

# We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

6,900

Open access books available

185,000

International authors and editors

200M

Downloads

Our authors are among the

154

Countries delivered to

TOP 1%

most cited scientists

12.2%

Contributors from top 500 universities



WEB OF SCIENCE™

Selection of our books indexed in the Book Citation Index  
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?  
Contact [book.department@intechopen.com](mailto:book.department@intechopen.com)

Numbers displayed above are based on latest data collected.  
For more information visit [www.intechopen.com](http://www.intechopen.com)



## HIV/Aids Fact Sheet – Predisposing Factors the Nigeria Situation

Uju Marie Esther Dibua

*Department of Microbiology, Faculty of Biological Sciences, University of Nigeria, Nigeria*

### 1. Introduction

HIV/AIDS has become a global scourge, a devastating challenge to human dignity and a generalized threat to sociocultural and socioeconomic growth. The deadly epidemic has grossly annihilated Millennium Development Goals, reduced life expectancy and heightened poverty levels particularly in the developing and underdeveloped countries of the world. The brunt of the plague is borne chiefly by the sub-Saharan Africa, where it takes its toll mostly on the most productive and sexually active persons of child bearing age.

Co-infection with HIV, TB and STIs has worsened the effect of the epidemic. The World Health Organization (WHO, 2009) declared TB to be a global health emergency, which disproportionately affects people in resource-poor settings, particularly those in Asia and Africa. In 2008, an estimated 11.1 million people were living with (active) TB, including 9.4 million new cases, with an estimated 1.8 million TB deaths including 500,000 deaths that were HIV-positive. TB and HIV are frequently referred to as co- or dual-epidemics as a result of the high morbidity and mortality rates emanating from the co-infection. Resurgence of latent TB in the developing world has largely been attributed to HIV infection.

Sexually transmitted infections (STIs) have similarly been closely associated with HIV as a result of their similar transmission modes, namely, sexual contact. Hence, STIs of different categories: treatable and untreatable, ulcerative and non-ulcerative, etc., have been known to fuel the transmissibility and/or co-infectivity of HIV by a peculiar paradigm: reduction in immunological functions and subsequent progression to the active disease, AIDS.

The future remains bleak as a result of the un-abating HIV prevalence in Nigeria. Estimates by the Federal Ministry of Health (FMOH, 2009), indicated that 2.98 million people were living with HIV/AIDS in Nigeria in 2009 with a total AIDS death of 192,000; the increasing number of orphans and vulnerable children estimated at 2.12million in 2008 and 2.175million in 200; the stigmatization of people living with HIV/AIDS and violation of their rights, their roles and responsibilities; the lack of adherence to the messages on behaviour change and safe sex options especially among young people aged 12-28 years old in secondary and tertiary institutions of learning and the difficulties associated with increased access to treatment options. Far from being an executive summary, this paper merely attempts to provide some useful data/or information on the prevailing situation and the predisposing factors to HIV epidemic in Nigeria and calls for a collaborative and concerted initiative by all and sundry

including the already established governmental and non-governmental parastatals in Nigeria towards a wholistic HIV intervention strategies/or programmes.

2.1 HIV situation

Nigeria, the most populous country in Africa, is located on the West Coast of Africa with a land mass of 923,768 square kilometers between 4°16' and 13°53' north of equator, and between 2°40' and 14°41' east of Greenwich. It is bordered by Niger Republic (north), Chad (north-east), Cameroon (east), Benin Republic (west) and Atlantic Ocean (south). Nigeria had a population of 140million in 2006; an estimation of 152.6 million in mid-2009, making Nigeria the eighth most populous country in the world (Population Reference Bureau 2009 Data Fact Sheet)



(Population Reference Bureau 2009 Fact Sheet)

Fig. 1. Nigerian Map showing major cities and international boundries

2.2 Global and national HIV/AIDS prevalence

AIDS has become a pandemic. There are 33.3 million people worldwide living with HIV/AIDS, with 2.6 million new infections per year and 1.8 million annual deaths due to AIDS (AVERT, 2009). In 2007, UNAIDS estimated: 33.2 million people worldwide had AIDS that year; AIDS killed 2.1 million people in the course of that year, including 330,000

children, and 76% of those deaths occurred in sub-Saharan Africa (UNAIDS/WHO, 2007). UNAIDS 2009 report indicated that worldwide some 60 million people have been infected, with some 25 million deaths, and 14 million orphaned children in southern Africa alone since the epidemic began (UNAIDS, 2009)

The index reported case of AIDS in Nigeria was in 1986 (Akinsete *et al.*, 1999). Two people were initially identified as sero-positive and by the end of the same year, a total of 6 were reported. By 1989, the figure had escalated to 65, and there is currently a very steady increase. HIV epidemic in Nigeria rose From 1.8% in 1991, the figure rose to 3.8% in 1993; 4.5% in 1995; 5.4% in 1999 and currently 5.8% in 2001 showing an average National HIV prevalence (Federal Ministry of Health 2001). Nevertheless, there was an observed slight increase in HIV from 4.4% in 2005 to 4.6% in 2008, with a state variation in some states and local government areas. From the 2008 ANC survey, a paradigm of variation was observed: at the zonal level, prevalence is lowest in the South West (2.0%) and highest in the South-South (7.0%).

Age specific prevalence is highest among 25-29 years age group (5.6%) and lowest among 40-44 years age group (2.9%) (NASCP Abuja, 2008). In the pattern of HIV transmission and prevalence, women are more affected; with policy implications for prevention of mother to child transmissions, hence, addressing gender inequality which is crucial in the control of the epidemic (Quinn and Overbaugh 2005; Ezumah, 2003).

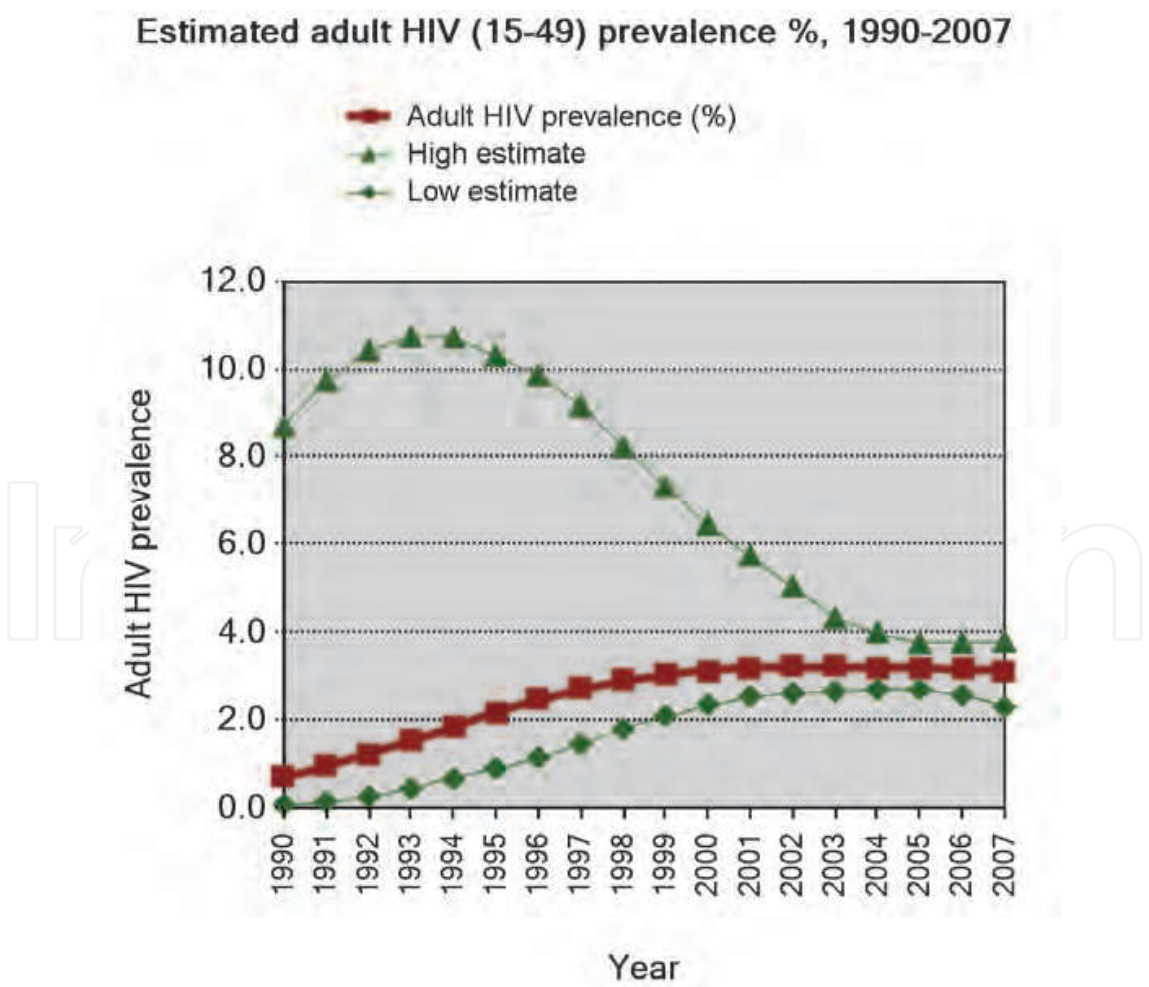


Fig. 2. UNAIDS/WHO estimate giving number of adults living with HIV



With a population of 152.6 million people and estimated HIV prevalence of 3.6 % in the general population, Nigeria has been reported to have the second largest population of people living with HIV/AIDS after South Africa: an 2.98 million people are living with HIV/AIDS by the end of 2009 (Population Reference Bureau 2009 Data Fact Sheet).

