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Effect of HIV status on fertility desire and knowledge of long-acting reversible contraception of postpartum Malawian women

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Abstract

The objectives of this study were to describe the most recent pregnancy intentions and family planning preferences of HIV-infected and HIV-uninfected postpartum Malawian women, and to assess whether HIV status is associated with fertility desire and knowledge of intrauterine contraception (IUC) and the subdermal contraceptive implant. We conducted a cross-sectional analysis of the baseline characteristics of Malawian women enrolled in a prospective cohort study assessing postpartum contraceptive uptake and continuation. Women at a government hospital completed a baseline survey assessing reproductive history, family planning preferences, and knowledge of IUC and the implant. We used Pearson's chi-square tests to compare these parameters between HIV-infected and HIV-uninfected women. Modified Poisson regression was performed to assess the association between HIV status and fertility desire and knowledge about IUC and the implant. Of 634 postpartum women surveyed, HIV-infected women were more likely to report their most recent pregnancy was unintended (49% versus 37%, p=0.004). Nearly all women (97%) did not want a child in the next two years but HIV-infected women were more likely to desire no more children (adjusted PR: 1.59; 95% CI: 1.33, 1.89). HIV-infected women were also less likely to know that IUC (adjusted PR 0.72; 95% CI: 0.61, 0.84) and the implant (adjusted PR 0.83; 95% CI: 0.75, 0.92) are safe during breastfeeding. Postpartum women strongly desire family spacing and many HIV-infected postpartum women desire no more children, suggesting an important role for these long-acting methods. Education about the efficacy and safety of IUC and the implant particularly during breastfeeding may facilitate postpartum use.

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Keywords

HIV; family planning; postpartum; contraception; Malawi

Introduction

Prevention of unintended pregnancies is one of the four cornerstones of a comprehensive approach to the prevention of mother-to-child-transmission (PMTCT) of HIV (WHO, 2009a). Both HIV infection and unintended pregnancies are common in sub-Saharan Africa, and have been associated with adverse maternal, perinatal, and infant outcomes (Hogan et al., 2010). Postpartum women tend to be particularly susceptible to unintended pregnancy in the first 3 to 6 months following delivery, as return to fertility is often unpredictable and lactational amenorrhea is not always strictly observed (Romero-Gutierrez, Vaca-Ortiz, Ponce-Ponce de Leon, & Lopez-Martinez, 2007). Therefore, HIV-infected postpartum women who want to limit or space their pregnancies should know about and have access to the most effective methods of family planning.

The two most effective forms of reversible contraception are intrauterine contraception (IUC) and the subdermal implant. They are collectively known as long-acting reversible contraception (LARC) as they are effective from three to twelve years. LARC is safe and highly effective in HIV-infected women stable on antiretroviral therapy (ART), with contraceptive failure rates of less than 1% (WHO, 2009b; Trussell, 2011; Winner et al., 2012). In Malawi, 13% of women aged 15-49 years are infected with HIV, and are eligible for lifelong combination ART if pregnant, breastfeeding, WHO Stage III or IV, or with CD4 count less than 500 cells/mm^3 (Malawi Ministry of Health, 2011). Although 41% of all pregnancies are unintended, fewer than 3% of sexually active Malawian women aged 15-49 years have ever used either LARC method (NSO, 2011). This is due, in part, to shortages of LARC methods and specially trained staff. Evaluating the level of knowledge and interest women have about these methods in the setting of currently limited access can inform educational interventions and policy changes to increase LARC demand and supply, which may help to decrease unintended pregnancy rates.

Evidence of possible interactions between ART and hormonal contraception have been reported in recent years (Robinson, Jamshidi, & Burke, 2012), while the depot medroxyprogesterone acetate (DMPA) injection has been recommended by the Malawi Ministry of Health as the “best hormonal contraception for women on ART and/or TB treatment” since 2011 (Malawi Ministry of Health, 2011). We therefore expected that HIV-infected women would have lower levels of LARC knowledge compared to HIV-uninfected women as a result of biased counseling on family planning methods to reflect national guidelines.

