Prevalence of Human Immunodeficiency Virus Infection among Pregnant Women Attending General Hospital Kashere, Gombe State, Nigeria

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Abstract: Prevention of transmission of HIV from mother to child is a serious public health issues globally.There are approximately 1.4 million HIV positive women who become pregnant and contribute to more than 300,000 neonatal and foetal deaths each year. HIV in pregnancy is of concern because women with HIV/AIDS may transmit the infection to their child during pregnancy, delivery and while breastfeeding. This study was carried out to determine the prevalence of HIV infection in pregnant women attending antenatal clinic in Kashere General Hospital from 2015 to 2019. A total of 3,144 pregnant women were enrolled and screened for HIV infection during the antenatal visit, after collecting their socio-demographic, gynecological and obstetric details. A one-step HIV-DETERMINE test kit was used to screen the blood samples collected by needle-prick on fingertip. The results revealed that out of the 3,144 pregnant women screened, only 41(1.30%) were found positive and 39 of the positive cases fall within 21 to 30 years age group. Highest rate (4.3%) was found in the year 2017, followed by 1.75% in 2015, with 0.60% in 2019 as the least. This study, therefore advocate advocated early antenatal visit, voluntary testing in pregnancy and improved girl-child education/awareness as an essential step in PMTCT programmes.
Key words: Pregnant women, Kashere, HIV, Trimester, Antenatal, Mother-to-child, Girl-child

INTRODUCTION

Human Immunodeficiency Virus (HIV) is the cause of the spectrum of disease known as acquired immune deficiency syndrome (AIDS). HIV is a retrovirus that primarily infects components of the human immune system such as $CD4^+$ T cells, macrophages and dendritic cells. It directly and indirectly destroys $CD4^+$ T cells. HIV is a member of the genus *Lentivirus*, part of the family *Retroviridae*.

Acquired immune deficiency syndrome (AIDS) is the HIV infection stage when a human immune system is highly compromised that it cannot control common diseases and certain cancer. Prior to introduction of antiretroviral therapy (ART), people with the virus could progress to AIDS in just a few years. But today, HIV-infected person can survive even beyond a decade with the disease before developing AIDS (Sawant *et al*., 2016). As HIV infections in women occur primarily during their reproductive life, pregnancy provides a unique opportunity for transmitting implanting HIV infection to the foetus (Anderson, 2012). The incidence of HIV infection especially in sexually active young individuals is the most sensitive marker to track the course of HIV epidemic (Read *et al*., 2012).

Acquired immune deficiency syndrome (AIDS) is a major threat to the global health and development. The consequences of the disease are undeniable, WHO (World health organization) stated that global HIV prevalence rate was approximately 35miliion in 2013 which constitutes around 3.2million HIV infected children less than 15years of age (Gill *et al*., 2015). Mother to child HIV transmission rate varies from 20 to 25 % in absence of any therapeutic intervention and the disease continues to impair the immune system, exposing the infected person to a range of opportunistic viral, bacterial, parasitic infections and malignancies (Okafor *et al*., 2014). This vertical transmission can be prevented by appropriate measures like early diagnosis during the timely antenatal visit and check (Okafor *et al*., 2014).

Human immunodeficiency virus (HIV) is mainly transmitted through unprotected sex, contaminated blood transfusions, hypodermic needles, and from mother to child (during pregnancy, delivery, or breastfeeding).

Some bodily fluids, such as saliva, sweat and tears may constitute a risk of HIV transmission. Methods of prevention include safe sex, needle exchange programs, treating those who are infected, pre- and post-exposure prophylaxis, and male circumcision.(Read *et al*., 2012). Disease in a baby can often be prevented by giving both the mother and child antiretroviral medication. There is no cure or vaccine; however, antiretroviral treatment can slow the course of the disease and may lead to a near-normal life expectancy. Treatment is recommended as soon as the diagnosis is made, without which the average survival time after infection is narrow (King *et al.,* 2013). In the case of blood transfusion, since blood carries a high concentration of HIV, it should always be screened so that infected blood should not be given to someone else. Sharing sharp metal equipment such as razor, piercing equipment and injecting equipment like needles, syringes and cottoning that are not sterilized and have been used before by an infected people can increase the risk of HIV/AIDS transmission (Nesheim *et al*., 2012).

