

## HIV in Pregnancy and Feto-Maternal Outcome

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### Abstract

Neonatal, Infant and subsequently childhood human immunodeficiency virus (HIV) infections are a result of transmission from a mother to her unborn fetus in utero, or during the intrapartum period, or postpartum secondary to breastfeeding. Factors like high viral load, and premature delivery, breastfeeding or mixed feeding promote mother-to-child transmission (MTCT) of HIV. Various interventions to prevent MTCT of HIV have been investigated and implemented. These interventions include the use of antiretroviral (ARV) drugs, safe delivery practices and infant feeding practices.

**Objective:** The aim of the study is to determine the feto-maternal outcomes in Sero-positive pregnant women.

**Materials and Methods:** The study population included women who delivered at UATH over 5-year period from January 2016 to December 2021. Data for all HIV positive women were collected retrospectively from antenatal clinic PMTCT unit, ART Special treatment centre, Labour ward and the theatre. The data was analyzed using statistical package for social science (SPSS) version 23.

**Results:** There were a total of 190 HIV positive women among the 10,416 deliveries during the study period, giving an institutional prevalence of 1.8%. There was no maternal dead recorded, there were 5 still births and no case was recorded of mother to child transmission of HIV.

**Conclusion:** The strategy for prevention of mother to child transmission of HIV is an effective strategy that if widely implemented could reduce the incidence of MTCT of HIV and even lead to the desired elimination of mother to child transmission of HIV.

**Keywords:** HIV, Pregnancy, Feto-maternal, Outcome

### Introduction

Human immunodeficiency virus (HIV) is a blood-borne infection that is initially asymptomatic but involves gradual compromise of immune function, eventually leading to acquired immunodeficiency syndrome (AIDS), and the time between HIV infection and development of AIDS ranges from a few months to 17 years in untreated patients [1]. Even though it is pandemic, the center of the global pandemic seems to be concentrated in the sub-Saharan African region which accounts for up to two-thirds of the global total of new HIV infections; And women of reproductive age are more impacted by the infection which constitutes a significant cause of maternal morbidity and mortality [2]. In most sub Saharan African countries including Nigeria, HIV infection has become a leading medical complication of pregnancy and cause of maternal and neonatal morbidity and

mortality [3]. Undiagnosed HIV infection during pregnancy has serious implications for the health of both the woman and her child. Therefore, early HIV diagnosis can reduce the risk of mother-to-child transmission and the rate of disease progression in the mother [1].

Approximately 37 million people were estimated to be living with HIV in the world at the end of 2015, and globally, the annual number of newly infected children in 2014 was 220 000 and the highest burden of them concentrated in Sub Saharan Africa (SSA) [4]. The 2018 Nigeria HIV/AIDS Indicator and Impact Survey (NAISS-2018) revealed a national HIV prevalence of 1.5% for people between 15-64 years and viral load suppression (VLS) of 44.5%. Women aged 15-49 years are more affected by HIV than men (1.9% versus 0.9%). The estimated population

of people living with HIV (PLHIV) aged 0 – 64 years is 1.9 million, the estimated treatment gap comprises 800,000 PLHIV. Viral load suppression among PLHIV aged 15-49 years with access to treatment was 42.3%. Among adults aged 15-64 years, HIV prevalence varies by geopolitical zones, with the highest prevalence in the South-South Zone (3.1%) and the lowest prevalence in the North West Zone (0.6%) [5]. An estimated 1.8 million (range 1.5–2.0 million) children under the age of 15 years were living with HIV infection or AIDS worldwide at the end of 2015, and most HIV-infected children acquire their infection through mother-to-child transmission (MTCT) [6].

HIV can be transmitted from an HIV-positive woman to her child during pregnancy, childbirth and breastfeeding. Mother-to-child transmission (MTCT), which is also known as ‘vertical transmission’, accounts for the vast majority of infections in children (0-14 years) [7]. Greater than 90% of HIV infections among children occur through MTCT; with 90% of MTCT occurring in sub-Saharan Africa. In the absence of appropriate treatment, about half of these children die before their second birthday [8]. The cumulative risk of exposed children acquiring the virus is 20-45% without any intervention if breastfeeding is prolonged to 2 years [8]. Nigeria has the second largest global burden of HIV/AIDS with an estimated 380,000 children living with HIV by the end of 2014 making the country home to over 30% of the global burden of HIV infected children. The high burden of mother-to-child transmission of HIV in Nigeria is due to high rates of heterosexual transmission, high prevalence of HIV in women of reproductive age, high total fertility rate, low PMTCT coverage and prolonged breastfeeding culture [9].