Little is known about LARC knowledge, LARC interest, and the reproductive intentions of postpartum and HIV-infected women in sub-Saharan Africa. Nor is it known whether HIV status will remain an important factor as ART is brought to scale with better health and survival for HIV-infected women. Therefore, the objectives of this study were to describe the most recent pregnancy intentions and family planning preferences of HIV-infected and

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HIV-uninfected postpartum Malawian women, and to assess whether HIV status is associated with fertility desire and knowledge of intrauterine contraception and the subdermal implant.

Methods

Study design and population

This was a cross-sectional evaluation of the baseline characteristics of women enrolled in a prospective cohort study of LARC uptake among postpartum Malawian women. Women were recruited from the postpartum unit of Bwaila Hospital, a government hospital in Lilongwe with over 15,000 deliveries a year, including 1,800 (12%) among HIV-infected women. Antenatal group counseling on family planning is routinely provided at the site where patients also receive individualized attention. While interval LARC insertion (insertion after the 6-week postpartum period) is also offered at the study site, postpartum women are not routinely offered LARC prior to discharge. Therefore, questions concerning interest in immediate postpartum LARC insertion were hypothetical.

Two research assistants fluent in English and Chichewa, the most commonly spoken local language, completed participant recruitment, enrollment, consenting and survey administration. All postpartum women were approached in the postpartum wards and informed about the study. Interested women were screened in a private area for eligibility. Inclusion criteria were: (a) current admission to the postpartum ward at Bwaila Hospital, (b) age 18-45 years, (c) live birth ≥28 weeks gestational age within the past 4 weeks, (d) fluency in English or Chichewa, (3) access to a working phone number and willingness to be contacted by phone for up to one year postpartum.

Eligible women underwent the informed consent process, and completed a 30-minute baseline survey focusing on participants' demographics, reproductive health history, most recent pregnancy intention, family planning preferences, and knowledge of LARC. Participants were also asked about antenatal counseling on LARC and general interest in IUC or the implant. Those responding affirmatively were asked about interest in immediate postpartum insertion of the method. HIV status was determined by verifying the participant's health passport with the participant's permission, as HIV testing is routinely done as part of antenatal care in Malawi.

Survey instrument

Survey questions were developed based on previous studies assessing LARC knowledge and interest as well as items from the Malawian Demographic Health Survey (Crede et al., 2012; Natinoal Statistical Office, 2011; Todd et al., 2012). In the survey, we clarified that condoms can be considered a family planning method when used to prevent pregnancy. 'Pregnancy intention' was based on a response to the question, "At the time you got pregnant with your new baby, did you want to want to become pregnant then, did you want to wait until later, or did you want no more children at all?" 'Fertility desire' was defined as a response of one or greater children when asked how many children participants would like in the future. The

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survey was piloted with the first nine participants and modified where necessary (see Supplementary File 1, survey).

Study sampling and sample size

The sample size (N=630) was based on a power calculation for the outcome of interest in the main cohort analysis (knowledge of both LARC methods) comparing HIV-infected women and HIV-uninfected women. We recruited HIV-infected and HIV-uninfected women at a 1:2 ratio. All eligible HIV-infected patients and up to five eligible HIV-uninfected patients were recruited per day.

Statistical analysis

All study data were double-entered into a secure Research Electronic Data Capture (REDCap) study database by the two research assistants (Harris et al., 2009). The REDCap data were then exported and analyzed using Stata Version 13.0 (StataCorp, College Station, TX).

Descriptive statistics were calculated for categorical variables, and the Student's t-test was used to compare continuous variables by HIV status. Pearson's chi-square test was used to compare distributions of categorical variables by HIV status. A two-sided p-value of 0.05 was considered statistically significant for all comparisons.

Modified Poisson regression with robust variance to estimate prevalence ratios was performed to evaluate the association between HIV status and the outcomes of fertility desire, knowledge of the safety and efficacy of LARC, and antenatal counseling on LARC. A fully adjusted model included education, age, number of living children, and socioeconomic status, which we hypothesized were possible confounders of HIV status and fertility-related outcomes. We adjusted the final model for age and number of living children following stepwise backward elimination of terms whose removal resulted in a <10% change in the primary regression coefficient.

