

# Resumption of Sexual Intercourse Among Postnatal Women Enrolled on Lifelong Antiretroviral Therapy in Uganda.

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## Research Article

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# Abstract

## Background

The postnatal period is critical to the delivery of interventions aimed at improving maternal health outcomes. This study established the timing of sexual intercourse resumption after childbirth and associated factors among women living with HIV in Uganda.

## Methods

Data were drawn from a larger prospective cohort of 507 HIV+ women who were recruited during pregnancy and followed-up for 18 months between August 2013 and May 2015. Analyses for this study were restricted to 385 women who had complete data on pregnancy outcomes. These women were followed-up for six months after childbirth and interviewed at 5 different time intervals (denoted as days since delivery) starting with 1-45 (acute), 46-90 (sub-acute) and 91-120, 121-150, 151-183 (delayed postpartum). At the initial visit, data were collected on women's socio-demographic characteristics and the outcome of their latest pregnancy. At subsequent visits, women were asked about currently having a sexual partner, desire for another child, contraceptive use and resumption of sexual intercourse. The primary outcome was the time to resumption of sexual intercourse within six months after childbirth. Survival analysis was used to estimate the time to sexual intercourse resumption based upon the visit at which sexual intercourse was first reported. Factors associated with time to sexual intercourse resumption were established using Cox proportional hazards regression analyses. We obtained adjusted hazard ratios with their 95% confidence intervals. All data analyses were performed using STATA version 14.0.

## Results

The cumulative probability of sexual intercourse resumption increased up to 88.2% by the sixth month postpartum. The instantaneous probability of sexual intercourse resumption was highest in the delayed postpartum period [68.6% (50.6, 89.3)]. The risk of sexual intercourse resumption was lower when a woman reported having a live-term baby [adj.HR=0.52 (0.31, 0.85)] and an advanced education [adj.HR=0.63 (0.40, 0.98)]. However, currently having a sexual partner [adj.HR=5.97 (3.10, 11.47)]; desire for another child [adj.HR=1.36 (1.08, 1.73)] and contraceptive use [adj.HR=2.21 (1.65, 2.95)] were associated with an increased risk of sexual intercourse resumption.

## Conclusion

The majority of women reported resuming sexual intercourse by the sixth month postpartum. Interventions aimed at improving contraceptive uptake should target the delayed postpartum period.

## 1.0 Introduction

The birth of a child is critical in a woman's life, more so, among women living with HIV [1, 2]. In general, the process of pregnancy and childbirth is known to change women's physical and mental condition as well as their health-related quality of life [3–6]. Some of the factors found to affect the quality of life of postpartum women include depression, lactation problems, urinary complications and difficulties engaging in sexual intercourse after child birth [7]. Although several studies have in the recent past explored issues around sexuality during the postnatal period, the majority focussed on women in the general population as opposed to those living with HIV [8–11]. Women living with HIV require special attention as they experience unique challenges with their health-related quality of life which are exacerbated by a compromised immunity [12]. In addition, majority report a shrinking desire for sex for fear of superficial infections including the fear that engaging in sex could potentially awaken the virus [13].

### **1.1 Global health perspective of sexual intercourse resumption for HIV-infected women.**

HIV is one of the global health pandemics cited in the Millennium Development Goals (MDG #6), which were endorsed by nearly 200 countries in the year 2000, as a strategy prioritized for elimination by 2030 [14]. Since the wake of the pandemic in the early 1980s, several countries around the globe have made tremendous progress in the fight against HIV resulting from integrating various interventions, including Prevention of Mother-To-Child Transmission services (PMTCT) for mothers and their infants [15]. However, as countries register progress towards HIV elimination, there is an increasing incidence of unwanted pregnancies among HIV-infected women, some of which have resulted in poor birth outcomes [16–20]. This is detrimental for women living with HIV given their already compromised immunity. In addition, having multiple pregnancies within the two-year child spacing period recommended by World Health Organization (WHO), further weakens women's health and reduces their quality of life and that of their infants [21]. Several countries across the globe have drafted guidelines for HIV prevention and treatment based upon WHO guidelines on family planning use for national health systems [22]. These national guidelines put emphasis on dual contraception; which involves the use of both a hormonal method (oral contraceptives, long-acting reversible contraceptives, etc.) and a barrier method (condoms) as a component of the postnatal care package. However, not much is done to align this message with the timing of sexual intercourse resumption for women in the postpartum period. As a result, we have women living with HIV who resume sexual intercourse after child birth before they return to contraceptive use [23].

### **1.2 Early resumption of sexual intercourse in the African region**

Early resumption of sexual intercourse (resumption of sexual intercourse before the end of the first six weeks of the postpartum period) is not generally recommended because of the increased risk of acquiring sexually transmitted infections due to vaginal lesions and complications following the delivery process. However, in most parts of rural Africa, a majority of women believe in the traditional practices of postnatal care within their communities including initiation of sexual intercourse after child birth [24–27]. Others fear that their sexual partners would find sex elsewhere if they delayed resumption of sexual relations for too long [28]. Whereas WHO recommends contact with the healthcare system during the

postnatal period [29] the average rural African woman will visit her mother or mother-in-law for postnatal care following childbirth [24]. Such traditional practices have continued to slow down global efforts towards HIV elimination.

