ORIGINAL RESEARCH

Fertility Desires and Intentions among HIV-Positive Women during the Post-natal period in Uganda

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Abstract

This study describes the fertility intentions and discusses the potential reproductive health needs of post-natal HIV-infected Ugandan women. HIV-infected mothers attending post-natal services in Kampala, Uganda participated in this cross-sectional study using structured interviewer administered questionnaires. Descriptive statistics and logistic regression models were used to identify predictors of desire for more children. Among 403 participants, 35% desired more children. Of these, 25% wanted another child within 2 years and 75% within 3 years or more. In multivariable analyses, believing that one's partners wanted more children (OR=2.44; 95% CI = 1.30, 4.59) was associated with the desire for future children while having more living children was negatively associated with the desire for future children (OR=0.08; 95% CI = 0.02, 0.39). A minority of women desired future pregnancies, and most wanted to delay pregnancy for 3 years. These women are in need of family planning (FP) methods to meet stated desires to delay or end future pregnancies. Perceived partner desire for children also impacts on women's fertility intentions, highlighting the importance of engaging men during the post-natal period. *(Afr J Reprod Health 2014; 18[3]: 67-77)*

Keywords: fertility intentions; desire for children; Post-natal women; HIV; reproductive health; contraception.

Résumé

Cette étude décrit les intentions de la fécondité et examine les besoins potentiels de la reproduction chez les femmes ougandaises post-natales infectées par le VIH. Des mères séropositives qui fréquentent les services de post-natal à Kampala, en Ouganda, ont participé à cette étude transversale en utilisant des questionnaires structurés et administrés par les intervieweurs. Les statistiques descriptives et des modèles de la régression logistique ont été utilisés pour identifier les indices de l'envie d'avoir plus d'enfants. Parmi 403 participants, 35% désire avoir plus d'enfants. Parmi celles-ci, 25% voulaient avoir un autre enfant dans 2 ans et 75% dans 3 ans ou plus. Dans les analyses multivariées, estimant que ses partenaires voulaient plus d'enfants (OR = 2,44; IC à 95% = 1,30, 4,59) a été associée à la volonté de leurs futurs enfants tout en ayant plus d'enfants alors que d'avoir plus d'enfants vivant a été négativement associés au désir d'avoir des enfants dans l'avenir (OR = 0,08 IC à 95% = 0,02, 0,39). Une minorité de femmes ont désiré des grossesses futures, et la plupart voulaient reporter la grossesse pendant 3 ans. Ces femmes ont besoin des méthodes de la planification familiale (PF) pour satisfaire aux désirs exprimés pour retarder ou pour mettre fin à des grossesses futures. Le désir perçu du partenaire des enfants a également un impact sur les intentions de la fécondité chez les femmes, soulignant ainsi l'importance de la participation des hommes au cours de la période post-natale. *(Afr J Reprod Health 2014; 18[3]: 67-77)*

Mots-clés: intentions de fécondité; Désir d'enfants; femmes post-natales; VIH; santé de la reproduction; contraception.

Introduction

In sub-Saharan Africa, where HIV prevalence and fertility rates are high and modern contraceptive access and use is low, addressing the fertility intentions and desires of people who are HIV-positive is increasingly important[1]. In Uganda, the highest prevalence of HIV is experienced by people in their reproductive years with 8% of women aged 15-49 being infected with HIV[2]. In addition, Uganda has one of the highest fertility rates among countries in eastern and southern Africa at 6.2 children per woman with 44% of women between 15 to 49 years reporting that their

last pregnancy was mistimed or unwanted[3]. At the same time, family planning (FP) use is low with only 26% of married women reporting current use of a modern method[3].

It appears that HIV status may dampen, but does not eliminate the desire for children[4-6]. Research has shown that HIV-infected individuals desire children less than non-infected individuals[7,8]. One study in Malawi found that the proportion of women who reported a desire for future children declined significantly when they found out they were HIV-infected[9]. Another Malawian study found that HIV-infected compared to uninfected women were more likely to change their intentions from wanting more children to not wanting more children over time[10]. However, exceptions exist and some studies have suggested that HIV-infection has little effect on women's and men's childbearing decisions[11,12].

