

Prevalence of Anaemia Among Human Immunodeficiency Virus (HIV) Positive Pregnant Women at Booking in Orlu, South-Eastern Nigeria

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ABSTRACT

Background: *Anaemia is the most commonly encountered haematological abnormality in human immunodeficiency virus (HIV) positive patients with estimates climbing as high as 95% depending on clinical settings. The twin effects of HIV infection and anaemia in pregnancy is associated with adverse maternal and perinatal outcomes.*

Objective: *To determine the prevalence of anaemia among HIV positive pregnant women at booking at Orlu, South-East Nigeria.*

Methods: *A retrospective analysis of the case records of women who were screened for Human Immunodeficiency Virus and anaemia at the Imo State University Teaching Hospital from 1st March 2008 to 28th February 2010 was done. Data on age, parity, educational status, marital status, haemoglobin concentration and retroviral status were collected and analyzed using SPSS version 13.*

Results: *Nine hundred and twenty one pregnant women were screened at booking within the study period. The age range of the women was 18-39years with a mean age of 28.22 ± 5.04 years. One hundred and six (11.5%) of the women tested and were confirmed positive to HIV 1 & 2 antibodies. Anaemia was significantly higher among HIV positive pregnant women than in HIV negative pregnant women (75.5% vs 57.9%; $P=0.001$). Seventy seven point three percent (75/97) of women ≤ 20 years were anaemic. This was shown to be significant ($P=0.000$). Three hundred and thirty three (69.2%) of the women that had only secondary education were significantly ($P=0.000$) more anaemic than those that had post-secondary education.*

Conclusion: *There was a high prevalence of anaemia among HIV positive pregnant women at booking at the Imo State University Teaching Hospital (IMSUTH), Orlu. Anaemia was also more significant in younger age (≤ 20 years) and lesser educated women (only secondary school)*

Key Words: *Anaemia, HIV, Pregnancy, Booking, Orlu.*

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INTRODUCTION

The Human immunodeficiency virus (HIV) has emerged as a global health problem, with serious medical, economic and social implications.¹ Sub-Saharan Africa remains the region most heavily affected by HIV infection. In 2008, sub-Saharan Africa accounted for 67% of HIV infections worldwide, 68% of new HIV infections among adults and 91% of new HIV infections among children.² The region also accounted for 72% of the world's AIDS-related deaths in 2008.² The epidemic continues to have an enormous impact on households, communities, businesses, public services and national economies in the region. Women and girls continue to be affected disproportionately by HIV in sub-Saharan Africa probably due to large mucosal exposure to semen, biology of the HIV virus, poverty / low socio-economic status.³ In 2009, women accounted for 56 percent of all adults aged 15 years and above living with the virus in Nigeria.³

Anaemia is defined by the World Health Organization (WHO) as a haemoglobin concentration less than 11g/dl.⁴ Pathologically, it is a condition in which the oxygen-carrying capacity of the red blood cells is insufficient to meet the patient's needs.⁵ The diagnosis is based on blood values, in particular, haemoglobin concentration.

Anaemia in pregnancy is a major public health problem in the world.⁶ It remains one of the four major causes of maternal deaths in Nigeria and is associated with a high fetal wastage.⁷ Anaemia in pregnancy, especially if severe, may have profound effects on the course and outcome of pregnancy if not detected early and appropriately managed. These effects could be maternal, fetal or fetomaternal and can occur in the first, second or third trimester and during the puerperium. There may also be preterm delivery.⁸

Anaemia has been shown to be the most commonly encountered haematological abnormality in HIV positive patients with estimates climbing as high as 95% depending on clinical settings.⁹ Anaemia has a profound effect on the quality of life of people by inducing such symptoms as loss of stamina, rapid heart rate and shortness of breath.¹⁰ It has also been identified as a risk factor for early death in patients with AIDS.¹¹ Ignorance, poverty and gender bias significantly contribute to high prevalence of anaemia.¹² Poverty, malnutrition, and low educational status are

known to be driving forces for acquiring HIV infection.¹³ These factors are rife in rural communities in Nigeria.¹⁴ The twin effect of HIV infection in pregnancy and anaemia is associated with adverse maternal and perinatal outcome.

As no previous study has been done in this institution, our study will provide baseline data, determine the magnitude of the problem and make recommendations on how to reduce the prevalence rate. Thus the main objective of this study was to determine the prevalence of anaemia among HIV positive pregnant women at booking for antenatal care at the Imo State University Teaching Hospital (IMSUTH), Orlu.

