Research Article

Comparison of Pregnancy and Neonatal Outcomes Amongst HIV Positive Women and HIV Negative Women at the University College Hospital Ibadan, Nigeria – A Cross-sectional Study

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ABSTRACT

The effect of Human Immunodeficiency Virus (HIV) and possibly Highly Active Antiretroviral Therapy (HAART) on pregnancy and neonatal outcomes has been a controversial issue with some researches reporting no association while others reporting significant association. This study aimed at comparing the pregnancy and neonatal outcomes between Human Immunodeficiency Virus (HIV) positive women and HIV negative women who delivered at University College Hospital (UCH), Ibadan. This study was a cross-sectional study carried out at the University College Hospital, Ibadan Nigeria. The case notes of all the HIV positive pregnant women and their comparison group who delivered in the year 2013(January 1st- December 31st) were retrieved. Data was summarized with frequency tables and mean (SD). Association between categorical variables was analyzed using chi-square test or Fisher test and association between continuous variables were analyzed using independent T-test. A probability value of <0.05 was considered statistically significant. Compared with the HIV negative women the HIV positive women had higher parity (p<0.001), lesser educational qualifications (p=0.004) and lower occupational positions (p<0.001). The differences for selected pregnancy and neonatal outcomes were not statistically significant; antenatal complications, blood loss at delivery, gestational age at delivery, birthweight of the babies, Apgar score, perinatal death and congenital anomalies. The socio-demographic characteristics were different in both groups and highlight need for programs to address these factors.

Keywords: *HIV, HAART, pregnancy, neonatal, outcomes*

INTRODUCTION

Human Immunodeficiency Virus (HIV) infection remains a global burden and a major health challenge in sub-Saharan Africa including Nigeria (Onah *et al.,* 2007). Reports have shown that Nigeria has the second highest number of people living with HIV after South Africa (World Fact Book, 2014). HIV prevalence rate among adults aged 15-49 years is 3.2%, which translates to about 3.4 million Nigerians (Awofala and Ogundele, 2016). Young adults especially women within the reproductive age group are mainly affected (Ezechi *et al.,* 2013). High incidence has also been reported within the paediatric age group due to vertical transmission of the disease (Onah *et al.,* 2007). The use of Highly Active Antiretroviral Therapy (HAART) early in pregnancy based on World Health Organization (WHO) guidelines has helped in reduction of vertical transmission (Tyndall *et al.,* 2011). Also, other measures such as elective cesarean section, the use of prophylactic antiretroviral by the exposed infant and exclusive breastfeeding within the first 6 months of life has also been incorporated to prevent mother-to-child transmission. With these measures, there has been a remarkable drop in the rate of vertical transmission of HIV (Haeri *et al.,* 2009), but a significant number of cases still occur in resource limited countries like Nigeria (Tang *et al.,* 2010).

Despite the obvious benefits of HAART in preventing mother-to-child transmission of HIV (PMTCT), the potential impact of these drugs in causing adverse obstetric and neonatal outcomes such as preterm delivery (PTB) and low birth weight (LBW) remain controversial (Ezechi *et al.,* 2013; Townsend *et al.,* 2007). While some studies have demonstrated little or no effects (Szyld *et al.,* 2006), others have shown a wide range of

effects (Onah *et al.,* 2007; Ezeaka *et al.,* 2009; Ezechi *et al.,* 2013; St John *et al.,* 2015). Thus, the main objective of this study was to compare the obstetrics and neonatal outcomes of HIV positive mothers with those of HIV negative mothers.

MATERIALS AND METHODS

Study design: This was a cross-sectional retrospective review study of records of HIV positive and HIV negative women.

Study population: The study population included women who delivered in the labor ward of the University College Hospital, Ibadan between January 1st and December 31st 2013.

Study area: It was carried out in the University College Hospital (UCH) Ibadan, Oyo State, Nigeria. UCH is located in the south-western geo-political zone of Nigeria. The hospital has 850 bed spaces and 163 examination couches. UCH offers prevention of mother-to-child transmission (PMTCT) services in the Anti-Retroviral Clinic supported by the AIDS Prevention Initiative in Nigeria (APIN) program.

