wards	Number of Communities in the ward	Proportion of communities to be selected from each ward; $\frac{\text{No of communities in the ward x No of communities to be used in the study}}{\text{Total number of communities in the five (5) wards}}$
2	39	$\frac{39\times 25}{114}=9$
3	22	$\frac{22\times 25}{114}=5$
8	20	$\frac{20\times 25}{114}=4$
11	15	$\frac{15\times 25}{114}=3$
12	18	$\frac{18\times 25}{114}=4$
Total	***114**	****25**

* Number of communitiesw in the five (5) wards =114

** Number of communities to be used in the study =25

3.6 INCLUSION CRITERIA.

The criteria were willingness to participate in the study, ability to comprehend relevant information and adults 18 years and above in Ibadan North local government area of Oyo State.

3.7 EXCLUSION CRITERIA

The study excluded persons with impaired mental function who were unable to comprehend relevant information and those not giving informed consent to participate in the study.

3.8 TRAINING OF RESEARCH ASSISTANTS

Four trained research assistants helped in the administration of the questionnaire in the Local Governments. The research assistants were experienced field data collectors and they were trained for two days on data collection for this study.

3.9 PRE-TEST OF SURVEY INSTRUMENT

A pre-test exercise was carried out among adults in Ibadan South West (Ring Road) Local Government area of Oyo State. This is because the local Government shares similar characteristics with Ibadan North Local Government in terms of it being an urban settlement and the possession of developmental structures as it houses the Adeoyo main Hospital (Ring Road State Hospital) among others. A total of 85 adults which makes 10% of the total sample size were interviewed.

The pre-test exercise served as a pilot for the data collection procedures. It helped in the validation of the instrument and determining problems which must be overcome during the main data collection process. The pre-test enabled the researcher to determine the trend in the responses of participants, their level of understanding of the research instruments and the duration of time it will take to administer the instrument.

3.10 DATA COLLECTION

Semi-structured questionnaires were used for data collection. The questionnaire was divided into five (5) sections.

Section A: Socio-demographic characteristic

Section B: Knowledge Evaluation

Section C: General Attitude to diabetes risk

Section D: Risk Perception

Section E: Behavioural Practices

3.11 STUDY VARIABLES

1) Dependent variable: The dependent variable in this study is diabetes risk perception.

2) Independent variables: The independent variables in this study include family history of diabetes, socio-demographic variables, diabetes knowledge and behavioural practices.

3.12 DATA MANAGEMENT AND ANALYSIS.

After administering the questionnaire, manual editing was carried out to ascertain the completeness, consistency and accuracy of information collected. Therefore each answer was immediately cleaned daily before leaving the school and the questionnaire was serially numbered. A coding guide was developed and used for coding the answered questionnaire. Data were fed into the computer using the Statistical Package for Social Sciences (SPSS) software. In order to determine the knowledge and risk perception of diabetes, a scoring mechanism was adopted.

All the 850 questionnaires administered were used for analysis. In respect to analysis, Respondents level of knowledge was graded from their responses, knowledge score of 6 and above were termed to be good, while less than 6 were poor. Diabetes risk perceptions of respondents were assessed by the use of Likert scale. Score of 17 and above was adjudged to be high risk perception while score less than 17 was low risk perception.

Data were analysed using descriptive statistics (such as frequency tables, mean and standard deviation). Chi-square and binary logistic regression tests at 0.05 level of significant.

3.13 ETHICAL CLEARANCE.

1. The study followed the ethical principles guiding the use of human participants in research, which include Respect for persons, Beneficence, Non-maleficence and Justice.

2. Ethical approval for the study was obtained from the Ethical Review Committee of the Ministry of Health, Oyo State.

3. With respect to confidentiality, no identifiers such as name of respondents was required or used during the course of the study.

4. All information provided was kept confidential during and after the research

5. All information was used for the purpose of the research only

CHAPTER FOUR

RESULTS

4.1 SURVEY

Eight hundred and fifty questionnaires were administered and the data collected was analysed. The survey results are arranged and presented as follows: socio-demographic characteristics of respondents; knowledge evaluation of diabetes; risk perception for developing diabetes; risk factors of diabetes; and factors affecting diabetes risk perception.

4.2 SOCIO-DEMOGRAPHIC CHARACTERISTICS

Results from Table 4:1 shows the distribution of age, gender, religion, ethnicity, level of education, occupation, marital status and duration of stay in the community. The total number of respondents studied was 850 adults.

4.2.1 Age and Sex- Distribution

The mean age of the respondents was 33.5 ± 11 years. Respondents within age group 18-25 years were 26.8%, and 34.7% of the total respondents were within 26-35 years. Majority of the respondents were females 66.9%, while 33.1% were males (Table 4:1).

4.2.2 Marital Status and Ethnicity - Distribution

Most of the respondents were married 63.4%, 35.6% were single, while 0.7% were widow/widower. Seven hundred and thirty four (734) of the respondents were Yoruba's, 9.9% were Igbo's, while only 0.2% were Hausa (Table 4:1).

