



# The Epidemiology Pattern of Human Immunodeficiency Virus/Acquire Immune Deficiency Syndrome, Diagnostic, Transmission and Prevention in Nigeria-Past and Present

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## Authors' contributions

*This work was carried out in collaboration among all authors. Author CEO designed the study, performed the statistical analysis and wrote the protocol. Author ENOO wrote the first draft of the manuscript. Authors IMS and SEA managed the analyses of the study. Authors COO, TJO and UME managed the literature searches. All authors read and approved the final manuscript.*

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## ABSTRACT

Human immune Virus/Acquire immune deficiency syndrome (HIV/AIDS) epidemic is one of the major public health challenges faced by Nigeria. The review present the Epidemiology of Human immune Virus/Acquire immune deficiency syndrome, diagnostic and Prevention in Nigeria. The

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method use was based on the data obtain in Nigeria. Nigeria's first two AIDS cases were diagnosed in 1985 in Lagos. Today, Nigeria's epidemic is characterized as one the most rapidly increased rates of HIV/AIDS cases in West Africa. Nigeria's population of 160 million and estimated HIV prevalence of 3.34% (2011) makes Nigeria the second highest HIV burden worldwide, with 3.2 million people living with HIV (PLHIV). Recently, it is estimated that about 3, 229, 757 people live with HIV in Nigeria and about 220, 393 new HIV infections occurred in 2013 and 210,031 died from AIDS- related causes. As of 2020 in Nigeria, the HIV prevalence rate among adults ages 15–49 was 3.1 percent Nigeria has the second-largest number of people living with HIV. In some states, the epidemic is more concentrated and driven by high-risk behaviors, while other states have more generalized epidemics that are sustained primarily by multiple sexual partnerships in the general population. HIV is spread by sexual contact with an infected person and by blood or body fluid exchange through sharing of contaminated needles or transfusions of infected blood or blood clotting factors. Infants born to HIV-infected women may become infected in gestation, during birth, or through breastfeeding. An antenatal clinic (ANC) HIV seroprevalence sentinel survey has been conducted biennially in Nigeria since 1991 to track the epidemic. The Joint United Nations Programme on HIV/AIDS (UNAIDS) estimates that 3.5 million Nigerian adults and children were living with HIV/AIDS by the end of 2001. Among sex workers in Lagos, HIV prevalence rose from 2 percent in 1988–89 to 12 percent in 1990–91. By 1995–96, up to 70 percent of sex workers tested positive. As a result of the epidemic, the crude death rate in Nigeria was about 20 percent higher in 2000 than in 1990. In 2019, 170,000 adults and children died of AIDS and UNAIDS estimated that 1 million children orphaned by AIDS were living in Nigeria. The main thrust of HIV prevention strategies in Nigeria is based on the following: Information, Education, and Communication; Condom Promotion; Behavior Change; and Vaccine Development.

*Keywords: Diagnostic; epidemiology; HIV/AIDS; prevention; Nigeria.*

## **ABBREVIATIONS**

*AIDS: Acquired Immune Deficiency Syndrome; ANC: Antenatal Care; ART: Antiretroviral Therapy; ARV: Antiretroviral drugs; CBO: Community Based Organization; CHEW: Community Health Extension Worker; CHO: Community Health Officer; CSOs: Civil Society Organizations; CSW: Commercial Sex Workers; DBS: Dried Blood Spots; DHPR: Department of Health Planning and Research; DHS: Demographic Health Survey; ELISA: Enzyme Linked Immuno-sorbent Assay; FBC: Full Blood Count; FBO: Faith-Based Organization; FLHE: Family Life and HIV Education; FMWASD: Federal Ministry of Woman Affairs and Social Development; FCT: Federal Capital Territory; FSW: Female Sex Workers; FMOHI: Federal Ministry of Health; FGN: Federal Government of Nigeria; GON: Government of Nigeria; HAART: Highly Active Antiretroviral Therapy; HBC: Home-Based Care; HCT: HIV Counselling and Testing; HFA: Health Facility Assessment; HMIS: Health Management Information System; HRIS Human Resource Information System; HEAP: HIV/AIDS Emergency Action Plan; HIV: Human Immunodeficiency Virus; IEC: Information Education and Communication; IMAI: Integrated Management of Adolescent and Adult Illness; IMCI: Integrated Management of Childhood Illness; JAPR: Joint Annual Performance Review LACA: local Action Committee on AIDS; L&D: Labour and Delivery; MAP: Multi-Sectoral AIDS Project; MDGs: Millennium Development Goals; M&E: Monitoring and Evaluation; MSM: Men having Sex with Men; MPP: Minimum Prevention Package; NACA: National Agency for the Control of HIV/AIDS; NASA: National Aids Spending Assessment; NASCP: National HIV/AIDS/STI Control Programme; NARHS: National Adolescent and Reproductive Health Survey; NDHS: National Demographic and Health Survey; NEPWAN: Network of People Living with HIV/AIDS; NGO: Non-Governmental Organization; NHRC: National HIV/AIDS Resource Centre; NNRIMS: Nigeria National Response Information Management System; NOP: National Operational Plan; NSF: National Strategic Framework; NSP: National Strategic Plan; OIs: Opportunistic Infections; PABA: People Affected by AIDS; PCR: Polymerase Chain Reaction; PEP: Post Exposure Prophylaxis; PEPFAR: President's Emergency Plan for AIDS Relief; PHC: Primary Health Care; PLHIV: People Living With HIV; PME: Patient Monitoring and Evaluation; PLWHA: People Living with HIV/AIDS; PMM: Patient Management Monitoring; PPM: Plan Preventive Maintenance; PMBC: Peripheral Blood Mononuclear Cells; PMTCT: Prevention of Mother-to-Child Transmission; SACA: State Agency for the Control of AIDS; SASCP: State HIV/AIDS/STI Control*

*Programme; SCR: Service Coverage Report; SKM: Strategic Knowledge Management; SSP: State Strategic Plan; STIs: Sexually Transmitted Infections; RAD: Return after Default; TB: Tuberculosis; USAID: United States Agency for International Development; USG United State Government; WHO: World Health Organization.*

## 1. INTRODUCTION

In recent past few decade, researchers have made significant progress to understand the Epidemiology of HIV/AIDS worldwide. Despite this improved understanding, the epidemic in Africa has continued to grow, with disastrous consequences [1]. The virus AIDS has begun to erase decades of Health, economic, and social progress as it has reduced life expectancy, deepened poverty, exacerbated gender inequalities, lessened labor productivity, increase stigmatization, and eroded the capacity of governments to provide essential services. Africa, with just over 10% of the world's population, recorded about 75% of the burden of this epidemic. While African nations are facing a virulent epidemic, there is no such thing as "The African epidemic." The continent shows tremendous diversity in the levels and trends of HIV infection. Prevalence rates in East Africa and southern Africa include some of the highest in the world, with prevalence rates exceeding 35% in Botswana and Swaziland [1]. The rates have remained lower in West Africa, with no country having a rate above 10% and most having a rate between 1% and 5%. Across the continent, an increasing number of children are now either infected with the virus, via mother-to-child-transmission, or have lost one or both parents. By all indications, HIV has continued to spread largely through unprotected sexual relationships between men and women and through mother-to-child transmission [2].

HIV/AIDS disease has cause a devastating effects on the world's population, particularly people in sub-Saharan Africa, have ceased to be in doubt [3]. Unfortunately, realization of these effects came relatively recently to Nigeria, the continent's most populous country. For a long time many Nigerians viewed AIDS as a scourge of distant lands, or even a product of the imaginations of some scientists. The country has since become among the most affected countries in the world, however, and it now ranks second among sub-Saharan African nations in the number of HIV-infected adults [4]. Among the people living with HIV globally, 9% of them live in Nigeria [5]. Although HIV prevalence among adults is remarkably small in Nigeria (3.2%) compared to other sub-Saharan African countries

such as South Africa (19.1%) and Zambia (12.5%), the size of Nigeria's population means that there were 3.2 million people living with HIV in [6] Nigeria, together with South Africa and Uganda, account for almost half of all annual new HIV infections in sub-Saharan Africa. This is despite achieving a 35% reduction in new infections between [1]. Approximately 210,000 people died from AIDS-related illnesses in Nigeria in 2013, which is 14% of the global total. Since 2005, there has been no reduction in the number of annual deaths, indicative of the fact that only 20% of people living with HIV in Nigeria are accessing antiretroviral treatment (ART) [7]. Unprotected heterosexual sex accounts for about 80% of new HIV infections in Nigeria, with the majority of remaining HIV infections among key affected populations [6]. This present review surveys the dynamics of HIV transmission in Nigeria, its prevention, its emerging trends and the sentinel surveillance system put in place by the governmental and non-governmental institutions, and international organizations and best behavioural practices among the highly risk individuals is presented.