### **1.3 Uganda as a focus for understanding timing of sexual intercourse resumption**

Uganda is unique as one of the countries in sub-Saharan Africa that tremendously contained the HIV pandemic in the early 1990s using messaging strategies such as the ABC (**A**bstain, no-sex **B**efore marriage, use **C**ondoms) strategy that brought down the HIV prevalence among adults aged 15–49 from a national average of 18.5% in 1992 to 6.3% in 2017 [15]. With the roll-out of PMTCT and infant services, Uganda is increasingly registering success with high rates of HIV-free infants born to HIV-positive mothers. Much as this achievement serves as a motivation for mothers to be retained in care, studies continue to report high pregnancy intentions among postnatal women living with HIV [30].

#### **1.3.1 Contraceptive use and timing of resumption of sexual intercourse in Uganda**

The World Bank put Uganda's total fertility rate at 4.98 births per woman in 2018, which is the highest in the region and the third highest fertility rate in the world. The Ugandan Ministry of Health (MoH) recommends postpartum abstinence for at least six weeks which aligns well with WHO recommended medical eligibility criteria for return to contraceptive use of not later than 42 days postpartum [31]. Although efforts to improve contraceptive uptake among women of child-bearing age have been stepped up, recent studies in Uganda have registered a delayed return to contraceptive use among postnatal women which does not tie-in with the timing of sexual intercourse resumption following child birth. A recent study in Uganda found a median time to contraceptive use following child birth of 19 months [32] relative to a 6 weeks to 6 months period within which the majority of postnatal women are likely to resume sexual intercourse [8, 33].

#### **1.3.2 Low postnatal care service utilization for Ugandan women living with HIV**

Despite global efforts to strengthen PMTCT services, Uganda like other parts of Africa (such as Ethiopia and South Africa) [34, 35] still struggles with low rates (27%-33%) of postnatal service utilization [36]. Previous studies have revealed that women living with HIV face unique challenges with keeping their clinic appointments during the postnatal period especially when they have not disclosed their HIV positive status to anyone [37]. The Ugandan Ministry of Health (MoH) recommends postpartum abstinence for at least six weeks to minimize the risk of acquiring sexually transmitted infections, including HIV [38]. It is also known that the risk of infecting the baby through breast milk increases during the first six weeks of breastfeeding [39, 40]. Previous work exploring facilitators and barriers to uptake and adherence to lifelong antiretroviral therapy among HIV infected women in Uganda, showed that some men often withdraw financial support in the form of transportation facilitation for women after delivery, as they no longer see the need to continue visiting the health facility after child birth [41]. This becomes even more challenging for women living with HIV since they have several clinic appointments scheduled for routine postnatal examination, HIV drug refills and infant services. The MoH currently employs strategies that

integrate antiretroviral therapy (ART) into postnatal maternal and child health services to minimize the frequency of clinic visits during the postnatal period. However, in several health facilities, there are still major challenges with integrating maternal and child health services. Women also need health education and adequate counselling on timing of sexual intercourse resumption after child birth. These counselling sessions should be delivered during the antenatal and postnatal period so as to avoid complications resulting from engaging in sexual intercourse before the perineum is completely healed [29, 42]. However, the extent to which postnatal women living with HIV adhere to the MoH guidelines for resumption of sexual intercourse, is not known. Several cross-sectional studies conducted in the Ugandan setting [8] were not capable of estimating the time to resumption of sexual intercourse after delivery because of limitations with the study design. This study used a prospective cohort to estimate the postpartum time periods during which women had a higher risk of sexual intercourse resumption within six months after childbirth. The study also established factors associated with resumption of sexual intercourse after childbirth.

## **2.0 Methods**

### **2.1 Study sites**

The study was conducted at three health facilities (Masaka Regional Referral Hospital, Mityana Hospital and Luwero Hospital) located respectively in Masaka, Mityana, and Luwero districts of Central Uganda. These facilities were among the first to provide lifelong ART in October 2012 shortly after the Ugandan Ministry of Health rolled out the national guidelines for implementation of lifelong ART for the prevention of Mother-to-Child Transmission of HIV.

### **2.2 Study design**

This study used data from a larger 3-year prospective cohort of 507 women who were enrolled on lifelong antiretroviral therapy during pregnancy and followed up to 18 months (between August 2013 and May 2015) to document retention in HIV care, adherence to treatment, uptake of ART, HIV positive status disclosure, partner HIV testing, sexual behaviours (including resumption of sexual intercourse), family planning use, childcare practices, and other PMTCT-related services. Detailed information on the study has been previously published [41, 43, 44].

### **2.3 Sample size**

The larger study estimated a total enrolment of 500 HIV-positive pregnant women to address the primary objective of assessing retention in care and adherence to ART before and after delivery. The sample size was determined using the following assumptions: percent of HIV+ pregnant and lactating women enrolled for PMTCT was  $p=80\%$ , a 5% level of precision, type-I error rate of 5%, a two-sided  $\alpha=0.05$ , and a design effect of 2 to account for the within facility clustering resulted in 492 women, which was rounded off to 500. The participants were drawn from three recruitment facilities where enrolment into the study was done concurrently, resulting in a total of 507 women. However, analysis for this study was restricted

to 732 repeated observations contributed by 385 women for whom there was data on pregnancy outcomes for the first 90 days post-delivery.