Sampling method: All HIV positive women who delivered in the labor ward of the University College Hospital, Ibadan between January 1st and December 31st 2013 were included. Also, the HIV negative women who delivered just before and just after the HIV positive women were included as the comparison group.

Data collection: These patients were identified through the birth register and their case notes were thereafter retrieved.
The data retrieved from the case notes included age, parity, last menstrual period and level of education. Others are antenatal complications, gestational age at delivery, mode of delivery, blood loss at delivery. Finally, information was also retrieved on the babies such as sex, birth weight, Apgar score, perinatal death and congenital anomalies.
The information retrieved was entered in the proforma data sheet.

Data analysis

The data was entered and analyzed using IBM Statistical Package for Social Sciences Version 20, New York, US. Data was summarized with frequency tables and mean (SD). Association between categorical variables and HIV status of the women was analyzed using chi-square test or Fisher test where appropriate. Association between continuous variables were analyzed using independent T-test. A probability value of <0.05 was considered statistically significant. However, only the data of the first twin in women who gave birth to twins were included in the analyses.

Ethical Consideration: The confidentiality of these women was maintained as their names and personal data were not revealed. Codes were used instead of their names. Data obtained was anonymized.
Ethical approval was granted by the University of Ibadan /University College Hospital Ethics Committee.
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RESULTS

Socio-demographics: During the study period, the records of 320 women were retrospectively reviewed with 110 being HIV positive and 210 being HIV negative. Of these, 84 case records (76.3%) were retrieved for the HIV positive women and 133 (63.3%) were retrieved for the HIV negative women. The mean age of the women was 31.6 (4.4) years. Two hundred and fourteen (98.6%) of the women were married, majority (96.7%) had one form of formal education or the other and most (86.2%) were employed (see Table 1).

Table 1.
Sociodemographic characteristics of the women

Variables		All women (217)	HIV +ve (84)	HIV –ve (133)	p – Value
Age	16-25	2(0.9%)	1(1.2%)	1(0.8%)	0.43
	26-30	11(5.1%)	4(4.8%)	7(5.3%)	
	31-35	51(23.5%)	14(16.7%)	37(17.1%)	
	36-40	112(51.6%)	48(57.1%)	64(27.8%)	
	41-45	41(18.9%)	17(20.2%)	24(18.0%)	
Parity	0	63(29.0%)	17(20.2%)	46(34.6%)	<0.001
	1	58(26.7%)	17(20.2%)	41(18.9%)	
	2	73(33.6%)	35(41.7%)	38(30.8%)	
	3	15(6.9%)	10(11.9%)	5(3.8%)	
	4	8(3.7%)	5(6.0%)	3(2.3%)	
Educational Level	Nil	8(3.7%)	7(8.3%)	1(0.8%)	0.004
	Primary	8(3.7%)	7(8.3%)	1(0.8%)	
	Secondary School	58(26.7%)	30(35.7%)	28(21.1%)	
	Post-Secondary (not tertiary)	51(23.5%)	20(23.8%)	31(23.3%)	
	Tertiary	92(42.4%)	20(23.8%)	72(54.1%)	
Occupation	Unemployed	30(13.8%)	9(10.7%)	21(15.8%)	<0.001
	Self-Employed	111(51.2%)	57(67.9%)	54(40.6%)	
	Civil Servant	41((18.9%)	11(13.1%)	30(22.6%)	
	Professional	35(16.1%)	7(8.3%)	28(21.1%)	

