

# **Human immunodeficiency virus seroconversion in late pregnancy: Effects on pregnancy and childbirth in Kenya**

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**Abstract**

**Background:** *In Kenya, there is limited empirical data on effects of seroconversion in pregnancy and child birth due to low uptake of HIV retesting despite there being a policy directive to do so.*

**Objectives:** *To determine the effect of seroconversion in late pregnancy regarding pregnancy and childbirth among women seeking delivery services in Kakamega County Hospital and Pumwani Maternity Hospital.*

**Methodology:** *A ten month quasi experimental longitudinal study design was employed whereby 1,156 respondents consecutively sampled.*

**Results:** *HIV seroconverters had a higher chance of developing premature rupture of membranes, hemorrhage and puerperal sepsis than HIV negative women.*

*The incidence of Mother to Child Transmission of HIV among exposed newborns was 0.09%. There was a statistically significant relationship between PEP administration, infant morbidity and mortality.*

**Conclusion:** *HIV seroconversion was associated with complications during delivery.*

**Recommendations:** *There's need to intensify retesting in late pregnancy as well as skilled birth attendance among the women seroconverting in late pregnancy.*

**Key words**

*Effects of HIV Seroconversion, late pregnancy, seroconverters, incidence of seroconversion, HIV retesting, seropositive status, Mother to Child Transmission of HIV, exposed newborns*

**1.1 HIV Seroconversion in late pregnancy**

Studies conducted in Botswana by (Thaczuk & Safreed-Harmon 2009) reported cases of HIV positive children being born from initially HIV negative women. Another study conducted by (Umeononihu et.al 2013), in Nigeria reported an HIV prevalence of 3.9% among initially HIV negative pregnant women in late pregnancy. A similar study conducted by (Ongeso 2013), in Kakamega established an HIV prevalence of 2.98% among initially HIV negative pregnant women. These studies bring to the fore the magnitude of missed opportunity associated with a single routine antibody rapid test for pregnant women in early pregnancy. Therefore, routine repeat antenatal HIV testing and counseling in late pregnancy is advocated.

According to Sirengo et.al (2014) the rate of Mother to Child Transmission in Kenya was 15.1%. (Kenya AIDS Indicator Survey 2014) puts it at 14%. The risk of an HIV-infected mother passing the virus to her infant during pregnancy, labor and delivery or in the postnatal period is 1 in 3 if nothing is done to reduce this risk (De Cock, Mbori-Ngacha, & Marum, 2002). HIV testing of women in pregnancy forms an entry point to the management of the pandemic.

Effects of HIV seropositivity in pregnancy have been documented by many researchers. (Pattrapornnan, DeRouen, and Songpaisan, 2012), in their study done in Thai found a positive risk of adverse neonatal outcomes in HIV-infected pregnant women. (Ikpim, Edet, Bassey, Asuquo & Inyang 2015) in Nigeria found that HIV-positive status increased adverse birth outcome of pregnancy.

## **1.2 Statement of the Problem**

Over the past five years there have been many studies conducted on seropositivity in late pregnancy globally and in Africa and its contribution to the high incidences of Mother to Child Transmission of HIV (Drake et.al, 2014; Steele, 2011; & McHugh et.al, 2015). There is limited empirical data explicitly assessing the outcomes of Human Immunodeficiency Virus (HIV) seropositivity in late pregnancy partly due to the fact that majority of the pregnant women globally start seeking antenatal care late in pregnancy and are rarely retested. This leaves a gap in the Elimination of Mother to Child Transmission (eMTCT) strategy which aims at virtual elimination of HIV thus contributing to high maternal and neonatal morbidity and mortality rates in Kenya.

## **1.3 Purpose of the study**

The purpose of this study was to determine the effects of HIV seroconversion among pregnant women seeking delivery and postnatal services in Nairobi and Kakamega counties.

