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Correlates of Use of Timed Unprotected Intercourse to Reduce Horizontal Transmission Among Ugandan HIV Clients with Fertility Intentions

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Abstract

We examined the correlates of use of safer conception methods (SCM) in a sample of 400 Ugandan HIV clients (75% female; 61% on antiretroviral therapy; 61% with HIV-negative or unknown status partners) in heterosexual relationships with fertility intentions. SCM assessed included timed unprotected intercourse, manual self-insemination, sperm washing, and pre-exposure prophylaxis (PrEP). In the 6 months prior to baseline, 47 (12%) reported using timed unprotected intercourse to reduce risk of HIV infection (or re-infection), none had used manual self-insemination or sperm washing, and 2 had used PrEP. In multiple regression analysis, correlates of use of timed unprotected intercourse included greater perceptions of partner's willingness to use SCM and providers' stigma of childbearing among people living with HIV, higher SCM knowledge, and desire for a child within the next 6 months. These findings highlight

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the need for policy and provider training regarding integration of couples' safer conception counselling into HIV care.

INTRODUCTION

HIV antiretroviral therapy (ART) has dramatically reduced mortality and morbidity in Sub-Saharan Africa [1], and lowered rates of both vertical (infant) and horizontal (partner) HIV transmission [2–4]. Greatly improved access to ART [5], and knowledge of the efficacy of treatment to reduce transmission likely contributes to the high proportion (20–50%) of persons living with HIV (PLWHIV) who desire to have children in Uganda [6–8] and the larger region [9–12]. In fact, 20–40% of HIV-infected women become pregnant post-HIV diagnosis [13, 14], and nearly 100,000 HIV-infected women become pregnant annually in Uganda [15].

Conception among PLWHIV involves risks of HIV transmission to uninfected partners, as well as the fetus, and recent data suggests that 50% of HIV-affected couples in Uganda are serodiscordant [16]. There are considerable resources and support for patients once they become pregnant, including prophylactic ART for prevention of mother-to-child-transmission (PMTCT) [17], but the pre-conception stage is starkly different. Counselling and contraceptives are readily available for preventing pregnancy, but services aimed at promoting safer conception are rarely available despite a majority (57%) of these pregnancies being planned [18]. This represents a clear need and opportunity for safer conception services.

Methods to reduce HIV transmission to uninfected partners during attempts to conceive, which we refer to as "safer conception methods" (SCM), range greatly in the level of technology and cost required [19, 20]. High-resource SCM such as sperm washing plus insemination or in vitro fertilization [21] are not yet realistic options for most serodiscordant couples in sub-Saharan Africa. Low cost, behavioral SCM include timed unprotected intercourse (during a woman's peak fertility days only), and manual self-insemination with partner's sperm (when male is HIV-negative), each of which has been demonstrated to reduce risk of HIV transmission [22, 23]. Other methods for reducing horizontal transmission that are not specific to the context of conception include ART, which has been shown to reduce infections in serodiscordant couples by 96% when adhered to properly [24], and male circumcision which can lower the transmission risk for uninfected men by 50% [25]. Pre-exposure antiretroviral prophylaxis (PrEP) for the uninfected partner may also reduce risk during conception attempts [26], but its efficacy in this context has not been established, nor is it currently widely available in Uganda or other sub-Saharan countries.

While SCM such as timed unprotected intercourse and manual self-insemination cost little and thus are feasible, successful use of these methods requires that clients have adequate knowledge of and self-efficacy for applying these strategies with their partner. Factors that influence the use of SCM may include individual (e.g., knowledge and attitudes towards specific SCM), relationship (e.g., HIV disclosure to partner, communication and decision making dynamics), and provider (e.g., provider-client communication about childbearing desires, provider attitudes towards childbearing among HIV clients) level factors [27, 28].

Existing research has mostly focused on prevalence and correlates of fertility desires, and we are unaware of any quantitative study that has evaluated the knowledge, attitudes and practices of PLWHIV in sub-Saharan Africa regarding specific SCM.

In this paper we report findings from a survey of 400 Ugandan HIV clients in committed heterosexual relationships who have intentions to conceive a child. We examined the utilization of SCM and the correlates of such use from among demographic, relationship, and health management characteristics, multidimensional childbearing stigma, and knowledge and attitudes towards SCM.