Table 2:
Obstetric Characteristics

Variable	All Women	HIV +ve	HIV –ve	p – Value
Ante-natal Complication				
HBSS	2 (5.1%)	0 (0)	2 (1.5%)	
Hypertension	17 (43.6%)	3 (3.6%)	14 (10.5%)	
PROM	6 (15.4%)	4 (4.8%)	2 (1.5%)	0.117
APH	5 (12.8%)	1 (1.2%)	4 (3.0%)	
Others	7 (17.9%)	4 (4.8%)	3 (2.3%)	
Hypertension and Diabetes Mellitus	2 (5.1%)	1 (1.2%)	1(0.8%)s	
Mode of delivery				
SVD	**86 (39.6%)**	**27(32.1%)**	**59(44.4%)**	
Assisted breech delivery	2 (0.9%)	1(1.2%)	1(0.8%)	0.315
Emergency CS	75 (34.6%)	32 (38.1%)	43 (32.3%)	
Elective CS	53 (24.4%)	24(28.6%)	29 (21.9%)	
Vacuum	1 (0.5%)	0(0)	1 (0.8%)	

Table 3
Neonatal Outcomes

Variable	All Women (217)	HIV +ve(84)	HIV –ve(133)	p – Value
Perinatal death				
Yes	11(5.1%)	5(5.95%)	6(4.5%)	
No	206(94.9%)	79(94.0%)	127(95.4%)	0.753
Congenital Anomaly				
Yes	3(1.4%)	1(1.2%)	2(1.5%)	1.000
No	214(98.6%)	83(98.8%)	131(98.5%)	
Apgar Score				
Normal	193(95.1%)	76(90.5%)	117(88.0%)	
Mild Asphyxia	5(2.5%)	3(3.57%)	2(1.5%)	0.269
Moderate Asphyxia	4(2.0%)	0	4(3.0%)	
Severe Asphyxia	1(0.5%)	0	1(0.8%)	

Pregnancy, birth and neonatal outcomes: Only 39 (18.3%) had antenatal complications with the most common being hypertension (17.8%). Eighty-six (39.6%) of the women delivered via spontaneous vaginal delivery, 75 (34.6%) by emergency caesarean section and 53 (24.4%) by elective caesarean section. There was only one case of vacuum delivery.

The mean birth weight was 3.06kg (±0.56) and the mean gestational age at delivery was 38.6weeks (2.31). Eleven (5.1%) cases of perinatal deaths and 3 (1.4%) of congenital anomalies were recorded.

Association between HIV status and demographics: The sociodemographic characteristics of the HIV positive women and their controls were compared. The HIV positive women were noted to have a higher parity (p < 0.001) and lesser educational qualifications (p < 0.004). The HIV negative women had higher proportion of professionals (21.1% vs 8.3%) and government workers (22.6% vs 13.1%) when compared to the HIV positive who had higher proportion of self-employment (67.9% vs 40.6%) (p < 0.001) (Table 1).

Association between HIV status and pregnancy, birth and neonatal outcomes: Thirty-nine of the women had one or more antenatal complication with two reported as having both hypertension and diabetes.

The HIV positive women had fewer cases of hypertensive disorders (3.6% vs 10.5%), had more deliveries by caesarean section (66.7% vs 54.2%), higher blood loss at delivery (376.8ml vs 353.3ml). However, these differences were not statistically significant. A review of the neonatal outcomes showed that the HIV positive parturient had babies with lower mean birth weight [2.98kg (0.5) vs 3.07kg (0.6) p=0.168] but the gestational age at delivery was similar for both HIV positive and negative groups [(38.5weeks (2.2) vs 38.7 weeks (2.4) p=0.975]. Finally, fewer babies with moderate or severe asphyxia (0% vs 3.8%). Again, these differences were not statistically different