MATERIALS AND METHODS

Imo State University Teaching Hospital is located in Umuna Orlu, in Orlu Local Government Area of Imo State, in South-East Nigeria. The teaching hospital is a major referral centre serving the whole of Imo State and its environs. It is one of collaborating centers for institute of human virology of Nigeria (IHVN). Voluntary counseling and testing with opt-out option are offered to the pregnant women at booking.

The patients were healthy pregnant women at booking in the antenatal clinic of Imo State University Teaching Hospital, Orlu. After obtaining ethical approval from the institution's ethical committee, a retrospective analysis of the case records of healthy pregnant women who booked for antenatal care and were screened for HIV and anaemia at booking at IMSUTH between 1st March 2008 and 28th February 2010 was made.

Anaemia in this study was defined as haemoglobin of less than 11g/dl. Data on age, parity, marital status, HIV status and haemoglobin level were retrieved and analyzed using the Statistical Package for Social Sciences (SPSS) software version 13 (IBM; SPSS, Chicago, IL, USA). Cross-tabulation of various variables was done and Pearson's chi-square test was used to evaluate the effect of these variables on the

haemoglobin concentration profile at the 95% confidence level.

The HIV tests were done, in parallel, with two different types of kits. Determine HIV- 1/ 2 Rapid Test (Abbott Laboratories; Abbott Park, IL) and the Uni-Gold Rapid Test (Trinity Biotech Co; Wicklow, Ireland). Any discordant result between the two were ratified by the use of a third kit StatPak (Chembio diagnostic systems inc; USA), as a 'tie-braker'. These tests were done with maternal whole blood, serum or plasma.

The haemoglobin estimations were done at the teaching hospital's haematological laboratory with the women's venous blood using Drabkin's method.^{15,16} Any pregnant woman with haemoglobin level less than 11g/dl was considered anaemic.

RESULTS

Nine hundred and twenty one pregnant women were screened at booking within the study period. The age range of the women was 18-39years with a mean age of 28.22 ± 5.04 years. Table I shows that 77.3%(75/97) of women ≤ 20 years were anaemic. This was shown to be significant ($P=0.000$). One hundred and six (11.5%) of the women tested and were confirmed positive to HIV 1 & 2 antibodies (table II).

As shown in table III, 59.9%(552/921) of the women were found to be anaemic at booking. Table IV showed that 75.5% (80/106) of the HIV positive patients were anaemic as against 57.9% of HIV negative patients. This was significant ($P=0.001$).

Table V shows the relationship between HIV and Anaemia prevalence with marital status.

Three hundred and thirty three (69.2%) of the women that had only secondary education were significantly ($P=0.000$) more anaemic than those that had post-secondary education. Parity was not shown to significantly ($P=0.085$) affect anaemia at booking.

Table I: Age Group Distribution of the Women and Anaemia

Age group(yrs)	Anaemia (No(%))		Total (No(%))
	No	Yes	
≤ 20	22(22.7)	75(77.3)	97(100)
21-25	65(33)	132(67)	197(100)
26-30	150(45.5)	180(54.5)	330(100)
31-35	103(43.5)	134(56.5)	237(100)
36-40	29(48.3)	31(51.7)	60(100)
Total	369(40.1)	552(59.9)	921(100)

$P=0.000$

Table II: Prevalence of HIV infection among the study group.

HIV status	Frequency	Percent
Positive	106	11.5
Negative	815	88.5
Total	921	100

Table III: Prevalence of Anaemia among the study group.

Anaemia	Frequency	Percentage
Yes	552	59.9
No	369	40.1
Total	921	100

Table IV: Relationship between HIV status and Prevalence of Anaemia

HIV Status	Frequency	Anaemic(%)
Positive	80	75.5
Negative	472	57.9

Table V: Marital Status, Anaemia and HIV Prevalence

Marital Status	Anaemia		Total(%)
	No(%)	Yes(%)	
Single	0(0)	19(100)	19(100)
Married	369(40.9)	533(59.1)	902(100)
Total	369(40.1)	552(59.9)	921(100)
P=0.01			
Retroviral Status			
	Negative (%)	Positive (%)	
Single	11(57.9)	8(42.1)	19(100)
Married	804(89.1)	98(10.9)	902(100)
Total	815(88.5)	106(11.5)	921(100)
P=0.000, OR 0.179, 95% CI 0.074-0.435			