Without antiretroviral preventive interventions, the risk of perinatal HIV transmission has varied between 15 and 45 percent, depending on maternal risk factors and whether breastfeeding is practiced (Nesheim *et al*., 2012). The most important risk factors for transmission have consistently been maternal plasma and breast milk viral load then maternal immunity and clinical stage. Analyses of viral load levels in the original trial of zidovudine to prevent MTCT (Birkhead *et al*., 2010; Bispo *et al*., 2017), demonstrated a direct positive correlation between maternal plasma viral load and risk of transmission to the infant. Other maternal and infant factors have also been associated with increased risk of transmission. Some associated maternal risk factors include low CD4 cell counts, anaemia, maternal mastitis, and acute maternal sero-conversion during pregnancy or breastfeeding (Townsend *et al*., 2012; Drake *et al*., 2014).

More than 90 % of all new paediatric HIV cases result from perinatal transmission of HIV, which can occur *in utero* accounted for about one-third of the infant HIV infections, while about two-thirds of transmissions occurred around the time of labour and delivery (Fowler *et al*., 2014). In breastfeeding settings prior to the availability of antiretroviral interventions, about 25 to 40% of infant infections were estimated to occur in utero, about 50 percent around the time of labour/delivery or through very early breastfeeding (De Cock *et al*., 2000).

A majority of *in utero* transmission is thought to occur during the third trimester. This is based on low rates of viral detection using HIV NAT on foetal tissue from abortions in the first and second trimester (Lallemant *et al*., 2004, as well as statistical modeling analyses (Kourtis *et al*., 2001). In a study of long versus short antenatal zidovudine prophylaxis for prevention of mother-to-child transmission, the rate of *in utero* transmission was 5.1% when starting zidovudine at 36 weeks gestation compared with 1.6% when starting zidovudine at 28 weeks gestation, suggesting that a significant proportion of transmission may occur between 28 to 36 weeks gestation, and a smaller residual amount of *in utero* infection may occur earlier in pregnancy (King *et al*., 2013). Mechanisms of transmission are thought to be related to breakdown of the integrity of the placenta, leading to micro-transfusions of viraemic maternal blood across the placenta to the foetus (Landesman *et al*., 1996).

A number of studies have shown that genital tract infections and placental inflammation, especially chorio-amnionitis, can increase in utero HIV transmission (Hoffman *et al*., 2010). Transmission during the time of labour and delivery is postulated to occur through contact of infant mucosal membranes with HIV virus in blood and secretions during the birth process. In the absence of antiretroviral treatment, duration of membrane rupture greater than four hours has been associated with increased risk of

transmission (Hoffman *et al*., 2010). In addition, micro-transfusions across the placenta during labour contractions also likely contribute to the heightened risk of transmission (Lee *et al*., 2010). The risk of HIV transmission from a mother to child is most directly related to the plasma viral load of the mother. Untreated mothers with a viral load >100,000 copies/ml have a transmission risk of over 50%. For women with a viral load <1000 copies/ml, the risk of transmission is less than 1% (Lee *et al*., 2010). In general, the lower the viral load the lower the risk of transmission. For this reason, ART is recommended throughout the pregnancy so that viral load levels remain as low as possible and the risk of transmission is reduced. Women with an established diagnosis of HIV often begin ART before becoming pregnant to treat the infection. It is recommended that all pregnant women begin ART regardless of CD4 counts or viral load to reduce the risk of transmission. The earlier ART is initiated, the more likely the viral load will be suppressed by the time of delivery. Some women are concerned about using ART early in the pregnancy, as babies are most susceptible to drug toxicities during the first trimester. However, delay in ART initiation may prove less effective in reducing infection transmission (Lee *et al*., 2010). Antiretroviral therapy is used at the following times in pregnancy to reduce the risk of mother-to-child transmission of HIV.

In developing countries like Nigeria, the successful prevention of mother-to-child transmission of HIV depends on women timely antenatal attendance, early/proper diagnosis and antiretroviral intervention; which is not feasible in some parts of the country. The aim of this study is to determine the prevalence of HIV/AIDS among pregnant women attending a health care facility in North-eastern Nigeria.

