

HIV among Ante-Natal Attendees in Tertiary Healthcare Facility in the Semi-Arid Region of North Eastern Nigeria

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ABSTRACT

Background: HIV infection which progresses to AIDS in immuno-compromised individuals is a global public health problem, particularly affecting pregnant women amongst whom the risk of infection increases greatly. This study was design to determine the sero-prevalence and risk factors of human immunodeficiency virus (HIV) infection among pregnant women attending antenatal clinic of the University of Maiduguri Teaching Hospital, Maiduguri, Nigeria.

Materials and Methods: A total of 250 pregnant women who consented were recruited for this study, blood samples were aseptically collected and subjected to serological assay for detections of HIV1/2 specific antibodies using the determined rapid test kit. Socio-demographic data were collected using a structured questionnaire.

Results: Out of the 250 blood samples subjected to the serological assay 6 (2.4%) were positive with women within the age bracket 30-34 having the highest sero-prevalence of 3 (1.2%) however, women within the age brackets 14-19, 25-29 and 35-39 had 1(0.4%) each. The highest prevalence of antibodies against HIV was observed in women from monogamous matrimonial homes or type of marriage. None of the six HIV positive women had a history of blood transfusion. Interestingly, women within the third trimester of pregnancy showed a prevalence of 3(1.2%) with relatively less CD4⁺ T-cells counts.

Conclusion: This study revealed that HIV infection among pregnant women in the study location is not uncommon; therefore we suggest that continuous antenatal screening exercise for all pregnant women seeking medical attention in various hospitals should be an on-going exercise.

Key words: Antenatal, CD4⁺ T-cells, HIV, Pregnant Women, Sero-prevalence, Trimester.

INTRODUCTION

Human immunodeficiency virus infection which progresses to AIDS in immuno-compromised individuals remains a significant global public health problem. In 2010, a worldwide estimate of about 33.3 million persons were reported to be infected with HIV/AIDS out of which 68% (22.5 million) are in Africa, 3 million of the 22.5 million persons infected with the virus in

Africa were reported to be in Nigeria, this makes the country second only to South Africa in the global burden of HIV/AIDS. ^[1] Globally the disease is recognized as a major contributor to maternal mortality and as the leading course of death in women of reproductive age with the risk of acquisition increased for both males and females during pregnancy, ^[2] even though the estimated male to female transmission of HIV has

been 2.3 times greater than female to male transmission. [3] The sero-prevalence of HIV among pregnant women is usually lower in the developed world relative to the developing world. In the Netherlands, HIV sero-prevalence of 0.20% was reported. [4] In Australia, 0.23 per 1000 antenatal women are HIV sero-positive, [5] 29% was reported in Zambia, but of more concern however, is the prevalence of HIV among antenatal women in Botswana which remains at 45%. [5] In Nigeria, however, the prevalence of HIV among pregnant women varies based on geopolitical zones ranging from as low as 1.9% in the North-West zone to 5.8% in the North-Central zone. [6] Mother-to-child transmission (MTCT) plays an important role in transmission of the virus from the pregnant women to their children with about 90% of children infected with HIV acquiring the infection from their mothers during pregnancy and parturition. It is estimated that about 5-10% of MTCT of HIV occurs during pregnancy, 15-20% occurring during parturition and 5-15% during breast feeding with high levels of