There are many factors that are associated with increased risk of MTCT and they operate at different stages of the period of transmission risk; during pregnancy, labor and delivery and breastfeeding. Factors that increase risk during pregnancy include high maternal viral load (the result of new infection or advanced disease), infection/infestation of the placenta, maternal malnutrition and antepartum haemorrhage. In addition to high maternal viral load, early rupture of membrane >4 hours before delivery, chorioamnionitis, prolonged labor, invasive delivery procedures including use of forceps and episiotomy are factors that increase transmission risk during labor and delivery. Others include preterm birth, first infant in multiple birth and preterm birth. Risk factors during breastfeeding include but are not limited to high maternal viral load (new infection or advanced disease), extended duration of breastfeeding, early mixed feeding, breast abscesses, nipple fissure, mastitis, poor maternal nutritional status and oral disease in the infant [9-11].

Maternal HIV infection in women who have not received antiretroviral therapy has been associated with adverse pregnancy outcomes such as preterm birth, low birth weight (LBW), small for gestational age (SGA) and stillbirth, especially in SSA [12]. Importantly, preterm birth constitutes the second world’s leading cause of death in children under five years [12]. The effects of HIV infection in pregnancy have been mainly studied in high income countries, where both disease burden and health systems are significantly different compared with those in the African region. Several studies conducted in SSA have reported that HIV infected women are at increased risk of maternal anaemia and adverse pregnancy outcomes such as stillbirth, LBW and

preterm new-born. In addition, children born to HIV infected mothers are at increased risk of mortality regardless of their HIV infectious status [12].

Prevention of transmission of HIV from a woman to her fetus or newborn is a major goal in the care of pregnant women infected with HIV [13]. In order to prevent this WHO introduced a set of interrelated interventions designed to block transmission of HIV from a HIV infected mother to her child during the period of pregnancy and breastfeeding. These interventions are offered together as a single package of care known as Prevention of Mother to Child Transmission of HIV (PMTCT) [9]. PMTCT programmes offer a range of services for women of reproductive age living with or at risk of HIV to maintain their health and stop their infants from acquiring HIV [7]. PMTCT, has benefits to the mother, the infant, the family, the community, and even the health system [9]. The United Nations in 2002, after a consultative meeting outlined four elements of a comprehensive approach to the Prevention of Mother to Child transmission of HIV (PMTCT). This has led to the promotion of a four-pronged strategy. These include Primary prevention of HIV infection among women of the reproductive age group and their partners, prevention of unwanted pregnancy among HIV infected women, prevention of HIV transmission from infected mothers to their unborn babies and infant and provision of care treatment and support for HIV infected women, their infants, and their family members [10]. MTCT rates of less than 2% have been reported in high income countries owing to provider-initiated HIV counselling and testing (HCT), accessibility to antiretroviral (ARV) prophylaxis and safe use of breast milk substitutes [8]. Thus, efforts to move towards elimination of mother-to-child HIV transmission (EMTCT) will increasingly need to focus on prevention, and early identification and treatment of HIV infections acquired during pregnancy and breastfeeding to achieve viral suppression. Identification of newly HIV-infected pregnant and postpartum women will be important to achieve the UNAIDS 90:90:90 goals [14]. The successful global movement to start all pregnant and breastfeeding women on antiretroviral therapy (ART) regardless of CD4 T-cell count or clinical staging (known as Option B+) set the stage for the World Health Organization's (WHO's) aptly named “Treat All” guidelines, which eliminated many longstanding barriers to HIV treatment. The rapid scale up of Option B+ to more than 21 countries has demonstrated that programs designed to test and then quickly start treatment in all pregnant and breastfeeding women with HIV lead to increased enrollment, infections averted, and lives saved. The elimination of mother-to child transmission of HIV in Armenia, Belarus, the Caribbean, Cuba, and Thailand could be an incentive [15].