### 1.1 HIV/AIDS in Nigeria

The first two AIDS cases in Nigeria was diagnosed in 1985 and reported in 1986 in Lagos one of which was a young female sex worker aged 13 years from one of the West African countries. The HIV epidemic in Nigeria is complex and varies widely by region. In some states, the epidemic is more concentrated and driven by high-risk behaviors, while other states have more generalized epidemics that are sustained primarily by multiple sexual partnerships in the general population. Youth and young adults in Nigeria are particularly vulnerable to HIV, with young women at higher risk than young men. There are many risk factors that contribute to the spread of HIV, including prostitution, high-risk practices among itinerant workers, high prevalence of sexually transmitted infections (STI), clandestine high-risk heterosexual and homosexual practices, international trafficking of women, and irregular blood screening [6,8]. Nigeria is emerging from a period of military rule that accounted for almost 28 of the 47 years since independence in 1960. Consequently, the policy environment is not fully

democratized. Civil society was weak during the military era, and its role in advocacy and lobbying remains weak. The size of the population and the nation pose logistical and political challenges particularly due to the political determination of the Nigerian Government to achieve health care equity across geopolitical zones [9]. The necessity to coordinate programs simultaneously at the federal, state and local levels introduces complexity into planning. The large private sector is largely unregulated and, more importantly, has no formal connection to the public health system where most HIV interventions are delivered. Training and human resource development is severely limited in all sectors and will hamper program implementation at all levels. Care and support is limited because existing staff are overstretched and most have insufficient training in key technical areas to provide complete HIV services [9].

HIV/AIDS is a major issue of concern for children, young people and women in Nigeria with a prevalence rate of 4.4 per cent in 2005. An estimated 3.5 to 3.8 million people are living with the virus, which makes Nigeria the third worst affected country in the world. Worryingly, the prevalence rate is highest among young people: 4.7 per cent of 20-24 year-olds and 4.9 per cent of 25-29 year-olds are infected with the HIV. About 4.4 percent of women attending antenatal clinics are infected with HIV. An increasing number of children are infected with the virus, through mother-to-child-transmission. Yet less than 1% of pregnant mothers have access to counseling and testing services for HIV in Nigeria. According to UNAIDS latest estimates, about 240,000 children are living with HIV-AIDS in Nigeria [4,9]. In addition, 930,000 children are orphaned by AIDS. While awareness about HIV/AIDS has gradually increased among the Nigerian population, misconceptions about transmission are still high. Only 20 per cent of women and 28 per cent of men say that they would purchase fresh vegetables from a person living with AIDS [10]. Perhaps, this has led to the seemingly unchanged trends in AIDS-related deaths in Nigeria between 2005 and 2013 Fig. 1.

HIV prevalence by state varies as shown in Fig. 2. While HIV/AIDS tends to be generally low in most parts of the country, the highest numbers of HIV prevalence were found mostly in Benue,

FCT, Anambra, Bayelsa and Akwa Ibom States of the federation. These marked differences in the prevalence rates among these states could be due to a number of factors including but not limited to cultural differences, varying levels of education, religion and differing socio-economic structures. Indeed, there must be interplay of these factors on HIV/AIDS outcomes in these states. The variations in socio-cultural and religious practices among about 400 different ethnic groups in Nigeria have implications on the risk of HIV transmission. Notably, some practices that include multiple and concurrent sex partners, delivery outside the health facility without a skilled birth attendant, female genital mutilation, unsterile traditional bloodletting and traditional marking and tattooing will lead to an increase in the risk of HIV transmission.

The first HIV/AIDS sentinel survey in Nigeria was conducted in 1991 with 1.8% prevalence reported. This was followed by 3.8% in 1993, 4.5% in 1996, 5.4% in 1999 and a 5.8% peak in 2001. From 2001 a somewhat decline in trends were noted, starting with 5.0% in 2003, 4.4% in 2005, 4.6% in 2008, 4.1% in 2010 and 3.4% in 2013 [13-15], NNAC AIDS [12], NNAC AIDS [16] see Fig. 3. It is now clear that HIV prevalence in the country is relatively stable. This positive trend is largely attributed to an effective reporting and intervention system.

## 2. MODES OF TRANSMISSION

HIV is spread by sexual contact with an infected person and by blood or body fluid exchange through sharing of contaminated needles or transfusions of infected blood or blood clotting factors. Infants born to HIV-infected women may become infected in gestation, during birth, or through breastfeeding. Heterosexual transmission accounts for up to 80% of all HIV infection in Africa. Other transmission routes in Africa include injection drug use (2.8%), mother-to-child (2.6%), and blood products and transfusion (2.5%). Unknown modes of transmission result in 7% of HIV infections [17]. In Nigeria, the heterosexual route of infection accounts for 82 percent of all transmissions and together with blood borne and mother to-child transmission account for the vast majority of different routes of HIV transmissions [18].

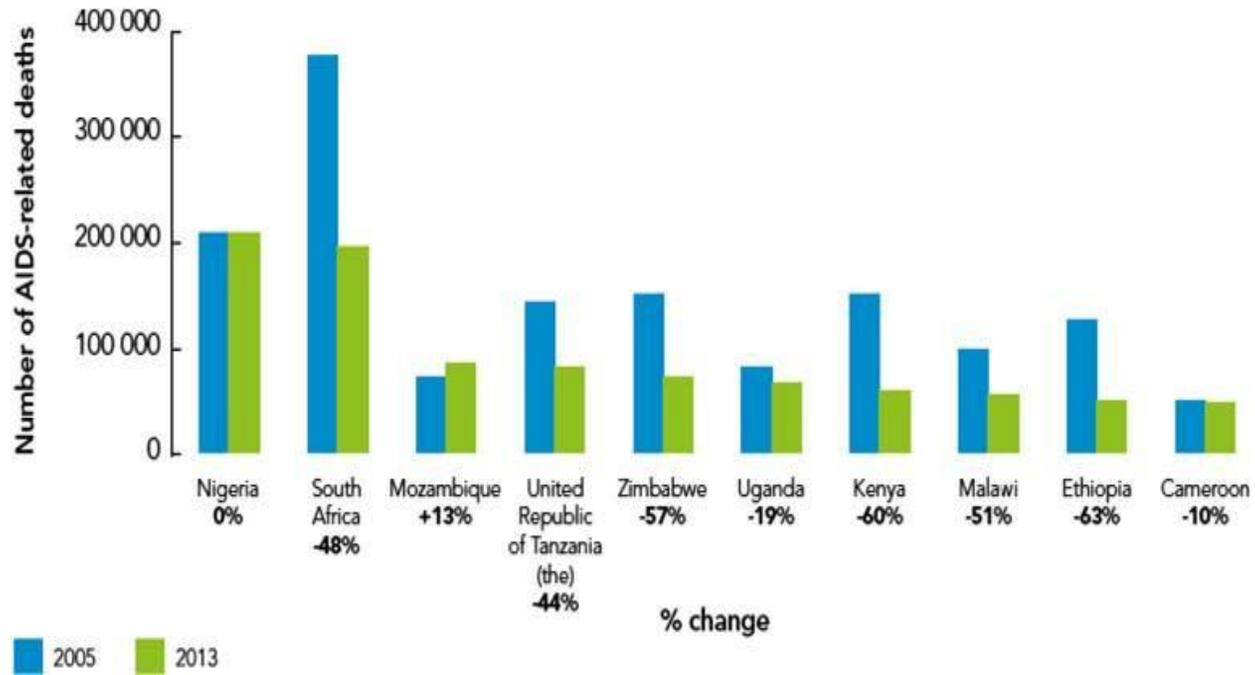
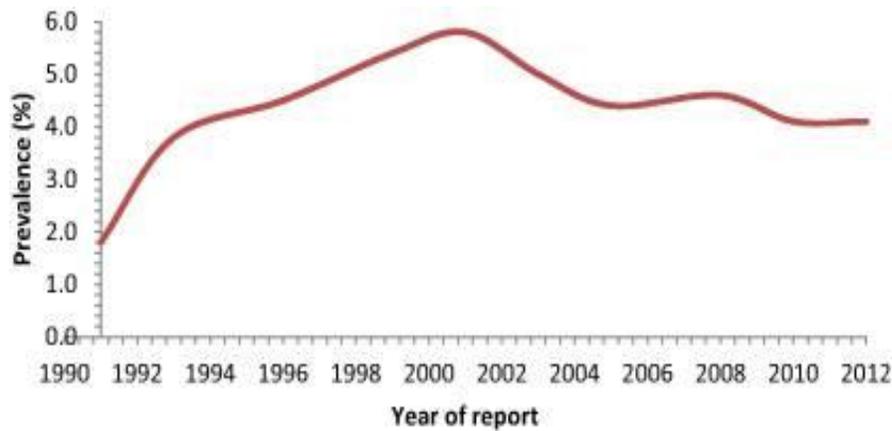