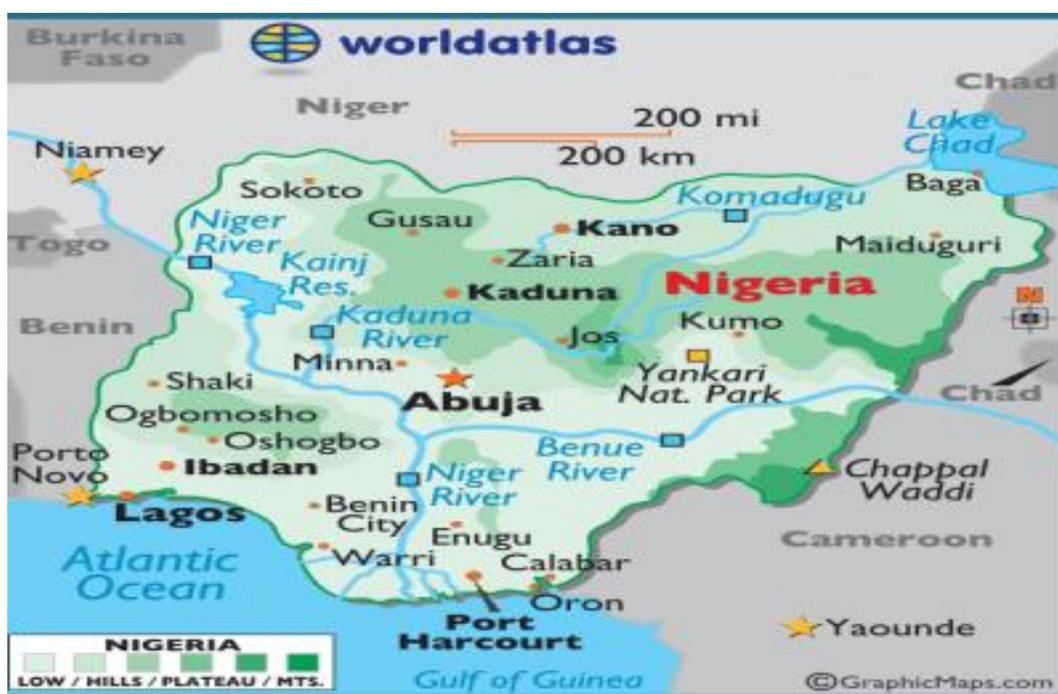
maternal viral load, vaginal delivery, breastfeeding and prematurity as the major risk factors. [7,8]

We carried out this study with the dual objectives of updating the available information on HIV epidemic among pregnant women in Maiduguri and also to identify factors associated with the transmission of HIV.

MATERIALS AND METHODS

Study Area:

Maiduguri, the capital of Borno State, lies between latitude 10.20N and 13.40N longitude 9.80E and 14.40N with an area of 69,436 sq km located in the North eastern corner of Nigeria sharing borders with Cameroun to the East, Chad to the Northeast and Niger to the North. [9] The State has Sahel vegetation in the North and a Sudan Savanna in the South with average peak daily temperature ranging between 34°C and 40°C especially in April and May and slightly milder temperatures in the southern part. It has an estimated population of 4.2 million people (Fig. 1). [10]



Source: GraphicMaps.com
Fig 1: Map showing the study location

Study design and Subjects:

Two hundred and fifty pregnant women (aged 14-44 years) attending

antenatal clinic at the University of Maiduguri Teaching Hospital between February to December 2015 were recruited for this study. The subjects were verbally informed of the study and their consent was obtained. Demographic data were obtained using structured questionnaires. For the risk factors, participants were asked to indicate whether they have had any history of previous blood transfusion, tattooing/scarification marks, history of sexual exposure to multiple sex partners, past history of sexually transmitted diseases and intravenous drug abuse. The Human Ethics Review Board of the hospital gave approval for the study. All testing was voluntary and it included pre- and post-counseling by trained HIV counselors.

Patient’s selection and Collection of samples:

Demographic data were collected using a non-probability convenient sampling technique. Blood samples (5ml) were collected into a plain container from each respondent. The blood samples were allowed to clot and then spun in a centrifuge at 10,000xg for 10 minutes. The serum was collected and stored at 4⁰C and prior to each test, the sample was allowed to attain room temperature.

Detection of Antibodies against HIV:

The determined rapid HIV-1 and HIV-2 screening kit was used in this study. This is an immunochromatography (rapid) method for quantitative detection of antibodies of all isotopes (IgG, IgM, IgA) specific to HIV-1 and HIV-2 simultaneously in serum. The test was carried out according to the manufacturer’s specifications.

Ethical Consideration:

Ethical approval for the study was granted by the ethical committee of the University of Maiduguri Teaching Hospital after all due processes were followed.

