

## Maternal HIV Positive Sero-Prevalence at Delivery at a Tertiary Hospital in South-Eastern Nigeria

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### Abstract

**Background:** The duo of HIV/AIDS infection has become a Global public health problem. This study was conducted to determine the maternal HIV positive sero-prevalence at delivery at the Imo State University Teaching Hospital, Orlu.

**Methods:** A retrospective analysis of the case records of women (both booked and unbooked) who tested positive to Human Immune-deficiency Virus at delivery at the Imo State University Teaching Hospital (IMSUTH), Orlu from 1<sup>st</sup> May 2005 to 30<sup>th</sup> April 2010 was made. The biosocial, obstetric and fetal sex data were extracted and analysed.

**Results:** The maternal HIV positive sero-prevalence at delivery was 6.9%. The highest sero prevalence rate of 42.4% occurred in the age group of 31-35years. Sixty three (68.5%) of the women were multiparous (para 1-4). The male: female birth ratio was 1 : 1.42. Forty one (44.6%) of the women were unbooked. None of the women were symptomatic of Acquired Immunodeficiency Syndrome (AIDS) on presentation.

**Conclusion:** There is high maternal HIV sero-prevalence at delivery at IMSUTH, Orlu. There should be improvement on interventions to reduce this ugly trend. There should also be early booking and adequate antenatal care services.

**Key Words:** Maternal HIV positive sero-prevalence, delivery, birth sex ratio, Orlu.

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### Introduction

Women are particularly vulnerable to heterosexual transmission of HIV infection because of large mucosal exposure to semen, biology of the HIV virus, poverty / low socio-economic status (high prevalence of non-consensual sex, sex without condom use, unknown or high-risk behavior of partners, young women with much older partners). There has been a steady rise in prevalence among women since early 1980s.

Worldwide, 50% of adult People Living With HIV/AIDS (PLWHA) are made up of women, while in Africa, women constitute 60% of them<sup>1</sup>. Thus HIV continues to be progressively feminized mostly in Africa. This has led to an increase in the number of paediatric HIV infections reported due to increased risk of mother-to-child transmission (MTCT) of HIV during pregnancy, labour and breastfeeding<sup>2</sup>.

In developed countries, vertical transmission rate is 15-25%, while in developing countries, it is 25-40%. 20-25% of these occur in-utero, 57-68% occur during Labour/delivery while 10-20% occur during postpartum mostly breast feeding<sup>3</sup>. All children born to HIV positive women test positive themselves at birth because of passive transfer of antibodies from mother to child<sup>2,4</sup>.

Sub-Saharan Africa harbors more than two-thirds of the world's 33.2 million persons infected with human immunodeficiency virus (HIV) and 80% of the world's HIV-infected women<sup>1</sup>. In parts of southern Africa, more than 30% of the pregnant women attending antenatal clinics are infected with HIV, thus making HIV infection one of the most common complications of pregnancy in sub-Saharan Africa<sup>1</sup>. Different studies<sup>5-10</sup> in Nigeria have reported a sero-prevalence range of 2.6-19.1%.

As at December 2008, the Nigerian National HIV sero-prevalence among antenatal women was 4.6%<sup>1</sup>. This was also the sero-prevalence in Imo State<sup>1</sup>. All these previous studies were carried out on antenatal women at the time of booking, thereby excluding any contribution to the sero-prevalence rate from unbooked patients. Despite this, there has not been any previous report from Imo State University Teaching Hospital (IMSUTH), Orlu on maternal HIV positive sero-prevalence during the antenatal period and none at delivery. We report here the maternal HIV sero-prevalence at delivery as seen at the Imo State University Teaching Hospital (IMSUTH), Orlu, Imo State, Nigeria.

## Methodology

A retrospective analysis of the delivery records of women who delivered at the Imo state university teaching hospital, Orlu from 1<sup>st</sup> May 2005 to 30<sup>th</sup> April 2010 was made. Imo State University Teaching Hospital is located in Orlu in Orlu Local Government Area of Orlu senatorial zone of Imo State. The inhabitants are both farmers, traders and civil servants. The teaching hospital is a major referral center serving the whole of Imo State and its environs. The biosocial and obstetrics data of these patients were obtained. These included maternal age, parity, booking status and foetal sex.

The maternal HIV status was assessed using the Determine HIV- 1/ 2 Rapid Test (Abbott Laboratories, Abbott Park, IL) and positive results were confirmed by the Uni-Gold Rapid Test (Trinity Biotech Co, Wicklow, Ireland) in serial algorithm. Any discordant result between the two was ratified by the use of a third kit StatPack as a tie-breaker. Determine is highly sensitive but less specific, while StatPack and UniGold are both highly specific but less sensitive. These tests were done with either maternal whole blood, serum or plasma.

## Results

A total of 1,334 women delivered in the hospital within the study period and were screened for the presence of HIV-1 & 2 antibody in their serum. Out of this, 92 (6.9%) tested and were confirmed sero-positive. Fifty one (54.4%) of these patients booked for and had Antenatal care in IMSUTH. They also received Highly Active Antiretroviral Therapy (HAART) during the antenatal period. Forty one (44.6%) of them were unbooked and did not receive any HAART.

As shown in Table I below, age group 31-35years contributed the highest percentage (42.4%) of the sero-positive patients. This was followed by age range of 26-30years which were 26 (28.3%).