Although many people living with HIV (PLHIV) report lower fertility intentions, evidence suggests that being on antiretroviral therapy (ART) can increase the desire for children[13-16]. Two recent studies in Uganda found that ART use and higher HAART optimism scores were associated with increased fertility desires or intentions[13-14]. Maier and colleagues found that women on ART were three times more likely to report fertility desires compared to HIV-positive women not on ART[14]. As ART continues to increase the lifespan and quality of life of PLHIV, they will be in need of safe conception counselling and PMTCT should they consider childbearing and effective FP methods to prevent unwanted pregnancies.

Even when women wish to end or delay childbearing, they often do not use contraceptives and engage in lower levels of protective sexual behavior[1,17]. In a study that looked at the desire for children among HIV-infected men and women in Uganda, it was found that 33% of participants practiced pregnancy risk behaviour, yet only 18% desired more children[1]. Of the 33% practicing pregnancy risk behaviours, 73% of those participants did not want more children and were at high risk for unwanted pregnancies[1]. In another Ugandan study, over 86% of sexually active women not desiring children were not using any modern contraceptive method other than condoms after 2 years on ART[17]. These results have great public health ramifications because they suggest that there are gaps between the intention to delay pregnancy and the ability to prevent pregnancy successfully.

One of these gaps may be the ability to engage men in reproductive decision-making. Men play an important decision-making role in the home in many African contexts, and male fertility desires and participation in child-bearing decisions can have a crucial impact on women[18-19]. Furthermore, in the context of HIV, studies have highlighted the important role that male partners play in fertility among HIV-infected women[16-20] and the important role male partners play in the successful implementation and uptake of PMTCT interventions[21.22].

This study focuses on the desire for future children among HIV-infected women during the post-natal period. While maternal transmission of HIV to an unborn baby can be reduced to as low as 2% in the context of PMTCT[23], without these interventions, an estimated 30% of Ugandan children born to HIV-infected women would become infected with HIV[1,24]. Among women who seek HIV care services, the promotion of FP during the post-natal period is paramount because limiting unwanted pregnancies in women who are already infected with HIV has important implications for the vertical transmission of HIV to newborns and the horizontal transmission of HIV to partners. Additionally, Demographic and Health Survey data from 17 countries demonstrated that 50-88% of women would like to avoid pregnancy in the first year postpartum but are not using contraception, representing an exceptionally high unmet need for FP[25]. The post-natal period is a crucial time to provide reproductive health services and FP information to women who are in their reproductive years who might otherwise not have access to reliable health care and who may not receive reproductive services they need or desire at a later stage[26]. It is also an ideal time for these women to access continuing HIV care including ART, if necessary. It is critical to understand the fertility desires of this population so they can be assisted to either

conceive safely in the future, delay, or limit unwanted births.

Methods

This descriptive, cross-sectional study was conducted at Mulago Hospital, which is the Ugandan National referral hospital as well as the teaching hospital for Makerere University College of Health Sciences. Mulago Hospital runs two antenatal clinics where women are routinely screened for HIV. During the data collection for this study, Uganda was following the 2006 WHO guidelines which recommended ARVs for mothers with CD4 counts below 350 and discontinuation of ARVs after delivery[27]. Mulago Hospital also has two post-natal/FP clinics; the Old Mulago and the Upper Mulago Family Planning Clinics respectively. The clinics are open five days a week and see mothers as part of their post-natal visit. In the clinic, the post-natal mothers receive a minimum package that includes general health education, a full physical examination, provision of FP methods after counselling, examination and screening for breast and cervical cancer, HIV testing and immunization of infants, infant feeding strategies are discussed, and the mothers are evaluated for ART needs and treatment[28].