METHODS

Study Setting

The study was conducted at The AIDS Support Organization (TASO) HIV care and treatment sites in Kampala and Jinja, Uganda. TASO is a non-governmental organization founded in 1987 to provide care and support for HIV/AIDS infected and affected people in Uganda. The Kampala site is located next to the Mulago National Referral Hospital and has over 6700 active clients. The Jinja site is located within the Jinja Regional Referral Hospital campus and provides HIV care to over 8000 clients. In addition to ART and counselling services, TASO has well established family planning and contraception services at its clinics, but has not integrated the routine delivery of safer conception services.

Participants

Clients at the two study clinics were eligible for the study if they were (1) 18 years or older, (2) married or in a committed heterosexual relationship, and (3) reported an intention to conceive a child with their partner within the next 24 months. Only one member of a couple was allowed to participate to ensure the participants were independent of each other. The cohort was recruited between May and October of 2013. Recruitment took place primarily during the triage phase of clients registering their attendance at clinic visits. A brief screening was conducted with adult clients by the triage personnel. Those who were likely eligible were referred to the research coordinator for a more thorough screening. Consent procedures were implemented with confirmed eligible clients interested in participating. After providing written informed consent, participants were administered the baseline survey. Follow-up surveys were scheduled at 6-month intervals for 24 months, or until the participants (or their partner) become pregnant in which case their participation ended after a post-delivery survey was completed. Since the study is still ongoing, we analysed only the baseline data for this paper. Participants received 15,000 Ush ($6 USD) for completing each survey. The study protocol was reviewed and approved by Institutional Review Boards at Makerere University School of Biomedical Sciences and RAND Corporation, as well as the Uganda National Council for Science and Technology.

Measures

All measures were translated (using standard forward and back translation methods) into and administered in Luganda, the most common native language in the study setting. Trained

and experienced interviewers used computer-assisted personal interview software to administer the survey.

SCM utilization—Participants were asked whether they used any of the following methods while trying to conceive with their partner during the last 6 months:

> ***Timed unprotected intercourse***: Did you have unprotected or "live" sex ONLY on the 2 to 3 specific days each month in which you (your partner) were (was) most fertile?
>
> ***Sperm washing*** (If male respondent and partner is HIV-negative): Did you pay for technology that cleanses your sperm or semen of the HIV virus?
>
> ***Manual self-insemination*** (If female respondent and partner is HIV-negative): Did your partner ejaculate into a condom or container and then manually inject the semen into your vagina?

Although not specific to the context of attempts to conceive, we also asked participants about the use of ***PrEP*** if the respondent's partner was HIV-negative: Did your partner take HIV medication every day during the months in which you were trying to conceive?

SCM knowledge—We developed a 15-item scale to measure knowledge of the availability of safer conception methods in general, specific safer conception methods (timed unprotected intercourse, manual self-insemination, sperm washing), and strategies to reduce transmission risk that are not specific to conception (e.g., circumcision, PrEP, treating any sexually transmitted infection [STI], waiting for higher CD4, starting ART early). Respondents were asked to indicate whether each statement was 'True' or 'False,' or whether they 'did not know.' A sum of the number of correct responses was tabulated.

SCM cultural acceptability—We adapted the WHO assessment of contraceptive method preferences [29] to develop 6 items that assess the respondent's perception of the cultural acceptability of specific safer conception methods. Respondents were asked to indicate their level of agreement with statements about the willingness of HIV-affected couples to engage in specific safer conception strategies (e.g., delaying attempts to conceive until CD4 count is high, timed unprotected intercourse, manual self-insemination, PrEP, HIV-infected partner starting ART early); response options ranged from 1 'Strongly Disagree' to 4 'Strongly Agree;' mean item score was computed and higher scores represented greater cultural acceptability.

SCM self-efficacy—We adapted a self-efficacy measure developed by Johnson et al. [30] to create 7 items to assess the respondent's level of confidence to negotiate and utilize safer conception methods (e.g., "I can follow advice about limiting unprotected sex to only 2–3 specific days per month"). Respondents rated their level of confidence on a scale of 1 'Can't do at all' to 10 'Certain I can do'. Mean item score was computed and higher scores represented greater self-efficacy.