4.2.3 Religion and Occupational Status - Distribution

Most of the respondents were Christians 66.7%, and 32.4% were Muslims. Also, most of them were self-employed (59.3%), Artisan (15.2%), Students (14.2%), Non-government (4.5%), Government employed (3.8%) (Table 4:1).

4.2.4 Level of Education, Duration of Stay in the Community and Family history of Diabetes - Distribution

There were 428 (50.4%) respondents with secondary school education, while 203 (23.9%) have Intermediary/Higher education, Primary school education 104 (12.2%), College 83 (9.8%), No formal education 20 (2.4%) and Post graduate 12 (1.4%). The mean number of years of living in the community was 9.93 ± 9.7 years, with 593 respondents (69.8%) having less than 10 years of duration, while those who had lived more than 10 years in the community were 29.6%. While majority of the respondents don't have family history of diabetes 748 (88%), only 102 (12%) had family history of diabetes (Table 4:1).

Table 4.1a: Respondents by some socio-demography characteristics

Distribution of respondents by some demographic Characteristics (N = 850)		
Variable	**Frequency**	**Percentage (100%)**
Age		
<24	176	20.7
24-34	294	34.6
35-44	248	29.2
45 and above	132	15.5
Sex		
Male	281	33.1
Female	569	66.9
Ethnicity		
Igbo	84	9.9
Yoruba	734	86.4
Hausa	2	0.2
Others	30	3.5
Marital Status		
Single	303	35.6
Married	539	63.4
Widow/Widower	6	0.7
Other	2	0.2
Religion		
Christianity	567	66.6
Islam	275	32.4
Traditional	4	0.5
Others	4	0.5

Table 4.1b: Respondents by some socio-demography characteristics

Variable	Frequency	Percentage (100%)
Level of Education		
No formal schooling	20	2.4
Primary	104	12.2
Secondary	428	50.4
Intermediate or higher	203	23.9
College/University	83	9.8
Postgraduate	12	1.4
Occupation		
Government Employee	32	3.8
Non-Government	38	4.5
Self Employed	504	59.3
Non paid	6	0.7
Artisan	129	15.2
Students	121	14.2
Retired	20	2.4
Duration of stay in this community		
< 5 years	315	37.1
5-9 years	193	22.7
10 years and above	342	40.2
Family history of diabetes		
Yes	102	12.0
No	748	88.0

Mean age of respondents=33.6 ± 11 years

Mean number of years of living in the community= 9.93 ± 9.70

4.3 KNOWLEDGE OF DIABETES AMONG RESPONDENTS

Most of the respondents (94.6%) have heard of diabetes mainly from television (19.9%), newspaper (2.9%), seminars (2.7%), radio (43.9%), or through other medium (30.6%). Factors that contributes to developing diabetes according to the respondents includes obesity (12.3%), decreased physical activity (8.0%), family history of diabetes (15.2%), mental stress (0.7%), consuming more sweet (57.7%), and others (6.1%) (Table 4. 2b). Symptoms attributed to diabetes include of weight loss (31.7%), frequent urination (40.2%), increased hunger (3.6%), increased thirst (15.8%), and others (8.7%). Some respondents (39.6%) said diabetes causes complications in other organ of the body while 77.5% says diabetes is preventable (Table 4.2c).

Most of the respondents 505 (59.4%) were adjudged to have good knowledge, while 345 (40.6%) had poor knowledge (Table 4.3).

Table 4.2a: Respondents knowledge of diabetes

Variable	Yes
Ever heard of diabetes	**804 (94.6%)**
Definition is diabetes	
Caused by eating too much sugary things	46 (5.72%)
Deadly disease	233 (29.0%)
Body sugar level is high	146 (18.2%)
When the infected person urinate till he/she loses weight	93 (11.6%)
It is a curable disease	182 (22.6%)
I don't know/No idea	104 (12.9%)
***Sources of information**	
Television	184 (19.9%)
Newspaper	27 (2.9%)
Seminars	25 (2.7%)
Radio	405 (43.9%)
Others	282 (30.6%)
***Signs and symptom**	
Ants in urine	201 (19.2%)
Continuous/frequent urination	269 (25.7%)
Loss of weight	168 (16.1%)
Stomach upset	30 (2.87%)
Selection of food to be consumed	7 (0.67%)
Unhealed wound	73 (6.98%)
Sweet urine	23 (2.20%)
Too much fat	1 (0.10%)
Weakness of the body	7 (0.67%)
Coughing	8 (0.77%)
Excessive taste	47 (4.49%)
Dizziness	4 (0.38%)
Burning urination	19 (1.82%)
Frequent sickness	7 (0.67%)
Swollen leg	5 (0.48%)
I don't know/I can't remember	177 (16.9%)

