The impact of antenatal HIV diagnosis on postpartum childbearing desires in Northern Tanzania: a mixed methods study

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ABSTRACT

With the expansion of routine antenatal HIV testing in Africa, women are increasingly discovering they are HIV-positive during pregnancy. While several African studies have examined the impact of HIV on childbearing, few have focused on the antenatal/postpartum period. Understanding how antenatal HIV diagnosis affects postpartum childbearing desires will help tailor counselling to positive women's needs. This is the first study to measure the effect of diagnosis on childbearing desires, adjusting for effects of HIV *before* diagnosis. A baseline survey of 5284 antenatal clients enquired about their reproductive behaviour, before they underwent routine HIV testing. Fifteen months later, a follow-up survey collected information on postpartum reproductive behaviour, and in-depth interviews explored attitudes to childbearing and HIV. HIV diagnosis caused a long-term downward adjustment in childbearing desires, but did not affect *short-term* postpartum desires. The qualitative interviews uncovered major factors discouraging childbearing post-diagnosis such as health concerns and nurses' dissuasive advice, but also factors pushing women to *continue* childbearing, in particular strong pronatalist norms. In light of changing fertility desires following antenatal diagnosis, contraceptive and HIV counselling should be provided on a continuum from antenatal through to postpartum care, taking into account the conflicting pressures faced by positive women in childbearing decision-making.

Keywords: HIV and pregnancy; fertility intentions; reproductive health services; antenatal care; post-partum period; Tanzania

INTRODUCTION

In Mwanza region, Tanzania, HIV prevalence among women of reproductive age is 7% [1]. HIV-positive women therefore make up a sizeable proportion of pregnant women, all of whom will be in need of antiretroviral prophylaxis to prevent mother-to-child transmission (PMTCT). Yet in this region, over a quarter of pregnancies are unplanned [2], and some estimates suggest this could be even higher amongst HIV-positive women [3]. Meeting the reproductive and contraceptive needs of positive women will help avoid further unintended pregnancies, reducing the need for costly PMTCT treatments, and ultimately the number of HIV-positive births [4]. Meeting these needs requires a thorough understanding of HIV-infected women's childbearing behaviour and intentions, and the impact of HIV diagnosis on these variables.

For many women in Africa, HIV diagnosis is increasingly occurring during pregnancy. In Tanzania, provider-initiated HIV testing is routinely offered as part of antenatal care in clinics with appropriate facilities, with the aim of identifying women in need of PMTCT. Although HIV testing is rapidly expanding, to date the great majority of pregnant women in Mwanza region have never had an HIV test before, so many of them will discover they are HIV-positive during pregnancy. In order to adequately address the reproductive and contraceptive needs of these women after diagnosis, it is crucial to examine the specific impact of antenatal HIV diagnosis on fertility behaviour and desires, particularly in the postpartum period. This will help inform HIV and contraceptive counselling guidelines for use during antenatal and postpartum care following HIV diagnosis.

Several recent studies in sub-Saharan Africa have examined the impact of HIV diagnosis on reproductive behaviour [5-8], but few have focused on the impact of *antenatal* diagnosis on *postpartum* fertility desires [9-11]. Of the few studies that have, none have taken into account baseline differences in reproductive behaviour between HIV-positive and negative women *prior* to HIV testing. Yet there is strong evidence from numerous studies (including this one) that HIV-positive and negative women have significant

differences in reproductive behaviour and intentions even before diagnosis, mediated by both biological and behavioural mechanisms [12-14]. Research that does not take these baseline differences into account risks over- or underestimating the effect of HIV diagnosis on childbearing. This study bridges this gap by investigating the differences in childbearing desires between HIV-negative and positive women after HIV testing, controlling for pre-test differences in reproductive behaviour. It is also the first study to combine quantitative and qualitative methods in this context.