The UNAIDS/WHO reports presented below give estimated number of adults and children living with HIV. Figure 1, is an estimated adult HIV (15-49 years) % prevalence. The figure shows a decline in adult HIV prevalence from 1990 to 2007 (UNAIDS/WHO, 2007)

In Figure 2, estimate of people living with HIV is presented with a similar decline in % prevalence from 1990 to 2007. The estimates are based on methods and parameters informed by advice given by the UNAIDS Reference Group on HIV/AIDS Estimates, Modeling and Projections. (The median prevalence rates (in percentages) are given for each of the categories). Several deaths were reported in same year (Figure 3); the death toll does not however seem to be completely on the decline.

The observed decline in HIV epidemics in Nigeria can be attributed to a mirage of factors, including the upsurge in the use of antiretroviral therapy. Estimated number of people receiving and needing antiretroviral therapy at the end of each year has been on the increase (Figure 4). Presented here are coverage estimates based on the estimated unrounded numbers of people - all age groups - receiving antiretroviral therapy and the estimated

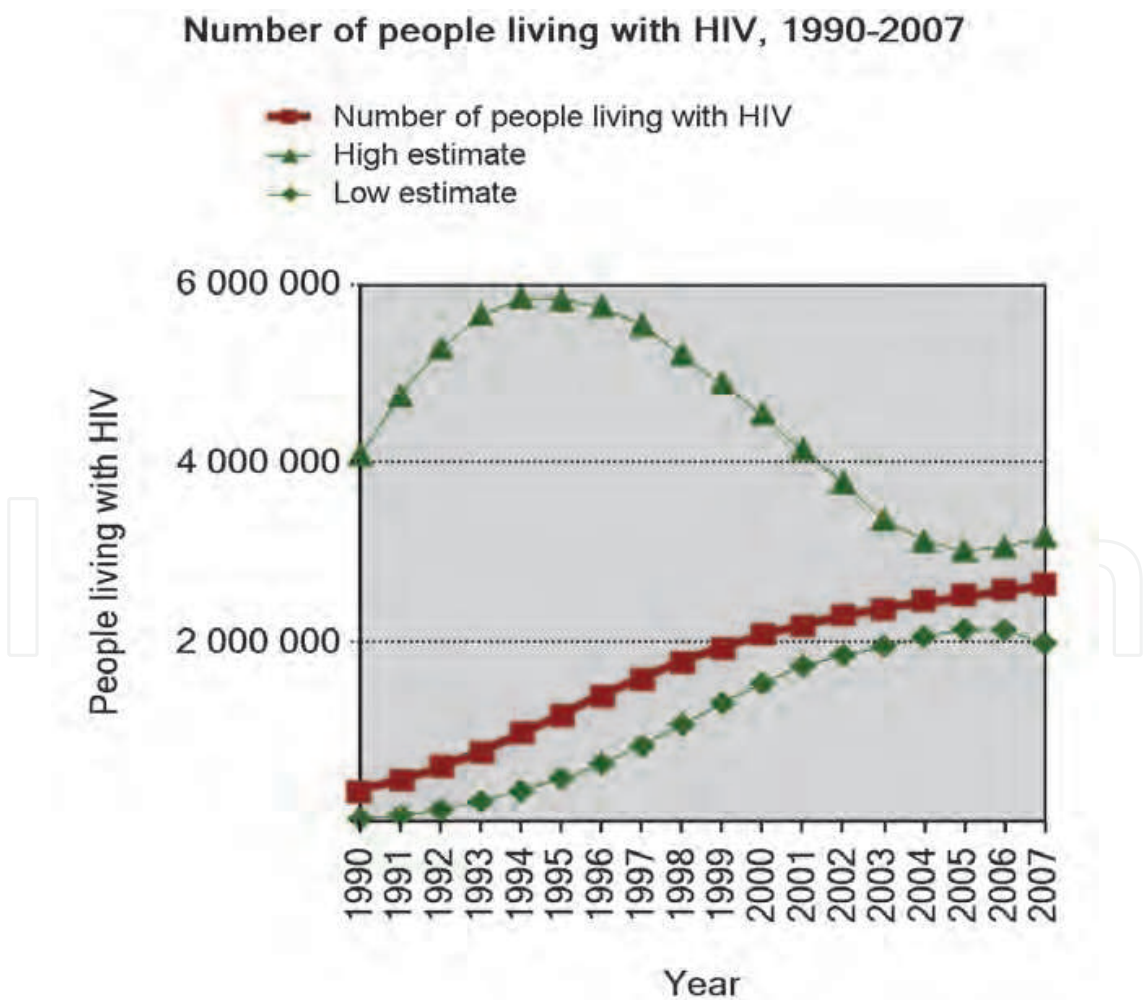


Fig. 3. Estimated HIV/AIDS death 1990-2007

unrounded need for antiretroviral therapy (based on UNAIDS/WHO methodology) (UNAIDS/WHO, 2008).

3.1 HIV transmission dynamics

Heterosexual sex remains the primary mode of transmission for HIV (Dibua, 2009), and accounts for 80-95% of HIV infections in Nigeria. According to the Federal Ministry of Health, high-risk groups significantly contributed to new HIV infections. The high risk groups are about 1% of the general population, and are men that have sex with men, female sex workers and injecting drug users. They contributed almost 23% of new infections. Also, the high risk groups and their partners contributed 40% of new infections. However, people practicing low-risk sex (clandestine sex) in the general population contribute 42% of the infections due to low condom use and high sexual networking (FMH, 2007) Furthermore, long distance truck drivers and traders who spend several days away from their homes and families and who engage the services of commercial sex workers or mistresses (Dibua, 2010), are also identified as important channels in the HIV distribution saga. Evidence of the enormous contribution of sex working (in its diverse forms) to HIV dissemination abound following the index screening of sex workers in 1988-1989 in Lagos State. Federal Ministry of Health (FMH, 1999), reported an increase from 2 -15% HIV prevalence among this group in 1993. This figure has escalated. Currently, HIV seroprevalence among prostitutes ranges from 18 - 51.8% with a national average of 22.9%.