## **1.4 Objectives:**

1. To determine the effect of seropositive status on the affected woman regarding pregnancy and childbirth in Kakamega County Hospital and Pumwani Maternity Hospital
2. To determine the incidence of Mother to Child Transmission of HIV among exposed newborns in Kakamega County Hospital and Pumwani Maternity Hospital.

## **1.5 Study justification**

The study was conducted in Kakamega and Nairobi counties since they were among the top three leading former provinces in HIV infection rates (KDHS, 2009). The study was therefore instrumental in addressing the problem facing the people of these counties in so far as uptake of effects of late HIV seroconversion on pregnancy and childbirth is concerned. Pumwani in Nairobi being mainly an urban setting and Kakamega mainly a peri-urban setting provided a rich source of data in so far as factors eMTCT uptake are concerned. Nairobi and Kakamega counties had almost similar HIV prevalence rates of 11 and 9 percent respectively (KDHS, 2009) and therefore the outcomes from the counties could be compared. Furthermore no similar study has been conducted in the study areas.

## **1.6 Significance of the Study:**

The study findings, if used by policy makers, will help address effects of late HIV seroconversion on pregnancy and child birth with an aim of mitigating the negative effects and improving quality of life of the mother and the newborn.

## 2.0 Literature Review

### 2.1 Effects of HIV Seroconversion among Pregnant Women

#### 2.1.1 Effects of HIV Seroconversion Globally

Effects of HIV seropositivity in pregnancy have been documented by many researchers. Most of the effects that occur in pregnancy are associated with a high viral load which is associated with the short duration of treatment rather than the effect of pregnancy on the treatment. This is according to (Rachas et.al 2013), who did their study in Botswana. (Pattrapornnan, DeRouen, and Songpaisan, 2012), in their study done in Thai found a positive risk of adverse neonatal outcomes in HIV-infected pregnant women. (Bùi, Gammeltoft, Nguyen and Rasch (2010) suggested that awareness of HIV-positive status is related with an increased tendency to have an induced abortion in a study on induced abortion among HIV positive women in Vietnam. A study in Brazil involving seventy-eight mother-child pairs showed that diagnosis of maternal disease after pregnancy as well as the non-utilization of antiretrovirals for prophylaxis or treatment during pregnancy as a significant factor in MTCT of HIV (Fernandes, Ribas, Pires, Gomes & Acosta2010).

#### 2.1.2 Effect of HIV Seropositivity in Africa

A study by (Ikpim, Edet, Bassey, Asuquo & Inyang 2015) in Nigeria found that HIV-positive status increased adverse birth outcome of pregnancy. Use of ART appeared to reduce the risk of preterm births in HIV-positive cohorts. Adverse pregnancy outcomes that were associated with HIV status included anemia -33 (8.1%) vs. 8 (3.1%) in controls, puerperal sepsis-18 (7%) vs. 2 (0.8%), and low birth weight-56 (21.7%) vs. 37 (14.4%). Caesarean delivery was higher among HIV- positive women than controls -96 (37.2%) vs. 58 (22.6%). Preterm births were higher in those HIV cohorts who did not receive antiretroviral therapy (ART)-13 (16.9%) vs. 7 (3.9%).

(Shapiro et.al 2012) suggested that MTCT of HIV was rarely associated with stillbirths, and did not occur among women receiving HAART in a study done among HIV positive and negative women in Botswana.

In a study done in four African countries namely Burkina Faso, Kenya, Malawi and Uganda among 408 clients by (Hardon et.al 2012), it was suggested that disclosure remains highly problematic whereby 79% of HIV-positive pregnant women reported that they generally keep their status secret and only 37% had disclosed their status to their husband. (Rochat et.al 2011), in their study in South Africa on prevalence and clinical presentation of antenatal depression, suggested that in a sample size of 109 clients, prevalence of depression was high with over half of the depressed women reporting episode duration greater than two months.