SCM motivation—We adapted items from the Brief Motivation Scale [31] to create 6 items to assess level of commitment and readiness to engage in safer conception counseling

and use of safer conception methods (e.g., "I am willing to go about conception in a non-traditional manner if it will reduce the risk of transmission to an uninfected partner"). Respondents rated their level of agreement with each statement on a scale of 1 'Strongly Agree' to 10 'Strongly Disagree'. Mean item score was computed and higher scores represented greater motivation.

Demographics—These included age, sex, education level (whether or not any secondary education had been completed), occupation, and monthly income.

Reproductive health history and current fertility intention—Participants reported their number of living children and pregnancy history (including miscarriages or abortions), as well as time frame of when they intend to conceive (0–6, 7–12, 13–24 months).

Health management characteristics—Date of HIV diagnosis was self-reported, and CD4 count and ART status were abstracted from the participant's clinic chart. To assess adherence to ART, respondents were asked to indicate how many doses per day they had been prescribed, and how many doses they missed in the last 7 days; for analysis, a binary variable was created to represent whether any doses had been missed. Respondents also reported whether or not they had missed any clinic appointments in the past 6 months. Respondents indicated whether they had discussed their childbearing desires with their HIV care providers, and rated their satisfaction with their HIV medical care on a scale of 1 'low satisfaction' to 10 'high satisfaction.'

Relationship and partner characteristics—These included marital status, whether respondent or partner had other spouses/partners (monogamous or polygamous relationship), HIV status of partner, and partner's knowledge of respondent's HIV status. Respondents were also asked to rate their ***perception of partner's willingness to use SCM***; we developed 5 items to assess the respondent's perception of their partner's willingness to use safer conception methods. Respondents were asked to rate their confidence from 1 'no confidence' to 5 'high confidence' that their partner would be willing to attend clinic visits to learn about safer ways to conceive, try methods to reduce risk during conception, wait to have unprotected sex until the infected partner's CD4 count was high, and cooperate with instructions for timed unprotected intercourse, and manual self-insemination (if partner was male and HIV-negative). Mean item score was computed. ***Control of decision making in the relationship*** was measured with the 15-item relationship control subscale of the Sexual Relationship Power Scale [32]; respondents were asked to rate their level of agreement with statements from 1 'Strongly Agree' to 4 'Strongly Disagree,' a mean item score was calculated, and higher scores represent greater self-efficacy in decision making.

Stigma of childbearing among PLWHIV—We developed a 4-item scale to measure the respondent's ***internalized childbearing stigma***. Each item was a statement and assessed respondents' personal attitudes about childbearing. Respondents were asked to indicate their level of agreement with statements about feelings of shame, guilt, and HIV-affected couple's ability to be good parents. Response options ranged from 1 'disagree strongly' to 5 'agree strongly;' mean item score was computed and higher scores represented greater internalized childbearing stigma. We developed a 4-item scale to measure the respondent's

perceived social childbearing stigma. Respondents were asked to indicate their level of agreement with statements reflecting their perceptions of how family members, friends or people in the community viewed HIV-affected couples who want to have a child, HIV-positive women who got pregnant or an HIV-positive man who got his partner pregnant. Response options ranged from 1 ‘disagree strongly’ to 5 ‘agree strongly;’ mean item score was computed and higher scores represented greater social stigma. We developed a single item to measure the respondent’s ***perceived provider childbearing stigma***. The item assessed the respondent’s perception of whether or not HIV providers think HIV-affected couples should have children. Response options ranged from 1 ‘disagree strongly’ to 5 ‘agree strongly’.

The appendix lists all of the items in the measures developed by the study team to assess knowledge and attitudes towards SCM, perceived partner willingness to use SCM, and childbearing stigma.

Data Analysis

Descriptive statistics were used to describe sample characteristics. Bivariate statistics (Chi Square tests, 2-tailed independent t-tests, Pearson correlations) were used to examine correlates of the use of specific SCM. To control for multiple comparisons, the text of the paper describes only the bivariate correlates that were significant at the $p < 0.001$ level of significance; however, the table reports the significance level of each correlation. Logistic regression analysis was used to further examine these correlates; independent variables included basic demographics (age, sex, any secondary education) as well as variables found to be correlated with the dependent variable in bivariate analyses at the $p < 0.05$ level.