Confidentiality assurances/Ethical considerations

Paper data were stored in locked file cabinets in a locked study office. Surveys were identified only by study ID number. Ethical approval was obtained from the University of North Carolina Institutional Review Board (IRB) and the National Health Sciences Research Committee of the Malawi Ministry of Health.

Results

Of 799 women screened between May and October 2013, 634 (79%) were eligible for study participation. The most common reason for exclusion was lack of access to a working phone (15%). All eligible women gave consent to participate in the study.

Demographic characteristics

Our analysis included 210 HIV-infected and 424 HIV-uninfected women (Table 1). HIV-infected participants were more likely to be at least 25 years of age and older than HIV-

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uninfected participants (67% vs. 45%, p<0.001) and were less likely to have completed primary school or beyond (64% vs. 75%, p=0.004). Nearly all (94%) participants were married, with no significant difference by HIV status. Most participants reported having trouble obtaining food, clothing, or medications, though a greater proportion of HIV-infected participants reported difficulty with at least one item (62% vs. 52%, p=0.02).

Pregnancy intention and family planning preferences

HIV-infected participants were more likely to report their most recent pregnancy was unintended (49% vs. 37%, p=0.004), and to have been using contraception at the time of conception (30% vs. 20%, p=0.005)(Table 1). Of those using contraception at conception, the most commonly reported methods used were injectables and condoms. Many participants reported using more than one method, though a greater proportion of HIV-infected participants reported using condoms (63% vs. 34%, p<0.001), dual method use with condoms (32% vs. 12%, p=0.003), and LARC methods (10% vs. 2%, p=0.06). While 50 women (34%) were using multiple modern methods, 30 (20%) were using condoms with another method.

Future contraceptive choices of participants varied slightly between the two groups, with HIV-infected participants more likely to plan to use condoms, female sterilization, and male sterilization, and less likely to use natural family planning, withdrawal, and oral contraceptives (Table 1). The most common methods planned between both groups were breastfeeding (73%), the implant (67%), and condoms (42%). Of HIV-infected women, 53% reported plans to use condoms and another modern method of family planning, compared with 35% of HIV-uninfected women (p<0.001).

The two groups did not differ in interest in the implant or IUC. A majority (81%) of participants were interested in using the implant, while 19% were interested in immediate postpartum implant. 52% of participants were interested in IUC whereas 12% were interested in immediate postpartum IUC insertion.

HIV status and future fertility desire

Nearly all participants (97%) did not want to become pregnant again in the next 2 years, and HIV-infected participants were more likely to desire no more children (59% vs. 26%, p<0.001)(Table 1). In multivariable analysis, HIV-infected participants were over 50% more likely to desire no further children (adjusted PR: 1.59; 95% CI: 1.33, 1.89) when adjusted for age and number of living children (Table 3). Other independent predictors of desire for no further children included having more than two living children (adjusted PR: 4.64; 95% CI: 2.86, 7.54) and age over 30 years (adjusted PR: 2.57; 95% CI: 1.92, 3.44).

HIV status and knowledge of long-acting reversible contraception

While nearly all HIV-infected and HIV-uninfected women had heard of the implant (99% vs. 97%, p=0.06) and IUC (98% vs. 89%, p<0.001), general knowledge of either LARC method was low. HIV-infected status was associated with lower levels of knowledge of LARC safety in breastfeeding (IUC: 50% vs 69%, p<0.001; Implant: 69% vs. 82%, p<0.001)(Table 2). Nearly all (99%) participants had at least one knowledge gap regarding

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the safety and efficacy of IUC, compared to 77% with the implant. In multivariable analyses, when adjusted for age and number of living children, HIV-infected status was independently associated with lower levels of knowledge of IUC safety during breastfeeding (adjusted PR: 0.72; 95% CI: 0.61, 0.84) and lower levels of knowledge of implant safety during breastfeeding (adjusted PR: 0.83; 95% CI: 0.75, 0.92)(Table 3). HIV-infected status was also independently associated with having received antenatal counseling about LARC (adjusted PR 1.19; 95% CI 1.10, 1.30). Antenatal counseling on LARC was not associated with LARC knowledge in multivariable analyses except in the case of IUC safety in breastfeeding, in which IUC counseling was associated with lower levels of knowledge of its safety in breastfeeding (adjusted PR 0.79; 95% CI 0.60, 0.82).