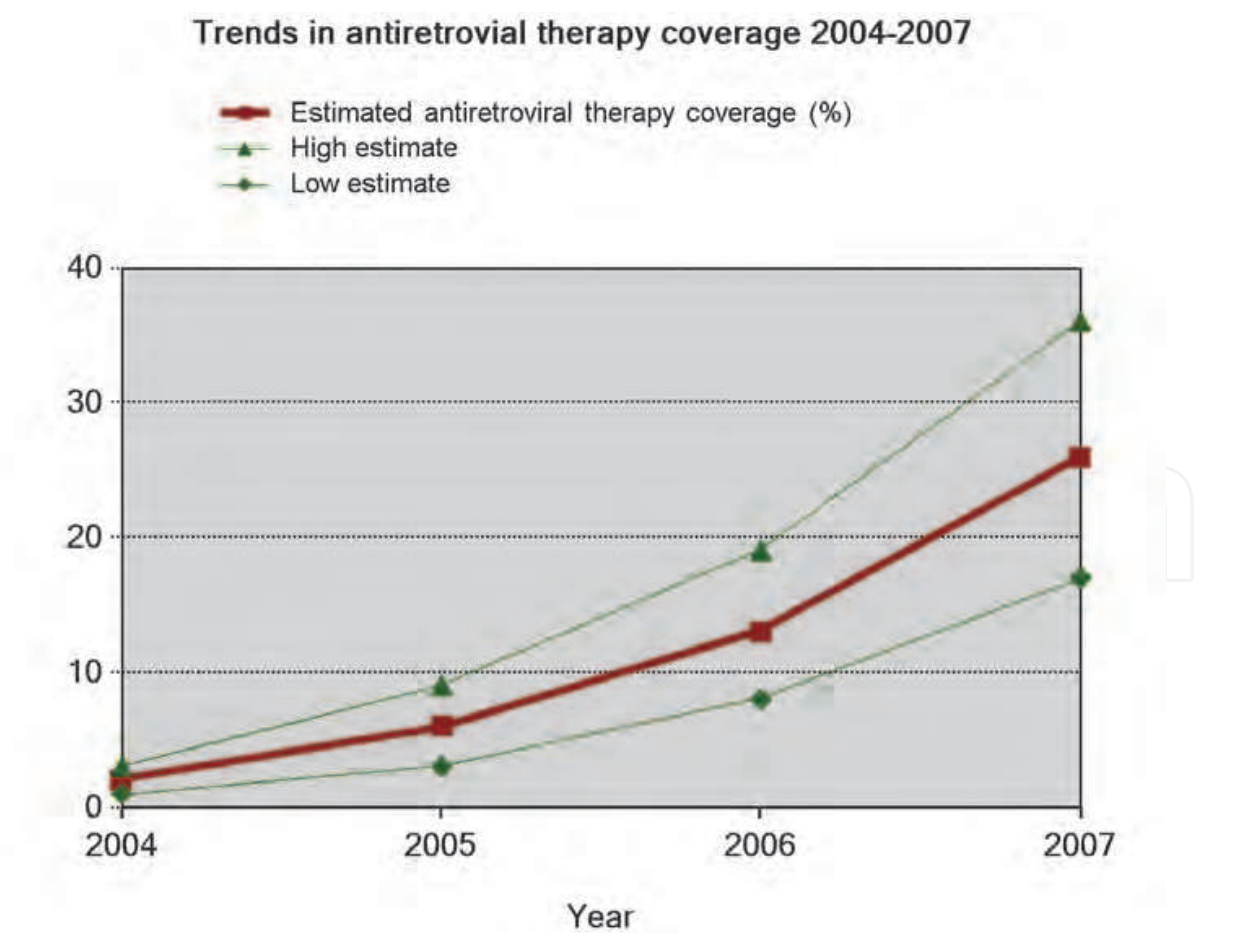


Fig. 4. Trend of Antiretroviral therapy in 2004-2007

Summary of HIV trend

The trend of the HIV epidemic is summarized in Table 1. The estimate of the percentage of adults (aged 15-49) living with HIV/AIDS is reported to be 3.6%. This is calculated by dividing the estimated number of adults living with HIV/AIDS at year-end by the total adult population at year-end.

Year	HIV/AIDS - adult prevalence rate	Rank	Percent Change	Date of Information
2003	5.80 %	26		2001 est.
2004	5.40 %	21	-6.90 %	2003 est.
2005	5.40 %	21	0.00 %	2003 est.
2006	5.40 %	21	0.00 %	2003 est.
2007	5.40 %	21	0.00 %	2003 est.
2008	5.40 %	21	0.00 %	2003 est.
2009	3.10 %	23	-42.59 %	2007 est.
2010	3.10 %	23	0.00 %	2007 est.
2011	3.60 %	17	16.13 %	2009 est.

Source: CIA World Fact-book March 11, 2010

Table 1. Nigeria HIV/AIDS - adult prevalence rate

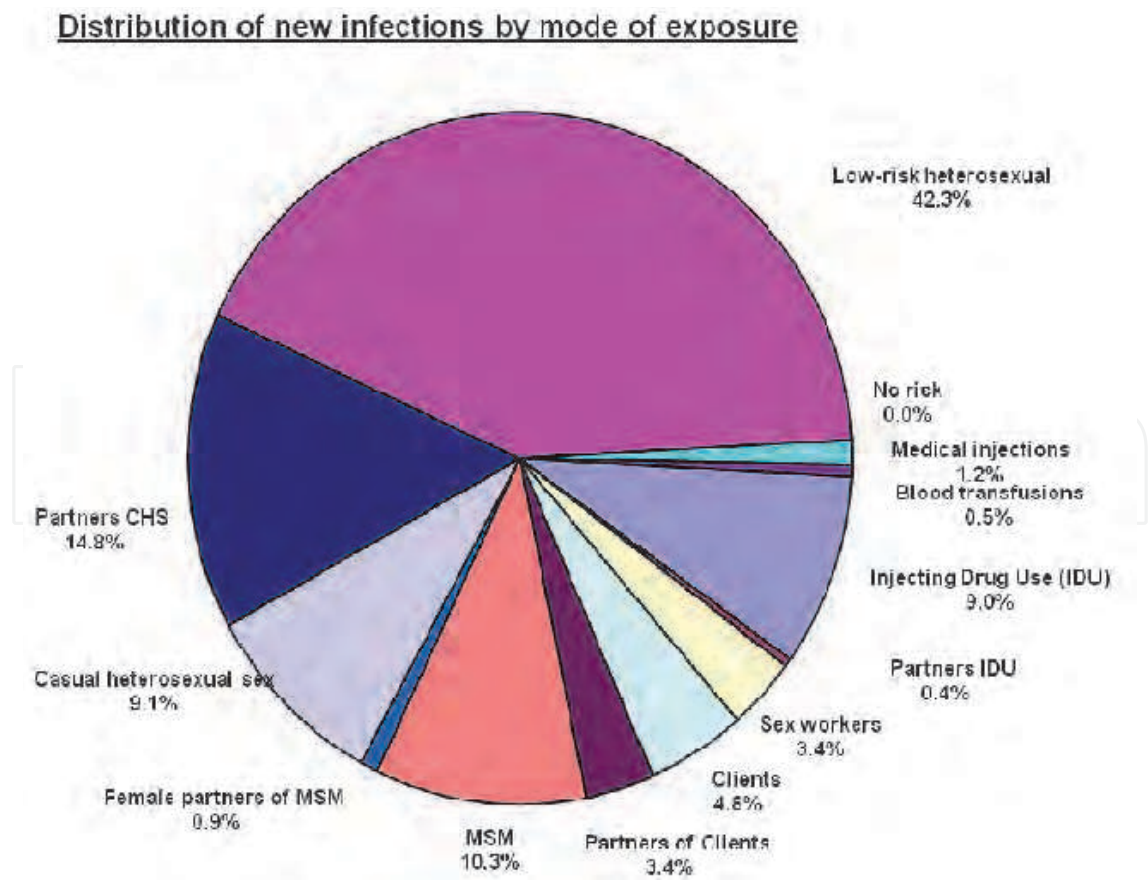


Fig. 5. Modes of HIV Transmission in Nigeria

A similar report on high risk groups and associated high HIV prevalence in the North-East trucking routes of Enugu State, indicated as follows: Commercial sex workers (CSW)(23%) > Students (21.%), Single parents (20%), Long Distance Truck Drivers – LDTD (19%) and Street Children (16%) (Figure 6) (Dibua, 2010)