RESULTS

Sample Characteristics

A sample of 400 participants was enrolled (207 at Kampala, 193 at Jinja). With the exception of five who refused, those who were screened and were eligible decided to participate. The characteristics of the sample are listed in Table 1, including demographics, HIV health characteristics, reproductive health history, and partner/relationship characteristics. Three-quarters of the sample were female, and 61% were on ART. Just under half (44%) reported being married, with all others being in a committed relationship. Thirty percent reported that their relationship was polygamous, including 16 men and 3 women who had multiple partners/spouses, and 102 women who had only one partner but their male partner had multiple wives/partners. However, all participants except one reported that they were trying to conceive a child with only one person; nearly two-thirds (n=244; 61%) reported that the HIV status of this partner was either negative or unknown (195/299 [65%] female participants; 49/101 [49%] male participants), and 79% indicated that this partner was aware that the respondent was HIV-positive. Two-thirds (67%) reported that they intended to have a child within the next 6 months, 24% wanted a child between 7–12 months from the time of the interview, and the remaining 9% wanted a child within 13–24 months.

Knowledge, Self-Efficacy and Utilization of Safer Conception Methods

In the 6 months prior to baseline, 12% (n=45) of the whole sample (and 15% [39/267] of those trying to conceive within next 6 months) reported using the strategy of having unprotected intercourse only during the woman's most fertile days (timed unprotected intercourse) to reduce risk of HIV transmission, but none had used manual self-insemination or sperm washing. Two participants reported that their HIV-negative partner had used daily ART (PrEP) while they were trying to conceive. Knowledge of these methods was generally low, with just over half the participants knowing that manual self-insemination (53%) and timed unprotected intercourse (51%) were methods to reduce transmission risk during conception, and only 15% knowing about the use of sperm washing or PrEP for this purpose.

In contrast to these low levels of use and knowledge, when the strategies were described to the respondents, levels of confidence in being able to use these methods were generally good. Confidence ratings (on scale of 1 'low' to 10 'high') were high for being able to limit unprotected sex to just the few days when the woman was most fertile (mean = 8.3), with men being more confident than women (8.8 vs. 8.1; $t = 2.90$; $p = 0.004$). Women who had HIV-positive partners reported a higher level of confidence in being able to limit unprotected sex to the few days in which they were most fertile compared to women who had HIV-negative or unknown status partners (8.5 vs. 7.8; $t = -2.45$; $p = 0.015$). Women who had HIV-negative or unknown status partners were considerably less confident (mean = 5.1; scale of 1–10) in their partner's ability to use manual self-insemination; nonetheless, 37% reported a confidence level of at least 6.

Correlates of Use of Timed Unprotected Intercourse

Given the low observed rate of use of other SCM, we restricted our examination of correlates to timed unprotected intercourse, and only among the subgroup of 267 (67%) participants who wanted to conceive within the next 6 months. Knowledge and attitudes regarding SCM were related to the use of this method; those who had used timed unprotected intercourse had greater overall SCM knowledge (10.4 vs. 9.3; $t = 2.62$; $p = 0.009$), greater perceived cultural acceptability of SCM (4.5 vs. 4.3; $t = 2.65$; $p = 0.009$), and had greater self-efficacy regarding use of SCM (8.4 vs. 7.8; $t = 2.47$; $p = 0.014$), compared to those who had not used the method. There was no difference between the groups with regard to motivation to use SCM.

Table 2 lists other bivariate correlates of use of timed unprotected intercourse from among measures of demographics, health, relationship/partner characteristics, and childbearing stigma. Greater perceived partner willingness to use SCM was the only variable related to use of timed unprotected sex at the $p < 0.001$ level. Confidence in one's partner being able to cooperate with timed unprotected intercourse (on a scale of 1 'low' to 5 'high') was high (mean = 3.8), with men being more confident in their partner's willingness than women (4.6 vs. 3.5; $t = 7.77$; $p < 0.001$), and women with HIV-positive partners having greater confidence than women with HIV-negative or unknown status partners (3.9 vs. 3.3; $t = 3.86$; $p < 0.001$).