Data analysis:

The prevalence for HIV-1 and HIV-2 antibodies was calculated by using pregnant women with positive samples as numerator and the total number of pregnant

women enrolled in this study as the denominator. The generated data were presented in descriptive statistics.

RESULTS AND DISCUSSION

For this study, a total of 250 blood samples were collected from pregnant women attending antenatal clinic at the University of Maiduguri teaching hospital to determine the sero-prevalence and associated risk factors of HIV infection among the study population. Of the 250 blood samples collected and subjected to serological assay using the determined rapid test kit, six samples were positive giving an overall sero-prevalence of 2.4%. (Table 1)

Table 1: Frequency of HIV infection among pregnant women screened

HIV Status	Frequency	Percentage %
No. of positive samples	06	2.4
No. of negative samples	244	97.6
Total	250	100

Women within the age bracket 30-34 had the highest sero-prevalence of 3 (1.2%) compared to women within the age brackets 14-19, 25-29 and 35-39 with 1 (0.4%) each. (Table 2).

Table 2: HIV Status in relation to age distribution

Age	No. of women	No. positive (%)
14-19yrs	45	1(0.4%)
20-24yrs	38	0(0%)
25-29yrs	62	1(0.4%)
30-34yrs	50	3(1.2%)
35-39yrs	18	1(0.4%)
40-44yrs	37	0(0%)
Total	250	6(2.4%)

N= 250, X² = .546,
df = 5, p>0.05 12

Out of the total samples analyzed, 3 (1.2%), 2(0.8%) and 1 (0.4%) represents HIV Determined Rapid Kit-positive women practicing monogamy, having a history of sexually transmitted infections and belonging to high socio-economic status respectively. The highest prevalence of antibodies against HIV was seen in women practicing monogamy type of marriage. None of the six HIV positive women had a history of blood transfusion. (Table 3)

Table 3: HIV status and associated risk factors

Variables		Frequency	Percentage (%)	No. of Positive (%)
Marriage	Monogamy	90	36	3(1.2%)
	Polygamy	160	64	0(0%)
Total		250	100	3(1.2%)
History of sexual transmitted diseases(STD'S)	Yes	70	28	2(0.8%)
	No	180	72	0(0%)
Total		250	100	2(0.8%)
History of blood transfusion	Yes	99	39.6	0(0%)
	No	151	60.4	0(0%)
Total		250	100	0(0%)
Socio-economic status	High	117	46.8	1(0.4%)
	Low	133	53.2	0(0%)
Total		250	100	1(0.4%)
Educational status	Yes	150	60	0(0%)
	No	100	40	0(0%)
Total		250	100	0(0%)
N = 250, $\chi^2 = 37.22$, $df = 1$, $P > 0.05$				

Table 4 HIV status in relation to trimester of pregnancy

Trimester	Frequency	No. of Positive (%)
First	50	1 (0.4)
Second	80	2 (0.8)
Third	120	3 (1.2)
Total	250	6 (2.4)

The trimester of pregnancy for HIV positive women revealed that the highest sero-prevalence was among women in the third trimester with 3(1.2%) relative to women in the second and first trimester of

pregnancy with 2 (0.8%) and 1 (0.4%) respectively. (Table 4)

Table 5 indicate that HIV positivity among women in the third trimester of pregnancy have the lowest CD4⁺ cell counts while women in the first and second trimester of pregnancy have a relatively similar CD4⁺ cell counts with that of women in the first trimester slightly higher to those in the second trimester.

Table 5 CD4⁺-T cell count of HIV positive women before and after antiretroviral therapy in relation to trimester of pregnancy

Trimester	No. of Positive	CD4 ⁺ -T cell count (cell/uL) before antiretroviral therapy	CD4 ⁺ -T cell count (cell/uL) after antiretroviral therapy
First	1	180	370
Second	2	170, 180	380, 400
Third	3	150, 150, 160	280, 350, 390

Recent studies have contributed to the determination of the sero-prevalence of HIV infection amongst pregnant women in different parts of the world, UK, [11] South Africa, [12] Tanzania, [13,14] Brazil, [15] Ethiopia, [16] Kenya [17] and Nigeria [18-22] which have significant implications on the global epidemiology of HIV. This study adds to the catalog of information on the prevalence of HIV and its associated risk factors among pregnant women in Nigeria.