Discussion

In this population of postpartum Malawian women, HIV-infected women were more likely to report that their most recent pregnancy was unintended, and more likely to desire no more children. Study participants had generally low levels of knowledge regarding the safety and efficacy of LARC, and HIV-infected women were less likely to know that LARC was safe to use during breastfeeding. Improved strategies are needed to appropriately counsel HIV-infected women about the most effective forms of postpartum contraception while ensuring consistent access to LARC methods to prevent future unintended pregnancies.

Attitudes towards reproduction among HIV-infected women are complex, given the conflict between cultural norms encouraging childbearing and social disapproval of childbearing among HIV-infected women (Cooper et al., 2007). Unintended pregnancy was common in our population, in which half of HIV-infected participants reported that their last pregnancy was unintended. Unintended pregnancy was also higher among HIV-infected women in Zimbabwe (McCoy et al., 2014), while most recent pregnancy intentions of postpartum women in South Africa and Swaziland did not differ by HIV status (Warren, Abuya, Askew, & Integra, 2013). Most of our HIV-infected women also did not want to have more children. HIV-infected women in sub-Saharan Africa tend to have lower fertility desire (Bankole, Biddlecom, & Dzekedzeke, 2011; Sarnquist, Rahangdale, & Maldonado, 2013; Taulo et al., 2009). In Uganda, the most commonly cited reason for lack of desire for future children was the impact of HIV on the mother and the risk of transmission to the child (Heys, 2012). However, this is not always the case, and many HIV-infected women in sub-Saharan Africa also continue to desire children (Cooper et al., 2007; Homsy et al., 2009; Maier et al., 2009; Myer, Morroni, & Rebe, 2007; Nakayiwa et al., 2006), though studies comparing HIV-infected and HIV-uninfected women have reported mixed results. HIV-infected women continued to desire children equal to HIV-uninfected women in South Africa (Cooper et al., 2007), but were less likely to desire more children in Rwanda and South Africa (Kaida et al., 2011). In Malawi, knowledge of HIV status among monogamous couples increased desire to limit childbearing (Dube et al., 2012), while younger age, less advanced WHO clinical stage at ART initiation, and longer time on ART have been associated with increased actual fertility among women on ART (Tweya et al., 2013).

We did not record date of HIV diagnosis, WHO clinical stage or ART status, which have shown variable association with fertility desire in Uganda, Tanzania, and South Africa

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(Kaida et al., 2011; Maier et al., 2009; Mmbaga, Leyna, Ezekiel, & Kakoko, 2013; Myer et al., 2007). Notably, according to the July-September 2013 Integrated HIV Program Report produced by the Malawi Ministry of Health, 75% of HIV-infected pregnant women were on ART during that quarter, coinciding with the time period in which most of the women completed this survey (Malawi Ministry of Health, 2013). Finally, we do not know how participants' fertility desires will translate to reproductive behavior, as partners' conflicting desires may affect contraceptive use (Hossain, Phillips, & Mozumder, 2007).

Many of our participants whose last pregnancy was unintended reported using condoms or the injectable at time of conception, consistent with previously-documented contraceptive patterns in the region (Kaida et al., 2010; Myer et al., 2010). This finding may be related to condoms and injectables having 1-year failure rates of 18% and 6%, respectively with typical use in industrialized countries (Trussell, 2011), and typical use in Malawi may be even worse. While dual method use with condoms was low, there was considerable overlap between injectables and oral contraceptives, which may result from method switching due to inconsistent supply of preferred short-term methods. Nearly all postpartum women did not desire another pregnancy in the next two years, though fewer women planned to use a contraceptive method that would be effective for a full two years. Given the emphasis of the Malawian Ministry of Health on DMPA in HIV-infected women and recent evidence of interactions between ART and hormonal contraception, further research is needed to establish the most effective contraceptive methods for this population.