In multiple regression analysis, use of timed unprotected intercourse was associated with greater perceived partner willingness to use SCM, greater perceived provider childbearing stigma, greater knowledge of SCM, and desire for a child within the next 6 months (see Table 3). For each unit increase in perceived partner willingness, the odds of use of timed unprotected intercourse increased by over 2.2 times, whereas each unit increase in provider stigma and SCM knowledge increased the odds by 34% and 29% respectively.

DISCUSSION

This may be the first quantitative study of the use of safer conception methods (SCM) among PLWHIV in sub-Saharan Africa. This study of HIV clients in Uganda with fertility intentions revealed poor knowledge and use of specific SCM. Only half were aware of timed unprotected intercourse and manual self-insemination as methods to reduce transmission during conception, and knowledge of sperm washing and PrEP was rare. With poor knowledge of SCM, it is not surprising that the only SCM that was used by a substantial number of participants was timed unprotected intercourse, and it was only employed by 12% of the sample. Greater use of timed unprotected intercourse is likely in part due to it being a common family planning method to avoid unwanted pregnancies. In contrast, when these methods were described to participants, confidence in being able to use them was generally good, suggesting that with effective education and counselling these methods are viable options to make conception safer for PLWHIV.

Perception of partner willingness to use SCM was a strong determinant of the use of timed unprotected intercourse. Like all SCM methods, limiting unprotected sex to just the two or three days of the woman's ovulation cycle when she is most fertile requires the cooperation of both members of a couple, so the willingness of one's partner to use SCM is critical. Men had greater self-efficacy regarding use of timed unprotected intercourse (as well as perceived partner willingness to use the method) than female respondents. Partner dynamics and gender power differentials in decision making related to sex in the context of committed relationships are likely playing a role in these findings [33]. Men have more control in determining whether and when a condom will be used, so this explains their greater self-efficacy, at least among HIV-positive men. While not measured in this study, the attitudes of HIV-negative men towards SCM may not be as favorable, even when they are in a serodiscordant relationship. This may also explain why women in serodiscordant relationships had less confidence in their ability to use timed unprotected intercourse, as well as lower perceived partner willingness to use this method, compared to women in seroconcordant relationships, as these women may feel a greater sense of power disparity within the relationship due to both their gender and HIV status. The influence of these partner-related variables highlight the importance of engaging both partners of a couple in safer conception counselling.

Perceived provider stigma of childbearing among PLWHIV was also a significant independent correlate of use of timed unprotected intercourse. Provider stigma in this context is attributed at least in part to concerns about the risks of HIV transmission to uninfected partners and future infants [34, 35]; therefore, a possible explanation of this finding is that clients who perceive their providers to be unsupportive of childbearing may

attribute this lack of support to provider fears about the risk of HIV transmission or re-infection for partners during conception, which may sensitize the client to the importance of using SCM. Furthermore, lack of support or counselling from providers may render clients with few options beyond methods that they are more familiar with and have greater access to; hence, the greater use of timed unprotected intercourse relative to use of manual self-insemination or PrEP. Training to reduce provider stigma and foster a more supportive, informative environment within routine HIV care is needed to promote greater exchange of information about childbearing needs between clients and providers, and encourage a wider use of SCM.

Another significant correlate in the regression analysis was SCM knowledge. Awareness of SCM is an essential first step in the process of using these risk reduction methods. Receipt of safer conception counselling is instrumental to a client gaining knowledge of SCM, as well as garnering partner support if the partner is included in the counselling. Providers need to initiate discussions with their clients about childbearing and SCM options, but clients also need to inform their providers of their childbearing desires and need for safer conception counselling. Unfortunately, counselling to address barriers to the use of SCM and instruct clients and couples on the use of these methods is not currently being implemented in sub-Saharan Africa (or any other part of the world) as part of standard care; in fact, providers and HIV clients do not typically discuss the childbearing desires of clients [13,36–38]. Even when a client does discuss fertility intentions with a provider, our qualitative research suggests that such discussions rarely include available options for safer conception methods [27].