Data Collection

Eligible women included those who knew they were: HIV-positive; aged 18-49; within 4-12 weeks post-delivery; and seeking post-natal care at the hospital. HIV-positive women were identified by a code on their discharge form or through disclosure to health personnel during a one-on-one FP counseling session. HIV-positive women presenting at either clinic for their post-natal visit and FP services or those who were referred from the PMTCT post-natal clinic were consecutively approached by research staff to assess eligibility and interest prior to requesting consent for participation in the study.

All participants (n=403) provided informed consent. Participants received a 30 minute interviewer administered structured questionnaire in either English or Luganda (the dominant language in the Central Region of Uganda) by trained interviewers. The Luganda questionnaire was translated from the original English version and then back-translated into English to ensure consistency between the two versions.

This study was approved by the Department of Obstetrics and Gynaecology and the IRB of the Makerere University College of Health Sciences, and the Ugandan National Council of Science and Technology (UNCST).

Measures

Socio-demographic data were collected on age, area of residence, religion, level of education, employment status, main source of income, marital status, and spouse age. Respondents were asked about various reproductive characteristics including age at first sex, age at first pregnancy, total number of pregnancies, number of living biological children, and death of a child. Data were also collected on recent sexual behaviour including whether respondents were in a sexual relationship, whether they knew the HIV-status of their partner and if yes, what the status of their partner was. Respondents were asked about their feelings towards their past fertility (whether last pregnancy was mistimed or unintended, history of unplanned pregnancy), as past fertility can affect future reproductive choices, and their future fertility intentions (e.g. whether they wanted more children, when they would want to have those children, how many children they desire in total). Respondents were also asked about how important they thought it was to their partners to have more children and how their partners would feel about a pregnancy in the next 12 months.

To assess the primary outcome of future fertility intentions, respondents were asked if they planned to have more children in the future and whether or not they were currently in a sexual relationship. Based on this response, if participants wanted more children, they were asked when they wanted their next child and how many children they wanted in total. Respondents were also asked why they did or did not want more children and how they would feel if they became pregnant in the next 12 months.

Statistical Analysis

Data were entered into a Microsoft Access database by a trained data entry clerk and all data

were analyzed using Stata 11 (Stata Corporation, College Station, TX, USA). Socio-demographics for respondents and their spouses, reproductive characteristics, recent sexual behaviour, feelings towards past fertility and partner desire for children were assessed as predictor variables for the primary outcome; desire for future children. Univariate analyses of participant characteristics of the study population were conducted. Categorical variables are presented as frequencies and percentages while continuous variables are presented as means and standard deviations (SD). Responses to open-ended questions were coded and collapsed into categories to allow quantitative assessment. Bivariate associations between participant characteristics and the primary outcome were described using student's T-tests, chi-square tests, and Wilcoxon rank-sum tests, as appropriate. Variables associated with a desire to have more children at P<0.25 in bivariate logistic regression analyses were considered for inclusion in multivariable analyses.

Results

Four hundred and three (403) HIV-infected post-partum women were interviewed between March and September 2007. Overall, 35% (n=143) said that they plan to have more children in the future while 65% reported that they did not desire more children.

Table 1: Socio-demographic characteristics of participants (n=403).

