

Incidence of HIV and AIDS in Ahoada, Port Harcourt, Nigeria

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Abstract

Acquired Immune-Deficiency Syndrome (AIDS) is a collection of symptoms and infections resulting from the specific damage to the immune system caused by the Human Immuno-deficiency Virus (HIV) in humans. A total of one hundred (100) persons including adults, teenagers, children and infants were screened for the presence of HIV antibodies as to determine the incidence of HIV and AIDS in Ahoada, a rural town near Port Harcourt, Nigeria. The investigation was carried out by obtaining serum from the blood of the individuals by centrifugation. The serum was subsequently used for the Enzyme Linked Immunosorbent Assay (ELISA) to determine the samples that were sero-positive or sero-negative for HIV. The results obtained showed that generally, 22 of the persons screened were sero-positive for HIV while 78 were sero-negative. Whereas sero-positive males and sero-negative males constituted 13% and 35% respectively, the sero-positive females and sero-negative females constituted 9% and 43% respectively. Of the sero-positive persons, 59.09% were males while 40.91% were females. The percentage of sero-positive persons under age classification was; adult males (36.36%), adult females (22.73%), teenage males (9.09%), teenage females (13.64%), male children (13.64%) and female children (4.45%). The order of decreasing incidence of HIV sero-positive persons within age group is Adult males > female teenagers > adult females > male teenagers > male children > female children. This study showed that, children who are not sexually active constituted 18.19% of sero-positive persons while teenagers and adults who are sexually active constituted 81.82% of sero-positive persons. All the adults are married while all the teenagers are not married. This paper aims at emphasizing the need for the control of this epidemic to avoid its spread in Ahoada and neighbouring communities where the awareness of the HIV epidemic is low.

Keywords: HIV; AIDS; Perinatal transmissions; Immunosorbent assay.

1. Introduction

The human Immune-Deficiency Virus (HIV) is the cause of the deadly disease, Acquired Immune-Deficiency syndrome (AIDS) which causes a serious loss of the human immune system's ability to protect a person against rare forms of cancer and other infections disease [1]. AIDS is a collection of symptoms and infections resulting from the specific damage to the Immune system. Infections with HIV are now global with many of those infected being homosexual and heterosexual young men and women all over the world with the highest prevalence in SubSaharan Africa [2,3].

Currently, two genetically and immunologically distinct human immunodeficiency viruses are known. They are HIV-1 and HIV-2 [4,5]. HIV-1 has the widest distribution in Europe and America while HIV-2 has the widest distribution in Africa [6]. HIV is present in semen, vagina and cervical secretions and blood and these are the main routes by which the virus is transmitted. The virus may also be present in saliva, tears, urine, breast milk, cerebrospinal fluid and infected discharges but these are seldom vehicles by which HIV is spread [7,4].

A healthy individual can be infected with HIV from an infected person either by blood, sexual or perinatal transmission. The virus may enter as a free pathogen or as a cell bound particle. After a person becomes infected with the virus, it reproduces itself and infects other cells[1] within three to eight weeks of infection, the infected individuals begins to develop an illness like influenza that may last for one to two weeks from then on, the infected person remains asymptomatic for weeks, months or years[8]. During this period the virus replicates and can be detected but more time is required for the person to respond immunologically with the formation of antibodies. Although there have been reports of delayed antibody response to HIV-1 infection, most infected persons develop antibodies (sero-convert) to HIV-1 proteins within 3 - 6 months. The interval between infection and seroconversion or detection of antibodies is called *window* period [9].

This period of latency from infection to full blown antibody detection may vary from one and a half to two months in blood-borne infection to long latent period in sexually transmitted HIV infection. A further period may last for years during which virus and antibodies co-exist. The individual becomes sero-positive but will not develop symptoms [10]. The response however depends on the route of transmission, the dose of the virus or viral load, the immune response of the individual, and the frequency of exposure to the virus.

In developing countries, the major modes of transmission are; heterosexual sex, mother to child transmission (perinatal transmission), blood transfusion, and through unsterilized sharp instruments like syringes, blades, needles etc [4,11]. Heterosexual intercourse is the commonest route of transmission of HIV infection from person to person. The virus can be spread from an infected man to an uninfected woman and *vice versa*. Heterosexual transmission via the vagina intercourse probably accounts for the majority of infection world wide. People with promiscuous lifestyles such as prostitutes, traveling business men, lorry drivers and men using prostitutes have a greater risk of HIV infection.