According to (Bodkin et.al 2006) pregnant PLHIV had a higher than normal possibility of having anemia (10.85 vs. 11.48 g/dl;  $P = 0.001$ ), attended significantly fewer antenatal clinic, weighed significantly less and were significantly more likely to present with an abnormal vaginal discharge than HIV negative pregnant women based on a study comparing HIV positive and negative pregnant women at a public sector hospital in South Africa. Pregnant PLHIV were significantly more likely to present with intrauterine growth retardation, were significantly more likely to deliver earlier and were significantly more likely to deliver neonates weighing less (2969.98 vs. 3138.43 g;  $P = 0.01$ ) than HIV negative pregnant women.

In a study done in Zimbabwe among HIV positive women on treatment, (McCoy et.al 2015), indicated that out of the 1,075 HIV-infected women, 59% reported using ART/ARV prophylaxis and 63% of their HIV-exposed infants received ARV prophylaxis. Among HIV-exposed infants, maternal receipt of ART/ARV prophylaxis

was protective against MTCT. The factors associated with receipt of maternal ART/ARV prophylaxis included four or more antenatal care visits, institutional delivery, and disclosure of serostatus.

A study in North-central Nigeria where 996 children were followed up, home delivery was associated with higher transmission than facility delivery ( $p=0.03$ ) (Sagay et.al 2015).

## **2.2 Incidence of HIV among Exposed Babies**

### **2.2.1 Incidence of HIV among Exposed Babies in Africa**

Studies conducted in Botswana by (Thaczuk 2009) indicated that there have been HIV positive children born from initially HIV negative women. Another study conducted by (Umeononihu et.al 2013), in Nigeria indicated an HIV prevalence of 3.9% among initially HIV negative pregnant women in late pregnancy.

According to (Sagay et.al 2015), in a study done in Nigeria where HIV positive mothers were started on triple therapy upon being diagnosed of HIV, a total of 996 children exposed to HIV were followed up. Six infants (0.7%) were confirmed to be HIV-infected (4 by the age of 6 months and 2 thereafter) and were referred for treatment.

According to a study conducted in Ethiopia by (Berhan et.al 2014), the prevalence of HIV among HIV exposed infants was 10.1% (95% CI=7.3-13%). Delayed diagnosis, mixed infant feeding, failure to receive either antiretroviral therapy or prophylaxis during pregnancy or breast feeding and shorter duration of HIV treatment were the factors that increase the risk of MTCT of HIV. This prevalence is very high, perhaps the highest in the world.

### **2.2.2 Incidence of HIV among Exposed Babies in Kenya**

A study conducted by (Ongeso 2013), in Kakamega Kenya suggested an HIV prevalence of 2.98% among previously HIV negative pregnant women. These studies therefore bring to the fore the enormity of "missed opportunity" associated with a single routine antibody rapid test for pregnant women in early pregnancy. Therefore, routine repeat antenatal HIV testing and counseling in late pregnancy is advocated. Retesting later in pregnancy is important in curbing MTCT according to (Kenyan pMTCT Guidelines 2012). According to (Mutiso et.al 2014), one out of the 21 babies (4.8%) born of HIV seroconverted women was confirmed to be HIV infected.

## **3.0 Methodology**

### **3.1 Study Design**

A longitudinal quasi experimental study design was adopted. It was considered most appropriate for this study since data was being collected at three month intervals, over a ten-month period and that the clients needed to be followed up to observe any changes regarding their serostatus.

Both HIV positive and negative pregnant women were recruited into the study. They were then divided into two groups of the HIV positive and HIV negative participants. The ones who were HIV positive commenced the Highly Active Antiretroviral Therapy regime according to eMTCT protocol. The participants were then followed up through pregnancy and delivery. Six weeks post delivery their children were tested for HIV to establish their serostatus. A research design in which a researcher does not use randomization in selecting the respondents to be placed in the treatment or intervention group is quasi experimental.

The study period was divided into four phases. The first phase of the study was enrollment of both HIV positive (treatment group) and HIV negative (intervention group) into the study. The clients with the help of Research Assistants filled up a questionnaire and those who were not HIV positive were tested for HIV. The information collected included demographic data, respondents' knowledge concerning HIV transmission, among others.