METHODOLOGY

In 2008, a baseline survey of 5284 pregnant women was carried out in 15 antenatal clinics offering HIV testing in two districts of Mwanza region, which encompassed highly urbanised areas such as Mwanza City (the second largest city in Tanzania) as well as remote rural areas. The 15 clinics surveyed represented all government clinics offering HIV testing in the catchment area at the time, and all women attending these clinics during the survey period were interviewed. Our study population therefore constituted a complete sample of antenatal clients in the catchment area during the study period.

All antenatal clients were invited to participate, subject to their informed consent. Nurses in each clinic were trained to administer a standardised survey questionnaire to women as they waited for their routine HIV test. The questionnaire collected information on socio-demographic characteristics, past reproductive behaviour and future intentions. Respondents were asked whether they agreed to be contacted 15 months later for a follow-up interview. If they agreed, their contact details were recorded on a separate form linked to their questionnaire by an anonymous study number. After the baseline interview, respondents underwent HIV testing and counselling, and subject to their consent, their HIV result was linked to their survey answers using the same anonymous study number.

Fifteen months later, a follow-up survey was conducted on the baseline respondents who agreed to be contacted and who had accepted HIV testing at baseline (so knew their HIV status). The follow-up questionnaire used a calendar tool to record data on pregnancies, sexual activity and contraceptive use for each month postpartum up until the interview, as well as collecting information on fertility desires at the time of the follow-up interview. The follow-up data was linked to respondents' baseline data using the same study numbers. During the follow-up survey period, in-depth interviews were conducted with a sub-sample of 25 respondents from the follow-up survey, to further explore feelings around childbearing and HIV. The in-depth interviews were carried out in three rounds, with respondents chosen using a combination of purposive and theoretical sampling, in order to ensure a diverse mix of respondents with relevant characteristics, while allowing the sampling to be responsive to ideas and themes emerging from the first interview rounds.

The survey data was analysed using STATA 11 [15]. Using multivariate linear, logistic and Cox regression models, we first examined baseline differences in reproductive behaviour between HIV-positive and negative respondents before they knew their status. Taking into account these baseline differences, we then investigated the effect of HIV *diagnosis* on postpartum reproductive outcomes. Although we also examined the impact of HIV status on contraceptive use and other reproductive outcomes throughout the postpartum period, this paper focuses on outcomes related to childbearing desires. Results are adjusted for clustering at the clinic level.

The qualitative data was analysed using elements of grounded theory, with the help of NVIVO8 qualitative analysis software [16]. Line-by-line coding of the data was initially carried out on six transcripts to identify recurring themes. These initial codes were then analysed, and as the analysis of the other transcripts progressed, the most important codes were refined and grouped into more conceptual codes at increasingly higher levels of abstraction. In order to increase the reliability and credibility of the analysis, the first six transcripts were double-coded by a Tanzanian qualitative researcher, and emerging themes were compared with those identified by the first coder [17].

Ethical approval for this study was obtained from the Tanzanian Medical Research Coordinating Committee and from the London School of Hygiene and Tropical Medicine Ethics Committee.

FINDINGS

Study sample

A total of 5284 pregnant women participated in the baseline survey, 5133 (97%) of whom agreed to an HIV test on the same day. HIV status was subsequently determined for 5121 women. 30% of these women reported having tested for HIV in the past. HIV prevalence was 8.9%, higher than in the general female reproductive age population in this region. The mean age of the sample was 25, and respondents had a mean parity of 1.9 children. For the follow-up survey, 2166 (45%) out of the 4850 baseline respondents who consented to participate in the follow-up were successfully contacted. No significant differences in baseline characteristics were identified between those lost to follow-up and those followed up, and loss to follow-up did not differ by HIV status, implying that findings were not biased due to loss to follow-up. Respondents were a median ten months postpartum at follow-up.

Differences by HIV status before testing

Amongst women who had never tested for HIV, HIV-positive women were found to differ from their HIV-negative counterparts before testing according to several reproductive characteristics (Table 1). After adjusting for other factors including socio-demographic characteristics, HIV-positive women had on average 0.3 fewer children than HIV-negative women, most likely due to factors described in other studies: biological effects of HIV such as reduced fecundity and increased foetal loss [14], and behavioural effects of undiagnosed HIV infection, such as reduced frequency of sexual intercourse due to illness, relationship instability, or suspicion of HIV infection [12-13]. Previous birth interval was also significantly longer in HIV-positive women compared to HIV-negative women by nearly 10 months, presumably due to similar biological and behavioural factors.