## 2.4 Sampling procedure

On each clinic day, the attending nurses referred HIV-positive pregnant women to the study interviewer for eligibility screening and enrolment into the cohort. Study enrolment was done consecutively until the required sample size was obtained.

## 2.5 Data collection methods

Written informed consent was obtained from all eligible study participants who accepted to participate. A structured questionnaire with pre-coded responses was administered by a trained and experienced study interviewer who was stationed at the facility for the duration of the study period. During the six-month follow-up period, face-to-face interviews were conducted at different time intervals defined as number of days since delivery: *1-45, 46-90, 91-120, 121-150 and 151-183*. These time intervals were selected based on the three phases of the postpartum period, which can be distinct but also continuous namely: the initial or acute phase which involves the first 6-12 hours after childbirth; sub-acute postpartum period which lasts 2–6 weeks, and the delayed postpartum period, which can last up to six months. For ethical reasons, interviews could not be conducted during the initial or acute phase (6-12 hours after childbirth). We selected the time interval of *1-45 days since delivery*, to represent the sub-acute postpartum period within which sexual intercourse resumption is not recommended based on current Ugandan MoH guidelines. In addition, at 6 weeks (about 45 days after delivery), infants exposed to HIV are expected to obtain their first PCR test at the health facility for purposes of early infant diagnosis. The *46-90 days since delivery* interval represents the delayed postpartum period which is a time of gradual restoration of muscle tone and connective tissue to the pre-pregnant state. All follow up interviews were, as much as possible, tied to the schedule of postnatal clinic visits for the women and their infants.

## 2.6 Data collection tools

The data collection tool used was a structured questionnaire which was translated into Luganda, the commonly spoken native language in the study area.

## 2.7 Study measures

At the initial visit, data were collected on women's socio-demographic characteristics included: age, marital status, education level, religion and primary occupation. At subsequent visits, women were asked about the outcome of their latest pregnancy, HIV positive status disclosure to at least someone, currently having a sexual partner, partner HIV testing (for those who reported having sexual partners) and current contraceptive use which we defined as condom use combined with or without other contraceptive methods. To capture data on current contraceptive use we asked; *are you or your spouse currently using any family planning method?* Those who said, 'yes' to this question were additionally asked to select one or more options from a pre-coded list of contraceptive methods. We also asked about women's desire for

another child and resumption of sexual intercourse after childbirth. The primary outcome variable was the '*time to resumption of sexual intercourse after childbirth*'. To obtain data on this variable, women were asked to self-report how soon they resumed sexual intercourse after delivery: '*Since you delivered your child, have you resumed sexual intercourse with your partner?*' Those who said, 'yes' to this question, were asked: '*how soon after delivery did you and your sexual partner resume sexual intercourse?*' The women had 3 options to choose from: 1) *within 6 weeks*; 2) *after 6 weeks*; 3) *I don't remember*. Those who chose the third option were assumed to have resumed sexual intercourse within 6 weeks based on findings from a prior study where 68% of postnatal women who resumed sexual intercourse within 6 weeks did not attend their scheduled six-week postnatal clinic visit [10, 45].

### **2.7.1 Study variables by specific objective**

This study used three interviewer-administered questionnaires: 1) the baseline questionnaire administered at the time of study enrolment; 2) the PNC-1<sup>st</sup> interview questionnaire administered during the first postnatal visit following childbirth and; 3) the PNC-subsequent questionnaire administered at all subsequent postnatal interviews (Table 1). The PNC-subsequent questionnaire did not include some questions from the PNC-1<sup>st</sup> postnatal interview as they did not need to be repeated, such as questions on pregnancy outcome. The English versions of these questionnaires are presented as additional files: 1, 2 and 3.

### **Table 1: Summary of study variables by specific objective**

Specific objective	Questionnaire type	Variable name
1. To describe characteristics of postnatal women enrolled on lifelong antiretroviral therapy in Uganda.	Baseline questionnaire	<ul style="list-style-type: none"> <li>- Enrolment health facility</li> <li>- Age, marital status</li> <li>- Education level</li> <li>- Occupation, religion</li> </ul>
	PNC (1) interview	<ul style="list-style-type: none"> <li>- HIV positive disclosure status</li> <li>- Latest pregnancy outcome</li> <li>- Currently having sexual partner</li> <li>- Current contraceptive use</li> <li>- Desire for another child</li> <li>- Timing for wanting another child</li> </ul>
2. To establish time to sexual intercourse resumption after child birth among women enrolled on lifelong antiretroviral therapy in Uganda.	PNC (1) interview	<ul style="list-style-type: none"> <li>- Sexual intercourse resumption</li> <li>- Timing of sexual resumption <ul style="list-style-type: none"> <li>Within 6 weeks.....1</li> <li>After 6 weeks..... 2</li> <li>I do not remember....3</li> </ul> </li> </ul>
3. To establish factors associated with time to sexual intercourse resumption after child birth among women enrolled on lifelong antiretroviral therapy in Uganda.	PNC (Subsequent) questionnaire	<ul style="list-style-type: none"> <li>- Sex intercourse resumption (dependent variable)</li> <li>- All variables highlighted in specific objective 1 above.</li> </ul>

## 2.8 Data management

All completed questionnaires were reviewed and edited onsite with support from the study coordinator. Each questionnaire was independently entered twice by two data entrants who conducted all the data capture into the computer using CSPro version 5. The data manager compared the two data entries to identify and edit any inconsistencies.