DISCUSSION

The major findings in this study are an antenatal prevalence rate of HIV at booking of 11.5% and high prevalence of anemia at booking of 59.9% of the study population. Anemia prevalence was also shown to be significantly higher among HIV positive antiretroviral naïve pregnant women at booking when compared to HIV negative women. The 2010 Nigerian national sentinel sero-prevalence rate among antenatal women of 4.1% shows a marginal reduction over the rate of 4.6% in 2008.¹⁷ The sero-prevalence rate among pregnant women at booking of 11.5% in this study is very high when compared to the 2010 Nigerian national sero-prevalence rate of 4.1%.¹⁷ It is more than 2.5 folds of the current (2010) national sero-prevalence rate of 4.1% among antenatal women.¹⁷ It is also higher than the records of 2.7-8.3% from other hospitals in Nigeria.¹⁸⁻²⁰ It is however lower than the 19.1% reported from Makurdi.²¹ The high prevalence rate in this center may be a reflection of an increase in the awareness and acceptance of HIV screening among the study population coupled with the fact that screening and antiretroviral drug is free of charge in the institution.

Anaemia is common in human immunodeficiency virus infection, particularly in patients with acquired immunodeficiency syndrome (AIDS). The prevalence of anaemia among HIV positive women in this study was significantly higher than in HIV negative pregnant women. This is similar to a previous study.²² Anaemia is multifactorial in HIV positive patients. This higher prevalence of anaemia among this group of women may be due to the haematological abnormalities associated with HIV infection which appear to be due to direct retroviral infection of the bone marrow cells, changes in the regulation of haematopoiesis, response to infection and autoimmune destruction of cells.⁴ There may also be HIV infection of the stromal and haematopoietic stem cells. Other common causes of anaemia in HIV positive women are anaemia of chronic disease consequent on opportunistic infections, bone marrow suppression by antiretroviral therapy, and haemolytic anaemia induced by oxidant drugs. Thrombotic microangiopathy is also a significant complication of HIV infection. Also, the cut off value for anaemia of 11g/dl as against 10g/dl as could be used in developing countries could contribute to this high

prevalence of anaemia in this study. However, this cut-off value was used in this study for a global comparison with other studies.

As in previous studies,^{23,24} there was a higher prevalence of anaemia in women at 20 years or less. However, this was not consistent with other studies which did not show maternal age to be statistically significant as a predictor of anaemia in pregnancy.^{25,26}

The high level of anaemia recorded in this study among unmarried pregnant women is similar to a previous study²³ and may indicate that poverty borne out of unemployment and low income earning may have contributed significantly to the high level of anaemia as the women may not be able to book early for antenatal care, eat nourishing food and prevent possible infection. This is also compounded by the finding in the study that HIV prevalence among unmarried women of 42.1% was significantly ($P=0.000$) higher than 10.9% in married pregnant women (OR 0.179, 95% CI 0.074-0.435)

As found in this study, there was a higher prevalence of anaemia in secondary school leavers than post-secondary school leavers. Lower level of education which may predict low socioeconomic conditions may also predispose pregnant women to anaemia as they are more prone to infections and infestations that may cause anemia.²⁶

The major limitation of the study is that it is a referral hospital-based study and thus, may not be a true representation of the entire community.

CONCLUSION

There was a high prevalence of HIV and anaemia at booking in this study. The prevalence of anaemia among HIV positive pregnant women at booking was significantly higher than HIV negative pregnant women. Anaemia was also significantly higher in unmarried women, teenage pregnancies and less educated women. The combined effect of all these factors in pregnancy will worsen the poor maternal and perinatal outcomes already observed in developed countries.

We therefore recommend that there should be an improvement in the various intervention strategies in order to reduce the prevalence rates of HIV and anaemia. Educating women on preconception care and early antenatal care booking including iron and folic acid supplementation should be advocated and emphasized to reduce this problem. There should also be empowerment of women to improve their socio-economic conditions. During pregnancy, efforts should

also be geared toward the early detection and treatment of anaemia especially among HIV positive pregnant women to prevent the negative twin effects of these on fetomaternal outcome. All of these efforts would help to ensure safe motherhood and achieve the relevant targets of the Millennium Development Goals.

CONFLICT OF INTEREST: We wish to state that there is no conflict of interest among the authors in production of this manuscript.

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