

Original Article

Prevalence of HIV and anemia among pregnant women

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Abstract

Background: Human immunodeficiency virus (HIV) prevalence is high among rural dwellers and pregnant women. **Aims:** This study aims to determine the prevalence of HIV and anemia among pregnant women attending antenatal clinic in rural community of Okada, Edo State, Nigeria. **Patients and Methods:** Anticoagulated blood and sera samples were obtained from 480 women consisting of 292 pregnant and 188 non-pregnant women. Antibodies to HIV were detected in the sera samples and hemoglobin concentration of the anticoagulated blood specimens were determined using standard techniques. Anemia was defined as hemoglobin concentration <11g/dl for pregnant women and <12g/dl for non-pregnant women. **Results:** Pregnancy was not a risk factor for acquiring HIV infection (pregnant vs. non-pregnant: 10.2% vs. 13.8%; OR=0.713, 95% CI=0.407, 1.259, $P = 0.247$). The prevalence of HIV was significantly ($P = 0.005$ and $P = 0.025$) higher in the age group 10-20 years and 21 – 30 years among pregnant and non-pregnant women respectively. Pregnancy was a risk factor for acquiring anemia (OR=1.717, 95% CI=1.179, 2.500, $P = 0.006$). Only the age of pregnant women significantly ($P = 0.004$) affected the prevalence of anemia inversely. **Conclusion:** The prevalence of HIV and anemia among pregnant women were 10.2% and 49.3% respectively. Pregnancy was associated with anemia. Interventions by appropriate agencies are advocated to reduce associated sequelae.

Keywords: Pregnancy, HIV, anemia, rural community, Nigeria.

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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 by far the most affected region, with 24.5 million people living with HIV, representing a little below two-thirds of all people living with HIV [2]. HIV epidemic affects females severely in the sub-region and women of reproductive age make up 57% of adults living with HIV [2]. The Center for Disease Control and Prevention reports that infection with HIV is increasing in rural communities in adolescent and young adults [3]. Reports have shown that HIV infection in Africa, is associated with urban-rural, and intra-rural human mobility [4,5]. More than two-thirds of people living with HIV in Africa's 25 most endemic countries for HIV are rural dwellers [6].

HIV prevalence in pregnancy is high [7]. Infection among

pregnant women poses particular risk to their families, offspring, and health workers at time of delivery [8]. HIV infection in pregnancy is associated with adverse maternal and foetal outcome [9]. The effect of which includes among others infectious morbidity, vertical transmission and severe anemia [2, 10]. The role of HIV/AIDS in maternal mortality in sub-Saharan Africa is difficult to evaluate as the HIV status of pregnant women in the region are largely unknown [2].

Anemia has been shown to be the most commonly encountered hematological abnormality in HIV positive patients with estimates climbing as high as 95% depending on clinical settings [11]. Anemia have 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 [12]. It has also being identified as a risk factor for early death in patients with AIDS [13]. Ignorance, poverty and

gender bias, significantly contribute to high prevalence of anemia [14]. Poverty, malnutrition, and low educational status are known to be driving forces for acquiring HIV infection [15]. These factors are rife in rural communities in Nigeria [16]. Access to information and health services is much poorer in rural settlements than cities and rural dwellers are less likely to be informed with protective measures and practices against HIV infection [6]. The current HIV/AIDS interventions by the Presidents Emergency Plan for AIDS Relief (PEPFAR) do not cover rural communities, particularly Okada. Consequently, pregnant women in our community are not candidates for prevention mother to child transmission (PMTCT) programs. This will ultimately increase the number of infants born with HIV. Against this background and the paucity of report on the prevalence of HIV and anemia among pregnant women in Okada (a rural settlement in Nigeria) this study was undertaken.

This study aims to determine the prevalence of HIV and anemia among pregnant and non-pregnant women in Okada community as well as the effect of age on their prevalence.

Patients and Methods

Study area

The study was conducted between September 2009 to August 2010, among pregnant women attending antenatal clinic at Igbinedion University Teaching Hospital, Okada, Edo State, Nigeria. Okada is a rural settlement and headquarter of Ovia North East Local Government area of Edo State, Nigeria. The residents are mainly farmers

Study population

A total of 480 women consisting of 292 pregnant and 188 non-pregnant apparently healthy women were recruited for this study. The age range of study population ranged from 13 to 46 years. Non-pregnant women who were on their monthly menstrual periods were excluded from this study. Verbal informed consent was obtained from all participating subjects or their parents/guardian in case of children prior to specimen collection. The study was approved by the Ethical Committee of Igbinedion University Teaching Hospital, Okada, Edo State, Nigeria.

Collection and processing of specimen

Ten mL of blood was collected from each subject and 5 mL was dispensed into an ethylene diamine tetra-acetic acid (EDTA) container and the remaining 5 mL was placed in a plain container, and allowed to clot. The sera obtained was used for serological diagnosis of HIV using a previously described method [17]. Hemoglobin concentration was determined using an autoanalyser-Sysmex KX-21 (Sysmex Corporation, Kobe, Japan). Anemia was defined as hemoglobin concentration <11g/dl for pregnant women and <12g/dl for non-pregnant women [18, 19].

Statistical analysis

The data obtained were analyzed using Chi square (X^2)

test and odd ratio analysis using the statistical software INSTAT® (GraphPad Software Inc., La Jolla, CA, USA).

Results

A total of 56 (11.7 %) out of the 480 women studied were infected with HIV. HIV prevalence among the pregnant women was 10.2 %. There was no significant difference in the seroprevalence between pregnant and non-pregnant women ($P = 0.247$). Age significantly affected the prevalence of HIV among pregnant ($P = 0.005$) and non-pregnant ($P = 0.023$) women, with the age group of 10-20 years having the highest prevalence among pregnant women, while the age group 21-20 years were the most infected among non-pregnant women (Table 1).