Interestingly, HIV-positive respondents were also slightly more likely to want to stop childbearing than their negative counterparts, although this was only borderline significant at the 95% confidence level (p=0.046). This suggests some HIV-positive women may have *suspected* they were infected, and altered their childbearing intentions in response. Such a phenomenon has been found in other African studies. [12,18,8] HIV-positive respondents were also significantly more likely to have used family planning in the past (p=0.017).

Table 1. Summary of associations of HIV status with reproductive outcomes

	Crude OR, HR or difference for HIV+ compared to HIV-* (95% CI)	Adjusted** OR, HR or difference for HIV+ compared to HIV-* (95% CI)	Adjusted p-value
Baseline reproductive behaviour in never-tested (before antenatal HIV test)			
Difference in parity	0.04 (-0.19-0.27)	-0.30 (-0.48--0.12)	0.003
Difference in length of last birth interval	16.22 (8.58-23.87)	9.58 (4.50-14.66)	0.001
Odds ratio of FP ever use	1.63 (1.24-2.13)	1.43 (1.07-1.90)	0.017
Odds ratio of wanting another child before testing	0.74 (0.59-0.92)	0.73 (0.54-0.99)	0.046
Postpartum childbearing outcomes			
Hazard ratio of repeat pregnancy	0.73 (0.43-1.26)	0.76 (0.40-1.45)	0.406
Odds ratio of wanting another child	0.50 (0.37-0.68)	0.51 (0.33-0.79)	0.006
Odds ratio of wanting a child within 2 years	1.17 (0.49-2.78)	0.94 (0.34-2.57)	0.897
Difference in ideal family size	-0.84 (-1.13--0.56)	-0.66 (-0.89--0.43)	<0.001
Fertility inhibitors in the postpartum period			
Hazard ratio of menses resumption	1.00 (0.80-1.24)	0.96 (0.79-1.16)	0.645
Hazard ratio of resuming sexual activity	0.84 (0.73-0.96)	0.83 (0.72-0.97)	0.019

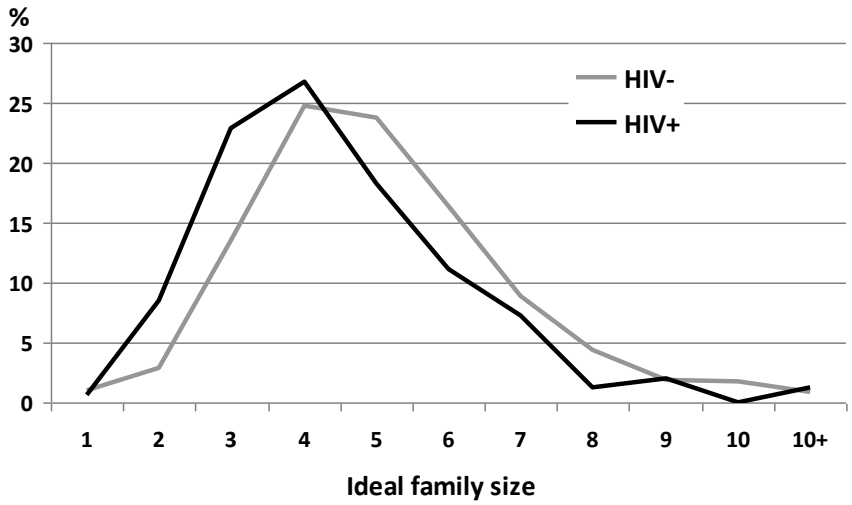
* Baseline category is always HIV-. Odds ratios, hazard ratios and differences compare HIV+ to HIV-. Shaded rows denote non-significant factors.

