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“I’m waiting for that”: Interest in the use of PrEP for safer conception in Botswana

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Abstract

Safe and effective low-cost safer conception (SC) methods are increasingly available and being integrated in national guidelines in sub-Saharan African contexts. Sero-different couples of childbearing age can benefit from such services and the routine provision of SC counselling. Pre-exposure prophylaxis (PrEP) to prevent HIV acquisition to uninfected partners can reduce the chances of HIV transmission when trying to achieve pregnancy. Botswana has strong commitment to reducing new HIV infections but PrEP is not yet widely available and little guidance has been offered on counselling sero-different couples. We conducted qualitative in-depth interviews in Gaborone, Botswana with ten HIV healthcare providers and ten women living with HIV of childbearing age because they act as a key conduit for reaching sero-different partners with information about PrEP. We examined knowledge and attitudes towards PrEP to assess viability and develop a deeper understanding of this SC option. Interviews were analysed using an

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The dataset generated and analysed during the current study are available from the corresponding author on reasonable request.

interpretive phenomenological approach. Three themes emerged: 1) awareness of PrEP is limited, 2) providers and women overwhelmingly showed interest in PrEP and 3) women living with HIV and providers have concerns about PrEP use. With correct support, PrEP could be a useful SC option for sero-different couples in Botswana and other sub-Saharan contexts.

Keywords

PrEP; safer conception; Botswana

Introduction

Safer conception (SC) encompasses a series of interventions that address HIV care, treatment, and prevention for individuals and couples who desire future childbearing, but where either one or both parties is living with HIV (Bekker et al., 2011; Davies et al., 2018; Matthews, Beyeza-Kashesya, et al., 2017). Data from various African contexts shows that people living with HIV desire childbearing, making it necessary to address risks for both vertical and horizontal transmission (Elul et al., 2009; Kaida et al., 2011; Keogh et al., 2012; Taulo et al., 2009; Tesfaye, Admassu, Getachew, & Sharma, 2012). SC includes the use of both behavioural and pharmacologic reproductive strategies to reduce the risk of HIV transmission to partners during conception while also supporting the reproductive rights of people living with HIV. A number of proven methods exist although the acceptability and feasibility of using methods may vary in different contexts.

Pre-exposure prophylaxis (PrEP) as oral TDF/FTC is an effective method (Baeten et al., 2012; Grant et al., 2010; Thigpen et al., 2012) that can be used by sero-different couples to prevent HIV transmission when trying to conceive (Davies et al., 2018; Heffron et al., 2019; Schwartz et al., 2019). PrEP for uninfected heterosexual partners has been shown to reduce the risk of HIV transmission to negative partners with a relative reduction of up to 73% in the incidence of HIV (Baeten et al., 2012; Thigpen et al., 2012). Starting in 2015, the WHO recommended the use of PrEP for individuals at substantial risk of HIV infection (WHO, 2015). Using PrEP in the context of safer conception (known as PrEP-ception) has been used in a number of sub-Saharan countries, is part of guidelines for safer conception, and is increasingly available in sub-Saharan Africa; although uptake has been limited (Heffron et al., 2019; Ngure et al., 2017; Schwartz et al., 2017, 2019; Wagner et al., 2017).

In the era of U=U (Undetectable = Untransmittable or uninfected), providing PrEP in the context of achieving pregnancy may seem unnecessary since if viral suppression is achieved, HIV transmission risk during conception should be eliminated (Cohen et al., 2011; MacCarthy, Laher, Nduna, Farlane, & Kaida, 2009; Rodger et al., 2016). However, viral suppression cannot be confirmed in all settings because routine viral load testing may be unavailable and not all people living with HIV on antiretroviral therapy (ART) are virally suppressed (Davies et al., 2018; Keiser et al., 2011; Mills et al., 2006; Schwartz et al., 2017; UNAIDS, 2018). Therefore, offering SC approaches, such as PrEP, that complement ART use are still relevant and should be provided as part of a multi-pronged approach to HIV prevention that supports reproductive choice for couples.

Botswana has one of the highest HIV rates in the world with an estimated prevalence of 20.3% among men and women aged 15–49 years (UNAIDS, 2018). HIV infections are concentrated among people in their reproductive years and studies suggest that 60 to 70% of women in Botswana know they are living with HIV before becoming pregnant (Government of Botswana, 2011, 2014; Mayondi et al., 2016; National AIDS Coordinating Agency, 2014). Expanded attention to approaches that can reduce HIV transmission during conception are clearly warranted. Botswana has adopted a test and treat approach, has signed on to the UNAIDS 95-95-95 targets, and has reported success with progress towards UNAIDS targets (Gaolathe et al., 2017; WHO, 2015). Like other countries, reductions in new infection rates have flattened and new innovative strategies are needed to further reduce new infections (Gaolathe et al., 2017). Reducing HIV infection during times of conception may be an important contribution to “bending the curve”. However, Botswana does not offer formal SC services in the public sector and although the most recent HIV clinical care guidelines suggest that PrEP could be appropriate for sero-different couples attempting to conceive, PrEP is not yet widely available and little guidance has been offered on how to counsel couples on using this new approach (Botswana MOH & Masa, 2016).