## 2.9 Data analysis

Analysis for this study included 732 repeated observations contributed by the 385 women for whom data were collected on pregnancy outcomes for the first 90 days since delivery. We used descriptive statistics, survival analysis and Cox proportional regression models to analyse the data. Descriptive analyses were conducted to describe women's characteristics using frequencies and proportions, means, and standard deviation. Survival analysis was used because of the nature of our primary outcome variable, '*time to resumption of sexual intercourse within six months after childbirth*', which is a time variable. The probability of sexual intercourse resumption was assessed by fixed covariates such as age, marital status, education at enrolment and by time-varying covariates such as HIV partner testing and disclosure of HIV positive status. Repeated measures were used at different time intervals because the nature of our data did not provide a common starting point, as women included in the analysis did not deliver on the same date. Due to the discrete nature of the timing of follow-up, data from visits were ascribed to the time of follow-up from date of delivery to self-report of first sexual intercourse. For the continuous predictors, we used a univariate Cox proportional model. We also used a life-table approach to obtain hazards of sexual intercourse resumption by categories of time from delivery to resumption. The cumulative probability of sexual intercourse resumption was assessed using Kaplan Meier curves. In order to determine independent factors associated with time-to-sexual intercourse resumption, we conducted semi-parametric Cox proportional hazards regression analyses. We obtained adjusted hazard ratios (HRs) as a measure of association with corresponding 95% confidence intervals (CIs) at 5% level of statistical significance. All data analyses were performed using STATA version 14.0 (Stata-Corp, College Station, Texas, USA).

## 3.0 Results

### 3.1 Participant characteristics at enrolment into the sub-study

Of all the 385 women (Fig. 1), the majority (41%,  $n = 159$ ) were recruited from Mityana Hospital, with 35% ( $n = 138$ ) from Masaka Hospital and 22% ( $n = 88$ ) from Luwero Hospital. Almost all the 385 women reported having a live term baby (92.5%,  $n = 356$ ). The mean age (SD) of participants was 25.2 years (SD = 5.2), with 51% ( $n = 196$ ) reporting from 0 to 7 years of school and 82% ( $n = 314$ ) being married (Table 2).

Table 2  
 Characteristics of postnatal women enrolled on lifelong antiretroviral therapy.

Characteristic	Frequencies (n)	Percent (%)
	<b>N = 385</b>	<b>100%</b>
<b>Enrolment health facility</b>		
Masaka Hospital	138	35.00
Luwero Hospital	88	22.00
Mityana Hospital	159	41.00
<b>Age (years)*</b>		
Mean (SD)	25.2 (5.2)	
< 25	193	50.13
25–30	112	29.09
> 30	80	20.78
<b>Education level</b>		
None/Primary	196	51.04
Lower (grade 1–4) secondary	160	41.67
Advanced level/University	28	7.29
<b>Marital status</b>		
Never married	44	11.43
Married	314	81.56
Widowed/separated	27	7.01
<b>Occupation</b>		
Not employed	147	38.18
Homemaker	88	22.86
Business/Wage	150	38.96
<b>Religion</b>		
Catholic	185	48.18
Protestant	77	20.05
Born Again	43	11.20

\*Age categories were based on fertility across age groups (based on Uganda UDHS data).

<b>Characteristic</b>	<b>Frequencies (n)</b>	<b>Percent (%)</b>
Muslim	68	17.71
Other	11	2.86
<b>Latest pregnancy outcome</b>		
Term baby (live)	356	92.47
Term baby (still birth)	5	1.30
Premature (live)	8	2.08
Premature (still birth)	4	1.04
Abortion (less than 28 weeks of gestation)	7	1.82
Other (missing)	5	1.30
*Age categories were based on fertility across age groups (based on Uganda UDHS data).		

### **3.2 Participant characteristics at the first postnatal visit, 90 days since delivery**

Out of the 385 women, the majority (87.0%, n = 335) reported having a sexual partner, nearly half of whom (46.8%, n = 180) did not know if their partner ever tested for HIV. About half (53.5%, n = 83) of those whose partners ever tested for HIV reported a positive partner HIV status. At the time of this follow up visit, 84.4% (n = 325) of women had disclosed their HIV positive status to at least one person (Table 3).

### **3.3 Desire for another child, resumption of sexual intercourse and contraceptive use**

Just under half (46.2%, n = 178) of women reported wanting more children. The majority (90.1%, n = 347) cited wanting to delay having more children for a period of two years (Table 3). By the 90th day after childbirth, less than half (26.2%, 100/385) of women had resumed sexual intercourse, with the majority reportedly resuming after 6 weeks post-delivery. However, only 25 (6.5%) women reported currently using contraception compared to the 100 who reported resuming sexual intercourse (Table 3).

Table 3  
Participant characteristics at the first postnatal visit, 90 days since delivery.