Fig. 1. AIDS-related deaths in sub-Saharan Africa [11]





**Fig. 3. Trends in HIV prevalence in Nigeria**

**Table 1. Below shows HIV/AIDS related data in Nigeria at the end of 2010 [17]**

<b>National Median HIV prevalence (ANC)</b>	<b>4.1%</b>
Estimated number of people living with HIV/AIDS	Total: 3.14million
Cumulative AIDS death	Total: 2.1million (male 970,000; 1.13million)
Annual AIDS Death	Total: 215,130 (male 96,740; female 118,390)
Number in need of Antiretroviral Therapy	Total 1,512,720 (adults 1,300,000 and children 212,720)
New HIV infection	Total 281,180 (adult 126,260 and children 154,920)
Total AIDS orphans	2,229,883

### 2.1 Sexual Route of Transmission

During heterosexual transmission, HIV can enter the body through the lining of the vagina, vulva, penis, rectum, or mouth, through vaginal, anal, or oral sexual intercourse [15,19]. Based on gender-specific anatomical and physiologic characteristics, it has been generally believed that male-to-female transmission is higher than female-to-male transmission. In addition, men tend to be more likely to have multiple sexual partners than women, which might contribute to HIV infection dynamics in heterosexual populations. Men who have sex with men constitute the second most-at-risk populations affected by the epidemic in Nigeria according to 2010 IBBS survey with 17.2% average prevalence rate [20,14]. The FCT was noted for having the highest prevalent rate (37.6%). Though homosexual intercourse does not appear to contribute significantly to the HIV epidemic in Nigeria. Following the diagnosis and report of the first AIDS case in a sex worker in Lagos, testing of sex workers began in the state in 1998–1989 with two per cent of the sex workers tested at the time reported to be HIV positive. The number of reports increased steadily to 15% in 1993 and by

1996, 31% of the sex workers in Lagos were HIV positive [16]. Today, the female sex workers (FSW) constitute the sub group most affected by HIV/AIDS in Nigeria [11,21].

It has been well recognized that STI prevalence rates are generally high in Africa [22-23] this fact may reflect both casual attitudes toward sex and tendencies toward multiple sex partners in some African communities, as well as the lack of easily available treatment for STIs. Sex workers are considered important in the transmission of HIV and other STIs in Africa [23-24]. Fig. 1 depicts the increase in HIV prevalence rates by risk group population surveyed over time, demonstrating higher rates of HIV prevalence among sex workers and STI patients than among antenatal populations [24-25]. The 2003 National HIV/AIDS and Reproductive Health Survey (NARHS) found that many Nigerians contract STIs during their sexually active years and engage in multiple-partner sex [26]. Therefore, understanding the patterns of sexual behavior and partner exchange is important to gauge the forces driving the spread of HIV and other STIs in communities. This information can then be used to determine how intervention strategies

may be adopted to curb further spread of HIV and other STIs and to minimize the impact of the HIV epidemic on the individual, the community, and society as a whole.

## **2.2 Mother-to-Child Transmission of HIV**

Women can transmit HIV to their babies in utero, during birth, and through breastfeeding. Most infection is thought to occur at the moment of delivery (60% to 70%), followed by transmission through breastfeeding (20% to 30%), and then transmission in utero (less than 10%) [27]. In the developed world with lower HIV prevalence rates, mother-to-child transmission has dropped to less than 2% with the implementation of universal VCT, ARV prophylaxis, elective Caesarean section, and the avoidance of breastfeeding [27]. Without preventive interventions, approximately 25% to 40% of infants born to HIV-positive mothers will contract the virus. Unfortunately, in Nigeria and other countries with poor health systems, particularly poor maternal and child health programs, and this transmission route continues to cause great concern to human.

The key entry point to PMTCT programs is the VCT offered to pregnant women. The experiences of PMTCT programs in Nigeria and other African nations demonstrate that much of their success is determined by the proportion of women, who agree to be tested for HIV, return to obtain their test results, and accept the ARV prophylaxis, which is often a single dose of nevirapine. The infrastructure, capacity building, and training are required to maximize the "uptake" of VCT, as well as the development of clinically proven ARV prophylaxis protocols. ARV prophylaxis significantly reduces the rate of mother-to-child transmission of HIV. This consists of single or double ARVs during the last trimester of pregnancy or at delivery with a goal of lowering viral load to decrease the risk of transmission. Trials of various PMTCT protocols have been conducted in the developing world, yet viral drug resistance remains a problem [27-28]. Although the current use of single dose nevirapine to HIV-infected pregnant women does significantly reduce mother-to-child transmission, it also leads to the development of nevirapine resistance in 12% to 40% of women [27,29]. The development of drug resistance in either the mother or infant compromises ARV provision since nevirapine is often used in first-line regimens for adults and infants in developing country programs [30]. To date, the use of

various short courses of ARVs given during the last trimester of pregnancy reduce levels of viral load and significantly lower the risk of in utero and intrapartum infection. HIV transmission through breast milk, however, continues to be a major obstacle for PMTCT efforts, particularly in Africa, where strong cultural and economic factors favor breast milk feeding rather than expensive breast milk substitutes. Furthermore, employment of safe breast milk substitutes is complicated by the fact that many HIV-infected women lack access to clean water and sanitation. Given these constraints, the development of successful HIV vaccines for pediatric use may prove invaluable for overcoming mother-to-child HIV transmission.

To understand the critical role mother-to-child transmission of HIV plays in Nigeria, it will be necessary to relate the poor reproductive health status in the country with the HIV prevalence among women of reproductive age. The 2003 NARHS found that Nigeria still has a high maternal mortality rate of 704 per 100,000 live births; this means that with about 2.4 million live births occurring annually, some 170,000 Nigerian women die as a result of complications associated with pregnancy or childbirth [26]. The maternal mortality rate in Nigeria is about 100 times higher than those in industrialized countries. Moreover, only one-third of Nigerian women who gave birth in the last five years reported being attended to during their last delivery by skilled health care professionals. Thus, unless health care systems undergo a dramatic overall improvement, significant progress with widespread implementation of PMTCT programs will be difficult to achieve. Nigeria initiated its PMTCT program in 2003 with a goal of reducing mother-to-child transmission of HIV by 50% in 2010. During 2003 and 2004, the AIDS Prevention Initiative in Nigeria supported 5 of the 11 federal PMTCT sites established.