DISCUSSION

The mean age of the mothers was 31.6years (4.4) which is similar to the mean age reported by Adesina *et al.,* (2015a) in Ibadan and Van der Merwe *et al.,* (2011) in South Africa. This study reported higher parity, lesser educational qualifications

and lower occupational positions/unemployment amongst HIV positive mothers in comparison to HIV negative women which is similar to the findings of Figueroa-Cosme *et al.,* (2010) in Puerto – Rico and Adejuyigbe *et al.,* (2004) in Ile-Ife. Different variables including occupation, type of housing and years of education have been used by different authors as proxy socioeconomic variables (Frank *et al.,* 2004; Gluckman *et al.,* 2008; Ahmadu *et al.,* 2013). When level of education is used as proxy for socio-economic class (SEC), fewer years of education are associated with lower classes of SEC. Poor socioeconomic background of women has been described as important predictors of adverse pregnancy outcomes such as spontaneous preterm delivery (Tucker and McGuire, 2004) and low birth weight (Kogan, 1995; Torres-Arreola *et al.,* 2005). It has been suggested that the effect of low SEC factors start at the time of conception through low physiologic reserves, inadequate medical care and high risk of infectious disease (Gluckman *et al.,* 2008). In addition, women with more years of education could be exposed to information on the importance of prenatal health care which could encourage healthy practices (Kogan, 1995; Torres-Arreola LP *et al.,* 2005).

Low birth weight has been a recurring outcome in past researches carried out on the obstetrics, birth and neonatal outcomes of HIV positive women (Haeri *et al.,* 2009; Ezechi *et al* 2013; Peng- Lei Xiao *et al.,* 2015). However, this study found no statistically significant difference between HIV positive and HIV negative babies even though the mean birth weight of babies born to HIV positive mothers was lower. This is consistent with the findings of Habib *et al.,* (2008), Onah *et al.,* (2007), Vincent-Tyndall *et al.,* (2011) and Adesina *et al.,* (2015a).

Also, this study found no significant statistical association between preterm delivery and HIV status of the mother as reported by Onah *et al.,* (2007) which is in contrast to the findings of Figueroa-Cosme et al (2010), Brocklehurst and French. (1998), Aebi – Popp et al (2010). The effect of antiretroviral therapy on prevalence of PTB among HIV +ve women remains unclear. While some authors demonstrated increased risk of PTB with antiretrovirals (Townsend *et al.,* 2007; ECS. 2000; Van der Merwe *et al.,* 2011, Ezechi *et al.,* 2012), others demonstrated no such increase (Szyld *et al.,* 2006; Yu L *et al.,* 2012). A possible reason proffered for the association of PTB with HIV and ARV is the Th2 to Th1 cytokine shift associated with HAART administration (Fiore *et al.,* 2006). This is in contrast to the Th1 to Th2 shift observed in successful pregnancies (Fiore *et al.,* 2006, Adesina *et al.,*2015a).

Furthermore, no statistically significant association was found between HIV status and other obsterics, birth and neonatal outcomes which includes the mode of delivery, antenatal complications, Apgar score, perinatal death, congenital anomaly and mean blood loss. Similar findings have been reported by Tyndall *et al.,* (2011) and Haeri *et al.,* (2009). The use of elective CS prior to the onset of labor can reduce the rate of MTCT by about 50% (Kuhn *et al.,* 2008). Despite this benefit, there is an aversion towards CS among Nigerian women (Ezechi *et al.,* 2004). However, an aggressive reduction in viral load during the antenatal period may allow the more culturally acceptable option of vaginal delivery to be practiced (Mofenson, 2002; Shapiro *et al.,* 2010), while ensuring a sustained reduction in vertical transmission of HIV. Indeed, Adesina *et al.,* (2015b) reported an increase from 64.8% to 73.5% of vaginal delivery with introduction of universal HAART for all HIV positive pregnant women at the UCH and implementation of the WHO rapid advice (Use of Antiretroviral Drugs for Treating Pregnant Women and Preventing HIV Infection in Infants). A possible explanation for this lack of association between HIV status and other outcomes of interest is the improved use of Highly Active Antiretroviral therapy (HAART) during pregnancy by the HIV positive women as most of the women were on HAART. However, an important limitation of this study is the small sample size of the HIV positive women and their controls.

In conclusion, very few differences in obstetric and neonatal outcomes were noted when HIV positive and HIV negative women were compared. This is reassuring given the benefits of HAART in preventing mother-to-child transmission of HIV. Nonetheless, health care providers must continue to carefully evaluate for any adverse effects.

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