Table 4.2b: Respondents knowledge of diabetes

Variable	Yes
***Factors that contribute to developing diabetes**	
Obesity	143 (12.3%)
Decreased physical activity	93 (8.0%)
Family history of diabetes	177 (15.2%)
Mental stress	8 (0.7%)
Consuming more sweet	672 (57.7%)
Others	71 (6.1%)
***Symptoms of diabetes**	
Weight loss	442 (31.7%)
Frequent urination	560 (40.2%)
Increased hunger	50 (3.6%)
Increased thirst	220 (15.8%)
Others	121 (8.7%)

Table 4.2c: Respondents' knowledge of diabetes complication

Variable	Yes	No	Don't know
Complications in other organs of the body	**337 (39.6%)**	**40 (4.7%)**	**473 (55.6%)**
If "yes" what are the complications?			
Malaria/Typhoid	15 (4.45%)		
Swelling in the body	58 (17.2%)		
Unhealed wound	72 (21.4%)		
Malfunctioning of organ	47 (13.9%)		
Affect the sight	26 (7.72%)		
Ill health	46 (13.7%)		
Hypertension	73 (21.7%)		
Preventing diabetes	**659 (77.5%)**	**20 (2.4%)**	**171 (20.1%)**
If yes "how"			
Proper medication	205 (31.1%)		
Avoid sweet/Sugar consumption	198 (30.1%)		
Medical check-up	229 (34.8%)		
Lifestyle modification	27 (4.1%)		

Table 4.3: Respondents level of knowledge

Level of knowledge	Frequency	Percentage
Poor	345	40.6
Good	505	59.4
Total	**850**	**100**

4.4 RISK PERCEPTION FOR DEVELOPING DIABETES

Table 4.4 shows respondents' diabetes self-risk perception. About 57.1% of the respondents agree that they have little control over risk to their health while 2.8% strongly disagree. Similarly, 68.4% of the respondents disagree that there is nothing they can do to prevent having diabetes while 3.5% strongly agree. Also 57.8% of the respondents agree that their personal effort will help control their risk of getting diabetes while 1.4% strongly disagrees. However, 47.8% of the respondents agreed that a person that makes good effort to control their risks of getting diabetes are much less likely to get diabetes while 4.2% strongly disagree. Some of the respondents 4.6% strongly agreed that they worry about getting diabetes while 44.4% disagree. While 58.8% of the respondent disagree that worrying about diabetes is very upsetting.

Table 4.5 shows respondents' diabetes diet risk perception in Ibadan North local government. Majority of the respondents (81.9%) think that eating fruits and vegetables decreases the risk of having diabetes while 1.6% thinks it increases the risk. About 56.6% of the respondents don't know whether having diabetes during pregnancy increases or decreases the risk of having diabetes or not while 4.0% thinks it has no effects on the risk of having diabetes. Some of the respondents (39.2%) think being 65 years of age and above has no effect on risk of having diabetes while 5.1% thinks it decreases the risk of having diabetes. Majority of the respondents (62.1%) think physical activities decreases the risk of having diabetes while 0.9% thinks it increases the risk of having diabetes. Similarly, about 52.4% of respondent thinks that controlling weight gain decreases the risk of having diabetes while 1.6% thinks it increases the risk of having diabetes.

Out of the 850 respondents, majority had high risk perception (n= 571, 67.2%). However, 279 respondents (32.8%) had low risk perception (Table 4.6).

Table 4.4: Respondents' diabetes self-risk perception

Variable	Strongly Agree n (%)	Agree n (%)	Disagree n (%)	Strongly Disagree n (%)
I feel that I have little control over risk to my health	87 (10.2)	485 (57.1)	254 (29.9)	24 (2.8)
If i am going to get diabetes, there is not much I can do about it	30 (3.5)	113 (13.3)	581 (68.4)	126 (14.8)
I think that my personal effort will help control my risk of getting diabetes	230 (27.1)	491 (57.8)	117 (13.8)	12 (1.4)
People who make a good effort to control the risks of getting diabetes are much less likely to get diabetes	150 (17.6)	406 (47.8)	258 (30.4)	36 (4.2)
I worry about getting diabetes	39 (4.6)	303 (35.6)	377 (44.4)	131 (15.4)
Worrying about diabetes is very upsetting	50 (5.9)	265 (31.2)	500 (58.8)	35 (4.1)

Table 4.6: Respondent diabetes risk perception

Risk perception	Frequency	Percent
Low	279	32.8
High	571	67.2
Total	**850**	**100**

4.5 RISK FACTORS FOR DIABETES AMONG RESPONDENTS

About 2.7% of the respondents currently smoke any tobacco product while 97.3% does not smoke tobacco product. Similarly, 18.9% of the respondents took alcohol within the past 30 days. More than 53.3% of the respondents ate fruit for 1-3 days in a week while 42.7% ate fruit for more than 3 days in a week. About 36.1% of respondents ate vegetable for 1-3 days in a week while 61.4% ate vegetable for more than 3 days in a week.