Characteristic	Frequencies (n)	Percent (%)
	<b>N = 385</b>	<b>100%</b>
<b>Currently have a sexual partner</b>		
Yes	335	87.0
No	48	12.5
Missing	2	0.5
<b>Partner's HIV testing</b>		
No sexual partner	48	12.5
Don't know if tested	180	46.8
Yes - tested	155	40.3
Missing	2	0.5
<b>Partner's HIV Status (those tested, n = 155)</b>		
HIV-	72	46.5
HIV+	83	53.5
<b>Women's HIV positive status disclosure</b>		
No	59	15.3
Yes	325	84.4
Missing	1	0.3
<b>Current contraceptive use</b>		
No	355	92.2
Yes (condom use ± other modern FP methods)	25	6.5
Missing	5	1.3
<b>Desire for another child</b>		
No more	191	49.6
Yes wants more	178	46.2
Missing	16	4.2

*\*Time to resumption of sexual intercourse after child birth was the main outcome of interest*

Characteristic	Frequencies (n)	Percent (%)
<b>Timing for wanting another child</b>		
Within 2 years	31	8.1
Delay for 2 years	347	90.1
Missing	7	1.8
<b>Resumption of sexual intercourse after child birth</b>		
Yes	100	26.2
No / declined to answer	222	57.7
Missing	63	16.1
<b>**Time to resumption of sexual intercourse for only the 100 women who had resumed</b>		
Within 6 weeks	24	23.8
After 6 weeks	77	76.2
<i>*Time to resumption of sexual intercourse after child birth was the main outcome of interest</i>		

### 3.4 Cumulative probability of sexual intercourse resumption within six months after childbirth among women enrolled on lifelong antiretroviral therapy in Uganda.

A total of 385 women were visited within the first 90 days after delivery and followed for up to 6 months. By the second visit at 46–90 days, 24 women had resumed sexual intercourse while 16 were lost-to-follow up between the first and second interval period. As a result, only 345 women were interviewed during the second visit (Table 4). Within the acute postpartum period (2–6 weeks), 6.2% reported resumption of sexual intercourse. By the 6th month post-delivery (delayed postpartum period), 88.2% of women had reported resuming sexual intercourse (Table 4). The same results are shown using KM curve below (Fig. 2).

Table 4

Cumulative probability of sexual intercourse resumption within six months after childbirth among women enrolled on lifelong antiretroviral therapy.

Days since delivery	Women who delivered	Resumed sex in interval	Lost before the next interval	Cumulative probability of resumption	95 %CI	
					Lower	Upper
1–45	385	24	16	0.0623	0.0422	0.0916
46–90	345	77	46	0.2716	0.2293	0.3199
91–120	222	50	26	0.4357	0.3844	0.4907
121–150	146	49	27	0.6251	0.5695	0.6808
151–183	70	48	22	0.8822	0.8335	0.9219

### 3.5 Hazard of sexual intercourse resumption within six months after childbirth.

The instantaneous probability of resumption of sexual intercourse was highest in the delayed postpartum period about 151–183 days since delivery; 68.6% [50.6, 89.3] and lowest in the sub-acute postpartum period (1–45 days; 6.2% [4.0, 9.0]). However, no significant difference was observed from the 46th up to the 90th day, where the hazard was 22.3% (Table 5).

Table 5

Hazard of sexual intercourse resumption within 6 months after childbirth among women enrolled on lifelong antiretroviral therapy in Uganda.

Interval	Number of women	Resumed Sex	Hazard In Interval	95%CI	
				Lower limit	Upper limit
[1, 45]	385	24	0.0623	0.0399	0.0896
[46,90]	345	77	0.2232	0.1761	0.2757
[91,120]	222	50	0.2252	0.1672	0.2918
[121,150]	146	49	0.3356	0.2483	0.4359
[151,183]	70	48	0.6857	0.5056	0.8929

### 3.6 Adjusted analysis of factors associated with time to sexual intercourse resumption within six months after childbirth among women enrolled on lifelong antiretroviral therapy in Uganda.

The five independent variables associated with the risk of sexual intercourse resumption within six months after childbirth were: 1) pregnancy outcome (having a live-term baby), 2) education level (advanced secondary /university), 3) currently having a sexual partner, 4) desire for another child and; 5) current contraceptive use.

Women who reported having a live-term baby had a 48% lower risk of resuming sexual intercourse within six months after childbirth compared to those who had a premature, still birth or miscarriage, [adj.HR = 0.52 (0.31, 0.85)]. Similarly; women who had completed advanced secondary/university education had a 37% lower risk of resuming sexual intercourse within six months after childbirth compared to those who had completed not more than 7 years of school [adj.HR = 0.63 (0.40, 0.98)] (Table 6).

Women who reported currently having a sexual partner were almost 6 times more likely to resume sexual intercourse within six months after childbirth compared to those who did not have sexual partners [adj.HR = 5.97 (3.10, 11.47)]. Similarly; women who reported wanting another child had a 36% higher risk of resuming sexual intercourse within six months after childbirth compared to those who did not want another child [adj.HR = 1.36 (1.08, 1.73)]. Lastly, women who reported currently using contraception (condoms/other modern family planning methods) were 2.21 times more likely to resume sexual intercourse within six months after childbirth compared to those who reported not currently using contraception [adj.HR = 2.21 (1.65, 2.95)] (Table 6).