Characteristic	***Participants who desired more children in the future N=143***	***Participants who did NOT desire more children in the future N=260***	***Total n (%) (n=403)***	***p-value***
SOCIO-DEMOGRAPHIC CHARACTERISTICS				
Mean age in years (SD)	25.0 (4.8)	28.6 (5.2)	27.3 (5.3)	< 0.0005
Age categories				
< 20	26 (18.2)	10 (3.9)	36 (8.9)	
20-24	43 (30.1)	48 (18.5)	91 (22.6)	
25-29	50 (35.0)	103 (39.6)	153 (38.0)	< 0.0005
30-34	16 (11.2)	63 (24.2)	79 (19.6)	
35-39	7 (4.9)	29 (11.2)	36 (8.9)	
40-49	1 (0.7)	7 (2.7)	8 (2.0)	
Area of Residence				
City or town	126 (88.7)	226 (88.3)	352 (88.4)	0.893
Countryside	16 (11.3)	30 (11.7)	46 (11.6)	
Religion				
Catholic	42 (29.4)	87 (33.5)	129 (32.0)	
Protestant	48 (33.6)	85 (32.7)	133 (33.0)	0.422
Muslim	31 (21.7)	61 (23.5)	92 (22.8)	
Other	22 (15.4)	27 (10.4)	49 (12.2)	
Level of education				
No formal schooling / Primary (P1-P7)	72 (50.4)	162 (62.3)	234 (58.1)	0.067
Secondary (S1-S4) Ordinary level	57 (39.9)	79 (30.4)	136 (33.8)	
Secondary (S5-S6) Advanced level and Tertiary	14 (9.8)	19 (7.3)	33 (8.2)	
Employment status (%)				
Employed	38 (26.6)	78 (30.1)	116 (28.9)	0.453
Un-employed	105 (73.4)	181 (69.9)	286 (71.1)	
Main source of income				
Spouse	111 (81.0)	183 (72.9)	294 (75.8)	0.075
All other sources (i.e.: self employed, casual work, wage earner, support from family member/friend)	26 (19.0)	68 (27.1)	94 (24.2)	
Marital status				
Married	112 (78.3)	201 (77.9)	313 (78.1)	0.923
Widowed/ Separated/ Divorced / Single	31 (21.7)	57 (22.1)	88 (22.0)	
Spouse Age - Mean years (SD)	30.6 (6.2)	34.4 (6.5)	33.05 (6.6)	< 0.0005

Participant Characteristics

Overall, study respondents were young (below 30 years, 69.5%), married (78%), and lived in urban areas (88%). Just over 50% had finished primary level education, 71% were unemployed and 76% reported that their main source of income was their spouse (Table 1). Eighty-five percent of respondents reported being in a sexual relationship (340/403). Thirty-eight percent of respondents said they knew the HIV-status of their partner (149/395) and of these, 68% reported that their partner is HIV-infected (100/147).

The reproductive and sexual behaviour characteristics of participants are presented in Table 2. The mean age at first sexual intercourse was 17 years (SD=2.2) and the mean age at first pregnancy was 19 years (SD=3.3). Overall, respondents had 3.4 (SD=2.0) total pregnancies and 50% had 2-3 living children. Approximately 30% had experienced the death of a child and 41% were looking after a child that was not biologically their own.

The 35% of women who desired more children in the future were younger and had younger spouses compared to women who did not desire more children ($p<0.0005$ for both, Table 1). Women who desired more children were older at the time of their first pregnancy ($p=0.008$), had fewer pregnancies ($p<0.0005$), fewer living children and fewer reported their partner was HIV-positive. Women who did not desire future children were more likely to have experienced the death of a child (Table 2).

Table 2: Reproductive and sexual behavior characteristics of participants (n=403).