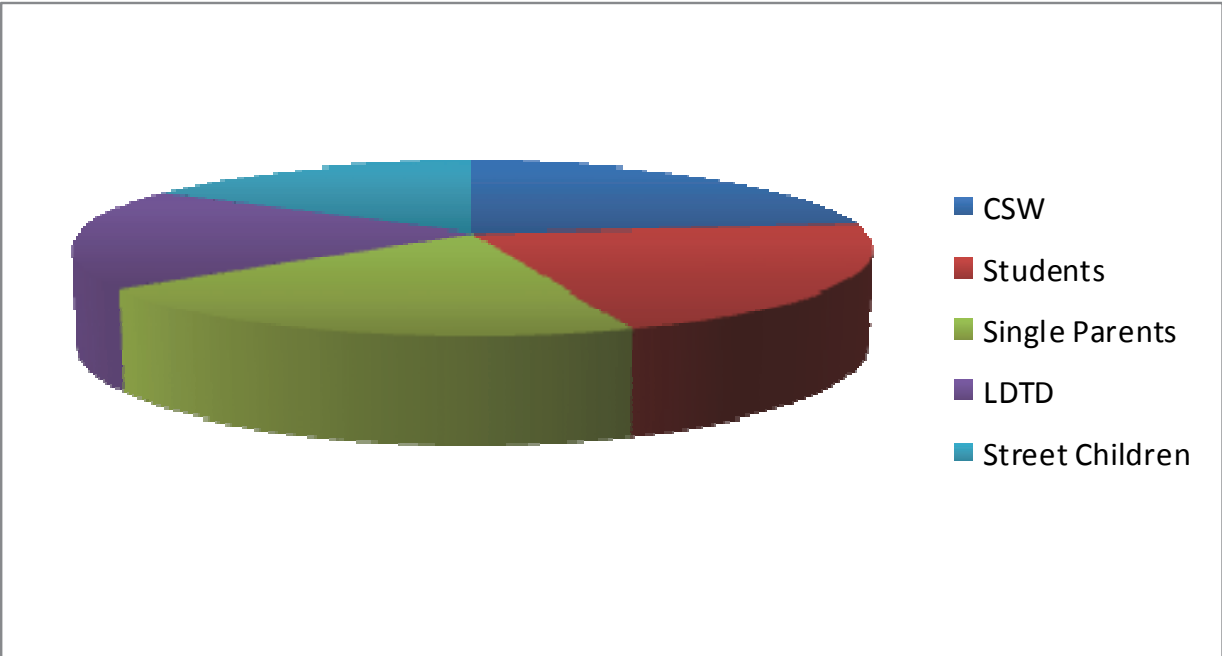


Fig. 6. HIV Transmission and Associated High Risk Groups

According to Dibua (2010), HIV spread in Nigeria is primarily a heterosexual phenomenon (multiple sex partnering): a function of sociocultural and economic predisposition: each filters out and merges into the final outcome: HIV/AIDS (Figure 7). However, there is no strict age or class divide or bias, as young and old are involved in commercial or clandestine sex working (though not resident in hotels), while the ultimate perpetrators are the rich or apparently rich financiers or customers. Anecdotal cases of HIV prevalence were mostly observed in the rural areas where people abscond to elude the social stigma of the disease. To arrest the hideous trend, the Nigeria Government under the auspices of the Federal Ministry of Health, responded by organizing series of surveillance campaigns at the grassroots.

With heterosexual intercourse driving the HIV epidemic, sex with prostitutes or commercial sex workers (identified here as individuals who exchange sex for money, not limited to those in brothels or hotels) has thus been identified as the largest single vector of HIV infection in the country. The steep increase in the rate of prostitution arising from economic recession as well as freedom of sexual expression are major factors responsible for the introduction / dissemination of HIV/AIDS into Nigerian homes. The study further indicated that HIV is a sociocultural and socioeconomic disease in Nigeria, and the paradigm of its infection and spread particularly within the local communities is a reflection of the sociocultural and socioeconomic profile of the people. Incriminated sociocultural predisposing factors to the HIV epidemic include marriage for the dead, surrogate marriage of woman to woman, concubinage, marriage of young girls to older men for favour or economic reasons. The factors have overlapping or interconnected relationships – none



excludes the other in importance or in enhancing HIV spread and progression. The precipitating factors of HIV infection as reported by Dibua (2010) is described below.

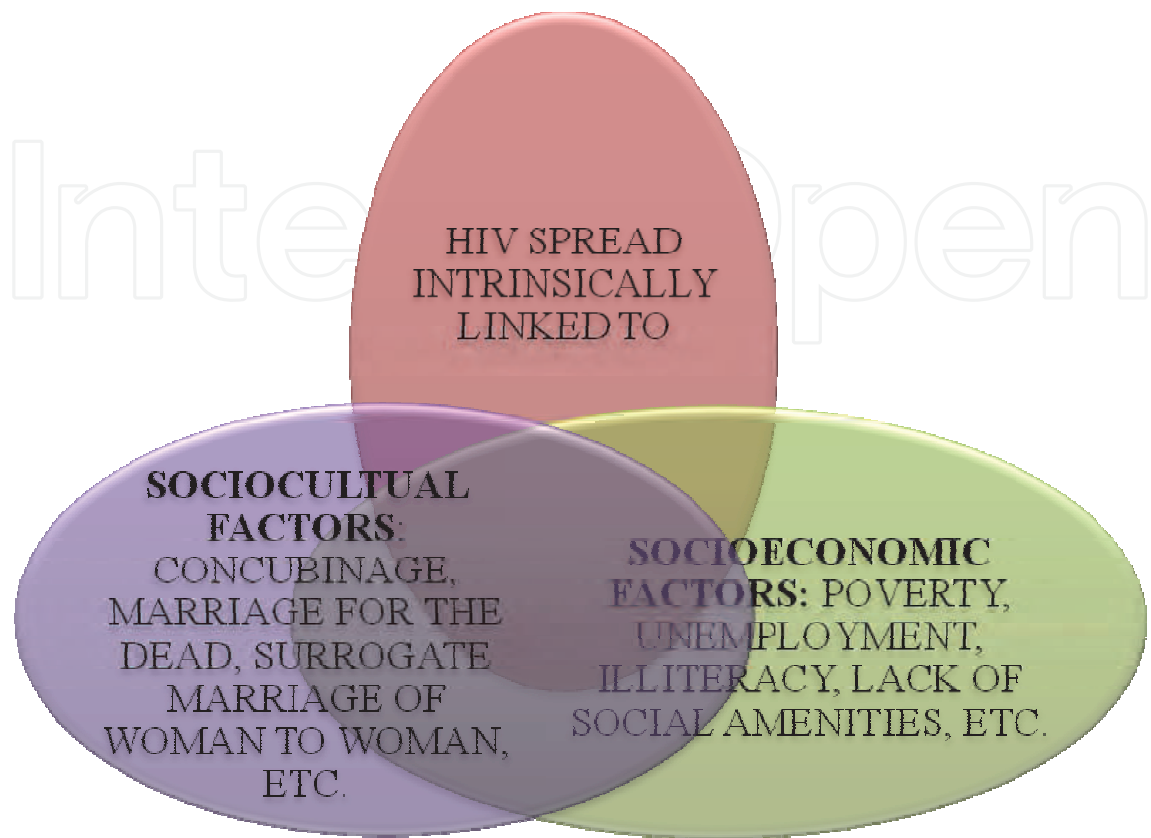


Fig. 7. Interlocking Paradigm Of HIV/AIDS Precipitating Factors

The concentration of the HIV epidemic in Nigeria is observed to be linked inextricably to socio-economic and political factors, which creates particular vulnerability to the agonizing consequences of the infection. Poverty, the incriminated factor, necessitates among others, population movement, thereby exacerbating the dissemination of the disease (Dibua, 2010); ignorance and low perception of risk/risk factors and risk groups in matters of sex and sexual contact among the men-folk, inability of women to negotiate for safe sex for fear of losing friends or finance, migrational activities due to economic repression, social/political conflicts which create avenue for stressful movements, and tend to separate spouses, thereby exposing the partners to sexual escapade, poverty, which makes people tend to be less anxious about risk-taking particularly for a long incubation period and gradual killer disease like AIDS. All these factors fuel the epidemic in significant but variable manner. Other incriminated factors include poor attitude/beliefs about AIDS and people living with HIV/AIDS. The absence of tolerance and involvement of these individuals in intervention programs creates some level of fear and shame/withdrawal that enhances re-infection. Similarly, the unwarranted social stigma and bitter cultural ostracization of the infected persons is on the increase. Furthermore, absence of safe and operational blood banking systems and good transfusion techniques especially in rural areas, where mostly untrained nurses, nursing aids and unqualified laboratory scientists/technicians are allowed to manage hospitals/clinics and medical laboratories are contributing factors in Nigeria.

### 3.2.1 HIV transmission modes

The risk of HIV infection depends on the amount of the virus in the transmitting fluid as well as the site of inoculation of that fluid. Retrospective studies have shown that there are some fluid-site combinations likely to result to HIV infection and those that are quite unlikely.

### 3.2.2 Blood transfusion

Blood given intravenously is observed to be the most likely combination with the highest probability of HIV infection (Busch et al, 1991). It is the mode with high risk of transmission of the HIV (CDC, 1982; Ammann et al, 1983). The association of transmissibility with inoculum of virus is most strikingly demonstrated in blood-borne infections. For small inocula, as with a needle prick infection, the risk is rather low, about 1/1000ml (CDC, 1987). On the other extreme, the recipient of a large volume, of instance, the 500ml in a unit of blood, is almost guaranteed to be infected (Busch et al, 1991). In some surgical operations such as heart transplant, HIV can be transmitted too when organs of an infected individual is transplanted into an uninfected person (CDC, 1993; Garner and Simmons 1983). Several cases of HIV transmission through blood transfusion has been reported in Nigeria and this calls for urgent action in personnel training and good blood screening protocols.