Phase two involved follow up of the HIV negative clients for retest three months later according to the Ministry of Health eMTCT 2010 guidelines to ascertain whether they had seroconverted or were still seronegative. Those who were seropositive joined the treatment group and the ones who remained seronegative remained in the control group.

Phase three involved follow up of both groups with the aid of a checklist to capture data from them at the point of childbirth.

Phase four involved follow up of HIV positive women (chronic HIV positives and those who seroconverted) six weeks post delivery where they were interviewed on determinants and outcomes of HIV seroconversion as well as how they were coping with HIV. Their exposed babies were also subjected to DNA/PCR test for HIV to ascertain their serostatus.

### **3.2 Study Site background**

All study activities were conducted at Kakamega County Hospital and Pumwani Maternity Hospital, which are the largest government antenatal facilities in Kakamega and Nairobi County. Both hospitals provide antenatal, delivery, postnatal, and family planning services, including antenatal pMTCT and labor ward HIV testing using "opt-out" approach for HIV testing. Repeat HIV testing is also practiced at both facilities.

### **3.3 Target Population**

The target population consisted of all women of reproductive age (WRA) i.e. 15-49 years of age attending antenatal care services in the two Kenyan Counties – Kakamega and Nairobi. (According to KDHS 2008-09 WRA were aged between 15-49 years.

### **3.4 Inclusion criteria**

All HIV positive and HIV negative women in early pregnancy below 26 weeks were enrolled into the study. The HIV negative women were then followed up for three months after which they were retested to ascertain their serology status.

All women attending antenatal care below 18 years both married and unmarried were considered as mature minors and included into the study, however consent was sought from their parents before enrolling them into the study.

### **3.5 Exclusion criteria**

Pregnant women with medical conditions or major complications in pregnancy were excluded from the study.

### **3.6 Sample Size Determination:**

Different sample sizes were picked from different hospitals; that is Pumwani and Kakamega County Hospital. Secondly quantitative and qualitative methodologies were used to arrive at the sample sizes for the different sets of data required.

For quantitative data, the researcher set out to enroll many respondents into the study to cater for the ones who were likely for one reason or another to drop out of the study. Hospital records in June 2013 revealed a total monthly first time attendance of 256 and 213 for Kakamega and Pumwani study sites respectively. The researcher therefore decided to enroll the clients over a period of ninety days (three months) to be able to cater for attrition. The sample size was  $213 \times 3 = 768$  and  $213 \times 3 = 639$  for Kakamega and Pumwani sites respectively giving a total of 1,407 respondents.

### **3.7 Sampling Procedure**

Consecutive sampling technique was employed whereby all accessible women in the hospital at the time of data collection period were approached.

Data collection was an ongoing process. It took between two to three months to finish enrolling all the women in the two study sites. Sampling procedure for qualitative data was done conveniently on first come first served basis and was concluded upon realization of data redundancy.

### **3.8 Pilot Testing:**

A month prior to commencement of the study, a pilot test was conducted at Mbagathi District Hospital during the month of May 2014, to ascertain questionnaire validity and reliability. According to (Hertzog 2008) and (Connelly 2008) 10% of the sample size is appropriate for use in a pilot test; the researcher recruited 116 clients for the pilot test, thirty five males (30%) and the rest (70%) were females. The questionnaire was mainly used to check for the adequacy of the research instruments as follows.

The questionnaire was evaluated for internal consistency whereby Cronbach's alpha of +0.70 was realized and for equivalence the degree of error observed through interrater reliability procedures where the index of equivalence was calculated and found to be strong.

Content validity of the questionnaire was also measured, giving a content validity index of 0.9. Quality control measures were deployed to ensure that the test kits were working correctly and that they were reporting accurate test results with a high degree of confidence. The test kits sensitivity and specificity was evaluated from literature. Sensitivity (95% CI) of 100% (99.1–100%) and an initial specificity (95% CI) of 97.9% (96.4–98.8%) was found.