Characteristic	*Participants who desired more children in the future N=143*	*Participants who did NOT desire more children in the future N=260*	*Total n (%) (n=403 unless otherwise specified)*	*p-value*
REPRODUCTIVE CHARACTERISTICS				
Mean age at first sex (SD)	17.1 (2.1)	17.0 (2.2)	17.0 (2.2)	0.601
Mean age at first pregnancy (SD)	19.7 (3.5)	18.8 (3.2)	19.1 (3.3)	0.008
Mean total number of pregnancies (SD)	2.4 (1.5)	4.0 (2.0)	3.4 (2.0)	< 0.0005
Number of living biological children				
1 child	58 (40.9)	32 (12.3)	90 (22.3)	< 0.0005
2-3 children	76 (53.5)	124 (47.7)	201 (49.9)	
4 + children	8 (5.6)	104 (40.0)	112 (27.8)	
Experienced death of a child				
Yes	37 (26.1)	94 (36.3)	131 (32.7)	0.037
No	105 (73.9)	165 (63.7)	270 (67.3)	
Looking after children not biologically your own				
Yes	53 (37.1)	114 (43.9)	167 (41.4)	0.186
No	90 (62.9)	146 (56.2)	236 (58.6)	
SEXUAL BEHAVIOR				
Currently not in a sexual relationship	17 (12.0)	45 (17.2)	62 (15.4)	0.161
HIV status known for most recent sexual partner (n=395)				0.335
Yes	48 (34.5)	101 (39.5)	149 (37.7)	
No	91 (65.5)	155 (60.6)	246 (62.3)	
HIV status of most recent sexual partner (n=147)				
HIV+	26 (56.5)	74 (73.3)	100 (68.0)	0.044
HIV-	20 (43.5)	27 (26.7)	47 (32.0)	

Past Fertility and Future Reproductive Timing and Intentions

Those who wanted more children (n=143) had different responses compared to those who did not want more children (n=260) with respect to reproductive timing (Table 3). Respondents who wanted more children were more likely to report that they wanted their last child at the time they had them and 44% of them reported ever having

an unintended pregnancy. Among those who did not want more children, 66% reported ever having an unintended pregnancy and over half of the women reported that their last pregnancy was either mistimed or unwanted. What is similar however between the two groups is that in light of their recent pregnancies, the overwhelming majority reported that they would be either somewhat sad or very sad if they became pregnant again within the next 12 months. When women who wanted more children were asked about when they wanted their next child, 25% wanted a child within 2 years while the majority (75%) did not want another child for 3 years or more. In this group, the mean number of desired children was 3.3 (SD=1.2).

Table 3: Past fertility and future reproductive timing and intentions.

Characteristic, %	***Participants who desired more children in the future N=143***	***Participants who did NOT desire more children in the future N=260***	***Total n (%) (n=403 unless otherwise specified)***	***p-value***
Feelings towards last pregnancy –timing				
Wanted child then	98 (68.5)	122 (46.9)	220 (54.6)	
Wanted child later	40 (28.0)	63 (24.2)	103 (25.6)	< 0.0005
Did not want more children	5 (3.5)	71 (27.3)	76 (18.9)	
Not sure	0	4 (1.0)	4 (1.0)	
Ever had unintended pregnancy	63 (44.4)	168 (65.6)	231 (58.0)	< 0.0005
Feelings towards a pregnancy in next 12 months				
Very happy / somewhat happy	14 (9.8)	4 (1.5)	23 (5.3)	
Mixed feelings	9 (6.3)	10 (3.9)	19 (4.4)	0.001
Somewhat sad	24 (16.8)	28 (10.8)	56 (12.9)	
Very sad / upset	92 (64.3)	212 (81.9)	325 (75.1)	
Don't know	4 (2.8)	5 (1.9)	9 (2.1)	
referred timing of next pregnancy (n=141)				
Within the next 2 years	35 (24.8)	-	-	-
Within the next 3-5 years	93 (66.0)			
Over 5 years	13 (9.2)			
Iean number of children desired (SD) (n=141)	3.3 (1.2)	-	-	-
Feelings of partner towards a pregnancy in next 12 months				
Very happy	21 (14.7)	28 (10.8)	54 (12.5)	
Somewhat happy	19 (13.3)	21 (8.1)	44 (10.2)	
Mixed feelings	8 (5.6)	7 (2.7)	16 (3.7)	0.096
Somewhat sad	15 (10.5)	21 (8.1)	39 (9.0)	
Very sad/upset	46 (32.2)	104 (40.2)	158 (36.5)	
Don't know	28 (19.6)	55 (21.2)	89 (20.6)	
No partner	6 (4.2)	23 (8.9)	31 (7.2)	
Importance of more children to partner				
Very important, Important, Somewhat important	84 (61.3)	83 (35.0)	167 (44.7)	< 0.0005
Not very important, Do not know	53 (38.7)	154 (65.0)	207 (55.4)	