Perinatal transmissions have three major routes of infection of the foetus/child by the mother namely transplacental, intra-partum (When there may be mixing of maternal and child blood and other fluids), and post-natally through breast-feeding. A fourth possibility of transmission in Africa especially exists when the mother feeds the infant with chewed food. Children born through caesarean section also have been documented to have HIV infection. Also postnatally, an infant born to an initially HIV negative mother who received infected blood through transfusion was thought to have been infected through breast milk. Not all infants delivered by HIV positive mother however contract the infection [1].

When a HIV infected person donates blood that is being transfused into a HIV-negative person, the non-infected persons becomes infected with the virus and can develop AIDS. In some developing countries like Nigeria, those at greater risk of becoming infected by blood transfusion are young children with severe anemia (mainly caused by malaria), children with sickle cell disease crisis, pregnant women with severe anaemia, or those with complication before, during or after delivery involving hemorrhage [7,11].

Moral decay is a social vice that has pervaded the Nigerian society and the world at large. But its recent history and consequences has had even greater impact on the prospects of youths, young adults and adults alike [12]. In 1987, approximately 25,000 blood samples were screened for HIV/ AIDS in Nigeria out of which 55 were confirmed to be positive to HIV virus and other had signs and symptoms for the virus. The HIV/AIDS epidemic is

now a serious problem in Nigeria. About 3.5 million Nigerians are infected with the HIV and several thousands have already died of disease due to AIDS. This is bound to have had a major social and economic impact on the Nigerian society [13].

The commonest screening method is called Elisa (Enzyme linked immunosorbent assay) which is capable of detecting the presence of HIV-1 and HIV-2 in serum of infected persons [5]. The enzyme linked immunosorbent assay (ELISA) strip test for HIV -1 and HIV-2 is based on highly specialized immunodominant antigen of the core and enveloped proteins of HIV-1 and epitope of the HIV-2 envelop which is modified to ensure specificity and sensitivity. A good example of Elisa is the peptide Elisa method. The advantage of this method is that it is highly accurate compared to other similar method of HIV detection. It works at room temperature and is thus adaptable to the Nigerian and African situations of erratic electricity supply thus making it useable in rural health facilities [12]. Each year, an estimated 7-10% of HIV infected persons develops full blown AIDS and die. The fact that an individual is sero-positive to Elisa and subsequently to Western blot is not an indication that the person has AIDS but only indicates the presence of HIV in the persons system. Testing for HIV will be an important component of AIDS control even as prevention and therapy are developed for this infection [14]. The percentage of HIV positive patients who actually develops full blown AIDS varies from one geographical area to another [1].

In Nigeria, the studies on HIV/AIDS are usually carried out in the cities and not in the rural areas. Medical assistance and care and distribution of antiretroviral drugs are also concentrated in the cities or urban areas. The predisposing factors for progression of HIV to AIDS after infection are thought to include malnutrition, overall health and constitution of the individual, genetically determined vulnerability to chronic HIV infection and the presence of other underlying infections that can hasten immunosuppression [1], anxiety of infection progressing to AIDS cause a lot of stress which may itself hasten the onset of full blown AIDS.

It is becoming increasingly clear that the role of HIV testing in clinical diagnoses of AIDS is not a simple one, particularly in tropical developing countries where simultaneous existence of human immune-deficiency virus and endemic tropical diseases is confusing the clinical picture [15].

Collection of blood samples, hair samples, etc from persons living in the rural areas for scientific studies is usually a herculean task. This is because of their beliefs that the blood samples may be used in voodoo activities. Another problem encountered is having the actual age of persons as in most cases births are not registered, and those who deliberately cut down on their age. This also applies to marital status where every adult considers it irresponsible to accept not being married in public. There is no

literature on scientific studies on HIV/AIDS in the rural areas. There is therefore the need to conduct such studies in the rural areas as to enlighten the individuals on the awareness of HIV/AIDS as to prevent the spread of the epidemic.

2. Methods

The materials used for screening for HIV antibodies during the investigation are; A low speed centrifuge, 25µm micropipettes, EDTA bottles, Izal and sodium hypochlorite for decontamination, Disposable hand gloves, Rubber tunicates, Methylated spirit, Cotton wool, and ELISA Screening test strips for HIV. The name of the test strips is DETERMINE. It is used for *in vitro* diagnostic use. The DETERMINE strips for HIV-1 and HIV-2 is a visual read qualitative immunoassay for the detection of antibodies to HIV-1 and HIV-2. The kit contains 100 HIV-1 and HIV-2 recombinant antigen and synthetic peptide coated test cards and it is stored at 2-30°C. The kit was manufactured by Inverness Co. LTD Japan. Manufacture date was 2008-03-10 and the expiring date is 2009-03-20. Laboratory wears like laboratory coat, mouth and nose cover, and hand gloves were put on for safety purposes.