### **3.9 Data Collection Tools**

Data collection tools included interviewer administered semi-structured questionnaires. The respondents were given the option of using either English or Kiswahili questionnaires. HIV Rapid test kits were also used to test the clients to ascertain their serostatus. A Checklist was used to ascertain the important events during delivery and at the postpartum period.

### **3.10 Data collection Methods**

The respondents were taken through the questionnaire and their responses documented. They were then taken through pretest counseling for HIV before being tested, they were given the results after which post test counseling was done. The HIV test was done to generate data on initial HIV status for all the respondents. A repeat rapid HIV test was done at least three months after the initial test. The clients were followed during delivery with a designed check list to record some of the predetermined parameters regarding their delivery. Six weeks later those who were sero reactive brought their newborns to the hospital for DNA/PCR to ascertain the newborn's serostatus.

### **3.11 Data Management and Analysis**

Data was captured into Epidata then exported to Statistical Package for Social Sciences (SPSS) Version 20. Measures of central tendency and dispersion were generated for continuous variables for example age and income, while frequency tables displayed categorical variables for example marital status and level of education, among others. Chi-square test of association was used to check for any relationships between selected categorical variable and the outcome such as HIV infection, for example seroconversion states between the two sites Kakamega and Pumwani. A P-value of  $<0.05$  was considered statistically significant.

### **3.12 Data Presentation**

After analysis of data from the two sites the report generated was in form of tables, graphs pie charts and narration.

### **3.13 Ethical Considerations**

The researcher sought ethical approval from Great Lakes University of Kisumu Ethics Review Committee. Ethical clearance was also sought from the National Commission for Science and Technology (NACOSTI). NACOSTI then wrote letters to the county executives for Nairobi and Kakamega counties requesting them to allow the researcher carry out the study in their counties. This facilitated community entry of the researcher to the counties. The county executives then instructed the medical superintendents of the two hospitals to allow the researcher collect data in their facilities. Kakamega and Pumwani Maternity Hospitals Ethical Review Committees also scrutinized the proposal before granting the researcher an approval to carry out research. The researcher having been granted permission to conduct the research by the respective hospitals, then approached the ward in charges in the facilities prior to the commencement of the study and sought permission after informing them of the intent carry out research and the process that had been followed in gaining access to the hospitals. Informed consent was sought from adult respondents. For mature minors aged below 18 years, informed consent was sought from the respondents and their parents or guardian as well before engaging them in the study. This was done through detailed informed consent form that was read to the respondents, who in turn signed the consent form, showing that they had understood and agreed to participate in the research. In the letter, the researcher had highlighted the aims and purposes for research as well as perceived benefits and risks associated with the study. The respondents had been informed that participation was voluntary. Permission was sought from the respondents before recording the conversations on an audio recorder. Anonymity of participants was maintained by not using any identifiers or personal information in the data collection tools. All the information collected from respondents was treated with utmost confidentiality and the respondents had been informed that no information divulged to anyone unless they said so. Respect

and dignity was upheld while collecting data by ensuring that no part of the procedure subjected the respondent to undue psychological discomfort by doing pre test and post test counseling. The women who were found to be HIV positive were started on antiretroviral therapy according to the Ministry of Medical services protocol.

#### **4.0 Results:**

### **4.1 Effect of Seropositive Status on Pregnancy and Childbirth**

#### **4.1.1 Effect on Delivery**

Women who seroconverted as well as the HIV negative were followed up during delivery to establish effects of seropositivity on their pregnancy and delivery. A checklist was used to assess the effects during this period. The effects were as shown in the table 1 below;

Among the 430 pregnant women who were followed up in the two study sites, there was significant association between Pre labor rupture of membranes, Mode of delivery, incidence of PPH, chances of developing febrile illness (puerperal sepsis) and HIV seropositivity; ( $p < 0.05$ ). However these results ought to be interpreted with care since the number of clients who seroconverted was quite minimal as shown in the table 2 below;

#### **4.1.2 Effects during Postnatal Period**

During postnatal period Forty seven women comprising of eight women who had seroconverted during the pregnancy as well as the 39 women already infected at enrollment were followed up at postnatal period and with the aid of a checklist. They were distributed as shown in the table 3 below;