** Adjusted for: socio-demographic characteristics, differences by HIV status at baseline in the case of postpartum reproductive outcomes, and where appropriate, past contraceptive use, baseline childbearing and contraceptive intentions, and time-varying reproductive factors during follow-up (return of menses, sexual activity resumption).

Impact of HIV diagnosis on childbearing intentions at follow-up

Having identified these significant differences before testing, we were able to adjust for them in subsequent analyses in order to determine the effect of HIV *diagnosis* on postpartum fertility desires, net of any pre-testing differences by HIV status. After adjusting for socio-demographic factors and baseline differences by HIV status such as parity, ideal family size was significantly lower in HIV-positive women. The overall distribution of ideal family size was shifted downwards for HIV-positive women (Figure 1), who desired on average 0.7 fewer children than their HIV-negative counterparts after adjustment (Table 1).

Figure 1. Distribution of ideal family size preferences by HIV status at follow-up, standardised for current parity

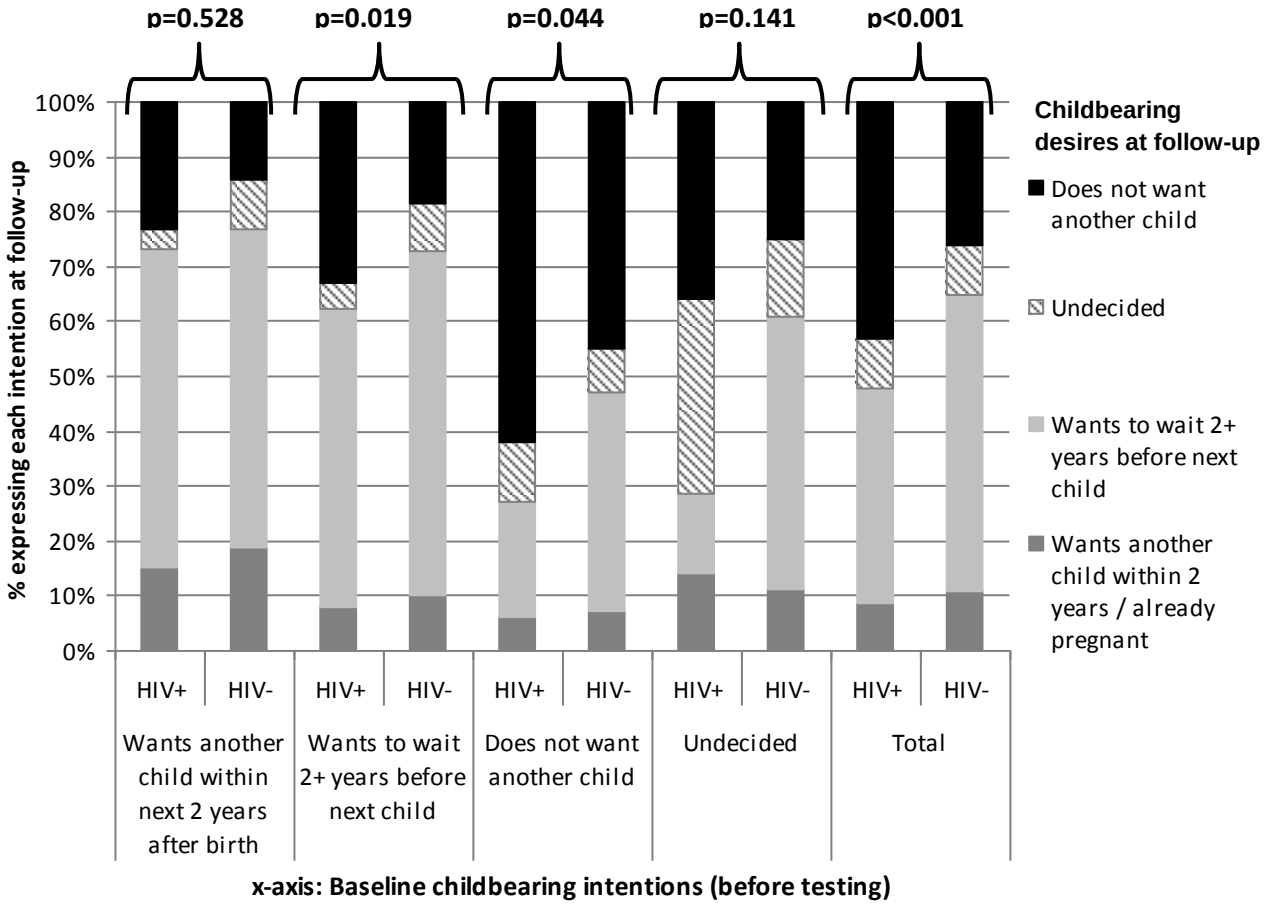


HIV diagnosis also had a significant effect on desire for another child: after adjusting for baseline factors including parity and pre-test childbearing intentions, HIV-positive women had half the odds of wanting another child compared to HIV-negative respondents (Table 1). This association was much stronger than the association between childbearing intentions and HIV status before testing, and represents the net effect of *diagnosis* on childbearing intentions, regardless of the previous influence of undiagnosed infection.

When we look at changes in intentions between before and after diagnosis (Figure 2), HIV diagnosis appears to decrease childbearing intentions through two pathways. First, a positive diagnosis encourages women who at baseline wanted to stop childbearing to stick to their intentions: 62% of the HIV-positive respondents who wanted to stop childbearing at baseline still wanted to stop at follow-up, whereas over half of the HIV-negative women who wanted to stop childbearing at baseline had changed their mind by the time of follow-up. Second, a positive diagnosis appears to discourage women who did want another child before testing from having one: amongst respondents who at baseline wanted a child after two years, HIV-positive respondents were significantly more likely than their negative counterparts to decide they did not want one at all by the time of follow-up. However, HIV diagnosis does not seem to affect short-term childbearing intentions: the proportion wanting a child within two years at follow-up was non-significantly different for HIV-positive and negative women in all baseline categories, and in the follow-up sample as a whole (Figure 2). This was confirmed in a multivariate regression on intended birth interval at follow-up: odds of wanting a child within two years were non-significantly different for HIV-positive and negative respondents (Table 1).