### 3.2.3 Parenteral transmission

In blood-borne transmission, the infectious inoculum transgresses the skin through needle prick, etc., while intact skin proves an effective barrier to HIV (Conley and Holmerg, 1992). Sharp objects such as needles, knives, razors, clippers, cosmetology tools, tattoo, piercing tools etc. can cut or wound the skin of individuals (Heald and Ransohoff, 1990). These objects used on infected individuals in whom cuts are made can, when used on wounded persons, transmit the virus from the objects containing blood particles (Henry and Campbell, 1995). Injection needles used on infected people can also transmit the virus when used on uninfected individuals if the needles are not discarded or sterilized before use (Gilmore, 1996).

Though individual cases of these transmission routes have not been well reported in Nigeria, they are nevertheless considered great possibilities in remote communities where tattooing and circumcision are done and several clinics and maternities are managed by unqualified and illiterate personnel

### 3.2.4 Perinatal or vertical transmission

Several cases have been reported on transmissions of the infection perenatally. This constitutes greater risk of mother to child (M-T-C) transmission of the virus.

#### a. Trans-placental infection

Perenatal transmission is common where the prevalence of infection among childbearing women is high (John and Kreiss, 1996). Infection also occurs after child delivery through breast milk from HIV-infected mother, or at time of delivery through blood transfusion. The mechanism of placental HIV transfer is as follows: the foetus is developed from the amniotic fluid; the placenta on the other hand surrounds the amniotic fluid, which contains the foetus (Minkoff et al, 1990). The umbilical cord connects the foetus and placenta, which in turn has

an attachment on the uterine wall. The placenta thus mediates between the foetus and the uterine wall. The foetus absorbs oxygen and other nutrients from the maternal placenta through diffusion. The umbilical cord, which is connected to the foetus, is also connected to the placenta, while blood vessels or capillaries transverse between the uterine wall and the umbilical cord. The capillaries are formed by the action of the progesterone during the implantation. The placenta receives the nutrients, oxygen etc., from the mothers' uterine wall and sends it to the foetus, then receives the liquid wastes products, carbon dioxide (CO<sub>2</sub>) from the foetus and transports through the umbilical cord into the system where it is now filtered and is excreted as waste through the urinary tract. HIV can then penetrate by diffusion; as the nutrients are being absorbed, the virus is also absorbed: from the infected mother to the foetus and hence the fetus becomes infected. Therefore, when the child is born it is already infected and so becomes an HIV-positive child (Minkoff et al, 1990).

#### **b. Breastfeeding**

The potential for transmission of HIV by breast-feeding is well established although the exact mechanism by which the transmission occurs has not been characterized. Below are two prospective mechanisms reported by researchers. Foremost, secretory Leukocyte protease inhibitor levels are high in both colostrums and breast milk as well as saliva of the new borne. Immediately at postpartum; only the breast milk shows dramatic decrease in the protease inhibitor level few weeks of postpartum (WHO, 1992; Peckman and Gibb, 1995). However if the mother of the child is HIV positive, the breast milk will show high levels of HIV as cell free virus as well as infections within the milk monocytes and macrophages. These high level of HIV present coupled with the relatively low levels of the protease inhibitor in breast milk may facilitate the viral entry in the tonsillar and intestinal crypts of the new born and the child will be infected thereby leading to the transmission and establishment of the HIV infection (Peckman and Gibb, 1995). Therefore, it appears that the local inhibitory factors that are important in hindering the HIV oral mucosal transmission are not efficient in preventing infection of the new born through breastfeeding. Secondly, it was observed that after the birth of the child, at the early stage of breast-feeding, the milk contains some droplets of blood particles from the infected mother, which could also be infected with HIV (WHO, 1992). When the child consumes this milk, the virus is thus transmitted to the child Southern and Southern (1997).

It is important to understand that finding a small amount of HIV in a body fluid does not necessarily mean that HIV can be transmitted by that body fluid. HIV has not been recovered from the sweat of HIV-infected persons. Contact with saliva; tears, or sweat has never been shown to be a major mode of transmission of HIV in Nigeria. Nevertheless, more research is needed to further unravel the possibilities of HIV infection through these modes.

#### **3.2.5 Sexual contacts**

The highest risky means of transmission of the HIV is through sexual contact (Ogbuagu and Charles, 1993; Dibua, 2010). Contaminated vaginal or seminal fluids are very sure sources of HIV transmission through sex by homosexuals, lesbians, bisexual and the heterosexuals (Liuzzi *et al*, 1996). The mechanism is as follow: the walls of the vagina of the female or the anus of the male (lesbians, homosexuals) have mucus membrane which contain the CD4+

cells such as macrophages, dendrites etc (Schwarz *et al* 1995). In the course of the sexual act, there are vaginal and penal secretions; if either the male or female is HIV positive, the secreted fluid, containing the virus now binds to the mucus membrane of the vagina or the opposite sex. In some cases (for those that use stimulants/drugs such as homosexuals, to enhance the pace of the sexual act), this up-thrust and forceful thrust of penis results in the wounding of the anal membrane of the counterpart or the vaginal walls and secretion of fluids from any party of the two individuals enhances the possibility of the virus to easily attach to the blood or the wounded membrane which has the CD4+ cells (Liuzzi *et al*, 1996). Moreover, in some sexual acts, leaking/sucking of the cunnus of the ladies results in sucking of the HIV from the cunnus of the vagina of the infected individual into the saliva, then to the mucus membrane and possibly to the blood stream. Even in the protected sex, there are reported cases of condoms being fake and breaking or slippage in the course of sex, instances which enhance viral entry and replication. Another mechanism is through penal secretions from the HIV positive man during sexual arousal, when he releases the sperm bearing the virus into the female. If fertilization occurs in the female, both the mother and the fetus are infected with the virus.

### 3.2.6 Saliva

Although transmission of HIV through sexual contact with saliva (oral sex) has not been widely shown (Fox, 1988), oral exposures to HIV infected semen, blood and breast milk can lead to infection in subtle ways. Unprotected orogenital contact, especially receptive oral intercourse are associated with greater risk of HIV transmission than previously thought (Southern and Southern 1997; Fleming and Wasserheit, 1999). The salivary anti- HIV properties, the local and mucosal integrity, and the level of infectious HIV present at the oral mucus site all influence the potential for HIV infection through the oral mucus membrane. WHO statistics has it that oral transmission of HIV does not constitute a great risk but makes 15% of the means of transmission of HIV (WHO, 1986; Fultz 1986).

Casual contact through “closed-mouth” or “Social kissing” has not been well shown to be a risk for transmission of HIV and no case of this has been reported in Nigeria. However, since the mouth of individuals has mucous membrane, which contains CD4+ receptors, when the virus gets to the mouth, it binds to the CD4 receptors at the oral mucosa and then replicates and spread to the other parts of the body (Ho and Byington, 1985; Barr *et al*, 1989). Nevertheless, the risk of acquiring HIV through saliva is said to be very low because the saliva is said to contain less quantity of HIV, which can cause infection (CDC, 1997). Because of the potential contact with blood during “French” or “Open-Mouth Kissing” CDC (National Centre for HIV/STD Control and Prevention) recommends against engaging in this activity with a person known to be infected (CDC, 1997; Berry and Shea, (1997). However, CDC has investigated only one case of HIV infection that may be an attitude to contact with blood during open mouth kissing (Crombie *et al*, 1998).

### 4.1 Role of opportunistic infections in development of aids

Opportunistic infections are typically observed only in individuals with a dysfunctional immune system (Madigan *et al*. 2009). The immune system can be weakened or compromised by malnutrition, alcoholism, cancer, diabetes, leukaemia, HIV/AIDS, trauma from surgery or injury, an altered microbiota from prolonged use of antibiotics (e.g. vaginal



candidiasis), and immune suppression led by drugs, hormones, genetic deficiencies, cancer therapy and old age (Joanne, 2008). Infection with HIV progressively reduces the effectiveness of the immune system by infecting primarily vital cells in the human immune system such as helper-T cells (to be specific, CD4<sup>+</sup> T cells), macrophages, and dendritic cells, leading to low levels of CD4<sup>+</sup> T cells. When CD4<sup>+</sup> T cell numbers decline below a critical level, cell-mediated immunity is lost, and the body becomes progressively more susceptible to malignancies and a mirage of infections, the opportunistic infections.

The geometric increase in the prevalence rates of the dual infections, tuberculosis and sexually transmitted diseases (STIs) have been identified as major factors driving the HIV epidemic in Nigeria. Untreated/poorly managed STIs create opportunity for viral entry. Similarly, the presence HIV activates latent TB and vice versa, which rather complicates HIV spread. Other driving factors worth enumerating include absence of quality medi-care, and health education programs particularly at the local levels.