From the study findings majority 46 (97.87%) of the women LHIV adhered to exclusive breastfeeding, had their children started on PEP for HIV as soon as they were born and had DNA PCR done to their children at six weeks during the postpartal period according to the Ministry of Health eMTCT protocols. There was one mother 1 (2.13%) whose child turned out HIV positive since the client though enrolled into the study as HIV negative did not turn up for repeat HIV testing, when she showed up at the clinic six weeks postpartally she was found to be HIV positive and as such had not taken precautionary measures aimed at eMTCT. She claimed her baby had been on exclusive breastfeeding but obviously was not on ART prophylaxis. The baby was unwell and later on died as shown in the table 4 below.

### **4.2 The incidence of HIV among Newborns**

Among the 1,117 HIV negative women enrolled to the study 1 (0.09%) neonate from the Kakamega site belonging to a woman who had been enrolled into the study as a HIV for follow but had not turned up for retest ended up seroconverting. Her mother had not turned up for retest three months later and was only captured when she had brought her baby for immunization. She was retested and found to be positive, this prompted the midwives to do Early Infant Diagnosis (EID) and the baby was also found to be HIV positive. The baby later on died at 8 months out of HIV complications.

## **5.0 Discussion:**

### **5.1 Effects of HIV Seropositivity among Pregnant Women**

A significant difference was observed in the study in terms of pre labor rupture of membranes, mean duration between rupture of membranes and delivery, mode of delivery, incidence of PPH and chances of developing puerperal sepsis between seroconversions and HIV infection ( $p < 0.05$ ). However these results ought to be interpreted with care since the number of clients who seroconverted was small. The effects of HIV seropositivity in pregnancy have been documented by many researchers. A study in Botswana by (Rachas et.al 2013) showed that most of the effects that occur in pregnancy are associated with a high viral load which is associated with the short duration of treatment rather than the effect of the pregnancy on treatment.

Results from this study indicated that there was a higher than normal chance of HIV seropositive women developing pre labor rupture of membranes as well as having a longer time between rupture of membranes and delivery which are key in development of puerperal sepsis as illustrated by findings from a study by (Ikpim et.al., 2015). Women living with the virus were more prone to having premature rupture of membranes and coupled with the fact that they had low immunity especially for those who have recently commenced ART, since they stood a very high chance of getting febrile illness.

In so far as mode of delivery is concerned, results from this study concurred with the findings by (Ikpim et.al, 2015) who did their studies in Nigeria and found out that HIV-positive status increased chances of caesarean delivery among HIV positive women. There was a high chance that women who seroconverted would undergo Caesarean section mainly as an eMTCT measure. Most health care providers and women as well will prefer to have a cesarean section to prevent MTCT of HIV.

With regard to incidence of Post Partum Hemorrhage (PPH), results from this study were consistent with the findings by Ikpim et.al., (2015) who did their studies in Nigeria and (Bodkin et.al 2006) who found that HIV positive women were more susceptible to acquiring anemia than other women in the general population and PPH is a major contributor as well as an effect of post partum hemorrhage.

Regarding chances of developing puerperal sepsis, results from this study concur with the findings by (Ikpim et.al. 2015) who did their studies in Nigeria found out that, HIV-positive status increased adverse birth outcome of pregnancy. Women living with the virus were more prone to having premature rupture of membranes and coupled with the fact that they had low immunity especially for those who recently commenced ART. They stood a very high chance of getting febrile illness.

In so far as post exposure Prophylaxis (PEP) administration was concerned, results from this study concur with the findings by (Ikpim et.al. 2015) who did their studies in Nigeria and (Fernandes et.al, 2010) in a study done in Brazil who found out that, HIV-positive status increased adverse birth outcome of pregnancy.

When it came to infant morbidity, results from this study concurred with the findings by (Fernandes et.al, 2010) who in a study done in Brazil found out that HIV-positive status increased chances of infant morbidity. Children who were not on PEP had much poorer prognosis in case of an infection and in this case it became fatal.