## **2.3 Transmission through Contact with Blood and Blood Products**

Contact with infected blood is responsible for HIV transmission in many communities, particularly in those where screening of blood and blood products is not performed routinely, as is the case in much of Nigeria. Although blood bank centers exist at most tertiary care institutions, the support for a robust HIV blood bank screening program has been sorely lacking. In communities where blood bank screening and inactivation of

blood products are routine, the risk of acquiring HIV infection from blood transfusion is extremely small. Nonetheless, as the HIV epidemic becomes more generalized in Nigeria, capacity building and support for a national blood bank screening program should be prioritized in the National AIDS Control and Prevention Plan FMOH.

The FMOH has developed a national protocol for proper blood bank screening of HIV. However, a number of gaps exist in enforcing adherence to the protocol, including pre- and post-test counseling of all donors, testing of donated blood using ELISA or rapid test before transfusion, and discarding blood that is reactive on the first ELISA or rapid test.

## 2.4 Transmission through Needles and Other Skin-Piercing Procedures

The sharing of needles and syringes is considered the main route of HIV transmission among injection drug users. Injection drug use is uncommon in Nigeria, as it is in other parts of sub-Saharan Africa, and it is not considered a major mode of transmission in the Nigerian epidemic. Other modes of transmission may include the sharing of HIV-contaminated skin-piercing objects, such as blades, clippers, and injection needles. Skin-piercing instruments may be shared during tattooing, manicures, pedicures, and even barbering and shaving. Although these practices are widespread, there is a general lack of studies that verify or quantify their role in transmitting HIV infection. Nonetheless, we describe some of them below, as they play a role in Nigerian society's perceptions of HIV risk. Tribal and medicinal scarification, group circumcision, and genital tattooing are common in Nigeria [31-32]. Particularly in the west among the Yoruba and the middle-belt region among the Tiv. Among these and some other Nigerian tribes, cuts are made for identification, beautification, and other ritual purposes. A proportion of the Hausa, an ethnic group in northern Nigeria and some other northern tribes also engage in the practice of scarification for medical purposes. Another important traditional practice that may play a role in the transmission of HIV in Nigeria is an obstetric incision procedure performed at delivery termed a "gishiri cut." In this traditional Hausa practice, the *wanzami*, who are generally accepted as local surgeons by the Hausa community, use non-sterilized instruments. The true risk of HIV transmission attributed to these

practices has not been rigorously studied, yet these ethnically linked practices have been prominently included in HIV education and prevention messages throughout the country. This does not, however, exclude the possibility that HIV could be transmitted if instruments contaminated with infected blood are not sterilized or disinfected between clients. In 1985, the U.S. Centers for Diseases Control and Prevention (CDC) and the WHO recommended standards and practices of good personal hygiene, food sanitation, and routine precautions that all personal-service workers—such as hairdressers, barbers, and massage therapists—should follow, even though there has been no evidence of transmission from a personal-service worker to a client or vice versa [33]. It has been recommended that instruments intended to penetrate the skin—such as tattooing and acupuncture needles and ear-piercing devices—should be used once and disposed of or thoroughly cleaned and sterilized. Personal-service workers can use the same cleaning procedures as those recommended for health care institutions [33].

## 2.5 Transmission in Health Care Settings

HIV transmission in health care settings occurs when workers are stuck with needles or sharp instruments contaminated with HIV-infected blood or, less frequently, when workers are exposed to infected blood through an open cut or a mucous membrane, such as the eyes or nasal passages [33-34]. Patients in African settings may be more likely to be infected with HIV, increasing the risk to health care workers if proper universal precautions are not well established. In developed countries, post-exposure prophylaxis is part of most health care policies. Post-exposure prophylaxis—a short course of triple-drug ART provided to prevent possible HIV infection [34] has yet to be broadly institutionalized in Nigeria's health care facilities, though increased availability of ARVs should improve this situation in the near future.

## 2.6 Other Modes of Transmission

Although HIV is found in varying concentrations or amounts in blood, semen, vaginal fluid, breast milk, saliva, and tears, scientists agree that HIV does not survive long outside of the human body, making the possibility of environmental transmission extremely remote. Several studies have found HIV in very low quantities in the saliva and tears of some PLWHAs, yet the risk of

exposure and infection via these fluids is considered minimal. Some people fear that, despite the lack of scientific evidence, HIV may be transmitted through air, water, and or insects. Even in Africa, where the fear of mosquitoes transmitting HIV is highest, mosquito transmission of HIV has never been reported. Studies conducted by researchers at the CDC and elsewhere have shown no evidence of HIV transmission through insects, even in areas where there are many AIDS cases and large insect populations [35-36].

## **2.7 Transmission of HIV during Wars and Civil Conflicts**

The number of states at war or involved in significant lethal conflicts increased from 11 in 1989 to 22 in 2000 [37-38] in sub-Saharan Africa. In a survey conducted in Sierra Leone recently, Physicians for Human Rights estimated that 215,000 to 257,000 internally displaced women and girls experienced rape or other forms of sexual violence in war, as well as non-combat situations. This demonstrates the potential for women to be exposed to HIV during conflicts [39]. Although Nigeria has not experienced a national war in the past 37 years, limited internal, inter-ethnic, and religious skirmishes have occurred in several regions. Moreover, women and children have become victims of forced sex and other human rights abuses. As no specific epidemiologic data exist to prove increased HIV transmission in those regions, additional research is needed. Several studies have shown that HIV prevalence among soldiers in Africa is elevated, with prevalence rates as high as 60% in the militaries of Angola and the Democratic Republic of Congo [37]. Many African military forces have infection rates as high as five times those of civilian populations [38]. It is important to remember that HIV transmission does not end when conflict ceases; when infected soldiers return to their communities, they continue to spread the virus. In Nigeria, this trend was confirmed by the increased HIV sero prevalence among soldiers returning home from a peacekeeping mission [39].

## **3. DIAGNOSIS OF HIV/AIDS**

### **3.1 Laboratory Diagnosis of HIV Infection**

The Laboratory diagnosis of HIV infection is based on the demonstration of antibodies in plasma or serum, and of virus in the blood. The

virus can be demonstrated in the blood with nucleic acid based tests (PCR for pro viral DNA and RT-PCR for plasma viral RNA), culture and p24 antigen assay. With the technology that is available at present, HIV antibodies are detectable within four to six weeks of infection, and within 24 weeks in virtually all infected individuals [40].

### **3.2 Antibody Assays**

The antibody assays that are used for HIV diagnosis consist of screening tests: rapid tests or ELISA, and confirmatory tests: Western blot and Indirect immunofluorescent assay. Routine antibody testing is performed with the serial or parallel testing algorithm using Rapid or ELISA test kits.

### **3.3 HIV Rapid Testing Algorithm**

There are two HIV Testing algorithms that have been used by government in recent times; the serial and the parallel testing algorithms. However, the current algorithm recommended for routine use is the serial HIV testing algorithm. Rapid Test Kits currently recommended for use in Nigeria include; Determine, Unigold and Stat Pak.

### **3.4 Serial Testing**

This refers to the use of 2 screening tests employed sequentially to test for HIV antibody. If the initial screening is negative, no further testing is required. If the initial test is positive, it is followed by one more test. The first test should be the most sensitive test and the second test should be very specific, and be based on an antigen source different from that of the first test. Samples that produce discordant results in the two tests are subjected to further testing.

### **3.5 Parallel Testing**

This involves the use of two screening tests performed simultaneously. Samples reactive to both tests are regarded as positive. However, those with discordant results require further testing. Parallel testing is performed to minimize the chances of false negative results and to guard against technical errors. It is often used when a very sensitive test is not available for the initial screening, and when the concordance of two tests is to be evaluated.

### 3.6 Nucleic Acid-based Tests

These consist of DNA Polymerase Chain Reaction (DNA PCR) and Reverse Transcriptase Polymerase Chain Reaction (RT-PCR). These tests are not routinely used for laboratory diagnosis of HIV infection in adults and adolescents.

### 3.7 HIV DNA Polymerase Chain Reaction

The DNA PCR involves the amplification of specific DNA sequences in the proviral DNA that has been integrated in the host cell. This test is the preferred procedure for diagnosing HIV infection in infants less than 18 months of age. Because of the high sensitivity of the test, false positive results may occur as a result of contamination by minute quantities of extraneous DNA.