The current study shows that the prevalence of HIV infection among pregnant women attending UMTN is 2.4% which is relatively less when compared to reports by [14,13] in Tanzania, [17] in Kenya, [12] in South Africa with a sero-prevalence of 10.6%, 6.7% and 19.8% respectively. In Nigeria, the present study indicates a sero-prevalence less than findings by, [23-26] who

reported sero-prevalence of 8.6%, 7.8%, 12.7% and 12.4% among ante-natal women in Anambra State, Minna, Benue State and Enugu respectively. Interestingly, the national prevalence of HIV among pregnant women is 4.6%. [25,26] The rate of HIV infection is on a decline nationwide since the 2003 federal ministry of health HIV seroprevalence sentinel survey. [25,27] This could be attributed to differences in cultural practices, increase awareness over the years which results in moderation of sexual behavior and health practices such as screening of blood for HIV before transfusion to anemic pregnant women, the use of sterile materials at the ante-natal clinics amongst others. Furthermore, the above attributes and difference in study design could possibly be the reasons for the

variation in the prevalence of HIV in the various studies stated above.

In addition, the study showed no statistically significant difference between the mean age of the HIV positive pregnant women relative to that of HIV negative pregnant women, however, women within the age bracket 30-34 years had the highest prevalence rate. In Nigeria, previous studies have also reported prevalence in this age group with the highest among women under the age of 35 years between the ages of 25-35 years. [18] Worthy of note however, is that the two pregnant women with the history of sexually transmitted infections are below 35 years of age giving a high prevalence of STI within that age group due to their increased risk of sexual activity which favors HIV transmission and acquisition. [28]

Previous studies in Africa have shown that married women are 50-59% more likely to be infected with HIV than unmarried women. [29,30] Although, it has also been reported that multiple sexual partners is a major risk factor in the transmission of HIV and on the other hand faithful single sexual partner relationships and monogamy are preventive measures, this study shows that monogamy is a crucial risk factor in HIV acquisition having the highest prevalence of 1.2%. This factor can probably be attributed to sexual behaviors among monogamous spouses, where the chances are higher for an individual with a single partner to indulge in extramarital activities with possibly individuals with multiple sexuality than individuals practicing polygamy.

Although, not statistically significant in this study, socio-economic status have been implicated in the transmission of HIV. [31] Pregnant women with high socio-economic status had a higher prevalence when compared to women with low socio-economic status. Increased social activities exhibited by husbands and also, emotional starvation amongst these women leads to extramarital affairs which may be attributed to the increased risk in HIV acquisition.

Majority of these women booked for ante-natal care during the third trimester of pregnancy with the mean gestational age at booking of 26.8 ± 5.4 weeks. The study revealed a prevalence of 1.2%, 0.8% and 0.4% for third, second and first semester respectively. This pose serious danger on the prevention of mother to child transmission of HIV/AIDS as significant number of these women present at an advanced stage of pregnancy with some delivering shortly after the initiation of antiretroviral therapy. This results in increased risk of vertical transmission in utero or perinatally during parturition. Vertical transmission rate varies from 15% in Western Europe to 50-60% in Africa [26] as a result of which WHO recommends early access to HIV test during pregnancy giving room for women with HIV to benefit from evidence based interventions to minimize the risk of mother to child transmission and preventing the infection of the uninfected. [31]

HIV infection when untreated results in poor maternal and fetal outcome as a result of both the virus and its complications making the infection a major cause of maternal mortality (Mephram *et al.*, 2011). Six fold increased risk of maternal death usually due to opportunistic infections have been reported in HIV positive pregnant women relative to HIV negative pregnant women. [32] This has direct effect on childhood survival. This study revealed that the severity of the infection was higher in women at the third trimester of pregnancy as they had a CD⁺4 T-cell count of less than 170 cells/uL. This greatly improved following the initiation of antiretroviral therapy as the CD⁺ T-cell count was elevated to above 250 cells/uL resulting in increase maternal and infant survival rate.