2.1 Collection of blood samples and spinning for collection of serum

Blood samples were collected from a total of one hundred (100) persons at random. They included sick persons who reported to a privately owned clinic, persons who accompanied sick persons to the clinic, and some volunteers. However, on analysis of the data of persons sampled, the following numbers and age range were obtained:

- 20 sexually active men ranging from 46-60 years.
- 20 sexually active women ranging from 46-60 years.
- 20 teenagers from 13-19 years with a total of 10 females and 10 males.
- 20 children ranging from ages 5-12 years
- 20 infants ranging from 6 months to 4 years.

The blood samples from each subject were collected intravenously ($\frac{1}{2}$) with 2ml syringes after their hands were tied with the rubber tunicate to aid blood sample collection.

Each blood sample was aseptically transferred into an EDTA blood bottle and appropriately labeled. Each of the EDTA blood bottles was kept on a bottle rack to prevent pouring and mixing up. The blood sample was subsequently spun (spinned) at 1000 rotations per minute for a period of 5 minutes in the Low Speed Centrifuge Model 800D (Surgifriend Medicals, England) for easy and fast sedimentation or coagulation as to obtain the serum needed for the HIV antibody screening. Blood samples were allowed to completely sediment so that a pure serum is obtained. The maximum speed of the

centrifuge is 4000rpm and the power source is 220 volts.

2.2 Procedure for ELISA test

ELISA Screening test strips for HIV were made available based on the total number of sera to be screened. Disposable micropipette (25µl) was used to add 25µl of each test serum to each strip. Each test strip has a control which detects anti-HIV antibody (*IgG* and *IgM*) and HIV P₂₄ antigens and a position where the test serum is deposited. Adequate time was allowed for proper reaction to occur before results are read. A new disposable micro pipette tip was used for each test serum sample to avoid mixing up of samples or contamination.

3. Results and Discussion

An unused ELISA HIV screening strip is as shown in Figure 1A. For an HIV sero-positive result, a red/pinkish colour line develops on the space provided for the test serum. This is an indication that the test serum contains antibodies to the virus (HIV-1 and HIV-2) and thus is sero-positive to HIV. However, another red/pinkish line develops on the control to show that the strip is valid. An HIV sero-positive ELISA strip is shown in Figure 1B.

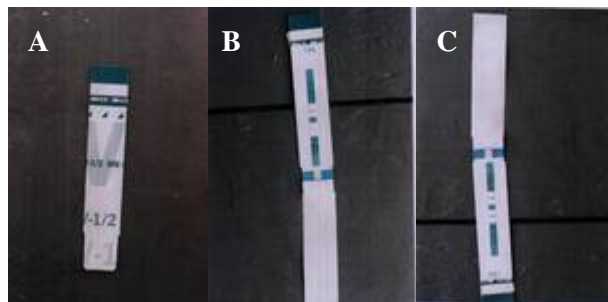


Figure 1. HIV screening strips. (A): Unused strip; (B): HIV sero-positive strip; (C): HIV sero-negative strip.

On the other hand, if only a single red/pinkish line develops on the control after deposition of the serum, this indicates that the individual is sero-negative to HIV virus. Where there is failure of development of a red/pinkish line on the ELISA test strip after the deposition of the test serum, it indicates that the strip is invalid and this must not be recorded. An HIV sero-negative ELISA strip is shown in Figure 1C.

The results obtained during the investigation showed that generally, 22 of the persons screened were sero-positive for HIV while 78 were sero-negative. Whereas sero-positive males and sero-negative males constituted 13% and 35% respectively, the sero-positive females and sero-negative females constituted 9% and 43% respectively. The result of the incidence of HIV within various age groups and sex including the marital status and educational background of the

one hundred (100) persons screened in Ahoada is as shown in Figure 2.