## Materials and Methods

The University of Abuja Teaching Hospital is a 550bed tertiary hospital located in Gwagwalada a satellite town of Federal Capital Territory (FCT) Abuja. It receives patients from within the FCT and the surrounding States of Kogi, Nasarawa, Niger and Kaduna States. The study was a retrospective study spanning from 1st January 2018 to 31st December 2022. The case files, antennal clinic/ PMTCT register, delivery and theater records from the labor ward and the theatre respectively, and follow up record and laboratory results from the Special treatment clinic were obtained. All HIV infected pregnant women booked or unbooked who delivered in the University of Abuja Teaching

Hospital from January 1, 2016 to December 31, 2021 were reviewed. Relevant data on age, parity, gestational age at delivery, complications, mode of delivery, birth weight, maternal and perinatal outcome were extracted.

Primary outcomes: Efficacy of the intervention, overall survival of the child, HIV-free survival, including HIV infection status of the child at 6 weeks. Secondary outcomes: Maternal outcomes: Maternal mortality; Infant outcomes; Stillbirth rates, Severe adverse events, including low birth weight (<2500 g), very low birth weight (<1500 g); preterm birth (<37 completed weeks of gestation), very preterm birth (<34 completed weeks of gestation), and admission to intensive care unit.

## Results

There were 10,416 deliveries during the period and 190 of these were to HIV infected women, and one hundred and fifty-four (154) were available for analysis with retrieval rate of 81%. This gives the prevalence of HIV in this study to be 1.8%. The mean age was  $31.6 \pm 4.7$  years, the median age was 32 years. Table 1 shows the socio-demographic characteristics of the patients studied. The age range was 20-45 years. Women within the age bracket 30-34 had the highest sero-prevalence, while those in the age range 20-24 years had the lowest prevalence. Parity during the study period ranged from 0-7, while gravidity ranged from 1-11.

Majority of the clients had secondary level of education (42. %), while only 0.6 % of the clients have no formal education.

**Table 1: Socio-Demographic Characteristics**

Age	Frequency	Percentage
20-24	10	6.5
25-29	42	27.3
30-34	56	36.4
$\geq 35$	46	29.9
Total	154	100.0
<b>Educational status</b>		
No formal education	1	0.6
Primary	23	14.9
Secondary	66	42.9
Tertiary	64	41.6
Total	154	100.0
<b>Gravidity</b>		
1	27	17.5
2-4	94	61.0
$\geq 5$	33	21.5
Total	154	100.0
<b>Parity</b>		
0	37	24
1-2	82	53.3
3-4	30	19.5
>4	5	3.2
Total	154	100.0

Table 2: Shows maternal antiretroviral drug use during pregnancy. Only 2 (1.3%) of the clients were not on antiretroviral drugs during the course of the pregnancy

**Table 2: ART Use in Pregnancy**

Clients on ART	Frequency	Percentage
Yes	152	98.7
No	2	1.3
Total	154	100

Table 3: Shows pregnancy complications of the patients. Out of the 154 patients in total, 30(19%) had complications as seen in table 3 below, which were not specific to their HIV status. Preterm delivery was the most common complication encountered, which accounted for as high as 70% of the complications encountered. With only 7 % having premature rupture of fetal membrane, accounting for the least.

**Table 3: Pregnancy Complications**

Complications	Frequency	Percentage
Preterm delivery	21	70
Pre-eclampsia	4	13
Abruptio placenta	3	10
PROM	2	7
Total	30	100

Table four shows Mode of delivery and the gestational age at delivery.

Majority of this patient, 81.2% delivered at term and only 7.1% have very preterm birth. Spontaneous vaginal delivery was the commonest route of delivery, accounting for as high as 63%. While caesarean section accounted for 36.4%. One patient had assisted breech vaginal delivery for intrauterine fetal death

**Table 4: Mode of Delivery and Gestational age at Delivery**

GA at Delivery	Frequency	Percentage
28-33wks 6d	11	7.1
34-36wks6d	18	11.7
≥37wks	125	81.2
Total	154	100
Total	154	100.0
<b>Mode of delivery</b>		
SVD	97	63.0
CS	56	36.4
AVBD	1	0.6
Total	154	100

Table 5: Shows pregnancy outcome of the participants at birth. Most of the participants had live birth and majority of them (87.7%) were well and had good apgar scores at birth. Meanwhile 9.1% of the newborn were admitted to the special care baby unit and majority of them were due to prematurity. And most of the newborn (84.4%) were of normal weight, 12.3% had low birth weight and 3.2% had very low birth weight.