HIV diagnosis was also associated with longer postpartum abstinence (Table 1), despite similar proportions married amongst positive and negative women, suggesting abstinence might be used as a transmission risk-reduction strategy. However, hazards of repeat pregnancy in the postpartum period were non-significantly different in positive and negative women, further suggesting that short-term childbearing desires (and their implementation) were not affected by HIV diagnosis.

Figure 2. Childbearing intentions at follow-up, according to respondents' HIV status and their pre-test childbearing intentions, with p-value for F-test on difference between HIV+ and HIV-



Factors influencing childbearing after diagnosis: qualitative findings

Given the strong effect of HIV diagnosis on decreasing childbearing desires, it is interesting to turn to the in-depth interviews to shed light on reasons for these effects. Several factors appeared to strongly discourage HIV-positive women from childbearing. The most frequently voiced concern of HIV-positive respondents regarding childbearing was the increased health risk associated with pregnancy for infected women:

"The community know that if a person with the virus gets pregnant and bears a child, her health condition deteriorates and she dies. Considering the condition I have, how would I live if I bear another child?" (Respondent 8, 35 years old)

Respondents had particular concerns about blood loss during childbirth, which they perceived as more severe for HIV-positive women:

R: "Now what makes me not become pregnant [is that] I tell myself that during delivery I'll bleed a lot. Now maybe... for instance, if I bleed, then I'll die prematurely.
I: You thought that you'd die prematurely?
R: Yeah, it is better I stopped [childbearing]." (Respondent 16, 30 years old)

Worries around blood loss were also prominent in discussions about hormonal contraceptives. Because blood was strongly linked to health, blood loss was associated with illness and weakening of the body. This posed a greater threat for HIV infected women, since their blood was already compromised by a virus and needed preserving. Any incident that might cause excessive or unnatural blood loss, such as childbirth or hormonal contraceptive use (even if the latter may reduce blood loss overall), was seen as detrimental to HIV-positive women's health.