When women were asked about their opinions about how their partners felt about future childbearing, there were some interesting similarities between the two groups and also an important difference. Among those who wanted and those who did not want more children, 43% and 48% respectively believed that their partners would be somewhat or very upset if they became pregnant in the next 12 months. However, when respondents were asked about the importance of more children to their partners, over half of those who wanted more children said that having more children was somewhat important, important, or very important to their partners. However, among those who did not want more children, almost half said that having more children was *not* very important to their partner or they did not know their partner's desires (65%).

Respondents were also asked about their reasons for either wanting or not wanting more children (not listed). Among women who wanted more children, the most common reasons mentioned were only having one child or not wanting their child to be alone (31%, n=44), that the woman wanted a certain number of children (27%, n=38), and that she wanted to have a child of a particular sex (19%, n=27). Participants who did not intend to have more children had several reasons for not wishing to have more children, such as; their HIV-positive sero-status or feeling that a pregnancy would put their health at greater risk because of their positive sero-status (50%, n=131), having enough children or not needing more (22%, n=59), having no support or not being able to manage more children (20%, n=55) or because they felt sickly and not well (13%, n=34).

Characteristics Associated with the Intention to have more children

In multivariable analyses, the two variables that remained significant were believing that one's partners wanted more children (OR=2.44; 95% CI = 1.30, 4.59) was associated with the desire for future children. Also, having more living children was negatively associated with the desire for future children (OR=0.08; 95% CI = 0.02, 0.39) (Table 4).

Table 4: Factors associated with the intention to have more children among HIV-infected women during the post-natal period.

Characteristics	***Unadjusted OR (95% CI)***	***Adjusted OR (95% CI)***	***p-value***
Mean age in years (SD)	0.86 (0.82 - 0.90)	0.95 (0.85 - 1.05)	0.304
Level of education			
Primary (P1-P7) or no formal schooling			
Secondary (S1-S4) Ordinary level	1.60 (1.03 - 2.49)	1.25 (0.65 - 2.40)	0.509
Secondary (S5-S6) Advanced level and Tertiary	1.66 (0.79 - 3.49)	1.24 (0.41 - 3.74)	0.697
Main source of income			
Spouse			
All other sources (i.e.: self employed, casual work, wage earner, support from family member/friend)	0.63 (0.38 - 1.05)	1.11 (0.44 - 2.82)	0.828
Marital status			
Married	0.98 (0.60 - 1.61)	1.21 (0.41 - 3.57)	0.724
Widowed/ Separated/ Divorced/ single			
Spouse Age - Mean years (SD)	0.90 (0.86-0.94)	0.97 (0.92 - 1.04)	0.407
Mean age at first pregnancy (SD)	1.08 (1.02 - 1.16)	1.07 (0.95 - 1.20)	0.262
Number of living biological children			
1 child			
2-3 children	0.34 (0.20 - 0.56)	0.50 (0.22 - 1.17)	0.109
4 + children	0.04 (0.02 - 0.10)	0.08 (0.02 - 0.39)	**0.002**
Experienced death of a child			
Yes	0.62 (0.40 - 0.98)	0.74 (0.36 - 1.53)	0.415
No			
Looking after children not biologically your own			
Yes	0.75 (0.49 - 1.14)	0.94 (0.52 - 1.73)	0.854
No			
Currently not in a sexual relationship	1.53 (0.84 - 2.79)	0.64 (0.20 - 2.07)	0.455
HIV status of most recent sexual partner			
HIV+	1.41 (0.76 - 2.61)	0.77 (0.33 - 1.80)	0.550
HIV-			
Ever had unintended pregnancy	0.42 (0.28 - 0.64)	0.90 (0.46 - 1.67)	0.741
Importance of more children to partner			
Very important, Important, Somewhat important	3.2 (1.97 – 5.22)	2.44 (1.30 - 4.59)	**0.006**
Not very important, Don't know			