Despite high levels of LARC interest, general knowledge of the safety and efficacy of LARC was low. Important misconceptions included the belief that LARC is unsafe in breastfeeding women and in HIV-infected women, similar to beliefs held by HIV-infected and HIV-uninfected women in South Africa (Crede et al., 2012). Overall, postpartum Malawian women knew less about IUC than the implant. In Ethiopia and Uganda, women were least knowledgeable of IUC and most knowledgeable of the implant and injectables (Anguzu et al., 2014; Tilahun et al., 2013). Provider misperceptions and biases may also account for the gap between counseling and knowledge. Health providers in Kenya and South Africa reported perceiving IUC as unsafe for HIV-infected women and were uncomfortable recommending IUC to HIV-infected patients (Gutin, Mlobeli, Moss, Buga, & Morroni, 2011; Newmann et al., 2013). These misunderstandings offer potential targets for educational interventions to increase LARC demand and uptake, which have been found to be effective in other settings (Lewis, Darney, & Thiel de Bocanegra, 2013; Secura, Allsworth, Madden, Mullersman, & Peipert, 2010). Such efforts must be coupled with policy changes ensuring LARC access, including training health care staff in IUC and implant insertions, and ensuring consistent supply of LARC commodities and equipment.

Our study has several limitations. First, the cross-sectional design restricts our ability to determine causal relationships between HIV status and LARC knowledge and fertility desire. As we relied on self-reported data, we may have encountered social desirability bias, which could have inflated reports of LARC interest, contraceptive use, condom use, and desire to limit fertility, particularly among HIV-infected women. Participants may have also had varying ability to recall aspects of personal history such as antenatal counseling. A potentially significant number of women were excluded due to lack of phone access, which

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may have also led to sampling bias excluding the most socioeconomically disadvantaged Malawians. Nonetheless, the family planning preferences reported are generally consistent with results from the most recent Malawi Demographic and Health Survey and likely reflective of a population that experiences both high HIV incidence and high fertility (NSO, 2011).

In conclusion, HIV-infected postpartum women in Malawi have high rates of most recent unintended pregnancy, desire to limit future childbearing, and have low knowledge about LARC. These findings underscore a need to improve efforts to integrate family planning and HIV services to decrease unintended pregnancies among HIV-infected women and mother-to-child- transmission of HIV (Wilcher, Hoke, Adamchak, & Cates, 2013). Evidence-based strategies to improve knowledge, access, and uptake of the most effective forms of contraception are needed to adequately address the stated reproductive goals of this population.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Demographics, Reproductive History, and Family Planning Preferences by HIV status

	HIV-infected (N=210)[a]		HIV-uninfected (N=424)[a]		All women (N=634)[a]		Pearson Chi[2]
	N	(%)	N	(%)	N	(%)	p-value
Age							
18-24	68	(32)	232	(55)	300	(47)	
25-34	116	(55)	169	(40)	285	(45)	
≥35	26	(12)	23	(5)	49	(8)	<0.001*
Relationship status							
Married	195	(93)	403	(95)	598	(94)	
Unmarried	15	(7)	21	(5)	36	(6)	0.3
Education							
None or some primary	76	(36)	104	(25)	180	(28)	
Primary/some secondary	90	(43)	195	(46)	285	(45)	
Secondary and beyond	44	(21)	125	(29)	169	(27)	0.004*
Trouble with food, clothing, or medications							
Yes	130	(62)	222	(52)	352	(56)	
No	79	(38)	201	(48)	280	(44)	0.02*
Living children							
1	49	(23)	195	(46)	244	(38)	
2-3	105	(50)	167	(39)	272	(43)	
≥4	56	(27)	62	(15)	118	(19)	<0.001*
Number of additional children desired							
0	124	(59)	108	(26)	232	(37)	
1	58	(28)	160	(38)	218	(35)	
≥2	23	(11)	148	(35)	171	(27)	
Don't know	4	(2)	6	(1)	10	(2)	<0.001*
Desire additional pregnancy in 2 years							
Yes	3	(1)	13	(3)	16	(3)	
No	207	(99)	408	(96)	615	(97)	
Don't know	0	(0)	3	(1)	3	(<1)	0.2
Most recent pregnancy intention							
Intended	107	(51)	268	(63)	375	(59)	
Unintended	102	(49)	156	(37)	258	(41)	0.004*
Using contraception during conception							
Yes	63	(30)	85	(20)	148	(23)	
No	147	(70)	339	(80)	486	(77)	0.005*
		(N=63)		(N=85)		(N=148)	
Contraceptive used during conception[b]							