### 3.8 RT- PCR

RT-PCR is used to detect and quantify the amount of HIV RNA in plasma. The assay requires the conversion of viral RNA to DNA and amplification of specific sequences in the DNA produced by a process known as reverse transcriptase polymerase chain reaction (RTPCR).

### 3.9 Other Tests

These tests are not routinely used for laboratory diagnosis of HIV infection.

- Antigen detection: Detection of p24 antigen is an ELISA-based test. The reliability of the test is in doubt because of specificity and sensitivity problems.
- Virus isolation: HIV is usually isolated in PBMCs. The procedure involves co-cultivating the Peripheral Blood Mononuclear Cells (PBMCs) from an HIV+ patient with those obtained from a healthy donor. HIV isolation in PBMC is quite sensitive and is comparable to DNA PCR in sensitivity.

#### 3.9.1 Clinical staging of HIV/AIDS disease

The WHO clinical staging of HIV/AIDS is based on the patient's clinical presentations at the time of initial consultation with the healthcare provider, this implies that the most advanced symptoms at time of evaluation represents the clinical stage of

HIV/AIDS infection. Before undertaking clinical staging, the patient's positive serostatus must have already been determined. Clinical staging guides the decision on when to start co-trimoxazole prophylaxis and when to start ART [6].

## 4. HIV/AIDS IN NIGERIA PAST AND PRESENT

### 4.1 Demographic Profile

Nigeria is located on the West Coast of Africa between latitude 4°16' and 13°53'N, and between longitude 2°40' and 14°41'E. Nigeria has a land mass of 923,768 square kilometres and is bordered by Niger Republic (north), Chad (north-east), Cameroon (east), Benin Republic (west) and Atlantic Ocean (south). It is primarily rural, with a land area of 923,768 square kilometers and a population density of about 96.3 people per square kilometer. The country is the most populous country in Africa with a population of 140 million from the 2006 National Census Fig. 1; A population of 158.3 million in mid-2010 from the estimate of Population Reference Bureau (PRB), and over 373 ethnic groups and its citizens have diverse religious and cultural backgrounds. This makes Nigeria one of the ten most populous countries in the world.2 administratively, the country has 36 states and a Federal Capital Territory (FCT). The states are semi-autonomous with independent administrative, legislative and judicial systems built to fit into the central government. The states and the FCT are further divided into administrative units called Local Government Areas (LGAs) with a total of 774 LGAs in the country. In addition, the states are grouped into six geopolitical zones namely: North-West (NW), North-Central (NC), North-East (NE), South-West (SW), South-South (SS) and South-East (SE). Development is complicated by the poor economic status of the country, which has a human development index of 152 out of 175, placing Nigeria among the 25 poorest countries in the world (UNDP, 2004). Nigeria has been undergoing a demographic transition from a high-fertility, high-mortality population to a low-fertility, declining-mortality one. The base of the population pyramid is wide because of the large number of people younger than 15. The median age of the population is 17 years, and the 15-to-24-year age group constitutes about 20%of the population, with a 1:1male-to-female ratio.

## 4.2 The Nigerian HIV/AIDs Epidemic

For many years, Nigeria was considered to be at a relatively early stage of the HIV/AIDS pandemic compared to the more heavily affected nations of East Africa and southern Africa and even some countries of the West Africa, such as Côte d'Ivoire and Ghana. Although Nigeria's prevalence rate is lower than those of neighboring countries, because of its large population size, it has the second highest number of HIV-positive adults in sub-Saharan Africa. It ranks third in the world in terms of the total number of people infected, behind India and South Africa [4]. One commonly used measure of the extent of HIV infection in a population is adult prevalence, or the proportion of adults infected with HIV in a given population. Studies in a number of African countries have shown that HIV prevalence among pregnant women is a good estimate of prevalence among all adults between the ages of 15 and 49 [26]. These surveys—coupled with high-quality behavioral data collection—can provide important information on the status of the epidemic. Nigeria's most recent national sentinel surveillance study, in 2003, tested more than 85,000 women from 86 sites throughout the federation [26]. The survey estimated that of the millions of Nigerians living with HIV/AIDS, 48% are women and 7.7% are children. More than 25,000 deaths occur from AIDS annually and close to 2 million AIDS orphans now live in Nigeria [4].

## 4.3 National Sentinel Surveillance

For strategies for the control of HIV/AIDS to succeed, the rates of HIV infection must be determined and the emerging trends in infection rates and risk-taking behaviors must be identified. One of the most efficient means of determining these rates and trends is to conduct sentinel surveillance surveys among specific groups of at-risk people within a specified time period. Thus, in 1991, the Federal Ministry of Health established the first HIV sentinel surveillance as a means of monitoring HIV/AIDS in the country. Subsequent surveys were conducted in 1993, 1995, 1999, 2001, and 2003 for a total of six national sentinel surveillance surveys between 1991 and 2003 [41,26]. These studies have shown that all 36 states now report HIV/AIDS, though the rates vary significantly from state to state and from zone to zone. In Nigeria, HIV prevalence increased from 0.9% in 1986–1989, to 1.8% in 1991, to 4.5% in 1996. By 1999, 5.4% of people aged 15 to 49 were

infected. In 2003, the prevalence was found to be 5.0%. The wide variation in HIV prevalence rates illustrates the importance of constant surveillance at several levels in a country as large and heterogeneous as Nigeria. In 2003, the states with the highest prevalence rates were Akwalbom, Anambra, Bayelsa, Benue, FCT, Cross River (12.0%), Benue (9.3%), Adamawa (7.5%), and Akwa Ibom (7.2%); the FCT had a rate of 8.5%. The states with the lowest prevalence rates were Osun (1.2%), Ogun (1.5%), Ekiti (1.95%), Jigawa (1.95%), Ondo (2.2%), and Kebbi (2.6%) (14).

## 4.4 History and Government Response

Nigeria's first two AIDS cases were diagnosed in 1985 in Lagos, the largest city in the country, and reported at the international AIDS conference that took place the following year [42]. The reporting of those findings to the Federal Ministry of Health (FMOH) created panic in government circles. That same year the FMOH set up the National Expert Advisory Committee on AIDS (NEACA) and requested the assistance of the World Health Organization (WHO). In 1987, with this assistance, the government established the first of nine HIV testing centers in the country. As work continued, additional AIDS cases were diagnosed, and a small number of apparently healthy blood donors were found to be HIV antibody-positive through routine pre-transfusion screening. Following the increasing detection of HIV-infected individuals in the country, NEACA recommended the development of a short-term plan to combat the spread of the virus. With the assistance of the WHO and under the guidance of NEACA, the FMOH implemented the comprehensive Medium-Term Plan for the nation's battle against HIV/AIDS. NEACA also played a key role in providing the initial epidemiologic information that was used for charting Nigeria's prevention and control strategies. In 1988, the National AIDS Control Program replaced NEACA, still under the auspices of the FMOH. The program was expanded in 1991 to include sexually transmitted infections (STIs) and renamed the National AIDS and STDs Control Program (NASCP). Unfortunately, those changes altered the multisectoral approach of NEACA, as NASCP began to focus primarily on the health sector responses to HIV and other STIs. It developed guidelines on key interventions, which included syndromic management of STIs, voluntary counseling and testing (VCT), prevention of mother-to-child transmission of HIV (PMTCT),

and management of HIV/AIDS, including treatment of opportunistic infections, administration of antiretrovirals (ARVs), and home-based care. It also supported monitoring and surveillance of the epidemic. Despite these actions, it wasn't until the restoration of democracy in 1999 that the nation launched a serious effort to tackle the epidemic.