With regard to infant mortality, results from this study concurred with the findings by (Fernandes et.al 2010), in a study done in Brazil who found out that HIV-positive status increased chances of infant mortality.

## **5.2 Incidence of Mother to Child Transmission of HIV among exposed Newborns**

There was one infant (representing 0.09% of the sample) who seroconverted within the study parameters, being born to a HIV positive mother, from a sample of 1,117 HIV positive women. This infant eventually died of HHIV complications. These findings are consistent with findings by (Sagay et.al 2015) whose recorded a HIV incidence of 0.7% among 996 Nigerian respondents. These incidences are quite low and as such revealing that the country is making huge strides in the quest to achieve virtual elimination of MTCT of HIV. However the findings disagree with those by (Mutiso et.al 2014) and (Behran et.al 2014) who conducted their studies in Kenya and Ethiopia respectively and found very high incidences of HIV; rate of 10% and 4.8% respectively.

## **6.0 Conclusion:**

### **6.1 Effect of Seropositive Status during Pregnancy and Childbirth**

Results gathered during delivery indicated that there was a statistically significant relationship in terms of pre labor rupture of membranes, mode of delivery, incidence of PPH and chances of developing puerperal sepsis between seroconversions and HIV negative women.

Results gathered during the postnatal period suggested that there was a statistically significant relationship between PEP administration, infant morbidity and mortality between seroconversions and those women already infected with HIV at enrollment i.e., the child who missed PEP became very sick and eventually died.

### **6.2 Incidence of HIV among Children born to HIV Positive Women**

One (0.09%) neonate from the Kakamega site belonging to a woman who had been enrolled into the study as a HIV negative mother for follow up but had not turned up for retest ended up seroconverting.

## **7.0 Recommendations:**

Seroconversion is associated with conditions that can put the woman and her newborn at risk and therefore all women who seroconvert during pregnancy require skilled birth attendance so that to mitigate the chance of getting complications which are likely to increase maternal and neonatal morbidity and mortality.

Retesting during pregnancy is of extreme importance since it leads to prompt interventions that are lifesaving. The absence of retesting on the contrary has a potential of exposing the mother and newborn to the complications of HIV which results in mortality.

Therefore there is need to intensify HIV retesting during late pregnancy in line with Ministry of Health (MOH) guidelines since the likely group to seroconvert have already tested and are mostly unsuspecting.

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Table 1: Number of clients who were followed up n = 430.

	Kakamega	Pumwani	Total
Seroconversion	3	5	8
HIV negative	149	273	422
Total	162	278	430

Table 2: Selected variables and delivery outcomes; n=430

Outcome	Seroconversion n= 8	HIV negative n=422	$\chi^2$ -Value	P-value
Pre labor Rupture of Membranes (PROM)	2	9	11.85	0.026***
Mode of delivery				
SVD	4	375		0.009***
C/S	4	47	11.34	
PPH	3	39	7.11	0.034***
Low Birth weight (Less than 2500gms)	2	69	0.43	0.624
APH	1	17	1.40	0.292
Puerperal sepsis	3	38	7.390	0.0321***
First minute APGAR score below 7 at birth	2	109	0.00	1.000

Table 3: Number of clients who were followed up (n = 47)

	Kakamega	Pumwani	Total
Seroconversion	3	5	8
Already infected with HIV at enrollment	8	31	39
Total	11	36	47

Table 4: Postnatal Outcome s(n=47)

Outcome	Seroconversion n=8	Women already infected with HIV at enrollment; n=39
Exclusive breastfeeding	7 (97.88%)	39 (100%)
DNA PCR for baby	8 (100%)	39 (100%)
PEP started	7 (97.88%)	39 (100%)
Incidence of MTCT of HIV	1(2.12%)	0 (0%)
Infant morbidity	1(2.12%)	0 (0%)
Infant mortality	1(2.12%)	0 (0%)