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	HIV-infected (N=210)[a]		HIV-uninfected (N=424)[a]		All women (N=634)[a]		Pearson Chi[2]
	N	(%)	N	(%)	N	(%)	p-value
Abstinence	3	(5)	11	(13)	14	(10)	0.09
Folk method	0	(0)	2	(2)	2	(1)	0.2
Natural family planning	10	(16)	19	(22)	29	(20)	0.3
Withdrawal	8	(13)	13	(15)	21	(14)	0.7
Breastfeeding	24	(38)	19	(22)	43	(29)	0.04*
Condoms	40	(63)	29	(34)	69	(47)	<0.001*
Condoms only	20	(32)	19	(22)	39	(26)	0.2
Condoms + modern method	20	(32)	10	(12)	30	(20)	0.003*
Emergency contraception	0	(0)	0	(0)	0	(0)	N/A
Oral contraceptives (OC)	17	(27)	21	(25)	38	(26)	0.8
Injectables	36	(57)	56	(66)	92	(62)	0.3
OC + injectables	11	(17)	14	(16)	25	(17)	0.9
LARC	6	(10)	2	(2)	8	(5)	0.06
Female sterilization	0	(0)	1	(1)	1	(1)	0.4
Male sterilization	0	(0)	0	(0)	0	(0)	N/A
		(N=210)		(N=424)		(N=634)	
Postpartum contraceptive planned[b]							
Abstinence	41	(20)	98	(23)	139	(22)	0.3
Natural family planning	17	(8)	77	(18)	94	(15)	0.001*
Withdrawal	3	(1)	56	(13)	59	(9)	<0.001*
Breastfeeding	145	(69)	320	(76)	465	(73)	0.09
Condoms	112	(53)	153	(36)	265	(42)	<0.001*
Condoms + modern method	111	(53)	147	(35)	258	(41)	<0.001*
Emergency contraception	2	(1)	15	(4)	17	(3)	0.06
Oral contraceptives	10	(5)	55	(13)	65	(10)	0.001*
Injectables	76	(36)	162	(38)	238	(38)	0.6
Implant	135	(64)	292	(69)	427	(67)	0.2
IUC	43	(21)	82	(19)	125	(20)	0.7
Female sterilization	53	(25)	44	(10)	97	(15)	<0.001*
Male sterilization	3	(1)	0	(0)	3	(<1)	0.01*
Don't know	2	(1)	6	(1)	8	(1)	0.6

*p<0.05; IUC=intrauterine contraception

[a]Columns may not add up to total N as ‘don't know,’ inappropriate responses, and nonresponses were excluded.

[b]Columns may not add up to 100% as participants were able to select multiple methods.