Majority of the respondents (62.6%) do vigorous physical activities for 1-3 days in a week while 37.4% do vigorous physical activities for more than 3 days in a week. Some of the respondents (26.4%) do moderate physical activities for 1-3 days in a week while 73.6% do moderate physical activities for more than 3 days in a week. A small percentage of respondents (16.6%) do light physical activities for 1-3 days in a week while 83.4% do light physical activities for more than 3 days in a week (Table 4.7).

Table 4.8 shows respondents' knowledge and diabetes risk perception. A greater proportion of respondents in the high risk perceived group had good knowledge of diabetes 367 (72.7%). There was a significant association between diabetes knowledge and risk perception ($p<0.05$).

able 4.7a: Known Risk factors for Diabetes among respondents

Variable	Frequency	Percentage
Do you currently smoke any tobacco products		
Yes	23	2.7
No	827	97.3
If yes,how often do you smoke tobacco products		
Daily	19	82.6
Weekly	2	8.7
Occassionally	2	8.7
On average how many of the following do you smoke each day		
Manufactured cigarettes		
1 -3 sticks	13	56.5
More than 3 sticks	10	43.5
Indian hemp		
1 -3 sticks	0	0.0
More than 3 sticks	2	100.0
Local cigarette (taba)		
1 – 3 sticks	2	100.0
Have you drank alcohol within the past 30 days, such as beer, wine or spirit		
Yes	161	18.9
No	689	81.1
In the past 30 days, how frequently have you drank at least a bottle of alcohol		
Daily	23	2.7
Weekly	54	6.4
Occasionally	84	9.9
On average how many bottles do you drink during one day		
1-3 bottles	129	80.1
More than 3 bottles	18	11.2
Don't know	14	8.7
In a typical week, how many days do you eat fruits?		
1-3	453	53.3
More than 3	363	42.7
Don't know	34	4.0
No of servings		
1-3	789	92.8
More than 3	27	3.2
Don't know	34	4.0
Diet (Vegetable)		
1-3	307	36.1
More than 3	522	61.4
Don't know	21	2.5
No of servings		
1-3	824	96.9
More than 3	5	0.6
Don't know	21	2.5

Table 4.7b: Known Risk factors for Diabetes among respondents

Variable	Frequency	Percentage
Physical activity(Vigorous)		
1-3 days in a week	166	62.6
More than 3 in a week	99	37.4
No of minutes		
60 mins or less	168	63.4
61 - 180 mins	59	22.3
More than 180	34	12.8
Don't know	4	1.5
Moderate activities		
1-3 days in a week	204	26.4
More than 3 in a week	569	73.6
No of Minutes		
60 mins or less	528	68.3
61 - 180 mins	174	22.5
More than 180	71	9.2
Light activities		
1-3 days in a week	137	16.6
More than 3 in a week	686	83.4
No of hours		
60 mins or less	695	84.4
61 - 180 mins	108	13.1
More than 180	20	2.4

Table 4.8: Distribution of respondent knowledge by diabetes risk Perception

Knowledge*	Risk Perception			
	High	Low	Chi square	P-value
	n (%)	n (%)		
Poor	204 (59.1)	141 (40.9)	17.049	0.00
Good	367 (72.7)	138 (27.3)		

*Indicates variables with significant associations

4.6 FACTORS AFFECTING DIABETES RISK PERCEPTION

Table 4.9 showed respondents diabetes risk perception and socio demographic characteristics such as sex, age, ethnic group, marital status, level of education, religion, occupation. There was a significant association between diabetes risk perception and sex ($p<0.05$), with the male respondents 205 (73.0%) having high diabetes risk perception than female 366 (64.3%). Similarly, there was a significant association between diabetes risk perception and religion ($p<0.05$), with 375 (66.1%) of the Christian respondents having high diabetes risk perception as compared to Muslim respondents 194 (70.5%) and 2 (50%) respondents that practise traditional religion. There was a significant association between diabetes risk perception and level of education ($p<0.05$), with secondary school certificate holder 264 (61.7%) having high diabetes risk perception. There was also a significant association between diabetes risk perception and occupation ($p<0.05$), with self-employed respondents 313(62.1%) having high diabetes risk perception.

Table 4.9a: Distribution of respondents' characteristics and diabetes risk perception

Variable	Risk Perception			
	High Risk n (%)	Low Risk n (%)	Total n (%)	p-value
Sex*				
Male	205 (73.0)	77 (27.0)	281(100)	0.012
Female	366 (64.3)	203 (35.7)	569(100)	
Age				
<24	107 (60.8)	69 (39.2)	176(100)	0.235
24-34	204 (69.4)	90 (30.6)	294(100)	
35-44	171 (69.0)	77 (31.0)	248(100)	
45 and above	89 (67.4)	43 (32.6)	132(100)	
Ethnic Group				
Yoruba	485 (66.1)	249 (33.9)	734(100)	0.083
Igbo	58 (69.0)	26 (31.0)	84(100)	
Hausa	2 (100)	0 (0.00)	2 (100)	
Others	26 (86.7)	4 (13.3)	30(100)	
Marital Status				
Single	197 (65.0)	106 (35.0)	303(100)	0.154
Married	370 (68.6)	169 (31.4)	539(100)	
Widow/Widower	4 (66.7)	2 (33.3)	6 (100)	
Highest level of education completed*				
No formal Schooling	12 (60.0)	8 (40.0)	20(100)	0.006
Primary school	82 (78.8)	22 (21.2)	104(100)	
Secondary school	264 (61.7)	164 (38.3)	428(100)	
Intermediate / Higher school completed	142 (70.0)	61 (30.0)	203(100)	