President Olusegun Obasanjo has since placed high priority on HIV prevention, treatment, care, and support activities both in Nigeria and in the international community. In 2001, for example, he hosted the Organization of African Unity's first African Summit on HIV/AIDS, Tuberculosis, and Other Related Infectious Diseases. President Obasanjo also replaced NASCP with a broader AIDS control program, which included the Presidential Committee on AIDS and the multisectoral National Action Committee on AIDS (NACA). This initiative further extended to all states through the state action committees on AIDS (SACAs) and to the district level through the local action committees on AIDS (LACAs). NACA was charged with developing policies for the prevention and control of HIV/AIDS, and its mandate included developing effective multisectoral response strategies nationwide (FMOH, 2001). NACA developed the first multisectoral medium-term plan of action, the HIV/AIDS Emergency Action Plan (HEAP). NACA's main responsibility then became the execution and implementation of activities under HEAP. The action plan had two main components: to break down barriers to HIV prevention at the community level and support community-based responses, and to provide prevention, care, and support interventions directly. Despite progress toward achieving these goals, huge gaps remained in HIV prevention, treatment, and care services, particularly at the community level. In 2004, the National HIV/AIDS Strategic Framework (2005–2009) was developed to succeed HEAP FMOH, NACA [40].

#### **4.5 Civil Society and Uniformed Services**

As soon as the government initiated its HIV/AIDS prevention and control program, several nongovernmental organizations, community-based organizations, and faith-based organizations established similar programs. A coalition—the Civil Society Consultative Group on HIV/AIDS in Nigeria, or CISCGHAN—was subsequently formed to help coordinate and advocate for this sector. Immediately after the

group's establishment, the Global Fund to Fight AIDS, Tuberculosis and Malaria provided funds to help strengthen its work. In addition, the National Network of People Living with HIV/AIDS in Nigeria (NEPWHAN) organized, leading advocacy efforts for the human rights and greater involvement of people living with HIV/AIDS (PLWHAs) in all sectors. These associations—together with the military, police, and other uniformed services, which occupy critical positions within Nigerian society—contributed immensely toward HIV prevention and control. The Armed Forces Program on AIDS Control, apart from developing a military HIV/AIDS policy, also runs its own treatment, care, support, prevention, and laboratory service activities.

##### **4.5.1 USAID support**

HIV/AIDS funding for Nigeria was \$12.8 million in FY 2001, up from \$6.7 million in FY 2000. Prior to the election of the new civilian government in Nigeria, the entirety of USAID's HIV/AIDS assistance was given to NGOs. In FY 1999, USAID began to examine ways to support the military HIV/AIDS program and the NACA. USAID's current HIV/AIDS program consists of 12 behavior change communication (preventative) activities, eight activities that focus on care and support of people living with HIV/AIDS, two activities that focus on care and support of children orphaned by HIV/AIDS, and one activity on AIDS impact modeling and advocacy. The Mission has begun to consolidate its HIV/AIDS activities in four states: Anambra, Lagos, Taraba, and Kano. USAID-supported country programs include the following:

- Behavior change
- Policy/advocacy
- Care and support
- Surveillance
- Prevention/education

##### **4.5.2 UNICEF's support to the national response**

Recognizing the public health, social and economic threat of the epidemic, UNICEF Nigeria supports projects in line with the Children and AIDS campaign:

- Primary Prevention: promoting behaviour change in young people for HIV prevention
- PMTCT: preventing mother to child transmission of HIV

- Paediatric AIDS: increasing access to anti-retroviral therapy for HIV infected children
- Protection of orphans and vulnerable children

HIV/AIDS is a core priority for UNICEF Nigeria and impacts on most programme work.

#### **4.6 Forces Driving the Spread of HIV in Nigeria**

Among the most important factors driving the HIV epidemic in Nigeria are sexual behavior, the presence of other STIs, stigmatization and discrimination, cultural factors, and the inadequacy of health care systems.

##### **4.6.1 Sexual behavior**

The sexual behavior determinants of HIV transmission are often difficult to study and identify. For cultural and religious reasons, sex is traditionally a very private subject in Nigeria, as in many other African nations. Discussions about sex with adolescents, particularly girls, are not considered culturally acceptable. Until recently, young people received little or no sexual health education, which has proved a major barrier to behavioral interventions aimed at reducing rates of HIV and other STIs. The lack of accurate information about sexual health has fostered myths and misconceptions, contributed to rising transmission rates, and helped fuel the stigmatization and discrimination of PLWHAs. The 2003 NARHS confirmed that virtually all respondents surveyed over the age of 30 had had sexual intercourse [26]. Among the respondents who had never married, about 39% of females and 48% of males reported that they had had sexual intercourse in the past year. The same survey showed that the median age at first sex was 16.9 years for females and 19.8 years for males. Females in the North-West and North-East zones reported the lowest median age at first sexual intercourse. The median age of first sex for both females and males was lower in rural areas than in urban areas. An important behavioral determinant of HIV sexual transmission is the level of multiple partnering within a community. Of all respondents who have ever had sex, only 3% women reported having multiple partners, compared to 26% of men. Different zones, age groups, and levels of education showed substantial differences [26]. For women, the lowest levels of multiple partnering were reported in the North-West (1%) and the North-East (2%) zones, while the highest

for males was from the North-Central zone (33%), which may explain the extensive HIV transmission observed within this zone. Interestingly, females with higher levels of education were more likely to report having multiple partners.

##### **4.6.2 Other sexually transmitted infections**

STIs pose a major public health problem as they affect hundreds of millions of people globally with far reaching health, social, and economic consequences. Although the probability of transmitting HIV during a single sexual act can be low, such factors as frequency of intercourse and a multiplicity of partners can increase the risk of infection dramatically. Among those factors is the presence in either partner of an STI, the practice of multiple partner sex, and a high prevalence of STIs among men who have sex with men. Some cultural practices—including female circumcision and in fibulation—may influence sexual transmission in Africa [43-44]. The level of awareness of STIs and their symptoms in Nigeria is generally high, though it is generally lower among women [26,45]. The NARHS showed that STI symptoms were most commonly seen in South at 10%, while the lowest (2%) was seen in the North-East zone [26]. Generally, women were more likely to report having experienced STI symptoms in the last year. For both sexes, genital ulcers were the least reported symptom (1%), while itching was the most commonly reported symptom (4%). Sexually active adults with higher levels of education were more likely to report genital discharge or genital itching. Among sexually active individuals, 8% and 4% of females and males respectively had at least one of these symptoms in the preceding 12 months. The most commonly used sources for STI treatment included government health institutions (24%), traditional healers (17%), and private health institutions (14%). Urban dwellers reported higher use of government health institutions and private health facilities, while a higher proportion of people living in rural areas received treatment from traditional healers. Some traditional healers in Nigeria have continued to claim having new treatments for HIV/AIDS and have even challenged orthodox medical centers with their claims.

##### **4.6.3 Stigmatization and discrimination**

Stigmatization and discrimination against PLWHAs are common in Nigeria. Often both

Christian and Muslim religious leaders view immoral behavior as the cause of the HIV/AIDS epidemic. PLWHAs often lose their jobs or are denied health care services because of the ignorance and fear surrounding the disease. Moreover, early surveys showed that 60% of health care workers believed HIV-infected patients should be isolated from other patients. Nevertheless, some progress has been made more recently because of increased national campaigns and more visible and vocal societies and support groups for people infected with or affected by HIV. Their efforts have helped educate the public about HIV/AIDS, dispelling myths and giving the disease a human face.

#### **4.6.4 Cultural factors**

Nigeria is a male-dominated society and women are viewed as inferior to men. Women's traditional role is to have children and be responsible for the home. Their low status, their lack of access to education, and certain social and cultural practices increase their vulnerability to HIV infection. Many marriage practices violate women's human rights and contribute to increasing HIV rates among women and girls. Nigeria has no legal minimum age for marriage, and in some areas early marriage is still the norm, as parents consider it a way to protect their young daughters from the outside world and maintain their chastity. Girls may get married between the ages of 12 and 13, and a large age gap usually exists between husbands and wives. Young married girls are at risk of contracting HIV from their husbands because it is considered acceptable for men to have sexual partners outside of marriage and even for some men to have more than one wife. Because of their age, lack of education, and low status, young married girls cannot negotiate condom use to protect themselves against HIV and other STIs [43].