Table II shows that multiparous (para 1-4) women contributed the highest percentage (68.5%) of the sero-positive patients. This was followed by nulliparous women who contributed 20 (21.7%).

Table III shows that 54 (58.7%) of the babies delivered by the seropositive mothers were female while 38 (41.3%) were male giving a Male : Female ratio of 1 : 1.42. None of the women were symptomatic of Acquired Immunodeficiency Syndrome (AIDS) on presentation.

**Table I: Frequency distribution of age group of the women**

Age Group(years)	Frequency	Percentage
<=20	5	5.4
21-25	7	7.6
26-30	26	28.3
31-35	39	42.4
36-40	13	14.1
>40	2	2.2
Total	92	100

**Table II: Parity range distribution of the women**

Parity	Frequency	Percentage
Nulliparous	20	21.7
Multiparous	63	68.5
Grandmultiparous	9	9.8
Total	92	100.0

**Table III: Frequency distribution of the sex of the babies.**

Sex of the babies	Frequency	Percentage
Male	38	41.3
Female	54	58.7
Total	92	100

## Discussion

The intrapartum maternal HIV sero-prevalence rate of 6.9% in this study is higher than both the National sero-prevalence rate at antenatal period for Nigeria and the Imo State sero-prevalence rate of 4.6% reported in the 2008 National sentinel surveillance<sup>1</sup>. It is also higher than the records of 2.7%, 5.2%, 5.3%, 6.0% and 6.8% from Calabar<sup>5</sup>, Yola<sup>6</sup>, Abakaliki<sup>7</sup>, Kaduna<sup>8</sup> and Nnewi<sup>9</sup> respectively. However it is lower than the 8.3% and 19.1% reported from Abuja<sup>10</sup> and Makurdi<sup>11</sup> respectively. These differences in the sero-prevalence rates could be explained by different study and laboratory methods and different patient case-mix<sup>12</sup>. For instance this study included both booked and unbooked patients unlike the other studies<sup>5,7,8,10</sup> which were carried out on antenatal women at booking thereby excluding the unbooked patients.

Thus the inclusion of unbooked women at delivery could explain the higher prevalence rate in this study compared to the national sentinel study of 2008. On the other hand, this could also be signifying a rising trend of HIV infection in the state. Thus routine voluntary testing is advisable both during antenatal period and during delivery especially for the unbooked patients. This will go a long way in reducing mother-to-child transmission of the infection, thereby reducing paediatric HIV infection. It will also help in counseling the woman on different forms of infant feeding that may be practiced by her.

These high figures in Nigeria is comparable to other African countries like Uganda, South Africa and

Botswana during 2003-04 which ranges from 6 to 39% and in Tanzania estimated to be 7%<sup>13</sup>.

The age of the women was between 17-41 years with a mean of 30.47 years. Contrary to other studies<sup>7,10</sup>, where the seropositivity rate was highest in the age group of 26-30 years, the age range of 31-35 years has the highest seropositivity rate of 42.4%. This could be explained by the increasing trend towards delaying child-bearing in pursuance of academic qualification and carrier satisfaction in our women. Thus, our result is still in consonance with the documentation that African women of child-bearing age are particularly vulnerable to HIV infection. This high rate has also led to an increase in the number of paediatric HIV infections reported due to mother to child transmission of HIV infection.

This study also showed that the male: female sex ratio of the babies tilted to more females than male. Proximate explanations to this sex ratio bias include Y-bearing sperm being faster but less resilient to unfavourable conditions in the mother's reproductive tract than X-bearing, who are slower but survive longer<sup>14,15</sup>; spontaneous abortion may be biased towards males<sup>15</sup> and might in general be more common than abortions of female fetuses<sup>16,17</sup>; maternal psychological stress could lead to foetal asphyxia, foetal death, or complications during parturition<sup>18,19</sup>. However, the ultimate explanations in sex ratio changes include the Trivers-Willard hypothesis<sup>17</sup>, which suggests that if a female is in poor condition, or of low social status, it is beneficial to her to invest into the offspring sex that is less reproductively variable. The reproductive success of male offspring, in the society where access to

breeding partners is limited through dominance hierarchies and male-male competition, tends to be more variable and resource sensitive. Some males are thus highly successful breeders while others are not. Although females can benefit by investing into the offspring with higher reproductive variance, they will not be able to do so if they lack the resources. Therefore, vertebrate females subjected to physiological and psychological stress like HIV infection, or in worse body condition gain a selective advantage by producing female offspring, since male offspring are thought to be more costly to produce and raise and are less likely to attain a high social status and lifetime reproductive success if born to a stressed, subordinate, female<sup>17,20,21</sup>. Hence, physiologically stressed females (as in HIV infection), would be better off producing female offspring under conditions of stress, as daughters are more likely to survive than sons<sup>22</sup>, and the reproductive success of daughters is usually not dependent on social status, thus the finding in this study.

In conclusion, the maternal HIV positive sero-prevalence at delivery in our centre is higher than the national sero-prevalence of HIV. Efforts should be made towards primary prevention of HIV infection in women of reproductive age. These will include Improvement of women's status in the society, provision of information about HIV/AIDS and its prevention, promotion of safer sex (barrier methods) and adequate treatment of sexually transmissible infections (STIs). Other behavioural interventions include reduction in frequency of unprotected sex during pregnancy, reduction in the number of sexual partners during pregnancy and lifestyle changes; avoidance of drug use and smoking in pregnancy.

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