In Botswana, childbearing is intimately intertwined with the construction of masculinity and femininity, such that womanhood or manhood is closely linked with parenthood (Schaan, Taylor, Gungqisa, & Marlink, 2016; Upton & Dolan, 2011). This creates a conundrum for women living with HIV who wish to fulfill cultural or gender roles by having children but are worried about transmitting HIV to their partners. Individuals therefore weigh the perceived risks of HIV infection against the potential stigma of not having children, making SC options especially salient (Upton & Dolan, 2011). In addition, while men in this context have a great deal of say over pregnancy decision-making (Beyeza-Kashesya et al., 2010; Gutin, Namusoke, Shade, & Mirembe, 2014; Matthews et al., 2013; Nattabi, Li, Thompson, Orach, & Earnest, 2012), pregnancy and childbearing are highly gendered experiences, with women often attending sexual and reproductive health services alone (Mindry et al., 2017). Highlighting this gendered phenomenon, a SC program in South Africa found that all male index clients attending the clinic were accompanied by their female partners, while just over half of the women attending the clinic were accompanied by their male partners (Schwartz et al., 2014). Engaging men with SC, and reproductive health services more broadly, continues to be an on-going challenge (Matthews, Burns, et al., 2017; Schwartz et al., 2017).

Despite an early PrEP study being conducted in Botswana (Thigpen et al., 2012), little is known about the knowledge and attitudes of healthcare providers in the HIV care sector and women living with HIV about this potentially useful method. In particular, assessing the perspectives of women living with HIV of childbearing age who are already engaged with HIV care is useful and relevant because they act as a key conduit for reaching sero-different partners with information about PrEP, help link partners to services, and their input is critical to disseminating PrEP for SC in HIV care systems. Therefore, as part of a larger qualitative study examining SC implementation and experiences of stigma when trying to access SC methods or antenatal care, we examined knowledge and attitudes towards PrEP among both healthcare providers and women living with HIV in Botswana in order to develop a deeper understanding of this potentially useful SC option.

Methods

Setting, study population, and participant recruitment

We conducted 20 in-depth semi-structured qualitative interviews between August 2015 and January 2016 with HIV/sexual and reproductive healthcare providers and women living with HIV in Gaborone, Botswana. Providers and women living with HIV were drawn from government-supported clinics, NGO-supported clinics, and a clinic at a tertiary educational institution in Gaborone, Botswana. Eligibility criteria for providers included being a doctor, midwife, or nurse, 18 years of age or older, willing to participate in the study, able to give informed consent, and working at a study clinic. Eligibility criteria for women living with HIV included being between 20 to 40 years old, previously or currently pregnant, accessing care at one of the study clinics, willing to participate in the study, and able to give informed consent. We interviewed only women living with HIV and not men because some of the larger research questions related to their experiences during past pregnancies. It is rare for men to accompany women in Botswana during reproductive health visits, and providers overwhelmingly have fertility-related discussions with women and not men (Crankshaw, Mindry, Munthre, Letsoalo, & Maharaj, 2014; Goggin et al., 2015; Matthews et al., 2016).

Providers were purposively sampled to represent a range of different healthcare settings where HIV-affected couples might access SC services. Providers were approached at their health facilities and assessed for interest and eligibility. All providers that were approached agreed to take part in the study. Women living with HIV were sampled to represent those who might access SC services in the public sector (reproductive years (20–40), varying amounts of time on treatment, varying relationship statuses (married, in relationship, single), and varying partner status (concordant positive or sero-different relationships)). Women living with HIV accessing care at the study sites were informed about the study by health centre staff. Women who were interested in taking part were referred to the study coordinator. The study coordinator screened women for study eligibility and explained the aims of the study. After assessing eligibility, less than 5% of women did not complete interviews, most commonly citing time constraints. Women were reimbursed 30 Botswana Pula (3 USD at the time of the study) to cover transport costs.

Ethical approvals were obtained from the University of Michigan Health Sciences and Behavioral Sciences Institutional Review Board (Ann Arbor, Michigan), the University of Botswana Research Ethics Committee, Office of Research and Development (Gaborone, Botswana), and the Health Research and Development Division of the Botswana Ministry of Health (MOH). Permissions were also obtained from the heads of health facilities before recruitment of providers and women living with HIV took place. All participants provided informed consent.

Data collection and analysis

The initial interview guide was drafted, tested and revised through a collaborative process involving experts in the field of sexual and reproductive health and SC (two sexual and reproductive health researchers from the USA and one medical doctor from Botswana), and two local researchers in Botswana with many years of experience in sexual and reproductive

health/HIV research, to ensure exploration of appropriate constructs. All members of the study team conduct behavioural research focused on sexual and reproductive health amongst people living with HIV.