MATERIALS AND METHODS

Collection of data and demographic details

A personal data information sheet was used to record the age of the pregnant women that attended the General Hospital Kashere from January 2015 to December, 2019. A simple questionnaire was also used to collect their socio-demographic details, gynecological and obstetric history and antenatal HIV status. The information given was verified by cross-checking with antenatal cards information and results for HIV test were confirmed from the laboratory database, according to the methods of Cornett and Kirn, (2013).

HIV screening test

A one-step HIV-DETERMINE^{TM} test kit was used to screen the blood samples collected by needle-prick on fingertip. A drop of whole blood specimens was placed on the sample application pad, one drop of buffer (supplied with the kit) was added. Test result was read after 2 minutes. A positive HIV antibody test result was shown by a red line in the patient and the control area as described by Cheesbrough (2016).

Ethical consideration

Ethical clearance was sought from the hospital management and informed consent of the women was obtained before commencement of data collection and sampling/screening.

RESULTS

In this study (Table 1), the median age of the pregnant women enrolled is 25 years (range of 15 – 45 years). Majority are married (94.5%), from Kashere town (61.8%), while 38.2% were from neighbouring villages. Most of the women (50.8%) started attending the antenatal clinic towards the end of second trimester to the beginning of third trimester and only 20.7% visited the hospital during the first trimester. The results also revealed that 50.5% of the women have attended secondary schools, but some dropped-out before completion.

Out of the 3,144 pregnant women screened in 2015 to 2019, 41(1.30%) were found positive. The annual prevalence of HIV infection among pregnant women on their antenatal visit in General hospital Kashere (Table 2), show that highest rate (4.3%) was found in the year 2017, followed by 1.75%

in 2015, with 0.60% in 2019 as the least. This study also shows the prevalence of HIV infection among pregnant women according to their age range (Table 3), where the highest positive cases (39) was found in the 21 - 30 age group.

Table 1: Socio-demographic characteristics of pregnant women in this study

Demographic Details	Number of women enrolled (n = 3, 144)	Percentage (%)
Age-median	25 (15 – 45 years)	
Location		
Town	1, 943	61.8
Village	1, 201	38.2
Marital status		
Married `	2, 971	94.5
Single	00	0.00
Divorced	124	3.94
Widowed	37	1.18
Separated	12	0.38
Trimesters		
First	651	20.7
Second	897	28.5
Third	1, 596	50.8
Educational Background		
Non-formal	345	10.9
Primary	1, 210	38.4
Secondary	1, 587	50.5
Tertiary	02	0.06

Table 2: Annual prevalence of HIV infection among pregnant women in Kashere

Year	Total No. tested	No. (%) negative	No. (%) positive
2015	513	504 (98.24)	09 (1.75)
2016	553	540 (97.65)	13 (2.40)
2017	377	373 (98.93)	04 (1.06)
2018	708	699 (98.73)	09 (1.27)
2019	993	987 (99.40)	06 (0.60)
Total	**3144**	**3,103 (98.70)**	**41 (1.30)**

Table 3: Prevalence of HIV infection according to the age of pregnant women in Kashere

Age (Years)	Years and No. of women screened					Positive cases
	2015	2016	2017	2018	2019	
11 - 20	194	176	204	165	294	00
21 - 30	236	259	131	334	467	39
31 - 40	79	112	42	192	232	02
41 - 50	04	06	00	03	00	00
Total	**513**	**553**	**377**	**708**	**993**	**41**

DISCUSSION

HIV infection in pregnancy has become a major concern in many developing countries. Previous reports showed that approximately 1.5 million HIVpositive women become pregnant each year, with mother to child transmission rate estimated at 600, 000 annually (Iliyasu *et al*., 2017). Early detection and treatment of HIV in pregnancy, especially when done before the second trimester, is essential in preventing long term neonatal complications and transmission of the disease. Human Immunodeficiency Virus (HIV) seronegative women who seroconvert in late pregnancy can have maternal foetal transmission (Coutsoudis *et al*., 2010). Human Immunodeficiency Virus (HIV) testing in early and late pregnancy or at delivery reduces the risk of mother to child transmission.