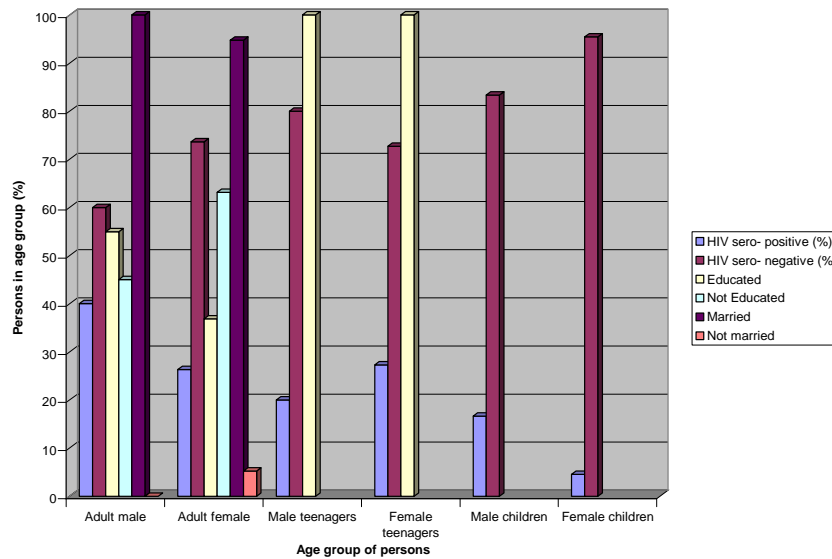


Figure 2. Incidence of HIV within age groups of 100 persons screened in Ahoada.

Figure 2 shows that within the adult male group, the HIV sero-positive persons constituted 40% while the HIV sero-negative persons constituted 60%. Educated adult males constituted 55% while the non-educated constituted 45%. All the adult males are married. Within the adult female group, the HIV sero-positive persons constituted 27.27% while the HIV sero-negative persons constituted 72.73%. Educated adult females constituted 36.84% while the non-educated constituted 61.16%. All the adult females except one (5.26%) are married. Within the male teenager group, the HIV sero-positive persons constituted 20% and the HIV sero-negative persons constituted 80%, while within the female teenager

group, the HIV sero-positive persons constituted 27.27% and the HIV sero-negative persons constituted 72.73%. All the teenagers are in secondary schools and none of them is married. Within the male children group, the HIV sero-positive persons constituted 16.67% and the HIV sero-negative persons constituted 83.33%, while within the female children group, the HIV sero-positive persons constituted 4.55% and the HIV sero-negative persons constituted 95.45%.

The information on the HIV sero-positive persons of the various age groups and sex including marital status and educational background in Ahoada is as shown in Figure 3.

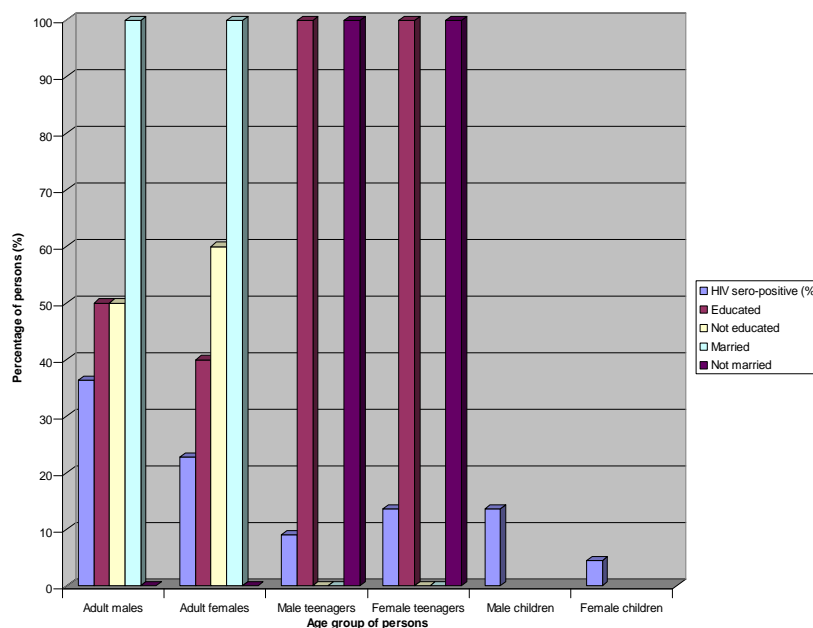


Figure 3. Information on the HIV sero positive persons in Ahoada.