Discussion

This is one of the first studies in Uganda that explores the fertility intentions of HIV-infected post-natal mothers. The fertility desires of this group has important implications for the partners of these women and their infants because of the high risk for both vertical and horizontal transmission of HIV. Our findings show that despite HIV status and a recent pregnancy, some women still wish to have a future pregnancy, although most would like to delay that next pregnancy for at least 3 years. The majority of participants (65%) reported a desire to stop childbearing. These data suggests that the post-natal period is a critical time to address FP needs considering that many HIV-positive women do not wish to be pregnant and would like to end childbearing following a recent birth.

Although much research has shown that HIV-positive women tend to have a lower desire for childbearing than HIV-negative women[7,29], this study adds to the body of research that shows that the fertility desires of HIV-infected women are not erased by HIV-positive status. Only 35% of the women studied reported a desire to have more children in the future. This is higher than various other Ugandan studies which have found rates of fertility intentions ranging from 7% to as high as 20%[1,13,17,30]. However, this is much lower than research among discordant couples in Uganda[6] as well as research from Nigeria and South Africa among HIV-positive men and women that have found higher proportions of both men and women who desire to have children in the future[5,12]. It is worth noting that women who desired more children reported wanting an average of 3.3 children. This is lower than the average fertility rate in Uganda which is 6.2 and the reported ideal family size among women (5 children) but matches the fertility rate in the capital, Kampala, where the fertility rate is 3.3[3]. HIV-infected women in this study still desired children and the number they desired was similar to other women in Kampala.

The majority of participants wanted to postpone a future pregnancy between 3 to 5 years or stop childbearing altogether. Our finding that the majority of participants wanted to stop childbearing is similar to two previous studies among HIV-infected women from South Africa and Uganda which found that between 71% and 73% of HIV-positive participants reported not wanting more children in the future[1,31]. Between those who did not desire more children and those who intended to have children in the future but wanted to delay a future birth, almost the entire sample of post-natal mothers was in need of either long acting or permanent methods of FP to meet their stated fertility desires. This highlights the imperative for FP services targeting this group. The post-natal period represents a unique opportunity to reach sexually active and high risk women with FP services because so many mothers state that they do not want more children or wish to postpone a pregnancy for 3 to 5 years at this time and may be highly motivated to accept a FP method.

Furthermore, among study participants, almost 60% reported ever having an unintended pregnancy and about 40% reported that their last pregnancy was either mistimed or unwanted, further highlighting an unmet need for FP. Our findings are similar to Ugandan national findings where 44% of women have reported that their last pregnancy was mistimed or unwanted[3] and another Ugandan study that found that 43% of HIV-positive men and women reported that pregnancies they had since being diagnosed with HIV were unplanned[30]. During the post-natal period, when women are engaged with health services, it may be possible to address some of this unmet need for FP but the fertility intentions of this group are likely to change over time with studies suggesting that being on ART may lead to renewed fertility desires[13-15].

Despite their own stated desires to delay a future pregnancy, women who had fewer living children and perceived future childbearing as being important to their partners were more likely to state a desire for childbearing. This underscores the importance of partner desires on fertility and its effect on future reproductive intentions. This is similar to findings from Brazil and Uganda where fertility desires have been significantly associated with younger age, number of children and the partner's desire for a child[32] as well as pressure from relatives to have a baby[6]. The effect of a

partner's desire for more children cannot be understated and research in South Africa and Uganda have shown that HIV-infected men are more likely to desire additional children than women[1,17,31]. Research from Nigeria further found that HIV-infected individuals who had a partner with fertility desires were more likely to desire childbearing compared to those whose partners did not desire children[12]. Over 40% of women in this study believed that having more children was important to their partner. While most women (75%) said they would be very sad or upset if they had another pregnancy within the next year, only 37% thought that their partner would be upset if they got pregnant in the next year. This is similar to research from Kenya, Namibia and Tanzania that found that 25% of women with HIV believed that their partners wanted them to become pregnant[33]. This research highlights a gap between the fertility intentions and desires of women and their perception of their partner's fertility desires. Research that is focused on the fertility desires of the male partners of HIV-positive women is recommended.