Limitations to this study include the reliance on self-reported data regarding use of SCM, and timed unprotected intercourse in particular, and the sample being comprised solely of PLWHIV who are receiving HIV care. Challenges to the validity of self-reported use of timed unprotected intercourse lie not only with social desirability, but also the difficulty in assessing whether participants who used the method, used it correctly. Accurately determining the timing of the woman’s ovulation period and knowing the duration of peak fertility during the ovulation cycle is a challenge in and of itself for couples who want to use this method. However, a more comprehensive, detailed assessment could be used to better determine the correct use of the method. As for the generalizability of the sample, the study results are only applicable to PLWHIV who are in HIV care and have intentions to conceive with their partner. PLWHIV who are not in HIV care may be less likely to be familiar with safer conception methods and how to use them.

The need for safer conception counselling to be integrated into routine HIV care services for PLWHIV and their partners is a key policy implication of our study findings. While use of ART and complete viral suppression greatly reduce any risk for horizontal transmission [4, 24], the absence of routine viral load tests in much of sub-Saharan Africa (including Uganda), inadequate adherence to achieve viral suppression in a sizable minority of clients on ART [39], and the fact that many HIV clients are not on ART [5], provide a strong rationale for the need for safer conception counselling. Even in the context of effective ART use, SCM still play an important role as part of a combination of safer conception specific and non-specific strategies to reducing horizontal transmission. The Uganda National

Strategic Plan and National Priority Action Plan for HIV/AIDS emphasize the integration of sexual and reproductive health into HIV care programs as a key intervention to reduce HIV transmission [40, 41], yet these policies and guidelines focus on prevention of maternal to child transmission and unplanned pregnancies, with minimal guidance on how to support HIV-affected couples who desire to have children. PLWHIV and their partners must be fully informed about their reproductive options and receive appropriate guidance for safer conception from their healthcare providers.

There are currently no formal guidelines for such support in Uganda. The Society of HIV Clinicians in South Africa have published such guidelines [42], but these guidelines have not been routinely implemented, perhaps because training materials and counselling protocols are not yet available to providers. Our prior qualitative research suggests that HIV providers want the training needed to provide quality safer conception counselling [27]. With both clients and providers having a desire for the provision of safer conception counselling, the field is primed for the integration of this important service into routine HIV reproductive health services, which is key to making further inroads to improving the health and safety of pregnancies among PLWHIV.

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Appendix

Items of scales developed to assess knowledge and attitudes related to safer conception methods, and stigma of childbearing among people living with HIV/AIDS

Knowledge of Safer Conception Methods (15 items)

Response options: True, false, don’t know

1. It is possible for an HIV+ woman to have an HIV-negative baby.
2. HIV antiretrovirals can reduce the risk of passing HIV to a baby.

3. There are ways to make conception with an HIV+ partner safer.
4. There are ways to make conception with an HIV-negative partner safer.
5. All options to make conception safer are very expensive. (*Item skipped if respondent indicates that statements 3 and 4 are false*).
6. Waiting until my CD4 count is high will reduce the risk of health complications to the mother during the pregnancy.
7. Having a sexually transmitted infection will increase the risk of passing HIV to an uninfected partner during unprotected or "live" sex.
8. There are times during a woman's cycle when she is most fertile (likely to become pregnant).
9. Health care providers can offer advice to help make childbearing safer for you, your partner, and your child.
10. If an HIV+ person has an undetectable amount of HIV virus, it means that person is no longer able to infect someone else.
11. For some couples, having the man ejaculate into a condom or container and then manually inject the semen into the woman's vagina is a way to reduce risk of HIV transmission if the man is HIV negative.
12. Only having unprotected sex during the few days each month when the woman is most fertile will help to limit the risk of HIV transmission to an uninfected partner.
13. There is technology available that can cleanse a man's sperm or semen of the HIV virus.
14. Starting to take HIV medications early (as soon as diagnosed) helps reduce the risk of transmitting HIV to a sexual partner.
15. HIV medications can be taken by an HIV-negative (or unknown status) partner that will reduce their risk of getting infected by their HIV+ partner.