#### **4.6.5 Inadequate health care systems**

Until democracy was reestablished in 1999, Nigeria's health care system had deteriorated significantly because of political instability, corruption, and a mismanaged economy under military rule. Large parts of the country still lack even basic health care provision, making it difficult to establish HIV testing and prevention services such as those for PMTCT and HIV/AIDS treatment and care. Sexual health clinics provide contraception, but testing and treatment for STIs are frequently absent.

#### **4.7 HIV Testing and Counseling (HTC) in Nigeria**

The introduction of effective ART and its demonstrated medical benefits has shown the usefulness and importance of expanding HCT services to facilitate early diagnosis and treatment of HIV-infected persons. It has also been shown that early knowledge of HIV infection can result in tremendous public health benefits through decreasing risk behaviors that could transmit HIV to uninfected persons [10]. The National HIV & AIDS and Reproductive Health Survey of 2012 found very low uptake of HIV testing in Nigeria - just 23% of males and 29% of females had tested in the last year. Less than 70% of these people had received their results. Since then, a huge number of new HTC sites have been built, bringing the total from 2,391 in 2012, to 7,075 in 2013. As a result, a 50% rise in the number of people tested was seen between those two years. Couples testing, and provider-initiated testing and counseling have been recommended throughout the country, but uptake at HTC sites is slow. There are a number of reasons why more people are not testing for HIV in Nigeria. These include supply problems with testing kits and logistic issues getting further supplies. There is also a common belief that HTC centres are where HIV-positive people go to access care, rather than them being testing centres for those who don't know their status [10].

#### **4.8 Antiretroviral Treatment (ART) in Nigeria**

Antiretroviral treatment (ART) provision in Nigeria is extremely low, with only 21% of adults living with HIV receiving treatment in 2013, and 12% of children. Only 19% of women who are living with HIV and breastfeeding are taking ART. Although the number of antiretroviral treatment (ART) sites increased between 2012 and 2013, it is still not enough. With only 820 sites in the whole of Nigeria, it is not surprising that people living with HIV are struggling to access clinics where they can get treatment. ART administration is being decentralised from hospitals to primary health centres, and from doctors to nurses and community health workers, although there is still a huge demand for more healthcare professionals. Certain weaknesses in the system exist, which mean many people who receive a positive HIV diagnosis are not referred on to treatment, or not retained in treatment for very

long. Even when ART can be accessed, drug supplies are known to run out and lead to stock-outs.

#### 4.8.1 Goals of antiretroviral therapy

Highly Active Antiretroviral Therapy (HAART) is the gold standard in the management of HIV/AIDS and all persons who are eligible to ART should be commenced on HAART as soon as possible. ART should be offered to all persons who are eligible in a comprehensive manner, which means that the persons should have access to ongoing HIV adherence counseling, baseline and routine periodic laboratory investigation, management of OIs, routine treatment monitoring and follow-up. When properly administered, ART should achieve the following goals;

- **Reduce Morbidity (includes morbidity from OIs) and Prolong Life of HIV Infected Individuals:** Optimal ART leads to rapid improvement of clinical indices, pre-existing OIs are more amenable to antimicrobial agents and patients become less susceptible to new infections. Prior to the advent of ARVs, mortality rates due to advanced HIV disease was unacceptably high nearing 100% in most cases. However, following the introduction of HAART, many more people live long and productive lives.
- **Improve Quality of Life of Infected Persons:** The absence of symptomatic HIV and HIV-related illness means that persons infected with HIV are able to carry on a normal existence and fend for themselves and their families unlike in the past when they were largely bedridden and dependent on others for support.
- **Achieve Rapid and Sustained Suppression of Viral Load:** Under optimal conditions, administration of ART should lead to rapid and sustained suppression of viral load. Usually by week 24 following initiation of treatment, patient's viral load should be at the least < 400 copies /ml. Rapid and sustained viral load suppression is necessary to prevent or delay the development of ARV drug resistance and allow for restoration of CD4 cells. The ideal is sustained viral suppression at 50c/ml for as long as possible to halt, prevent or delay disease progression.

- **Enhance immunity by increasing CD4+ cell count:** Potent and effective ART leads to an increase in CD4 cells and recovery of the immune functions. Under optimal conditions patients should be able to achieve a CD4 cell count increase of 50 to 100 cells/ $\mu$ l /year.
- **Educe Risk of Transmission of HIV to Infants (mother to child transmission) and Sexual Partners:** ART is effective in reducing transmission of HIV from a positive person to an uninfected person. When used as prophylaxis in an infected pregnant woman, it leads to a markedly significant reduction in mother to child transmission of the virus.

#### 4.9 The Future of HIV in Nigeria

Nigeria is an enormous country, and so it has a very high number of people living with HIV despite a relatively low HIV prevalence. When reading the major statistics all together the situation is stark: 9% of all people living with HIV globally are in Nigeria, 14% of the global deaths from HIV-related illness are in Nigeria, only 20% of people living with HIV are on treatment, and only 27% of pregnant women are receiving treatment for PMTCT. Providing antiretroviral treatment for all people living with HIV doesn't only benefit those already living with HIV, it also dramatically reduces the chance of onwards HIV transmission to others. In a country like Nigeria where there are so many people not on treatment, it is hard to tackle the HIV epidemic. Considerable commitment, funding and resources need to be mobilised to expand access to treatment as a prevention method [7]. Despite government commitment to the HIV response in many ways, punitive laws such as the anti-homosexuality bill damage progress. They prevent key populations such as MSM seeking HIV services and make it extremely difficult to reach them with prevention messages. Engaging all members of society, and especially those who are most vulnerable to HIV, is key to a unified and considered HIV response. Finally, encouraging HIV testing among the Nigerian population to ensure everyone knows their HIV status is key to any informed strategic plan. Without knowing the extent of how many people are living with HIV it is hard to mitigate new infections and provide HIV treatment to all [10].

## **5. PREVENTION AND CONTROL OF HIV / AIDS**

### **5.1 Prevention of HIV Transmission**

The main thrust of HIV prevention strategies in Nigeria is based on the following: Information, Education, and Communication; Condom Promotion; Behavior Change; and Vaccine Development. Since 2000, the Government of Nigeria, with outside support and the help of Non-governmental organizations in the country, has been conducting public education campaigns about HIV/AIDS. Interventions currently being used to limit transmission include promoting abstinence before marriage; encouraging, through a combination of mass media campaigns and counseling, faithfulness to one partner; and various HIV education programs. Although some of these efforts are likely to bear fruit if they are sustained and spread across the entire country, prevention efforts are at risk of being eclipsed by official, popular, and international emphasis on ARV therapy. Again, poverty, enormous cultural and religious diversity, and an increased allocation of funds to AIDS treatment threaten the maintenance of effective prevention and control strategies [27,7] Overall, there are several important lessons to be learned about prevention. Pilot tests have shown that interventions can be successful in significantly reducing the spread of HIV. It is important to intervene as early as possible with a mix of interventions that have proved effective in reaching the largest possible number of people and that can achieve maximum impact. The most effective interventions are those that focus on population groups with the highest transmission rates. Prevention through behavior change, condom promotion, and STI treatment is thought to be the most cost effective approach. Applying interventions on a large scale is costly, and success is difficult to measure. Yet there is now evidence From Senegal, Uganda, and Thailand that significant reductions in HIV incidence and prevalence can occur at a national level. Those countries recognized the seriousness of the epidemic early and implemented strong national programs to reduce the spread of HIV and to support PLWHAs and their families [27].

### **5.2 HIV and AIDS Education**

Family Life and HIV Education (LLHE) lessons are part of the Nigerian school curriculum. The requirements include a comprehensive list of topics related to HIV, including the basic facts

about HIV transmission and prevention, alongside more complex issues such as stigma and gender-based violence [46]. One study in 2013 evaluated the successes and failures of the curriculum, finding that pupil enrolment is increasing, teachers are mostly adequately trained, and learning is likely to reduce new HIV infections. However, there are not enough teachers for the number of pupils, and the number of classrooms and teachers are concentrated in certain areas.