CONCLUSION

This study revealed that HIV infection is still prevalent among pregnant women in this locality, therefore ante-natal screening and counseling exercise for all pregnant women seeking medical attention

in various hospital is highly recommended as this will go a long way in preventing the risk of mother to child transmission of HIV.

On the other hand, additional medical precautionary measures should be duly followed which include proper diet, elective caesarean section (cs), avoidance of breast feeding, taking of antiretroviral drugs before and after delivery of the new born. A change in life style and sexual behavior would largely reduce the risk of transmission.

Conflict of Interests

The authors declare that they have no conflict of interests.

Expectation about Citation In The Future

The authors expect the paper to have a high citation rate in the near future.

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REFERENCES

1. UNAIDS, 2008 Report on the global. HIV/AIDS epidemic 2008. Geneva Switzerland, 2008
2. Keating MA, Hamela G, Miller WC, Moses A, Hoffman IF, Hosseinipour MC. High HIV incidence and sexual behavior change among pregnant women in Lilongwe, Malawi: implications for the risk of HIV acquisition. *PLoS One* 2012; 7(6):391-09.
3. Otworld KN, Ndindi P, Ajema C, Wanyungu J. Using VCT statistics from Kenya in understanding the association between gender and HIV. *SAHARA J*, 2007; 4(3):110-115.
4. Op de Coul ELM, Schreuder I, Conti S, Van Sighem A, Xiridou M, Van Veen M G, Heijne JCM. Changing Patterns of Undiagnosed HIV Infection in the Netherlands: Who Benefits Most from Intensified HIV Test and Treat Policies? *PLoS One* 2015; 10(7), 1-12.
5. Spencer JD, Tibbits D, Tippet C, Mead C, Kaldor JM. Review of antenatal testing policies and practice for HIV and hepatitis C infection. *Aust New Zealand Pub Health* 2003; 27:614-619.
6. FMOH. National HIV Sero-prevalence, 2014 Sentinel Survey among Pregnant Women Attending Antenatal Clinics in Nigeria. National AIDS/STI Control Programme Fact Sheet 2015;1-12
7. Kasenga F, Byass P, Emmelin M, Hurtig AK . The implications of policy changes on the uptake of a PMTCT programme in rural Malawi: first three years of experience. *Glob Health Action*, Jan 2009;23: 27.
8. WHO. Update on HIV/AIDS mother to child transmission of HIV 2016.
9. Musa AW, Pindar TY. Geographical history of Borno State; by the Borno State Ministry for Local Government and Chieftaincy Affairs. *ALGON Diary* 2005.
10. National Population Commission, (NPC) Nigeria 2006.
11. Ades, AE, Parker S, Walker J, Clubitt WD, Jones R. HCV prevalence in pregnant women in UK. *Epidemiol infect*, 2000 ; 125(2): 399-405.
12. Peltzer K, Mlambo G. Sexual HIV risk behavior and associated factors among pregnant women in Mpumalanga, South Africa. *BMC Pregnancy and Childbirth* 2013; 13:57,
13. WHO/UNAIDS/UNICEF. Epidemiological fact sheet on HIV and AIDS. Core data on epidemiology and response Nigeria 2008 update. October 2008; 1-24.
14. Mmbaga EJ, Leyna GH, Mnyika KS, Klepp KI. Comparison of HIV-1 prevalence and risk factors between pregnant, non-pregnant, all women and the general population in Tanzania: implications for second generation surveillance. *Int J STD AIDS*, 2009; 20(7):483-488.
15. Manenti SA, Galato JJ, Silveira ES, Oenning RT, Simões PW, Moreira J, Fochesato CM, Brígido LF, Rodrigues R, Romão PR. Epidemiologic and clinical characteristics of pregnant women living with HIV/AIDS in a region of Southern Brazil where the subtype C of HIV-1 infection predominates. *Braz J Infect Dis*, 2011; 15(4):349-355.
16. Mulu A, Kassu A, Tessema B, Yismaw G, Tiruneh M, Moges F. Seroprevalence of syphilis and HIV-1 during pregnancy in a teaching hospital in northwest Ethiopia. *Jpn J Infect Dis*, 2007;60:193-5.