**Table 6: Adjusted analysis of factors associated with time to resumption of sexual intercourse within six months after childbirth among women enrolled on lifelong antiretroviral therapy in Uganda.**

**N = 385**

<b>Independent Variable</b>	<b>P-value</b>	<b>Adjusted Hazard Ratio (95% CI)</b>
<b>Age (years)</b>		
<25	1.0	1.0
25–29	0.49	1.09 (0.84, 1.42)
> 30	0.25	1.18 (0.88, 1.58)
<b>Enrolment facility</b>		
Mityana Hospital	1.0	1.0
Luwero Hospital	0.43	1.10 (0.86, 1.41)
Masaka Hospital	0.45	1.09 (0.86, 1.39)
<b>Education level</b>		
None/completed primary	1.0	1.0
Lower (grade 1–4) secondary	0.41	0.91 (0.74, 1.13)
Advanced secondary level/university	0.04*	0.63 (0.40, 0.98)*
<b>Pregnancy outcome</b>		
Premature, still birth or miscarriage	1.0	1.0
Live-term baby	0.01*	0.52 (0.31, 0.85)*
<b>Currently having a sexual partner</b>		
No	1.0	1.0
Yes	0.00*	5.97 (3.10, 11.47)*
<b>Desire for another child</b>		
No	1.0	1.0
Yes	0.01*	1.36 (1.08, 1.73)*
<b>Current contraceptive use</b>		
No	1.0	1.0
Yes (condom use ± other modern FP methods)	0.00*	2.21 (1.65, 2.95)*
*Indicates a significant association		

## 4.0 Discussion

This study is one of the very few studies among HIV positive postnatal women that used a prospective cohort design to estimate the risk of sexual intercourse resumption across different postpartum time periods. The study also established factors associated with resumption of sexual intercourse within six months after childbirth.

Overall, by the 90th day after childbirth, less than half (26.2%) of women had resumed sexual intercourse, with majority reportedly resuming after 6 weeks post-delivery. This is good news for HIV programs in Uganda as it aligns well with the Ugandan MoH recommendation of 6 weeks of postpartum abstinence. We also found that the cumulative probability of sexual intercourse resumption was lowest in the sub-acute postpartum period (26.2%) and highest (88.2%) in the delayed postpartum period. This is not surprising given similar findings from prior studies in Nigeria and Australia which reported a gradual increase in the risk of post-delivery sexual intercourse resumption of up to 94% by the 6th month [9, 11]. This may be attributed to the fact that the sub-acute postpartum period (between 2–6 weeks after child birth) is a critical period of physical and emotional restoration for the mother. However, by the 6th month postpartum, the health-related quality of life should have normally improved for most women irrespective of mode of birth [6]. Another study that examined women's postnatal wellbeing in the first 90 days after childbirth, found that most women's physical and emotional health appeared to improve with time while some women still reported ongoing post-traumatic symptoms several months after child birth [46] which would most likely delay sexual intercourse resumption.

The present study also identified five independent variables which were associated with the risk of sexual intercourse resumption within six months after childbirth. For instance, pregnancy outcome (having a live-term baby) and education level (advanced secondary/university) were associated with a lower risk of sexual intercourse resumption while variables such as currently having a sexual partner, desire for another child and current contraceptive use were associated with an increased risk of sexual intercourse resumption.

Having a live-term baby was found to be associated with a reduced risk of sexual intercourse resumption. This is consistent with findings from a prior study in South Carolina (USA) which found a lower risk of sexual intercourse resumption when a mother had a live-term baby [47]. A population based study in Australia that examined the prevalence and persistence of women's health problems experienced within 8 to 24 weeks postpartum, cited among other health problems, exhaustion/extreme tiredness, backache and lack of sleep due to the baby crying [48]. Such issues may subsequently shift the attention of the mother away from her sexual partner, as more time is spent caring for the newborn as opposed to attending to the sexual needs of her partner. This is evidenced by a study done to explore postpartum sexuality among black African couples, which found among factors, a reduced frequency of sexual intercourse in 75% of the couples. This decrease was largely attributed to the time dedicated to the child [49].

Another factor which was associated with a lower risk of sexual intercourse resumption was higher education (completing advanced secondary/university education). This finding is supported by a prior

study in Nigeria where women with a higher education had a longer median time to end of postpartum abstinence [9].

On the flip side, the woman's desire for another child coupled with having a sexual partner increased the risk of sexual intercourse resumption in the present study. Wanting another child within six months post-delivery seems too early although not surprising; as a prior study conducted in Uganda in 2014 (about the same time when these data were collected) registered high fertility desires and pregnancy intentions among women living with HIV [30]. Similar studies in Cameroon and Ethiopia which evaluated factors associated with sexual intercourse resumption before the 6-week postpartum visit [10, 50] also found among other factors that, having one child, was significantly associated with sexual intercourse resumption [51]. In Ethiopia, a cross-sectional study among postnatal women similarly found among other factors, that desire for another child coupled with pressure from the husband to initiate sexual intercourse, were significantly associated with early sex resumption [50]. An additional finding of this study points to contraceptive use as a significant predictor of early sexual intercourse resumption. We found that women who reported using contraception had a 48% increased risk of sexual intercourse resumption. A similar message is implied in a study conducted in Nigeria where women using contraceptives had a 40% hazard of ending postpartum abstinence earlier than those who did not use contraception [9]. Our study also found that only 25 (6.5%) women reported currently using contraception compared to the 100 who reported resuming sexual intercourse. This finding is supported by a study in Ethiopia among postnatal women which found a median time to start of modern contraceptive use of 4 months after resumption of sexual intercourse [23]. This highlights a delay in return to postpartum contraceptive use after resumption of sexual intercourse. This delay needs to be addressed by HIV policies and programs so as to accelerate the achievement of the 5th MDG of improving maternal health by 2030.