Table 4.9b: Distribution of respondents' characteristics and diabetes risk perception

Variable	Risk Perception			
	High Risk n (%)	Low Risk n (%)	Total n (%)	p-value
College /University completed	63 (75.9)	20 (24.1)	83 (100)	
Postgraduate degree and above	8 (66.7)	4 (33.3)	12 (100)	
Religion*				
Christianity	375 (66.1)	192 (33.9)	567(100)	0.015
Islam	194 (70.5)	81 (29.5)	275(100)	
Traditional	2 (50.0)	2 (50.0)	4 (100)	
Others	0 (0.00)	4 (100)	4(100)	
Which of the following best describe your main occupation *				
Government	30 (93.8)	2 (6.2)	32(100)	0.000
Non-government	32 (84.2)	6 (15.8)	38(100)	
Self-employed	313 (62.1)	191 (37.9)	504(100)	
Retired	16 (80.0)	4 (20.0)	20 (100)	
Non-paid	2 (33.3)	4 (66.7)	6(100)	
Artisan	105 (81.4)	24 (18.6)	129(100)	
Student	73 (60.3)	48 (39.7)	121(100)	
Duration of stay in this community				
Less than 5 years	203 (64.4)	112 (35.6)	315 (100)	0.424
5- 9 years	132 (68.4)	61 (31.6)	193 (100)	
10 and above	236 (69.0)	106 (31.0)	342 (100)	
Do you have a family member suffering from diabetes				
Yes	65 (63.7)	37 (36.3)	102(100)	0.429
No	506 (67.6)	242 (32.4)	748(100)	

*Indicates variables with significant associations

Table 4.10 showed respondents diabetes risk perception and lifestyle such as tobacco smoking, alcohol drinking, diets and physical activity. There was a significant association between diabetes risk perception and number of fruits serving ($p<0.05$), with respondents with more than 3 serving (63.6%) having high diabetes risk perception. Similarly, there was a significant association between diabetes risk perception and light physical activities ($p<0.05$), with respondents with light physical activity (69.5%) having high diabetes risk perception.

Table 4.10a: Distribution of respondents' lifestyle and diabetes Risk Perception

Variable	Risk Perception			
	High Risk	Low Risk	Total	P value
	N (%)	N (%)		
Do you currently smoke any tobacco products				
Yes	19 (82.6)	4 (17.4)	23 (100)	0.110
No	552 (66.7)	275 (33.3)	827 (100)	
Have you drank alcohol within the past 30 days, such as beer, wine or spirit				
Yes	117 (72.7)	44 (27.3)	161(100)	0.099
No	454 (65.9)	235 (34.1)	689 (100)	
In a typical week, how many days do you eat fruits?				
1-3	299 (66.0)	154 (34.0)	453 (100)	0.654
More than 3	250 (68.9)	113 (31.1)	363 (100)	
Don't know	22 (64.7)	12 (35.3)	34 (100)	
No of servings*				
1-3	224 (73.0)	83 (27.0)	307 (100)	0.020
More than 3	332 (63.6)	190(36.4)	522 (100)	
Don't know	15 (71.4)	6 (28.6)	21 (100)	
Vigorous Physical activity				
1-3 days in a week	116 (69.9)	50 (30.1)	166 (100)	0.621
More than 3 in a week	72 (72.7)	27 (27.3)	99 (100)	

Table 4.10b: Distribution of respondents' lifestyle and diabetes Risk Perception

Variable	Risk Perception			
	High Risk n (%)	Low Risk n (%)	Total	P value
Moderate Physical activities				
1-3 days in a week	129 (63.2)	75 (36.8)	204 (100)	0.181
More than 3 in a week	389 (68.4)	180 (31.6)	569 (100)	
Light Physical activities*				
1-3 days in a week	77 (56.2)	60 (43.8)	137 (100)	0.002
More than 3 in a week	477 (69.5)	209 (30.5)	686 (100)	

*Indicates variables with significant associations

PREDICTORS OF RISK PERCEPTION FOR DEVELOPING DIABETES.

Respondents practising Islamic religion were more likely to have high risk perception for developing diabetes compare to those practising Christianity religion (OR = 1.477, 95 CI = 1.001-2.091).

Among the occupations, Respondents who were self-employed were 85 less likely to have high risk perception for developing diabetes compare to those who were working in government establishments (0R = 0.151,95 CI = 0.031-0.743). Respondents who were doing non-paid jobs are 93 less likely to have high risk perception for developing diabetes compare to those who were working in government establishments (OR = 0.071, 95 CI = 0.006-0.817). Respondents who were students are 88 less likely to have high risk perception for developing diabetes compare to those who were working in government establishments (OR=0.118, 95 CI = 0.023-0.601).