Respondents were also heavily influenced by the advice they had been given by their healthcare providers, which was largely directive and dissuasive of them having more children, as exemplified here. This is despite the shift in global policy and advocacy in recent years towards a reproductive rights-based approach to counselling for HIV-positive women:

"When I got tested and was found to be infected, the nurse advised me not to bear children anymore: 'if you continue bearing children, you keep on losing strength through bleeding'. People would be very worried [if an HIV infected woman continued childbearing]. They might say: 'This person will die upon delivery' [...] So my worry in bearing children is the nurse advised me that when you bear children, your health keeps deteriorating...that is my worry. I might give birth and die on the same day."
(Respondent 6, 31 years old, five children)

Concerns around orphaning future children were brought up by some HIV-positive respondents, especially if their children were still young, as they could not care for themselves. Infected respondents insisted on the importance of investing their energy in taking care of the children they already had, rather than further 'increasing the burden'. In comparison to these concerns, worries of mother-to-child transmission were surprisingly rare, likely due to improvements in PMTCT treatment. In fact, the only respondents who voiced worries related to MTCT were HIV-negative women, who were perhaps less well informed on PMTCT and its efficacy.

Despite a general consensus that it was preferable to stop childbearing if diagnosed HIV-positive, we know from the survey results that many women continue to want more children after diagnosis. While only one HIV-positive woman in the in-depth interviews reported wanting more children, respondents nonetheless cited several factors that may encourage women to continue childbearing after diagnosis.

For example, there appears to be a common perception that HIV infected women cannot get pregnant due to their illness, as illustrated here:

"If her condition does not indicate that surely she is suffering, they'd say: 'Wrong things are being said about this person, she is healthy. Had she been infected, why would she be pregnant?' Those who do not know much about it think that when you get infected, you become so sick and can't become pregnant, that you'd just be glued to a sickbed. If I become pregnant, these people wouldn't know that I'm HIV positive. Even if they knew that so and so has been infected, they'd doubt it: 'If so and so is suffering [from HIV], why is it that she's become pregnant? Mm, it is not true, these are mere rumours, so and so is healthy because she's become pregnant'." (Respondent 16, 30 years old, HIV+)

This belief, which was reiterated by HIV-negative respondents, could be capitalised on by HIV infected women, who may become pregnant to dispel rumours of their positive status. The strong societal and family pressure to have children may also push some infected women to continue childbearing, especially if they have few children, and if they have not disclosed their status. Childless women were described in extremely negative terms, such as worthless and promiscuous. There was a widespread association of childlessness with prostitution and abortion, as illustrated here:

"[A childless woman] feels awkward because she does not have a child while her fellows have children. If you asked a child: 'Would you bring me some drinking water?' you'd be told by their parent: 'Don't disturb him/her please, you left yours in a toilet [when you underwent abortion]'."
(Respondent 12, 23 years old, one child)

In contrast, childbearing was associated with a respect for family values and motherhood, and constituted a validation of marriage. Within this value system, childlessness was considered acceptable grounds for men to leave their wives, as alluded to by this respondent:

I: "If a woman does not have children, how do you think the society will regard her?
R: They'd say: 'Gosh! This person doesn't bear children, she bears poop'.
I: What does 'she bears poop' mean?
R: You know, in many homes, if someone gets married and does not bear children, this person would be gossiped about at home: 'Mr X, your wife bears poop! Every day she bears poop, we don't like her. It is better you find someone who can bear a child'." (Respondent 25, 41 years old, eight children)

Given the strong pressure on women to bear children in order to ensure the stability of their marriage, it is hardly surprising that HIV-positive respondents who wanted to stop childbearing sometimes found it difficult to get their partner to accept it. This particular respondent felt coerced into continuing childbearing:

"My partner forces that we have children, but I don't like it, given my condition [...] he wants to destroy me because he'd want it by force. Now how do I... I have no way out!"
(Respondent 7, 39 years old, HIV-positive, two children)

HIV-positive women face a near impossible task in trying to comply with societal and familial expectations of their conflicting roles as mothers and HIV-infected individuals. These expectations are likely to be particularly problematic for women who are diagnosed before they have had any children, when pressure to prove they are not barren is at its highest. Because our study population was from antenatal clinics, it was by definition impossible to interview childless women, but it is noteworthy that the only HIV-positive in-depth interview respondent who wished to continue childbearing was a 23-year-old who had just had her first child. All other in-depth interview respondents had at least two children.