As age is an important factor in female reproduction, this study observed that the median age of the pregnant women enrolled is 25 years which.is a sexually active stage that make HIV transmission very easy. Majority of the women are married (94.5%) and hail from Kashere town (61.8%), while 38.2% were from neighbouring villages. Most of the women (50.8%) usually started attending the antenatal clinic at the end of second trimester and the beginning of third trimester, which constitute a significant risk of HIV transmission from mother to baby, Timely detection of HIV and counseling of the pregnant women would facilitate early antiretroviral intervention on positive mother and her infant, thereby greatly reducing the risk of vertical transmission. It was found that only 20.7% visited the hospital during the first trimester. This is due to lack of proper orientation on the importance of early commencement of antenatal visit. The findings of present study is in contrast with previous studies by Charles *et al*. (2016) where 73.1% of the women booked within the first and second trimesters, but 26.9% started the visit in the third trimester. Agida *et al*. (2010) and Okafor *et al*. (2014) reported 46.7% and 48.9% on late attendance of antenatal clinics in Makurdi and Nnewi respectively. Cherinet *et al*. (2013) also found that 55.4% (4327 of 7817) of the pregnant women were screened for HIV within a gestational age of <27 weeks, which is very commendable.

The results also revealed that 50.5% of the women had attended secondary schools, although some terminated at junior secondary school level and got married. In Jos, Charles *et al*. (2016) reported that 94% of the pregnant women that participated in their study obtained formal education ranging from primary to tertiary levels. Urbanization is another factor that can determine the level of awareness of the pregnant women, unlike in Kashere, a small town.

The prevalence of HIV infection among pregnant women in General hospital Kashere, revealed that highest rate of 4.3% was found in the year 2017, followed by 1.75% in 2015, with 0.60% in 2019 as the least. A total of 3,144 pregnant women was screened between 2015 and 2019 and 41(1.30%) were found positive. During pregnancy, the risk of HIV acquisition increases due to immunological and hormonal changes, resulting in increasing progesterone levels which affects the mucosa of the genital tract (van Leeuwen *et al*., 2007). HIV infection during pregnancy has been associated with adverse foetal and maternal outcomes (Hoddinott *et al*., 2008).

Previous study conducted in Nigeria by Egesie *et al*. (2008), showed that, 3.96% pregnant women were positive for HIV. The present study indicated a great decline in HIV 06 (0.60%) in 2019, but the prevalence rate of 8.3% in a study by Charles *et al*. (2016) is much higher. This confirmed the existing observation that HIV is more prevalent in urban settings, than in small town and villages (Charles *et al*., 2016). Therefore, routine voluntary testing in pregnancy is advisable everywhere, more especially in high HIV prevalence areas.

Transmission of HIV infection from mother to child is a major concern for developed as well as developing countries (Ibrahim *et al*., 2013). Similarly, increasing patterns of recognition of HIV-infected women during pregnancy were observed in developed countries (Okafor *et al*., 2014). The prevalence of HIV infection among pregnant women according to their age range in this study, revealed that highest positive cases (39) was found in the in the 21 - 30 age group. The median age of participants was 25 (range of 15 – 45 years). There was a significant relationship (P = 0.04) between HIV positive cases and age, which implies that the disease is more common among sexually active adults, and reveals the necessity for screening all pregnant women. Lowest HIV prevalence rate was detected among those aged <15 years and no case was reported among women aged 45 years and above, which indicated a low level of exposure of this group to sexual activity. Retroviral screening in pregnancy will benefit the women in observing safer sex practices, providing opportunity for counseling on infant feeding options, and enabling a woman to make informed choices about future pregnancies (Isichie *et al*., 2015; Gill *et al*., 2015). It also reduces the risk of transmission of HIV to a partner who is negative and may eventually become the child sole parent (Isichie *et al*., 2015).

The integration of HIV voluntary counseling and testing into antenatal care has numerous benefits that should be extended to all women and their spouses by offering them antenatal HIV screening and thus a knowledge of their HIV status (Agida *et al*., 2010). The effective implementation of this programme is fraught with some challenges which in developing countries will include lack of privacy thereby making confidentiality difficult and increased stigmatization of HIV-positive women.

CONCLUSION

It was found that HIV infection prevalence rate among antenatal women at the General Hospital, Kashere is low and is common within active age group. The women had low formal education levels and attended antenatal clinic late, which can increase the risk of mother to child transmission. There should be increased awareness campaign on the importance of early attendance of antenatal clinic by pregnant women in the area. A remarkable counseling and testing for HIV infection to all pregnant women, and improved girl-child enrolment into secondary schools up to completion (particularly before marriage) is highly recommended.

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