## 5.0 Study Limitations

Data was not collected on the mode of delivery yet this variable has been previously found to be significantly associated with duration of postpartum abstinence [8] and timing of resumption of vaginal sex [8, 11]. To the contrary, findings from some prior studies showed that mode of delivery did not reach statistical significance in affecting the time to sexual intercourse resumption [47, 51–54]. The lack of data on mode of delivery may not have probably changed the direction of our study findings based on evidence from a systematic review of literature searched from PubMed, CINAHL and Cochrane databases for the period January 1990 and September 2003, which indicates inconsistencies in reported associations between mode of delivery and sexual intercourse resumption [55].

## 6.0 Conclusions

The majority of postnatal women living with HIV reported resuming sexual intercourse after six weeks post-delivery which aligns well with the Ugandan Ministry of Health 6-week recommendation on postpartum abstinence for all women irrespective of HIV status. However, only 25 in 100 women who

resumed sexual intercourse reported currently using contraception. Resumption of sexual intercourse among women living with HIV (if not matched with a timely return to contraceptive use) may lead to undesirable multiple pregnancies and adverse maternal health outcomes given their compromised immunity.

Interventions aimed at addressing issues around timing of sexual intercourse resumption among postnatal women living with HIV should be complemented with an appropriate message that ties the timing of sexual intercourse resumption with the time to return of contraceptive use.

## List Of Abbreviations

GF	Global Fund
MoH	Ministry of Health
HIV	Human Immunodeficiency Virus
PMTCT	Prevention of Mother-To-Child-Transmission of HIV
MTCT	Mother-to-Child Transmission
HR	Hazard Ratio
CI	Confidence Interval
SD	Standard Deviation
KM	Kaplan Meier
ANC	Antenatal Care
PNC	Postnatal Care
FP	Family Planning
ART	Antiretroviral Therapy

## Declarations

### 8.1 Ethics approval and consent to participate

Ethical approval was obtained from Makerere University School of Public Health Higher Degrees Research and Ethics Committee (protocol number 064) as well as the Uganda National Council for Science and Technology (registration number SS3153). Permission to conduct the study was obtained from the respective health facilities. Potentially eligible study participants were read an informed consent

form and asked if they were willing to participate in the study. During each visit, participants were reminded that they were free to voluntarily withdraw from the study at any time and that their withdrawal from the study would not by any means affect their access to any of the services provided at their enrolment health facility. Consenting participants signed two copies of a written informed consent form and retained a copy for their future reference. Interviews were conducted privately at a preferred location within or outside the facility setting. Study identification numbers were assigned to participants to ensure anonymity and confidentiality of all the data collected. These measures were taken in accordance with the Declaration of Helsinki-Ethical principles for research involving human subjects.

## **8.2 Consent for publication**

Not applicable

## **8.3 Availability of data and materials**

The datasets analyzed for this study are available from the corresponding author if requested.

## **8.4 Competing interests**

The authors have no competing interests to declare.

## **8.5 Funding**

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## **8.6 Authors' contributions**

All authors supervised data collection including recruitment and follow up of study participants. RN conceptualized the research question and wrote the first draft of the paper. FM led the analysis and interpretation of data. AM and EB revised the draft manuscript to strengthen its intellectual content. RKW conceived and led the design of the larger study protocol, reviewed and revised the paper for substantial intellectual content. SK contributed to revising the manuscript and helped to strengthen the global health component of the manuscript while JA and JM provided technical oversight and supervision of study implementation on behalf of the Ugandan Ministry of Health. All authors reviewed and approved the final version of the manuscript.