Since a woman's reproductive desires can be considerably influenced by her partner's desire for children, it is important to involve male partners whenever possible to clarify their childbearing goals[1-34]. While there are many challenges to increasing male involvement, making the whole MCH continuum more male friendly would be an important step. Health education campaigns that focus on changing the beliefs and attitudes of men are needed[18] as are interventions that reinforce positive gender norms. Welcoming men within MCH contexts may be one way to improve partner communication about fertility desires while also improving PMTCT outcomes and greater FP uptake. Engaging male partners through antenatal couples testing is an effective way to engage men as a part of PMTCT programs and also to increase uptake and adherence to PMTCT interventions by women[21,22]. By offering male partners testing during antenatal care and involving them in infant health outcomes, it may be possible to keep men engaged with sexual and reproductive health services and also involved in post-natal FP choices.

Integrated HIV and sexual and reproductive health services may offer the opportunity to involve men more actively in contraceptive decision making. In African contexts, studies have found that increased spousal communication regarding fertility preferences is associated with increased contraceptive use and has been suggested as a way to reduce unmet need for FP[35-37]. In Kenya, HIV-positive women and men thought they or their partner would be more likely to use FP if it was offered at the HIV clinic[38] and integrating FP services into HIV care and treatment was associated with significantly higher use of more effective contraceptive methods[39]. Integrating FP services into HIV care broadly and within PMTCT and post-natal services specifically could have a significant impact on addressing unmet need for FP among HIV-positive post-natal women.

This study had limitations. Although we hoped to have a varied sample by conducting this research at the national referral hospital, our sample represents post-natal HIV-positive women in an urban setting. These women may express a greater desire to delay or stop fertility than women in rural settings. Only 33% of women attend post-natal services in Uganda and yet this is an important time for mothers and babies to access health services[3]. Our results therefore are not representative of all post-natal mothers. Participants were recruited from the two FP clinics at the hospital. This might suggest that desire for FP was inflated in our sample but all women are sent to the FP clinic as part of their post-natal visit and receive counselling there and only a small number of women had received FP services prior to their post-natal visit. In addition, there may be some social desirability and reporting bias affecting our results. Women may have under-reported their desire for more children due to fear of stigma from interviewers should women voice a desire for further childbearing. Also, we relied on self-reports of partner HIV status and this may have led to subjective reporting or an under-reporting of positive HIV-status. Lastly, we did not measure how long women had been aware of their HIV-status or their ART status and length of use. These factors have been found to be

associated with fertility desires. The impact of not including these factors is unknown.

Our findings highlight the importance of working with HIV-infected women and their partners during the post-natal period as this is a crucial time to reach HIV-infected women with FP services because following a birth, the desire to delay, space, or end childbearing is high. However, it is also necessary to reach out to the partners of HIV-infected women and include them in discussions about FP since women's fertility intentions are impacted by perceived partner desires for childbearing. More study is needed to understand how to target men and involve them in future fertility decisions.

During the post-natal period, sexual and reproductive health services, including integrated FP services and guidance about safe pregnancy, can be effectively offered to those deemed a priority demographic by the Ugandan National Health Service. Repeated exposure to messages about future fertility desires and appropriate FP methods throughout pregnancy and across a continuum from antenatal to post-natal care may help women and their partners to be more prepared to accept a FP method when they arrive for post-natal visits[26]. In order to provide comprehensive care and ensure that women receive the reproductive services they need, it is imperative to place FP strongly within PMTCT and treatment programs so that information can be provided along a broader spectrum of care. Not integrating these services represents a missed opportunity for HIV prevention and the promotion of safer pregnancies.

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