### **5.3 Barriers to HIV Prevention in Nigeria**

#### **5.3.1 Legal barriers**

One of the major barriers to accessing HIV prevention programmes for MSM are laws that prohibit their activities. For example, same-sex relations in Nigeria are criminalised with 14 years imprisonment. This is not only limiting access for HIV prevention programming for this community, but causing nationwide stigma and discrimination against people based on their sexual orientation.

#### **5.3.2 Social barriers**

Gender inequality is imbedded in Nigerian society and culture [43]. Although women do have rights to land, the patriarchal society dictates that their rights are weaker than a man's. The result is a high fertility rate of six children per woman, due to the pressure on her to give birth to boys who can inherit and own land. If a woman has a girl first, she is more likely to have more children, not use contraceptives, have short periods between pregnancies, and be subjected to polygamy. Each of these factors increases a woman's vulnerability to HIV. 1.6 million women are living with HIV in Nigeria.

#### **5.3.3 Structural barriers**

A simple lack of sites that deliver HIV services (testing sites, PMTCT sites, and treatment sites) presents problems for the Nigerian population. PMTCT coverage and sites that provide early infant diagnosis remain extremely low and results in many new HIV infections each year. HIV transmission via blood products is minimal in Nigeria, enhanced effort could almost eliminate this risk. Although there are guidelines for certain practices, the lack of universal precautions and failure to record blood safety information in all circumstances means HIV transmission via blood products remains a risk for patients and healthcare workers.

### 5.3.4 Economic barriers

Nigeria's funding of its HIV response remains challenging, but the PCRFP launched in 2013 has committed to bridging the gap in funding by providing more domestic resources. It is hoped this will mobilise the response to HIV dramatically, as in 2012, only 21.4% was domestically financed.

### 5.4 Common Fears about HIV Transmission

- **Kissing:** Kissing seems a very common act between two intimate persons. No wonder, it is the easiest and most common expression of affection among people of different races all over the world. Even animals kiss! Kissing, because of the intimacy of the act, is the No 1 fear that majority have as regards HIV transmission. Interestingly, the act of kissing on its own carries no risk for HIV. It doesn't matter whether it's a peck on the cheek or deep tongue-on-tongue action. (And no, you can't transmit HIV through cold sores). The only kissing scenario that would involve even a remote risk would be where fresh blood was exchanged – and, like it has been rightly suggested, unless you're dating a vampire, that kind of thing is extremely unlikely to happen. However, there are some STDs that can be passed across during that closed eyes session! So exercise some restraints when that oral cavity doesn't look too kissable.
- **Mosquito Bites:** What if a mosquito bites an HIV-positive person and then feasts on you? If a mosquito can transmit malaria, it can transmit HIV too, right? Wrong! Malaria is a very different kind of disease than HIV. Even if HIV could survive long enough in the extracted blood, there would be so little HIV in there that you'd have no risk of being infected by it if you were the mosquito's next victim — even if you squashed that sucker on your arm, blood-filled stomach and all [35-36].
- **Coughing or Sneezing:** Many people still find it uneasy in simply being in the presence of someone who is HIV positive. But there's no need to be afraid of being near people with HIV! HIV is not an airborne disease and cannot be transmitted even if someone with HIV coughs or sneezes directly in your face or onto your food. If it were that easy to pass along HIV, the number of people living with the virus today would probably be in the billions, not the millions.
- **Urine or Blood from the Pool Water:** A lot of people worry about HIV entering their bodies via blood or urine in a pool. HIV is not transmitted through water, period — it doesn't matter whether you're standing in it, bathing in it or drinking gallons of it. (That also goes for hot tubs, showers, the sink at the gas station — you name it!) So, enjoy the swim without worries [31].
- **Public Restrooms:** Did you forget to put down toilet paper on the seat before using the toilet? No need to run out for an HIV test. Even if a disgusting bodily fluid left on the seat were somehow able to get into your bloodstream (which is virtually impossible as it is — and no, “up-splashing” does not put you at risk either), the HIV within that fluid wouldn't survive long enough outside of the body to harm you. Not only that, but there wouldn't be enough HIV in that small amount of fluid to pose an infection risk.
- **Sharing a Drinking Glass:** Pure and simple: Saliva is not one of the four bodily fluids that can transmit the virus. That list is reserved for blood, semen, vaginal secretions and breast milk. So unless you were drinking a large, frothy glass of any of those, you have nothing to worry about.
- **Shaking Hands:** Shaking hands is considered “casual contact” and absolutely does not put you at risk for contracting HIV. It doesn't matter if the shaking involved hands (yours, theirs or both) that were peeling, sweaty, dirty, or had cuts on them. The same goes for other common concerns, such as hugging someone, being scratched or even being bitten (unless the bite is very deep, meaning it went all the way through your skin — and even then, any potential risk would be extremely small). Similar considerations covers sharing a bed or sitting together either in a bus or in your homes.
- **Chewing Gum:** Whether it's merely touching an old piece of chewed-up gum or transferring a wad of it from your HIV-positive friend's mouth to yours, gum does not represent an HIV risk. HIV is not transmitted through saliva; this is why you can also share food, drinks or utensils with

HIV-positive people and not worry about becoming infected.

- **Eating at a Restaurant:** For some reason, restaurants make the imagination run wild. People write in with an endless string of scenarios, including a chef's accidental slip of the knife, a waitress with a scratch on her hand, and a piece of food that briefly fell off someone's plate and touched the table. But here are the facts: In all of those infectious fantasies, there simply wouldn't be enough HIV present to pose a risk. (In most of them, there's zero chance that HIV would be present at all.) In addition, HIV doesn't live long enough outside of the body for any restaurant scenario to carry a risk — that is, unless you run off and have unprotected sex with the waiter.
- **Getting a Lap Dance:** Oh, if only we had a dollar tucked in our G-string for every person who's written in after a visit to a strip club. (And it's not solely the clients who fear the wrath of the lap!) Lap dances — and most other strip club encounters — bear absolutely no risk for one huge reason: at least one of you is wearing clothing on top of your happy parts, and no bodily fluids are being exchanged. (Even if you think you felt a little bit of wetness on your skin, that doesn't count as "exchanging fluids").

## 5.5 Challenges

According to an August 2000 *Situation Assessment of HIV/AIDS in Nigeria* by FHI/IMPACT, constraints to a national response to HIV/AIDS include:

- Insufficient funding given the scale and complexity of Nigeria's epidemic;
- Over-dependence on donor support;
- Lack of political will and commitment from policymakers;
- Insufficient number of trained personnel to implement the national AIDS program;
- Need for increased coordination and/or support to local NGOs;
- Low perception of risk among policymakers and the general population;
- Weak STI interventions and surveillance systems;
- Absence of a reliable national database on HIV/AIDS programs;
- Lack of supportive legislation for HIV/AIDS programming;

- Conservative social values, and regional religious and cultural differences; and
- Poverty and low status of women

## 6. CONCLUSION

By the time the first two AIDS cases in Nigeria were reported in 1986, much had been learned about the character of the epidemic from other African countries and beyond. From 1986 to 1990, only a few AIDS cases were reported in Nigeria, even in major hospitals where conscious efforts were made to find cases. Nigeria had the opportunity to limit the spread of HIV by instituting elaborate measures across the country. Unfortunately, this did not happen. Now the country appears to be paying the price for a less than vigorous response to the HIV/AIDS problem at the early stage of the epidemic. Nigeria now has a significant HIV/AIDS problem, and it needs to commit attention and resources to prevent further deterioration of the situation. Improvement of the health system and medical care services especially at the level of primary health care could help reduce HIV transmission and strengthen case management. Increasing levels of poverty could indirectly affect the increase in the prevalence of HIV in Nigeria. Moreover, the poor level of maternal health system in the country may enable further transmission of HIV. Most prevention programs have failed, in part because they were not evidence based on the appropriate specific population group, the behavioral and cultural factors involved, and the mechanism of transmission. To develop effective prevention and control strategies, therefore, it is important that we understand the multiple cultural characteristics of the population and address issues of worsening poverty and the negative impact of frequent conflicts and wars on our efforts. Ultimately, HIV/AIDS will not diminish in Africa until socio cultural, gender, and economic inequities are addressed in a meaningful manner.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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