Respondents who have good knowledge of diabetes were 2 times more likely to have high risk perception for developing diabetes compare to those who had poor knowledge (OR = 1.724, 95 CI = 1.239-2.399).

Respondents who received more than three serving of fruits were 50 less likely to have high risk perception for developing diabetes compare to those who received one to three serving of fruits (OR = -0.498, 95 CI = 0.351-0.707).

Respondents who had more than three days of light physical activity in a week were 2 times more likely to have high risk perception for developing diabetes compare to those who had one to three days of light physical activity (0R=1.930, 95 CI = 1.277-2.918).

Table 4.11a: Binary logistic regression of risk perception and significant socio-demographic variables, lifestyle and knowledge

	B	Sig.	Exp (B) OR	95 C.I. for EXP (B) Lower	Upper
Sex					
Male**			1		
Female	-0.259	0.161	0.772	0.538	1.108
Highest level of education					
No formal schooling**			1		
Primary school	0.877	0.123	2.403	0.788	7.326
Secondary school	-0.163	0.753	0.850	0.308	2.344
Intermediate or higher secondary school	0.265	0.625	1.304	0.450	3.781
College/University completed	0.417	0.488	1.517	0.467	4.925
Postgraduate degree and above	-0.015	0.989	0.985	0.127	7.654
Religion					
Christianity**			1		
Islam	0.369	0.049*	1.447	1.001	2.091
Traditional	-1.785	0.117	0.168	0.018	1.560
Others	-22.589	0.999	0.000	0.000	0.000
Main occupation					
Government employee**			1		
Non-government	-1.019	0.270	0.361	0.059	2.208
Self-employed	-1.888	0.020*	0.151	0.031	0.743
Retired	-1.703	0.090	0.182	0.025	1.307
Non paid	-2.647	0.034*	0.071	0.006	0,817
Artisan	-0.823	0.333	0.439	0.083	2.327
Student	-2.137	0.010*	0.118	0.023	0.601

Table 4.11b: Binary logistic regression of risk perception and significant socio-demographic variables, lifestyle and knowledge

	B	Sig.	Exp (B) OR	95 C.I. for EXP (B) Lower	Upper
Knowledge group					
Poor**			1		
Good	0.545	0.001*	1.724	1.239	2.399
No of servings					
1-3**			1		
More than 3	-0.696	0.000*	0.498	0.351	0.707
Don't know	-0.433	0.431	0.649	0.221	1.902
Light activities					
1-3 days in a week			1		
More than 3 in a week	0.657	0.002*	1.930	1.277	2.918

**Indicates reference category

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Knowledge of diabetes among respondents

An important finding in this study was that respondents showed good knowledge of diabetes. This knowledge is better when compared to another study in which about 25% has heard about diabetes (William et al., 2010). This could probably be due to public awareness in the electronic media (radio and television) which has a wider outreach among the respondents. According to the respondents; ants in urine, continuous urination, loss of weight and unhealed wound are the major symptoms of diabetes. Similarly, consuming more sweets, family history of diabetes, obesity, decreased physical activities were the major factors that contribute to developing diabetes. This knowledge of diabetes was similar to what Omobuwa and Alebiosu reported in 2014. Most of the respondents were not aware that poorly controlled diabetes may lead to complications in other organs of the body. For instance, poorly controlled diabetes can cause damage to eyes (leading to blindness), kidneys (leading to renal failure), and nerves (leading to impotence and foot disorders/ possibly amputation) as well as increased risk of heart disease, stroke, and poor blood supply to the limbs. Knowledge of diabetes could be an indication of whether or not someone will come for diabetes screening or not. It may also determine whether or not one will adopt behavioural changes towards prevention of risk factors for diabetes and adoption of healthier lifestyle.

5.2 Risk perception for developing diabetes

Most of the respondents had high diabetes self-risk perception. Though, most of the respondents also feel that regular physical activities and controlling weight gain decreases the risk of having diabetes. Self-risk perception differs among groups; for example, wide gaps exist between experts' (scientists, health professionals) perceptions of risk and the lay public's perceptions (Walker and Mertz, 2003). This high diabetes self-risk among respondents may be due to their feeling that they have little control over risk to their health.

5.3 Risk factors for diabetes among respondents

In this study, most of the respondents have good knowledge of diabetes risk perception. Majority of the respondents (97.3%) don't smoke any tobacco products. Among the respondents that smoke tobacco products only two (8.70%) smoke local cigarettes while

others smoke manufactured cigarettes. More than half of the respondents that drank alcohol do so occasionally. More than half of the respondents ate fruits one to three days in a week. Most of the respondents ate vegetable more than three days in a week and this will help them to control the release of glucose into their blood streams. Similarly, most of the respondents participate in physical activities that help in the metabolism of stored sugar (glycogen) in the body.