**Table 5: Pregnancy Outcome of Participants at Birth**

Infant outcome at delivery	Frequency	Percentages
live birth and well	135	87.7
live birth,admitted to scbu	14	9.1
still birth	5	3.2
Total	154	100.0
<b>Birth weight</b>		
<1500g	5	3.2
1500-2499g	19	12.3
>or=2500g	130	84.4
Total	154	100.0

Table 6: Shows outcome of the infants at 6 weeks. Apart from those that were still born, all infants survived through first six weeks of live and HIV DNA-PCR carried out on all of them was negative.

**Table 6: Outcome at Six Weeks**

Infant at 6wks	Frequency	Percentage
Alive	149	96.8
Alive but sick	0	0
Dead	5	3.2

Total	154	100
<b>DNA PCR at 6 wks</b>		
Negative	149	100
Positive	0	0
Total	149	100

## Discussions

Maternal HIV transmission is the primary means by which infants become infected. Hence prevention of maternal HIV transmission is of paramount importance. The study was conducted on all HIV positive pregnant women who attended antenatal clinic or delivered in Department of Obstetrics and Gynecology UATH Gwagwalada. There were 10,416 deliveries during the period and 190 of these were to HIV infected women, given the prevalence of HIV in this study to be 1.8%. This figure is lower than 6.7% earlier reported in the same center [16]. Another study in Jos North central Nigeria, reported similar prevalent rate and 3-5-fold decline in the prevalence rate [17]. The difference may be due to the global trend in the reduction in the prevalence of HIV infection, it is however similar with the prevalence of 1.9% reported in the 2018 Nigeria HIV/AIDS Indicator and Impact Survey (NAISS) for women between 15-49 years [5].

Women within the age bracket 30-34 had the highest sero-prevalence, which is similar to what was reported from Maiduguri [18]. This could be attributed to the fact that this is the age bracket in which most deliveries take place, as women now delay marriage and given birth due to educational pursuit. There were more educated women, 84.5% having at least secondary education, implying that these women are more likely to take informed decision and comply with treatment and instruction for PMTCT.

Almost all the women (98.7%) took ART during the course of the pregnancy, which is a good number. Scaling up of Option B+ couple with the Test and treat policy of the Federal government may be responsible for the high number of the patients on ART and this could account for the low rate of transmission.

It has been reported that normal vaginal delivery is associated with higher rate (16.6%) of transmission as compare to LSCS (9%) [19]. In this study however, no difference was found as there was zero transmission rate irrespective of the route of delivery. And caesarean section was done for obstetric indications, only two were done for the purpose of PMTCT for women who are not on ART, and whose viral loads are not known. Evidence also abound that once there is viral suppression, even operative vaginal delivery may be safe [20].

In this study, 81.2% of the paturesnts had term delivery. However, previous studies have reported that low birth weight, prematurity, perinatal death and spontaneous abortion are significantly associated with HIV infection [12]. For instance, a study reported that only 30% of women who became pregnant delivered a live-born infant at term [21]. The proportion of pregnancies that ended in a stillbirth was 3.2%. This was close to 4% reported in other studies [21]. The stillbirth rate in the HIV-positive population in this study was 32.5/1 000 births which was lower than

the 50.4/1000 deliveries in the general population reported in the same center [22].

All infants had Nevirapine prophylaxis for at least 6weeks postpartum and were exclusively breastfed. All (100%) of the living children of the HIV positive women tested negative for HIV using DNA PCR at six weeks of life, this is similar to what was reported in this center [16]. This duration of follow up is however too short as breast feeding still continues beyond this period and could even account for up to 40-45% of MTCT postpartum although with HAARTs and adequate viral suppression this could be minimal [23, 24].

## Conclusion

The prevalence of HIV is on the decline as seen in this study (1.8%). Even though it has been documented that, HIV infection or ART in pregnancy may predispose to adverse pregnancy and perinatal outcome, with good antenatal care and multidisciplinary approach HIV-infected women can have good pregnancy outcome. And when there is adequate scaling up and wide spread implementation of the strategies of PMTCT, the desired elimination of MTCT which are already being achieved elsewhere will be a reality in our country just as it was obtained in this study.

## Conflicts of Interest

There are no conflicts of interest

## Source of Funding

Nil

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