#### **4.2 Sexually transmitted infections**

Sexually transmitted infections are a major global cause of acute illness, infertility, long term disability and death, with severe medical and psychological consequences for millions of men, women and children. The World Health Organization states that: "in developing countries, STIs and their complications are amongst the top five disease categories for which adults seek health care. In women of childbearing age, STIs (excluding HIV) are second only to maternal factors as causes of disease, death and healthy life lost". The presence of an untreated STI can also "increase the risk of both acquisition and transmission of HIV by a factor of up to 10". Unlike HIV, many STIs can be treated and cured relatively easily and cheaply if diagnosed early enough. However, diagnosis of STIs particularly among the local populace has become a herculean task as a result of indiscriminate use of antibiotics and/or drug abuse, which has increased the incidence in drug resistant strains. To fight these epidemics, Nigerian health authorities must act to expand access to testing and treatment facilities; to educate people about safer sex and risk reduction; and to counter the prejudice surrounding STIs.

The WHO estimates that 340 million new cases of syphilis, gonorrhea, chlamydia and trichomoniasis occurred throughout the world in 1999 in men and women aged 15-49 years. The largest number of new infections occurred in the region of South and Southeast Asia, followed by sub-Saharan Africa and Latin America and the Caribbean. The highest rate of new cases per 1,000 population occurred in sub-Saharan Africa (UNAIDS/WHO, 2004).

Prevalence rates of syphilis among women in the developing countries, is estimated at 100 times higher than in developed, industrialized world. The dissimilitude is due to socioeconomic factors, primarily poverty and its twin evil, lack of employment opportunity for the productive age group. These necessitate the influx of young men into urban, and quickly lead to increased demand for sexual services, provided very often by commercial sex workers as documented by Dibua (2009). The women at home in turn, resort to similar occupation to subsidize their income, with the resultant spread of several diseases including STIs. Other prevailing and devastating factors in Nigeria include lack of infrastructure and adequate information about STIs, illiteracy, and limited access to medi-care. Many women have symptomless STIs, hence do not recognize symptoms or are too embarrassed, shy or afraid to seek adequate medical attention. Several others rely

on native doctors and traditional healing methods and end up compounding the infection, ending up in multi resistant pathogens. Similarly, the social stigma associated with STIs, as well as the absence of cost effective treatment in government hospital/clinics necessitates the turmoil that encourages the patronage of native doctors and quacks. As a result of unrecognized and untreated STIs, women suffer severe complications such as pelvic inflammatory diseases (PID), ectopic pregnancy and infertility; men become sterile; new-born are left blind.

#### 4.3 Dangers of the STIs/HIV interaction

Several control strategies have been mounted by both national and international health oriented organizations against sexually transmitted diseases during the past decade due primarily to the fact that infection with several STIs is strongly believed to predispose or enhance HIV infection. It is now a general opinion that the presence of an STI can lead to tenfold increase of the risk of HIV infection.

An STI may increase susceptibility to HIV infection by causing genital lesions that facilitate viral entry, or by increasing the number of target cells (viral load) for HIV (activated lymphocytes or monocytes), causing infected individuals to reach peak infectivity at an earlier time. Genital ulcer disease cause enhanced HIV-1 transmission by amplifying viral replication (shedding) or independently increasing immunosuppression, giving rise to bursts of viremia, and subsequently, development of more rapid immunodeficiency. Sero-prevalence studies conducted in some African STI clinics indicate that these ulcers are more frequently cause by *Haemophilus ducreyi* infection, which is of less occurrence in the Western world. It was also shown that in Africa, the risk of HIV infection is higher with genital ulcers caused by Syphilis, Herpes Simplex, and *Chlamydia trachomatis* infections. Epstein Barr virus (EBV) and Cytomegalovirus (CMV), though not directly associated with genital lesions, result in activation of target cells, hence are co-factors though their single and pair-wise effect has not been documented in Nigeria.

The shedding of HIV in genital fluids is increased by discharge from, and the inflammatory to sexually acquired infections, rendering the HIV sero-positive individuals more infective at the moment of the infection with STIs. The CD4 lymphocytes (the white blood cells targeted by HIV) in the mucus membrane lining the womb (endocervix) where the infection often occurs in women, is observed to increased incommensurably during a gonococcal or chlamydial infection. Research has shown that treating an STI can reduce the secretion of HIV. In one study, HIV virus was isolated in only half as many HIV-positive men after treating them for gonorrhea. In another, there was a 100-fold decrease in the amount of virus detected in the ejaculate of a man after treatment for chlamydial urethritis (Dallabetta, 1999). Other epidemiological studies indicated that the risk of HIV infection was higher with genital ulcers (caused by syphilis, chancroid or herpes). The clearest evidence STIs have significant impact on HIV transmission is the result of a community-based randomized clinical trial from the London School of Hygiene and Tropical Medicine, the Tanzania National Institute of Medical Research and the African Medical and Research Foundation (AMREF). The investigation showed a 42 percent reduction in new HIV infections in communities where improved STD treatment was effected

The foregoing outline the synergy between HIV and STIs. While HIV enhances the span of several STIs, Some STIs in turn intensifies the infective rate of HIV. It therefore becomes

evident that effective and worthwhile intervention strategies aimed at preventing HIV infection in Nigeria particularly among the high risk groups are rooted in the prevention and control of sexually transmitted infections – STIs.

#### 4.4 HIV and TB, the dual epidemic

HIV epidemic has breathed new life into an old enemy – Tuberculosis even in Nigeria. HIV spurs the spread of TB and increases the tuberculosis risk for the whole population. One-third of the world's population, or two billion people, carry the TB bacteria, more than 9 million of whom become sick each year with "active" TB which can be spread to others. "Latent TB" disease cannot be spread (WHO, 2010). TB has highest prevalence in conditions of poverty and overcrowding. In such communities as in most African countries, people typically become infected in childhood, but a healthy immune system wards off the infection. Hence, people can remain infected for life with dormant, un-infectious TB, and are called TB carriers. The carriers remain healthy, but transmit the germs to the close contacts.

With the emergence of HIV, the depleted immune system due to the virus is predisposed to TB infection. Hence, the risk of developing active TB is 30-50 folds higher for people infected with TB alone. TB disproportionately affects people in resource-poor settings, particularly those in Asia and Africa (WHO, 2009). Clearly TB is the single most important opportunistic disease related to HIV infection in the developing world, and in Africa. Twenty-two countries are considered "high-burden countries (HBCs)," accounting for approximately 80% of new TB cases each year; most HBCs are in Africa and Asia. India, China, South Africa, Nigeria, and Indonesia have the highest number of new TB cases in the world. In 2008, the global TB incidence rate was 139 per 100,000 population, down from a peak of 143 per 100,000 in 2004 (U.S. Global Health Policy, 2010). About 78% of co-infections were in Africa, the region hardest hit by HIV. South Africa alone accounted for 32% of the total number of HIV positive TB cases in the Africa region.<sup>3</sup> Of the 1.8 million people who died from TB in 2008, an estimated 500,000 were HIV-positive. Overall, one-third of the world's population is currently infected with the TB bacillus. 5-10% of people who are infected with TB bacilli (but who are not infected with HIV) become sick or infectious at some time during their life. People with HIV and TB infection are much more likely to develop TB (WHO, 2010).

TB and HIV are frequently referred to as co- or dual-epidemics due to their high rate of co-infection (UNAIDS 2006). TB is the dominant infection in one third or more of AID patients (De Cock *et al*, 1992). The proposal that all HIV - positive patients in the US with CD4 cell counts less than 200 ( $0.20 \times 10^9/L$  - 200 ml) be considered cases of AIDS (CDC, 1992) irrespective of disease presentation, would resolve the discussion about when TB becomes an AIDS-defining illness but would be impossible to apply in the developing world.

#### 4.5 HIV and TB - a deadly synergy

HIV and TB form a lethal combination, each speeding the other's progress. HIV weakens the immune system. Someone who is HIV-positive and infected with TB bacilli is many times more likely to become sick with TB than someone infected with TB bacilli that is HIV-negative. TB is a leading cause of death among people who are HIV-positive. In Africa, HIV

is the single most important factor contributing to the increase in the incidence of TB since 1990 (WHO, 2010).