5.4 Factors affecting diabetes risk perception

This study revealed that male respondents had high risk perception than female respondents in the Local Government. Primary school certificate holders had high risk perception compared to other level of education in the Local Government. Respondent practising Islamic religion had high risk perception as compared to the Christians. Respondents who are government employee also had high risk factor compared with other category.

5.5 Limitations of study.

1. The cost of carrying out the study in Ibadan North local government area.
2. Lack of information on family history of diabetes.

5.6 Conclusion

In this study, majority of the respondents in the study area had good knowledge of diabetes. This study reveals that male respondents have high risk perception than female respondents. Also, primary school certificate holders had high risk perception compared to other level of education. It was also deduced from the study that majority of the respondents had high self-risk perception of diabetes.

Furthermore, this study revealed that a greater proportion of respondents in the high risk perceived group had good knowledge of diabetes.

5.7 Recommendations

Based on the findings from this study, the following are recommended:

1. There is need for the development of a comprehensive health programme for the management of diabetes and its related risk factors.

2. There is also need for infrastructure for diabetic screening and identification of high risk group in the community.

3. Finally, there is need for adequate public awareness and knowledge on the risk factors and symptoms of diabetes.

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QUESTIONNAIRE

DIABETES RISK PERCEPTION AMONG ADULTS IN IBADAN NORTH LOCAL GOVERNMENT AREA OF OYO STATE

My name is Akadri, Fatimat Adedolapo. I am a second year student of the Department of Epidemiology & Medical Statistics, Faculty of Public health, University of Ibadan, Ibadan. Diabetes is rising in Nigeria. In this context, it's important that we recognize the risk factors and implement prevention programme against them. For the same purpose, we are conducting this survey. We need your support and cooperation. In the course of interview, we will ask you question and take physical measurement. We assure you that the information which you provide for the survey will be kept confidential and will be used for the purpose of survey only.

Consent: Now that the study has been well explained to me and I fully understand the content of the study procedure, I will be willing to take in the study.

....

Signature/Thumbprint of Participant Interview Date

Serial Number ……..

Section A: Demographic Information

1. Sex (1) Male (2) Female
2. Age in years……
3. Ethnic group (1) Yoruba (2) Igbo (3) Hausa (4) Others
4. Marital Status (1) Single (2) Married (3) Divorced/Separated (4) Widow/er (5) Others
5. What is the highest level of education you have completed?

   (1) No formal schooling (2) Primary School (3) Secondary School (4) Intermediate or higher secondary school (5) College/University completed (6)Postgraduate degree and above

5. Religion (1) Christianity (2) Islam (3) Traditional (4) No religion (5) Others

7. Which of the following best describes your main occupation?

(1) Government employee (2) Non-Government (3) Self-employed (4)Retired (5) Non-paid (6) Artisan (7) Student

8. How long have you been living in this community? ..... Don't know .....

9. Do you have a family member suffering from diabetes? (1) Yes (2) No (3) Don't know

Section B: Knowledge Evaluation

10. Have you ever heard of diabetes? (1) Yes (2) No

11a. What is diabetes?

b. How did you hear about diabetes for the first time? (1) Radio (2) Television (3) Newspapers

(4) Seminars (5) Others (specify) .....

c. What are the signs and symptoms of diabetes? .....

12. Do you think, in general, more and more people are getting affected with diabetes nowadays?

(1) Yes (2) No (3) Don't know

13. What are the factors you think contribute to developing diabetes?

(1) Obesity (2) Decreased physical activity (3) Family history of diabetes (4) Mental stress

(5) Consuming more sweet (6) Others (name) .....

14. Can diabetes cause complications in other organs of the body?

(1) Yes (2) No (3) Don't Know

If yes what are the complications it can cause? (list) .....

15. What are the symptoms of diabetes? (1) Weight loss (2) Frequent urination (3) Increased hunger

(4) Increased thirst (5) Others (specify) .....

16. Can diabetes be prevented? (1) Yes (2) No (3) Don't know

If yes, how can it be prevented? .....

Section C: General Attitude to Diabetes Risk

The following questions are about your general attitudes.

Kindly answer: strongly agree, agree, disagree or strongly disagree to each of the following questions.

S/N	Strongly Agree	Agree	Disagree	Strongly Disagree
17				

18				
19				
20				
21				
22				

17. I feel that I have little control over risk to my health.

18. If I am going to get diabetes, there is not much I can do about it.

19. I think that my personal effort will help control my risks of getting diabetes.

20. People who make a good effort to control the risks of getting diabetes are much less likely to get diabetes.

21. I worry about getting diabetes.

22. Worrying about getting diabetes is very upsetting.

Section D: Risk Perception

Complete the following statement with your perception if you think the item listed increases (or raises) the risk of someone getting diabetes, has no effect on the risk, or decreases (or lowers) the risk of someone getting diabetes.