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Table 2

Knowledge of Intrauterine Contraception and Subdermal Implant by HIV Status

	HIV-infected (N=210)		HIV-uninfected (N=424)		All women (N=634)		Pearson Chi^2 p-value
	N	(%)	N	(%)	N	(%)	
Heard of IUC							
Yes	206	(98)	377	(89)	583	(92)	
No	4	(2)	47	(11)	51	(8)	<0.001*
IUC knowledge[a]		(N=206)		(N=377)		(N=583)	
Knowledge of IUC efficacy (compared with injection)							
More effective	100	(49)	195	(52)	295	(51)	
Less effective	26	(13)	51	(14)	77	(13)	
Equally effective	6	(3)	14	(4)	20	(3)	
Don't know	74	(36)	115	(31)	189	(33)	0.6
Knowledge of IUC safety							
Safe	130	(63)	224	(60)	354	(61)	
Unsafe/Don't know	75	(37)	151	(40)	226	(39)	0.4
Knowledge of IUC safety in HIV-infected women							
Safe	85	(42)	173	(46)	258	(45)	
Unsafe/Don't know	116	(58)	203	(54)	319	(55)	0.4
Knowledge of IUC safety in breastfeeding							
Safe	101	(50)	260	(69)	361	(62)	
Unsafe/Don't know	103	(50)	117	(31)	220	(38)	<0.001*
Does IUC cause infertility?							
No	159	(78)	265	(71)	424	(73)	
Yes/Don't know	46	(22)	110	(29)	156	(27)	0.07
Knowledge of maximum duration of IUC							
0-5 years	93	(46)	191	(51)	284	(49)	
5-10 years	22	(11)	31	(8)	53	(9)	
>10 years	3	(1)	5	(1)	8	(1)	
Don't know	85	(42)	147	(39)	232	(40)	0.6
Heard of implant							
Yes	209	(99)	410	(97)	619	(98)	
No	1	(1)	11	(3)	12	(2)	0.06
Implant knowledge[a]		(N=209)		(N=410)		(N = 619)	
Knowledge of implant efficacy (compared to injection)							
More effective	171	(82)	335	(82)	506	(82)	
Less effective	18	(9)	18	(4)	36	(6)	
Equally effective	8	(4)	22	(5)	30	(5)	
Don't know	11	(5)	35	(9)	46	(7)	0.07
Knowledge of implant safety							
Safe	179	(87)	354	(88)	533	(88)	

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	HIV-infected (N=210)		HIV-uninfected (N=424)		All women (N=634)		Pearson Chi^2 p-value
	N	(%)	N	(%)	N	(%)	
Unsafe/Don't know	26	(13)	50	(12)	76	(12)	0.9
Knowledge of implant safety in HIV-infected women							
Safe	127	(62)	272	(66)	399	(65)	
Unsafe/Don't know	79	(38)	137	(34)	216	(35)	0.2
Knowledge of implant safety in breastfeeding							
Safe	144	(69)	336	(82)	480	(78)	
Unsafe/Don't know	65	(31)	73	(18)	138	(22)	<0.001*
Does the implant cause infertility?							
No	187	(90)	337	(82)	524	(85)	
Yes/Don't know	21	(10)	71	(18)	92	(15)	0.02*
Knowledge of maximum implant duration							
0-2 years	1	(1)	4	(1)	5	(1)	
3-5 years	179	(86)	329	(81)	508	(83)	
>5 years	14	(7)	39	(10)	53	(9)	
Don't know	13	(6)	33	(8)	46	(8)	0.4

*p<0.05; IUC=intrauterine contraception

[a]Observations for IUC and implant knowledge include only responses of those reporting awareness of either method and exclude inappropriate responses and nonresponses.

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Table 3

Association between HIV-infected Status and Outcomes of Fertility Desire, Intrauterine Contraception Knowledge, and Implant Knowledge

	N[a]	Unadjusted PR	(95% CI)	Adjusted PR[b]	(95% CI)
Do not want more children[c]	634	2.32	(1.90 2.83)	1.59	(1.33 1.89)
IUC knowledge					
Safety of IUC in breastfeeding	581	0.72	(0.62 0.84)	0.72	(0.61 0.84)
Safety of IUC in HIV-infected	577	0.92	(0.76 1.12)	0.93	(0.76 1.14)
Efficacy of IUC	581	0.93	(0.79 1.11)	0.92	(0.77 1.10)
Implant knowledge					
Safety of implant in breastfeeding	618	0.84	(0.76 0.93)	0.83	(0.75 0.92)
Safety of implant in HIV-infected	615	0.93	(0.82 1.05)	0.93	(0.82 1.06)
Efficacy of implant	618	1.01	(0.93 1.09)	1.01	(0.93 1.09)
Antenatal counseling on IUC and the implant	634	1.24	(1.14 1.34)	1.19	(1.10 1.30)

PR=prevalence ratio, CI=confidence interval, IUC=intrauterine contraception

[a] Observations for IUC and implant knowledge include only responses of those reporting awareness of the method and exclude inappropriate responses and nonresponses.

[b] Adjusted for age and number of living children.

[c] HIV-infected women were 1.59 times more likely to not want more children when adjusted for age and number of living children.