Interest in the study of the dual epidemic has emerged as a result of the following:

- One-third of the world population is living with HIV. 80% of the adult population in the developing and under-developed countries, especially in conditions of poverty and overcrowding carry the tubercle bacilli.
- TB adds to HIV burden by shortening life expectancy, while HIV spurs the spread of TB.
- Range of infectivity of TB (spread via aerosol) is wider than HIV. TB can infect 10-15 people if untreated within 1 year. TB carriers who are also infected with HIV are 30-15 times more likely to develop active TB than those without HIV since HIV weakens their immune system.
- Spread of HIV in a community where TB carriers live implies parallel epidemics of AIDS and TB faced by the population.
- TB cases have doubled or even tripled in some countries of Africa. These caseloads are great health hazards stretching the health care system to breaking point.
- TB is the leading killer of HIV- positive Africans. More than 5 million of the 13 million Africans now alive with HIV are expected to develop TB, and over 4 million will die untidy deaths.
- HIV infected people who also have the tubercle bacilli are unusually prone to developing active tuberculosis.

#### 4.5.1 In HIV infected people

- TB is harder to diagnose than in HIV-negative people, only 35-50% of HIV positive people have pulmonary TB, detectable from first a sputum sample others have "extra-pulmonary disseminated TB" which can be diagnosed only with special laboratory facilities.
- TB progresses faster (than AIDS) in HIV-infected people and is more fatal.
- TB occurs earlier in the course of HIV infections than other opportunistic infections, at a CD4 cell count of 350.
- The epidemiology of TB has been profoundly influenced by the epidemic of HIV infection in most developing countries.
- TB is an earlier opportunistic disease in the course of HIV infection. Wherever the infection with *M. tuberculosis* is common, predominantly in the developing world, TB rapidly becomes the major implication of HIV infection where HIV begins to spread.
- The highest rates of TB incidence and HIV specific mortality occurs in Sub Saharan African (Murray *et al*, 1990).

#### 4.5.2 Burden of HIV/TB

- Infection with HIV will increase the number of TB cases directly promoting reactivation of TB.
- It will increase the caseload to man uncertain degree by increasing secondary transmission from the increased number of active cases.
- Untreated, a sputum-smear positive patient infects 10-15 other people in a year (Murray *et al*, 1990)



- Primary TB infections in HIV- positive persons will run a more aggressive course and cause disease more frequently.
- About 10% HIV seroprevalence will result in a three-fold increase in adult TB cases.
- Published data of TB in HIV-positive persons range from 3.1 to 7.9 per 100 person-year. If applied to Africa, between 95,000 and 359,000 cases of TB occur annually in HIV-positive persons.

## 5. Conclusion

HIV epidemic has become a reality in Nigeria. Understanding the dynamics and variability of HIV infection in a community is a major step in tracking down HIV transmission in the area. This study elucidates target issues in HIV epidemic such as global and national prevalence, associated sociocultural and socioeconomic predisposing factors, transmission modes, risk groups, and AIDS-related opportunistic infections including other sexually transmitted infections and tuberculosis with the aim to encourage further research on the dynamics and mechanisms of HIV transmission which will foster HIV Prevention and Control strategies. Primary prevention of HIV/AIDS pandemic can best be achieved through education changes in sexual behaviour (abstinence or reduction of sexual partners). Treatment of other sexually transmitted diseases was shown to reduce HIV infection in a large controlled trial from Tanzania. Among persons already infected with HIV early detection of the infection provides the greatest opportunity for Counselling, partner referral, prevention, and other services. Increased rate of HIV infection has been inextricably linked to socioeconomic factors (poverty) that place women at disadvantaged position (Ainsworth *et al*, 1994). Alleviation of poverty and women emancipation programs may contribute towards effective HIV control and/or prevention. Similarly, wider prevention of perinatal transmission, screening of blood and heat treatment of blood products to destroy the virus should be fostered particularly in resource poor villages and peri-urban centres (Ullrich, 2003). HIV infected mothers should avoid breast-feeding to reduce transmission of the virus to their children using alternative feeding options available (WHO, 1992). All women who have been potentially exposed should seek HIV antibody testing before becoming pregnant and, if the test is positive, should consider avoiding pregnancy. Further action needed include: education of intravenous drug users concerning the need to avoid sharing the needles and syringes, abstinence from casual sex and strict monogamous relationship, education on protected sexual behavior and practices. Effectiveness of Condom remains issue of debate. The Food and Drug Administration (FDA) of America indicated that proper and consistent use of latex or polyurethane (a type of plastic) condoms when engaging in sexual intercourse--vaginal, anal, or oral, greatly reduce a person's risk of acquiring or transmitting sexually transmitted diseases, including HIV. Nevertheless, fidelity and abstinence remain significant preventive measures.

## 6. References

- Ainsworth, M. & Over, M.A (1994). The economic impact of AIDS in Africa. *AIDS in Africa*, pp. 559-585.

- Akinsete, I., Nasidi, A. S., Egbewunmi, A. et al. (1989). Seroprevalence of HIV- Infection in Various Groups Tested at the Lagos University Teaching Hospital, Lagos, Nigeria, between. *IV Internet Conf.: AIDS and Assoc. Cancers in Africa*, Marseille, Oct. 18-20, Poster 400
- Ammann, A.J., Wara, D.W. & Dritz, S. (1983). Acquired immunodeficiency in an infant: possible transmission by means of blood products. *Lancet*, 1: 965-958.
- AVERT HIV/AIDS Nigeria. (2010).  
<http://www.avert.org/aids-nigeria.htm>
- Berry, M.M., & Shea, T. (1997). Oral sex and HIV transmission. *Journal of Acquired Immune Deficiency Syndrome*, 14: 475-7.
- Busch, M.P., Young, M.J. & Samson, S.M. (1991). Risk of human immunodeficiency virus (HIV) transmission by blood transfusions before the implementation of HIV-1 antibody screening. *Transfusion*, 31: 4 -11.
- Center for Disease Control and Prevention (CDC) (1982). Possible transfusion-associated acquired immune deficiency syndrome (AIDS) – California. *Mortality and Morbidity Weekly Report*, 1: 652-65.
- Center for Disease Control and Prevention (CDC) (1987). Revision of the CDC Surveillance Case Definition for Acquired Immunodeficiency Syndrome. *Journal of American Medical Association*, 258: 1143-1145.
- Center for Disease Control and Prevention (CDC) (1992). Revised classification system for HIV infection and expanded surveillance case definition for AIDS among adolescents and adults. *MMWR*. 41 (no.17:961-2.
- Center for Disease Control and Prevention (CDC) (1993). Recommendations on prophylaxis and therapy for disseminated *Mycobacterium avium* complex for adults and adolescents infected with human immunodeficiency virus. *Mortality and Morbidity Weekly Report*, 42: 3-20.
- Center for Disease Control and Prevention (CDC) (1997). Evaluation of safety devices for preventing percutaneous injuries among health-care workers during phlebotomy procedures – Minneapolis St. Paul, New York City, and San Francisco. *Mortality and Morbidity Weekly Report*, 46: 21-25.
- CIA World Fact-book, (2010).  
<https://www.cia.gov//Library/publications/the-world-fact-book/fields/2155/html>
- Conley, L. J. & Holmberg, S.D. (1992). Transmission of AIDS from blood screened negative for antibody to the human immunodeficiency virus. *New England Journal of Medicine*, 326: 1499-1502
- Crombie, R. & Silverstein, R. L. (1998). Identification of a CD36-related thrombosporidin 1-binding domain in HIV-1 envelope glycoprotein gp120: relationship to HIV-1 specific inhibitory factors in human saliva. *Journal of Experimental Medicine*, 198: 25-35.
- Dallabetta, G. (1999). Treating sexually transmitted diseases to control HIV transmission. *Current Option in Infectious Diseases*, 10: 22-25.
- De Cock, K.M., Soro, B. Coulibaly, I.M. & Lucas, S.B. (1992). Tuberculosis and HIV infection in sub-Saharan Africa. *Journal of American Medical Association*, 268: 1581-1587