Cultural Acceptability of Safer Conception Methods (6 items)

Response options: Strongly disagree, somewhat disagree, somewhat agree, strongly agree

1. When deciding whether or not to have a child, it is appropriate to involve a health care worker in that decision.
2. It is realistic to ask one's partner to delay conception until the HIV+ partner’s CD4 count is high enough.
3. Couples living with HIV are able to restrict unprotected sex to only 2–3 specific days per month, when the woman is most fertile, if it helps to conceive a child more safely.
4. Involving a health care provider in our conception efforts will be beneficial.

5. HIV+ partners would be willing to start HIV medications early (as soon as diagnosed) if they knew it would reduce their risk of transmitting the virus to a partner.
6. HIV negative partners of HIV+ patients would be willing to take HIV medications every day during the months in which they were trying to conceive in order to reduce their risk of infection.

Self-efficacy Regarding Use of Safer Conception Methods (7 items)

Response options: Rating of confidence rating from 1 ‘can’t do at all’ to 10 ‘certain I can do’

1. I can discuss safer conception options with my partner.
2. I can ask a provider for help in planning a pregnancy.
3. I can follow advice about postponing attempts to conceive until any sexually transmitted infections are treated.
4. I can follow advice about limiting unprotected sex to only 2–3 specific days per month.
5. I/my partner can learn how to track the most fertile days in a woman’s cycle.
6. My partner can ejaculate into a container or a condom during sex and then inject the semen into my vagina if necessary to reduce the risk of transmission to my partner. (*Item only asked if respondent was female and male partner’s HIV status is negative or unknown*).
7. My partner can take HIV medications every day during the months we try to conceive if it reduces his/her risk of getting infected with HIV. (*Item asked only if partner’s HIV status is negative or unknown*).

Motivation to Use Safer Conception Methods (6 items)

Response options: Rating of agreement from 1 ‘strongly agree’ to 10 ‘strongly disagree’

1. It is important to me to work with a health care provider to plan a pregnancy.
2. I want to discuss conception options with my partner before we try to have a child.
3. I'm confident a health care provider can be helpful to me and my partner in trying to have a child safely.
4. I feel it is important to include my partner in this discussion about safer childbearing.
5. I am willing to go about conception in a non-traditional manner if it will reduce the risk of transmission to an uninfected partner.
6. I am ready to temporarily delay getting pregnant if it helps me to have a child more safely.

Perception of Partner's Willingness to Use Safer Conception Methods (5 items)

Response options: Rating of confidence from 1 'no confidence' to 5 'high confidence'

1. Partner would attend a doctor visit with you to learn about safer ways to conceive a child.
2. Partner would be open to trying methods to reduce risk during conception.
3. Partner would be willing to wait to have unprotected or "live" sex until your/both of your CD4 counts are at a high level.
4. Partner would cooperate with advice to only have unprotected sex during 2–3 peak fertility days per month.
5. Partner would cooperate with advice to have sex with a condom so that his semen could be contained and then injected into your vagina in order to reduce the risk associated with trying to conceive a child. (*Item asked only if partner was male and HIV status was negative or unknown*).

Internalized Childbearing Stigma (4 items)

Response options: Disagree strongly, disagree slightly, neutral, agree slightly, agree strongly

1. I feel ashamed for wanting to have a child.
2. I feel selfish for wanting to have a child.
3. HIV+ persons who want to have a child should feel embarrassed to tell their HIV provider.
4. People living with HIV can be good parents. (Item reversed before scoring)

Perceived Social Childbearing Stigma (4 items)

Response options: Disagree strongly, disagree slightly, neutral, agree slightly, agree strongly

1. Family members who know I am HIV+ will not approve of me wanting to have a child.
2. People in the community look down on HIV+ individuals who want to have a child.
3. An HIV+ man who gets his partner pregnant is looked down upon.
4. An HIV+ woman who gets pregnant is looked down upon.