Table 1 Effect of age and pregnancy status on prevalence of HIV in women in Okada Community

Characteristics	N	N Pos(%)	OR	95% CI	P value
Subject status					
Pregnant	292	30(10.2)	0.713	0.407, 1.250	0.247
Non-Pregnant	188	26 (13.8)	1.402	0.800, 2.435	
Age (ys)					
Pregnant women					
10-20	78	14 (17.9)			0.005
21-30	156	14 (8.9)			
31-40	52	2 (3.8)			
41-50	6	0 (0)			
Non-Pregnant women					
10-20	62	10 (16.1)			0.025
21-30	88	16 (18.2)			
31-40	26	0 (0)			
41-50	16	0 (0)			

N=number tested; OR=odd ratio; CI=confidence interval.

Table 2 Effect of age and pregnancy status on prevalence of anemia in women in Okada Community

Characteristics	N	N Anemic (%)	OR	95% CI	P value
Subject Status					
Pregnant	292	144 (49.3)	1.717	1.179, 2.500	0.006
Non-Pregnant	188	68 (36.2)	0.582	0.400, 0.848	
Age (ys)					
Pregnant women					
10-20	78	51 (65.4)			0.004
21-30	156	69 (44.2)			
31-40	52	22 (42.3)			
41-50	6	2 (33.3)			
Non-Pregnant women					
10-20	62	23 (37.1)			0.921
21-30	88	30 (34.1)			
31-40	26	9 (34.6)			
41-50	16	6 (37.5)			

N= number tested, OR=odd ratio, CI= confidence interval

A total of 212 (44.2%) out of 480 women had anemia, and pregnancy was a significant risk factor for acquiring anemia (OR= 1.717, 95% CI = 1.179, 2.500; $P = 0.006$). Age only significantly affected the prevalence of anemia among pregnant women with the prevalence of anemia decreasing with increasing age (Table 2).

HIV status was a significant risk factor for acquiring anemia among pregnant women (OR=4.733, 95%CI= 1.873-11.968; $P = 0.0004$) and non pregnant women (OR= 5.04, 95% CI=2.055-12.363; $P = 0.0003$) (Table 3).

Table 3 Effect of HIV on anemia in pregnant and non-pregnant women in Okada Community

Characteristics	N	N Pos (%)	OR	95%CI	P-value
HIV+pregnant	30	24 (80.0)	4.73	1.873, 11.968	0.0004
HIV-pregnant	262	120 (45.8)	0.21	0.084, 0.534	
HIV+Non-pregnant	26	18 (69.2)	5.04	2.055, 12.363	0.0003
HIV-Non-pregnant	162	50 (30.8)	0.19	0.081, 0.487	

N= number tested ; OR=odd ratio ; CI= confidence interval

Discussion

Lack of data on prevalence of HIV among pregnant women in rural areas necessitated this study. This study aims to determine the prevalence of HIV and anemia among pregnant women of Okada – a rural community in Edo State, Nigeria.

The prevalence of HIV in this study was 11.7 %. In 2005, the HIV prevalence rate for women between the ages of 15-29 in Nigeria was 13.2 % [20]. Lack of HIV knowledge have been shown to promote high risk heterosexual behavior which results in high incidence of HIV among young people within the sub-Saharan Africa [21] and this may be the case in most rural settlements in Nigeria where data on HIV prevalence are scarce. HIV prevalence among pregnant women was 10.2 %. This is in contrast with the Nigerian national overall average prevalence of 4.6% reported among pregnant women in 2008 [22]. Although pregnancy is characterized by general immunosuppression, sustained by elevated level of serum cortisol, which allows foetal allograft retention and predisposing the woman to various diseases [23] pregnancy in this study was not a significant risk factor for acquiring HIV infection. This is consistent with a previous finding [24].

The age group of 10-20 years accounted for the highest number of HIV infected pregnant women. This agrees with previous reports [25, 26]. Data shows that very young women are more at risk of HIV infection as their immature cervix and scant vaginal secretions makes them prone to vaginal mucosal lacerations [27]. Teenage pregnancies are known to be associated with poverty and lack of good education [28] factors which have also been identified as driving forces for acquisition of HIV infection [15]. These same factors are rife in rural settings in Nigeria [16] and may increase the risk of teenage pregnant women being infected with HIV. Age was also significant in acquiring HIV in non-pregnant women, with the highest prevalence recorded within the age group of 20-30 years.

Anemia was associated with pregnancy in our study. This agrees with an earlier finding [29]. Pregnant women had a

1-3 fold increase of developing anemia than non-pregnant women. The pregnancy related decline in hemoglobin could be explained by haemodilution. Age was significantly associated with development of anemia only in pregnant women and those in the age group of 10-20years were mostly affected. Anemia is reported to be strongly associated with teenage pregnancy [30]. Teenage pregnancies are known to be associated with poverty and lack of good education [28]. Poverty which characterize most rural settings in Nigeria, [16] coupled with poor attendance of ante-natal clinic by pregnant women may also account for this observation. However, the reason for the inverse relationship between age and prevalence of anemia among pregnant women is unclear.

Irrespective of pregnancy status HIV infection was associated with anemia. Bone marrow suppression amongst other mechanisms has been reported as reason for anemia among HIV patients [31]. However, HIV infection in women is critical for children since children born to HIV positive mothers are at risk of being born HIV positive or contracting HIV after birth, unless adequate and appropriate interventions and are available.

Conclusion

the prevalence of HIV and anemia among pregnant women in Okada community is 10.2% and 49.3% respectively. Irrespective of pregnancy status, HIV infection was associated with anemia. Appropriate interventions by relevant agencies are advocated.

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