17. Kiptoo M, Mpoke S, Ng'ang'a Z, Mueke J, Okoth F, Songok E. Survey on prevalence and risk factors on HIV-1 among pregnant women in North-Rift, Kenya: a hospital based cross-sectional study conducted between 2005 and 2006. *BMC Int Health Hum Rights*. 2009;9:10.
18. Sagay AS, Kapiga SH, Imade GE, Sankale JL, Idoko J, Kanki P. HIV infection among pregnant women in Nigeria. *Intern J Gynec. Obstet*; 2005; 90:61-67.
19. Obi, SN, Pregnancy outcome in HIV seroprevalence in Abakaliki, Nigeria. *Orient J Med*, 2005;17(3 and 4):25-30.
20. Utulu SN, Lawoyin TO. Epidemiological features of HIV infection among pregnant women in Makurdi, Benue State, Nigeria. *J BiosocSci* 2007; 39(3):397-408.
21. Salawa FK, Danburam A, Desalu OO, Midala JK, Olokoba LB, Abdurrahman MB, Vandi K. Screening for Human Immunodeficiency Virus Infection amongst Pregnant Women: A practice that must continue. *Eur J Sci Res*, 2009;28(2):266-270.
22. Ezugwu EC, Agu P, Ohayi Sam, Okeke TC, Dim CC, Obi SN. HIV Seroprevalence among Pregnant Women in A Resource Constrained Setting, South East Nigeria, *Niger J Med*, 2012;338-342.
23. Ezegbudo CN, Agbonlahor DE, Nwobu GO, Igwe CU, Agba MI, Okpala HO. The seroprevalence of hepatitis B surface antigen and human immunodeficiency virus among pregnant women in Anambra state, Nigeria. *Shiraz E Med J* 2004;5:1-9.
24. Ndams IS, Joshua IA, Luka SA, Sadiq HO, Ayodele SB. Human Immunodeficiency virus seroprevalence among pregnant women in Minna, Nigeria. *Ann Niger Med*, 2010; 4:14-7.
25. Federal Ministry of Health (FMOH). Technical report on National HIV Seroprevalence sentinel Survey Among Pregnant Women Attending Antenatal Clinics in Nigeria. Abuja 2010.
26. Ikeako LC, Ezegwui HU, Ajah LO, Dim CC, Okeke TC. Seroprevalence of human immunodeficiency virus, hepatitis B, hepatitis C, syphilis, and co-infections among antenatal women in a tertiary institution in South East, Nigeria. *Ann Med Health Sci Re*, 2014; 4:954-8.
27. United Nations Children's Fund (UNCF). State of the World's Children. New York: United Nations Children's Fund 2009.
28. Laga M, Schwartlander B, Pisani E, Sow PS, Caraei MT. Stem HIV in Africa, prevent transmission to young women *AIDS*, 2001;15:885-98.
29. Kelly RJ, Gray RH, Sewankambo NK. Age difference in sexual partners and risk of HIV-1 infection in rural Uganda. *J Acquir Immune defic Syndr*, 2003;32:446-451.
30. Tang J, Nour NM. HIV and pregnancy in resource Poor setting. *Rev Obstet Gynaecol*, 2010;3(2): 66- 77.
31. WHO/UNAIDS/UNICEF. Towards Universal Access: Scaling up HIV priority interventions in the health sector. Progress Report 2009.
32. Mepham SO, Bland RM, Newell ML. Prevention of Mother to Child transmission of HIV in resource- rich and poor settings. *RCOG*, 2011;118: 202-218.

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