- Dibua U. (2010). Socio-Economic And Socio-Cultural Predisposing Risk Factors To HIV/AIDS: Case Study of Some Locations In Eastern Nigeria. *The Internet Journal of Tropical Medicine*; Volume 6 Number 2.
- Ezumah, N.E. (2003). Gender Issues in the Prevention and Control of STIs and HIV/AIDS; Lessons from Awka and Agulu, Anambra State, Nigeria. *African Journal of Reproductive Health*, 7:89: 99
- Federal Ministry of Health (FMOH), (1999) HIV/Syphilis Sentinel Sero-prevalence Survey in Nigeria. Technical Report. National AIDS/STD Control Programme, Nov. Pp. 1-53
- Federal Ministry of Health (FMOH). (2001). A Technical Report on 2001 National HIV/Syphilis Sero-Prevalence Sentinel Survey among Pregnant Women Attending Antenatal Clinics in Nigeria. Abuja: NASCP, Nigeria
- Federal Ministry of Health (FMOH). (2007). Integrated Bio-Behavioural Surveillance Survey Among Most at Risk Populations in Nigeria. Abuja: National AIDS/STIs Control Programme (NASCP), Nigeria (IBBS 2007)
- Federal Ministry of Health. (2009). National HIV/AIDS and Reproductive Health Survey. Abuja (NARHS 2007), Nigeria
- Fleming, D.T. & Wasserheit, J.N. (1999). From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission of HIV infection. *Sexually Transmitted Infections*, 75: 3-17.
- Fox, P.C. & Wolff, A. (1988). Salivary inhibition of HIV-1 infectivity: functional properties and distribution in men, women, and children. *Journal of American Dental Association* 118: 709-11.
- Fultz, P.N. (1986). Components of saliva inactivate human immunodeficiency virus [letter]. *Lancet*, 2: 215.
- Garner, J.S. and Simmons, B. P. (1983). Guidelines for isolation precautions in hospitals. *Infectious Control*, 4: 245-253.
- Gilmore, N. (1996). Blood and blood product safety. In: Mann J, Tarantola D, eds. *AIDS in the World*. II. Oxford: Oxford University Press, 287-301.
- Heald, A.E., & Ransohoff, D.F. (1990). Phlebotomy practices/needles stick injuries/Hepatitis B status/among interns in a Dublin Hospital *Irish Medical Journal*, 85: 102-104.
- Henry, K. & Campbell, S. (1995). Needle stick/sharps injuries and HIV exposure among health care workers. National estimates based on a survey of U.S. Hospitals. *Minn. Med* . 78: 41-44.
- Ho, D.D. & Byington, R. E.. (1985). Infrequency of isolation of HIV-III virus from saliva in AIDS [Letter]. *New England Journal of Medicine*, 313: 1606-1672.
- Joanne W.M., Linda M.S., Christopher J.W. (2008). Prescott, Harley, Klen's Microbiology. Seventh Edition. McGraw Hill. Boston. Pg 1016.
- John, G.C. & Kreiss, J. (1996). Mother to child transmission of human immunodeficiency virus type 1. *Epidemiological Review*, 8: 149-157.
- Madigan M.T., Martinko J.M., Dunlap P.V., Clark D.P. (2009). Brock's Biology of Microorganisms 12<sup>th</sup> Edition. Pearson Benjamin Cummings. San Francisco. Pg 993.

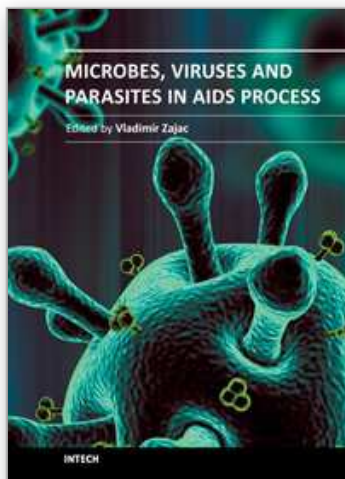
- Minkoff, H., Nanda, D., Merez, R. & Fikrig, S. (1990). Pregnancies resulting in infants with acquired immunodeficiency syndrome or AIDS related complex *Obstetric gynecology*, 69: 285.
- Murray, C.J.L., Styblo, K. & Rouillon, A. (1990). Tuberculosis in developing countries: burden, intervention and cost. *Bulletin of the International Union Against Tuberculosis and Lung Disease*, 65: 6-24.
- NASCP Abuja. (2008). Federal Ministry of Health Report on the 2008 National HIV/Syphilis Seroprevalence Sentinel Survey among Pregnant Women Attending Antenatal Clinics in Nigeria. Abuja: Nigeria.
- Ogbuagu, S.U. & Charles, J.O. (1993). Survey of sexual networking in Calabar. *Health Transition Review*. 3 (Suppl): 105-19.
- Peckham, C. & Gibb, D. (1995). Mother to child transmission of the human Immunodeficiency virus. *New England Journal of Medicine*, 1: 133:298-302
- Population Reference Bureau. (2009). HIV Data Fact Sheet Reference Bureau
- Quinn, T.C., Overbaugh, J. (2005). HIV/AIDS in women: an expanding epidemic. *Science*, 308: 1582-83
- Schwartz, S.K. & Kellogg, T.A. (1995). Temporal trends in human immunodeficiency virus seroprevalence and sexual behavior at San Francisco Municipal Sexually Transmitted Disease Clinic, 1989-1992. *American Journal of Epidemiology*, 142: 314-22.
- Southern, S. & P.J. Southern. (1997). Oral Transmission of HIV during long-term breastfeeding. HIV-1 Infection, Mucosal Immunity and Pathogenesis. *Natcher Conference Center NIH*, October [abstract p.51]
- Ullrich, D. (2003). HIV/AIDS and Urban Poverty in South Africa, *An Update* pp. 11-19.
- UNAIDS, 2006. *Report on the global AIDS epidemic*. Geneva, <http://www.unaids.org:80/en/KnowledgeCentre/HIVData/GlobalReport/Default.asp>, accessed 5 May 2008).
- UNAIDS. (2009). Report: Modes of HIV Transmission in Nigeria: Analysis of the Distribution of New HIV Infections in Nigeria and recommendations for Prevention
- UNAIDS/WHO. (2004). Epidemiological Fact-Sheets on HIV/AIDS and Sexually Transmitted Infections, Update
- UNAIDS/WHO. (2007). *AIDS epidemic update*. Geneva <http://www.unaids.org/en/KnowledgeCentre/HIVData/EpiUpdate/EpiUpdateArchive/2007>, accessed 5 May)
- UNAIDS/WHO (2008). UNAIDS/ Reference Group on HIV/AIDS Estimates, Modelling and Projections. Estimated number of adults and children living with HIV
- World Health Organization (WHO). (1986). Acquired immunodeficiency syndrome (AIDS). *Weekly Epidemiological Records*, 61: 69-73.
- World Health Organization (WHO) (1992). Global AIDS Case Surveillance. World Health Statistics, *Annual Review*, 30-2
- World Health Organization WHO. (2009). Rapid advice: Antiretroviral Therapy for HIV infection in adults and adolescents



World Health Organisation (WHO). (2010). Gender inequalities in HIV. August  
<http://www.who.int/en/>

IntechOpen

IntechOpen



## **Microbes, Viruses and Parasites in AIDS Process**

Edited by Prof. Vladimír Zajac

ISBN 978-953-307-601-0

Hard cover, 390 pages

**Publisher** InTech

**Published online** 19, October, 2011

**Published in print edition** October, 2011

The main goal in compiling this book was to highlight the situation in Africa in terms of AIDS and opportunistic diseases. Several chapters reveal great poverty, an apocalyptic situation in many parts of Africa. Global migration of people resulted in their exposure to pathogens from all over the world. This fact has to be acknowledged and accepted as African reality. New, unconventional hypotheses, not determined by established dogmas, have been incorporated into the book, although they have not yet been sufficiently validated experimentally. It still applies that any dogma in any area of science, and medicine in particular, has and always will hinder progress. According to some biologists, in the future, AIDS is very likely to occur in a number of variations, as a direct result of the ongoing processes in the global human society. Thus, we urgently need a comprehensive solution for AIDS, in order to be ready to fight other, much more dangerous intruders.

### **How to reference**

In order to correctly reference this scholarly work, feel free to copy and paste the following:

Dibua Uju (2011). HIV/Aids Fact Sheet – Predisposing Factors the Nigeria Situation, Microbes, Viruses and Parasites in AIDS Process, Prof. Vladimír Zajac (Ed.), ISBN: 978-953-307-601-0, InTech, Available from: <http://www.intechopen.com/books/microbes-viruses-and-parasites-in-aids-process/hiv-aids-fact-sheet-predisposing-factors-the-nigeria-situation>

**INTECH**  
open science | open minds

### **InTech Europe**

University Campus STeP Ri  
Slavka Krautzeka 83/A  
51000 Rijeka, Croatia  
Phone: +385 (51) 770 447  
Fax: +385 (51) 686 166  
[www.intechopen.com](http://www.intechopen.com)

### **InTech China**

Unit 405, Office Block, Hotel Equatorial Shanghai  
No.65, Yan An Road (West), Shanghai, 200040, China  
中国上海市延安西路65号上海国际贵都大饭店办公楼405单元  
Phone: +86-21-62489820  
Fax: +86-21-62489821

© 2011 The Author(s). Licensee IntechOpen. This is an open access article distributed under the terms of the [Creative Commons Attribution 3.0 License](https://creativecommons.org/licenses/by/3.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

IntechOpen

IntechOpen