Perceived Provider Childbearing Stigma (1 item)

Response options: Disagree strongly, disagree slightly, neutral, agree slightly, agree strongly

1. Most HIV providers think that HIV+ clients should not have children.

Table 1

Characteristics of the Sample (*n*=400)

Variable	Mean/Frequency (SD or %)
Demographics	
Female	299 (74.8%)
Mean age (years)	33.8 (7.5)
At least some secondary education	179 (47.2%)
Operates a small business/sells things	194 (48.6%)
Average monthly income $40-$220 USD	292 (74.7%)
Health Characteristics	
Mean years since HIV diagnosis	5.5 (4.7)
Mean CD4 count	435 (277)
On HIV antiretroviral therapy	242 (60.7%)
Reproductive health history	
Have had children	354 (88.5%)
Mean number of children (among parents)	3.2 (2.3)
Have had a child with current partner	195 (48.8%)
Had pregnancy since knowing HIV status	110 (38.7%)
Relationship/Partner Characteristics	
Marital status:	
Married	175 (43.8%)
In committed relationship	225 (56.2%)
In a polygamous relationship	121 (30.3%)
HIV status of partner with whom trying to conceive	
HIV positive	156 (39.0%)
HIV negative	122 (30.5%)
Unknown HIV status	122 (30.5%)
Partner knows respondent's HIV status	317 (79.3%)

Table 2

Bivariate correlates of use of timed unprotected intercourse (TUI) (n = 267)

	Use TUI	Don't use TUI	Test statistic (Chi-square/ *t* test)	*p* value
Demographics				
Age	30.6	34.0	2.65	0.009
Female sex	77.5%	77.6%	0.0003	0.985
Has any secondary education	45.0%	48.8%	0.20	0.658
Health Management				
CD4 cell count	452.7	425.7	−0.57	0.568
Currently on ART	55.0%	60.5%	0.43	0.511
Length of time since diagnosis (months)	70.5	62.5	−0.88	0.379
Missed any ART doses in past 7 days	0.0%	14.7%	3.54	0.060
Missed any clinic appointments in past 6 months	26.3%	19.7%	0.86	0.354
Has talked with care provider about childbearing desires	57.5%	47.8%	1.28	0.258
Satisfaction with HIV treatment	3.8	3.8	0.50	0.621
Relationship/Partner				
Decision making power in relationship	2.7	2.5	−2.39	0.017
Married	47.5%	40.8%	0.63	0.427
In a polygamous relationship	12.5%	32.0%	6.28	0.012
Number of children	2.9	3.1	0.47	0.640
Partner HIV status is HIV-negative or unknown	42.5%	38.1%	0.27	0.603
Partner knows respondent is HIV-positive	92.5%	78.9%	4.06	0.044
Perceived partner willingness to use SCM	4.3	3.7	−3.52	<0.001
Childbearing Stigma				
Internalized stigma regarding childbearing	1.3	1.3	−0.45	0.655
Perceived social stigma of childbearing	3.4	3.6	0.94	0.351
Perceived provider stigma of childbearing	2.5	2.2	−1.11	0.269
Knowledge and Attitudes Towards SCM				
SCM knowledge	10.4	9.3	−2.62	0.009
SCM cultural acceptability	4.5	4.3	−2.65	0.009
SCM self-efficacy	8.4	7.8	−2.47	0.014
SCM motivation	8.9	8.7	−0.64	0.522

Table 3

Multivariate logistic regression analysis of correlates of use of timed unprotected intercourse (*n*=267)

	OR (95% CI)	*p* value
Participant demographics		
Age	0.93 (0.87–0.99)	0.034
Female sex	1.56 (0.52–4.69)	0.427
Has any secondary education	0.94 (0.43–2.07)	0.877
Relationship/Partner		
Decision making power in relationship	2.79 (0.82–9.52)	0.101
In a polygamous relationship	1.02 (0.32–3.30)	0.967
Partner knows respondent is HIV+	1.55 (0.32–7.48)	0.584
Perceived partner willingness to use SCM	2.21 (1.10–4.46)	0.027
Health management		
Has talked with care provider about childbearing desires	1.02 (0.46–2.23)	0.963
Childbearing stigma		
Perceived provider childbearing stigma	1.34 (1.00–1.79)	0.053
SCM knowledge and attitudes		
SCM knowledge	1.29 (1.04–1.58)	0.018
SCM cultural acceptability	1.30 (0.49–3.50)	0.599
SCM self-efficacy	0.94 (0.62–1.40)	0.750
SCM motivation	0.88 (0.67–1.16)	0.364