DISCUSSION

Our study is the first to examine the effect of HIV diagnosis on postpartum childbearing, taking into account pre-testing differences by HIV status, and using mixed methods. We showed that after adjusting for pre-test differences, antenatal HIV diagnosis causes a downward adjustment in long-term childbearing intentions, nearly halving the odds of wanting another child. Lower childbearing desires following HIV diagnosis have been found in other African studies [9, 6-8]. However, findings from other studies have suggested that HIV diagnosis leads women to accelerate their pace of childbearing in the *short term* relative to HIV-negative women, despite lower long-term desires, perhaps in a bid to reach an acceptable family size while they are still healthy [6-7]. In contrast, in our study HIV diagnosis did not affect short-term childbearing desires or repeat pregnancy rates. We propose that this is a peculiarity of the postpartum period: HIV infected women diagnosed during pregnancy may not be so 'desperate' to have another child soon after diagnosis compared to the general population, as they may have fulfilled their short-term childbearing desires with their recent birth (97% gave birth to a live baby), and may want to wait longer before their next child to let their body rest. This is plausible given their acute concerns over the health risks involved in an HIV-positive pregnancy.

Delayed resumption of sexual activity may be a conscious strategy to reduce the risk of HIV and STI transmission, but it may also be a consequence of HIV infected women's partners being disproportionately absent, or of reduced desire or ability to have sex due to HIV-related illness in the woman or her partner. However, the effects of HIV on coital frequency and fecundity may disappear with increasing access to antiretrovirals, as women on treatment start to get healthier [19-22], which could increase the likelihood of unwanted pregnancy. This highlights the need for a continuum of contraceptive counselling for HIV-positive women from antenatal care into the extended postpartum period and through to antiretroviral treatment clinics, at which point access to contraceptive information and methods will become increasingly important as HIV-positive women develop a higher demand for contraception to meet their greater need for limiting births.

The observed downward adjustment in childbearing desires after diagnosis was in spite of strong societal pressure to continue childbearing. For women who already had several children, economic worries, health concerns (compounded by counsellors' dissuasive advice against pregnancy), and the uncertain plight of existing children, prevailed over the desire to conform to societal norms. HIV infection remained at the forefront of their childbearing considerations, and this was true regardless of whether they were on antiretroviral therapy, of their current health status, and of their marital status.

However, factors such as age and parity still showed a strong influence on postpartum childbearing desires, both in the quantitative and qualitative analyses, in line with findings from other studies highlighting the continuing influence of demographic characteristics and societal norms on fertility desires even after a positive diagnosis [23]. Pronatalist norms appeared to be more influential for young, low parity women after diagnosis, and future research is needed to understand the specific reproductive needs of young, low parity HIV+ women and their partners.

In light of the numerous other factors that HIV-positive women had to consider in childbearing decision-making, it is imperative that antenatal HIV counselling and any subsequent contraceptive counselling be person-centred, taking into account each woman's individual circumstances with regard to her marital status, status disclosure, and wider societal expectations [24-25]. Other studies have shown that if counsellors display negative attitudes towards HIV-positive women childbearing or even being sexually active, this may alienate women who want another child, as well as women who want to use hormonal contraception to avoid pregnancy, potentially resulting in unwanted pregnancies and unnecessary risk-

taking [26-27]. A woman's ability and willingness to discuss her pregnancy plans with her healthcare provider is pivotal to enabling her to access the services she requires. The obvious need to take HIV status into account when providing such tailored reproductive information underscores the rationale for integrating contraceptive and HIV counselling.

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