Of the sero-positive persons, 59.09% were males while 40.91% were females. The percentage of sero-positive persons under age classification was; adult males (36.36%), adult females (22.73%), teenage males (9.09%), teenage females (13.64%), male children (13.64%) and female children (4.45%). This study showed that, children who are not sexually active constituted 18.19% of sero-positive persons while teenagers and adults who are sexually active constituted 81.82% of sero-positive persons. All the adults are married while all the teenagers are not married. The present investigation showed that heterosexual sex contributed 72.74% of the persons who were sero-positive for HIV. The sero-positive case makes one to query the lifestyles of the persons, whether educated or not educated. Fifty percent (50%) of the sero-positive adult males are educated while 50% are not educated. On the other hand, Forty percent (40%) of the sero-positive adult females are educated while 60% are not educated.

This study has revealed the incidence of HIV infection among individuals in Ahoada using the enzyme linked immunosorbent assay (ELISA). However, a negative Elisa test at any time does not preclude the possibility of an exposure or infection by HIV. This is so because a false negative result may occur if ELISA testing is carried out soon after infection by HIV [16]. This shows that the percentage of HIV sero-positive persons may in fact be higher than as reported in this study.

This study shows that the order of decreasing incidence of HIV sero-positive persons within age group is Adult males > female teenagers > adult females > male teenagers > male children > female children. This present study showed that children who are not sexually active constituted 18.19% of sero-positive persons while teenagers and adults who are sexually active constituted 81.82% of sero-positive persons. This confirms that heterosexual sex contributes about 80% of the total HIV transmission in Nigeria [16].

A major reason for the prevalence of HIV in this region is that given the main routes of spread, there are particular behaviours and practices that increase the risk of HIV infection. These are having multiple sexual partners (polygamy and sexual promiscuity) whose HIV status are unknown, engaging in unprotected sex or "unsafe sex" practices and sharing objects such as razor blades and circumcision. Many of the seropositive individuals living in Ahoada may have acquired this virus through immoral life styles especially their sexual activities with prostitutes who might have HIV and careless life styles. The incidence of HIV is higher in both the adult males and female teenagers than in their corresponding counterparts because these groups of persons tend to sleep out for pleasure and financial gains and they also cheat on their partners. However, some of the HIV sero-

positive female teenagers and the female children may have been victims of rape which is very rampant in the rural areas.

In view of the long incubation period of HIV, most infected persons would be seen healthy and within this asymptomatic period, they pose a serious danger to the public by spreading the virus [8]. Some infected persons are professional blood donors due to economic hardship and because of the monetary compensation involved. Some were detected during this investigation and have been found positive and unfit for blood donation.

Breast feeding mother who do not know their HIV status will keep transferring the virus to their little infants who becomes positive to HIV and dies. Many HIV positive individuals are not on routing antiretroviral drugs. This is due to the expenses involved in incurring these drugs and the inconsistency in the supply of the drugs to rural areas.

The investigation also revealed that some individuals having this virus have no knowledge about it and this could lead to an increase in the spread of this virus since many who are HIV sero-positive are not even aware that they are living with the virus.

The present attitude of not screening blood before transfusion and not knowing individual's HIV status especially with the proliferation of private hospitals and clinics in Ahoada also aid in the increase in the prevalence of HIV infection in Ahoada. Since most communities like Ahoada where activities like blood transfusion and other health related activities take place do not have facilities for screening, it is suggested that the time is ripe for the establishment of more regional screening facilities which should be responsible for collection, screening and provision of screened blood to all health institutions within the areas of operation.

The result of this study also suggest that there is need for law against transfusion of unscreened blood, rape and other immoral acts that could lead to transmission of HIV. There is also need to legislate against the donation of blood especially by commercial blood donors as it has been found that most blood donors are touts with high prevalence rate of blood infection. The transmission of HIV through blood transfusion will become a serious problem in Ahoada if not properly handled and checked. This is because there is high demand for blood in hospitals due to frequent fatal road traffic accidents, anemia and other disease conditions.

4 Conclusion

The investigation has revealed that the incidence of HIV/AIDS occurred in all the age groups and sex in the study. Since some of the infected persons consider themselves healthy, they may be unaware of the risk they pose to others. The incidence of HIV

infection around Ahoada will therefore be on the increase if the necessary precautions are not adhered to.

Currently, there is no known cure for AIDS. Although anti-retroviral drugs are presently in use for suppressing the proliferation of the virus within the system of infected persons, the routine access to anti-retroviral medication is not readily available especially in a developing country like Nigeria and most especially in the rural areas such as Ahoada. There is therefore, need to urgently emphasize the prevention of HIV infection through sex, blood transfusion and perinatal transmission and sharing of sharp objects. Sex education and HIV/AIDS outreach/awareness campaigns (public enlightenment) should be carried out in this community and its environs.

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