23. Eating fruits and vegetables ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

24. Having had diabetes during pregnancy ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

25. Having a family member suffering from diabetes ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

26. Being 65 years of age and above ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

27. Regular physical exercise ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

28. Controlling weight gain ..... (1) Increases the risk (2) Decreases the risk (3) Has no effect on risk (4) Don't Know

Section E: Behavioural Practices

This section is all about various health behaviours. This includes things like smoking, drinking alcohol, eating fruits and vegetables and physical activity.

Tobacco Use

29. Do you currently smoke any tobacco products, Such as cigarettes, Indian hemp or pipes?

(1) Yes (2) No (If no, skip to Q.32)

30. If yes, how often do you smoke tobacco products?

(1) daily (2) weekly (3) occasionally

31. On average, how many of the following do you smoke each day?

a. Manufactured cigarettes b. Indian hemp c. pipes d. Others specify

....

Alcohol Consumption

32. Have you taken alcohol (such as beer, wine or spirit) within the past 30 days?

(1) Yes (2) No (If no, skip to Q.35)

33. In the past 30 days, how frequently have you taken at least a bottle of alcohol?

(1) Daily (2) weekly (3) occasionally

34. When you drink alcohol, on average, how many bottles do you have during one day?

..... Don't know

Diet

The next question ask about the fruits and vegetables that you usually eat.

35. In a typical week, on how many days do you eat fruits?

Examples: Apple, banana, orange, canned fruit, fruit juice (no artificial flavour), etc.

Number of days ..... Don't know ( )

36. How many servings of fruits do you eat on one of those days?

Number of servings ..... Don't know ( )

37. In a typical week, on how many days do you eat vegetables? Examples: Green leafy vegetables (spinach), tomatoes, carrots, pumpkin, cabbage, cooked beans, onions, etc.

Number of days ..... Don't know ( )

38. How many servings of vegetables do you eat on one of those days?

Number of servings ..... Don't know ( )

Physical Activity/Exercise

This includes activities that make you sweat, make your legs feel tired, or make you breathe hard.

Think about all the vigorous activities that you did in the last 7 days. Vigorous physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think about those physical activities that you did for at least 10 minutes at a time.

39. During the last 7 days, on how many days did you do vigorous physical activities?

Examples: heavy lifting, jogging or running, vigorous dance, competitive sports (football, basketball, etc), strenuous occupation activity, digging, aerobics, or fast bicycling?

_____ days per week (If no vigorous physical activity skip to Q 41)

40. How much time did you usually spend doing vigorous physical activities on one of those days?
_____ hours per day _____ minutes per day ( ) Don't know/Not sure

Think about all the moderate activities that you did in the last 7 days. Moderate activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

41. During the last 7 days, on how many days did you do moderate physical activities? Examples: Carrying light loads, house walk that requires involves intense scrubbing/cleaning, competitive sport (tennis, volley ball), moderate dancing, gymnastics, and occupation that requires an extended amount of time standing or walking?

Do not include walking. _____ days per week (If no moderate physical activities skip to Q 43)

42. How much time did you usually spend doing moderate physical activities on one of those days?

_____ hours per day _____ minutes per day ( ) Don't know/Not sure

Think about the time you spent walking in the last 7 days. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

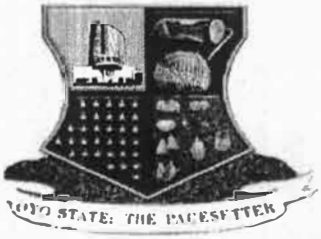
43. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

_____ days per week (If no walking skip to Q 45)

44. How much time did you usually spend walking on one of those days?

_____ hours per day _____ minutes per day ( ) Don't know/Not sure

TELEGRAMS..... TELEPHONE.....



MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honorable Commissioner quoting

Our Ref. No. AD 13/ 479/ 800

February, 2015

The Principal Investigator,
Department of Epidemiology and Medical Statistics,
Faculty of Public Health,
University of Ibadan,
Ibadan.

Attention: Akadri Fatimat

Ethical Approval for the Implementation of your Research Proposal in Oyo State

This acknowledges the receipt of the corrected version of your Research Proposal titled: "Diabetes Risk Perception among Adults in Ibadan North Local Government Area of Oyo State."

2. The committee has noted your compliance with all the ethical concerns raised in the initial review of the proposal. In the light of this, I am pleased to convey to you the approval of committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of the findings as this will help in policy making in the health sector.

4. Wishing you all the best.

Sola Akande (Dr)
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review Committee

ORAL POLIO VACCINE STATUS AND OCCURENCE OF WILD POLIO VIRUS AMONG REPORTED ACUTE FLACCID PARALYZED CHILDREN IN NIGERIA.

BolajokoOlufunmilayo AJUWON

D.V.M (Ibadan)

MATRICNO. 74229

PROJECT SUBMITTED IN PARTIAL FUFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS OF SCIENCE (EPIDEMIOLOGY), DEPARTMENT OF EPIDEMIOLOGY AND MEDICAL STATISTICS (EMS), FACULTY OF PUBLIC HEALTH, UNIVERSITY OF IBADAN.

MAY 2014