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## Figures

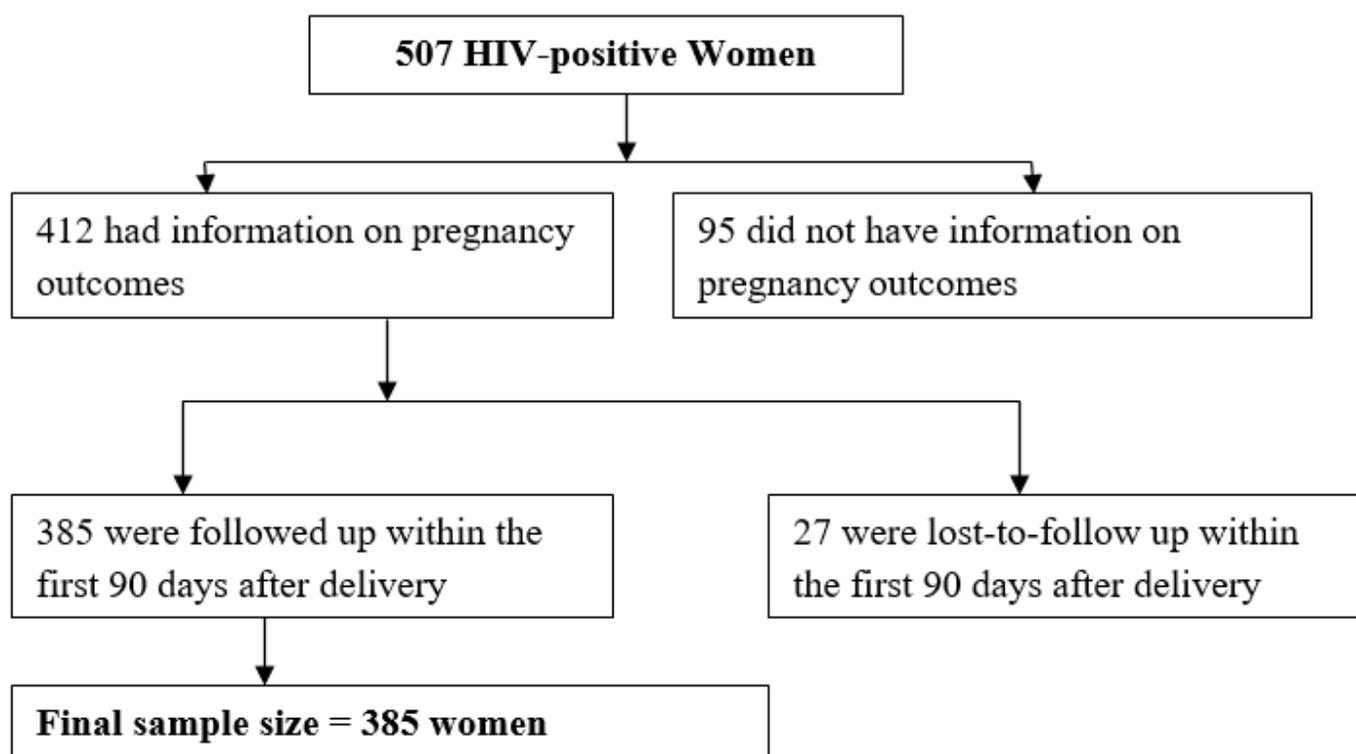
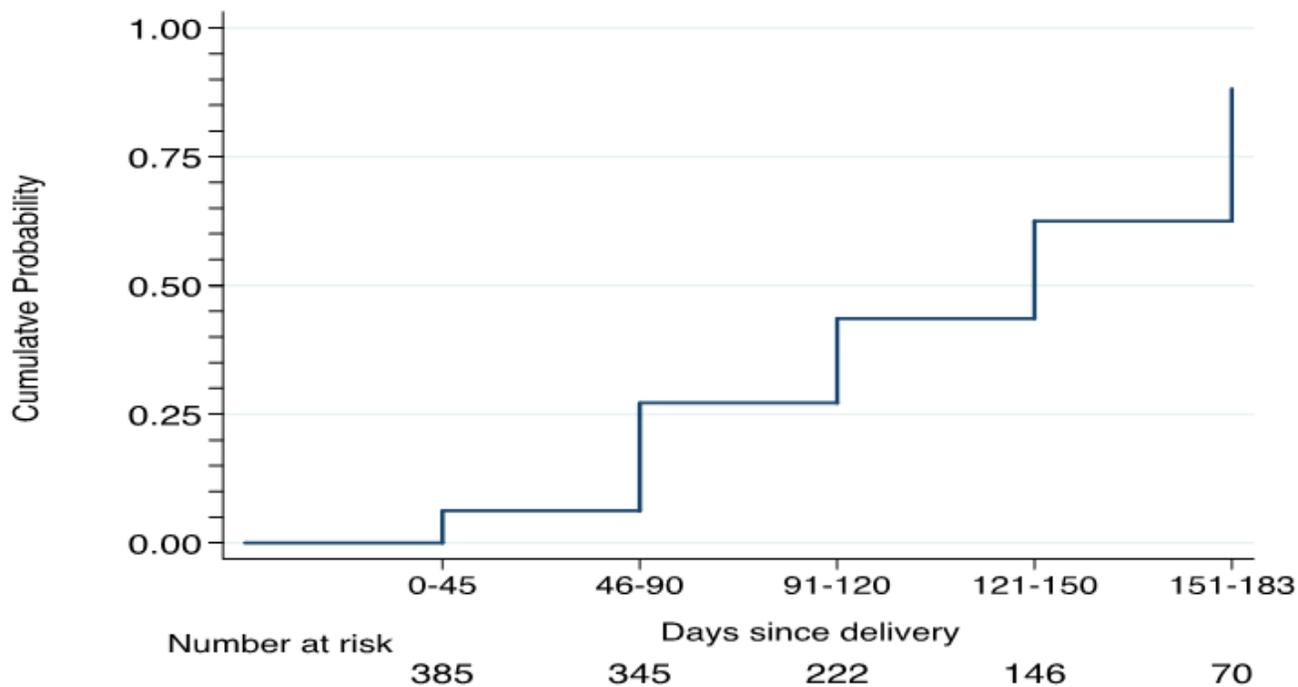


Figure 1

Flow chart on participant inclusion



**Figure 2**

Cumulative probability of sexual intercourse resumption within six months after childbirth among women enrolled on lifelong antiretroviral therapy.

## Supplementary Files

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- [AdditionalFile2PNC1stInterviewQuestionnaireEnglishVersion.pdf](#)
- [AdditionalFile3PNCSubsequentQuestionnaireEnglishVersion.pdf](#)