Healthcare provider interview domains included awareness of PrEP and knowledge about how the method works, attitudes about the appropriateness of PrEP for use in Botswana, whether PrEP would be an appropriate SC method for sero-different couples, and whether they thought sero-different couples would be interested in this method. Interview domains for women living with HIV included awareness of PrEP, knowledge about how the method works, interest in this method, and attitudes about the feasibility of PrEP use in Botswana.

Semi-structured in-depth interviews with healthcare providers were conducted in English by SG in private spaces at the health centres where the providers worked or in a private location of the participant's choosing. All providers were fluent in English. Interviews lasted approximately one hour. Local, female research assistants who were fluent in English and Setswana (the local language) conducted semi-structured interviews with women living with HIV. Local research assistants were all experienced qualitative interviewers with HIV/sexual and reproductive health expertise. Interviews with women took place in either English or Setswana, depending on the preference of the participant. Interviews were conducted either in a private space at the health centre where the woman was recruited or a private location of her choosing. Interviews lasted approximately one hour. All participants were first asked if they had ever heard of pre-exposure prophylaxis or PrEP. If participants had not heard of the method or gave incorrect information about PrEP, they were read a short description about PrEP. Following the description, participants were asked a series of questions about potential interest in PrEP and the ability to use PrEP in relationships. An interview transcript in English was produced for each interview from either English or Setswana digital recordings. A member of the study team reviewed each transcript for quality and accuracy and corrections were made as necessary.

The data were analysed using an interpretive phenomenological approach (Smith, Flowers, & Larkin, 2009). Interpretive phenomenology focuses on understanding people's perceptions, perspectives, and lived experiences by prioritizing the viewpoint of the participant. This also allows one to examine the social and cultural contexts in which the data emerged.

Data analysis began by reading hard copy transcripts, creating memos, and identifying significant statements in the data (Moustakas, 1994). Statements were grouped into clusters of meaning and recurring themes (Moustakas, 1994). We iteratively developed inductive codes that emerged from the data to complement our initial a priori codes, which were derived from our research questions (Miles, Huberman, & Saldana, 2014). SG and CM identified, discussed, and compared key themes and developed a codebook. Following codebook finalization, translated interviews were entered into the web application Dedoose (www.dedoose.com) for final code application and assistance in systematic data management (Dedoose, 2016).

We reviewed the coded text thematically and then conducted cross-case analysis to deepen our understanding by examining similarities and differences and to better understand recurring themes (Miles et al., 2014). SG led the analysis and regularly consulted with co-collaborators to discuss interpretation of the data. SG also consulted with local members of the study team in Botswana to ensure the cultural salience of the findings. In cases where there was disagreement about interpretation, discrepancies were discussed until consensus was achieved.

Results

A total of 20 interviews with HIV/sexual and reproductive healthcare providers (n=10) and women living with HIV (n=10) were conducted. The sample of providers consisted of six nurses, three midwives, and one medical doctor (nine women and one man). The mean age of providers was 41 years. They had been clinicians for a mean of 18 years and worked with people living with HIV for ten years. The mean age of women living with HIV was 32 years and women had known their HIV status for a mean of 7 years (although one woman had been perinatally infected). All women interviewed were currently using ART and had used treatment for a mean of six years. Two women were single, three were in relationships with a regular partner (not cohabiting), and five were cohabiting with a regular partner or spouse. Seven women living with HIV reported they were in sero-concordant relationships while three were in sero-different relationships. Women living with HIV reported a mean of 2.4 lifetime pregnancies and a mean of 1.8 living children. Four women were pregnant at the time of the interview (none was a first pregnancy) while six had previously been pregnant. Nine of the 10 women had become pregnant since learning their HIV status.

The results section is organized to reflect key themes related to how healthcare providers and women living with HIV in Botswana feel about the possibility of PrEP for SC. Three key themes emerged from this analysis. First, awareness of PrEP is very limited. Second, despite low awareness, providers and women living with HIV overwhelmingly showed interest in PrEP after being read a short description of the method. Third, we note concerns raised by both women living with HIV and providers about this method.

Low awareness of PrEP

Most providers and women living with HIV had never heard of PrEP. This low awareness tended to be characterized by either 1) a complete lack of knowledge about the method or 2) misinformation about PrEP. The low awareness of PrEP did not differ by the type of care setting that the providers or women were recruited from. In addition, half of the providers were confused between post-exposure prophylaxis (PEP), which can be administered after a potential exposure to HIV (like in cases of rape or a needle prick), and pre-exposure prophylaxis (PrEP), which is designed to be taken as a preventive measure by at risk populations. This confusion was most common among providers from government-supported clinics.

Mhm, PrEP? Mhm - pre-exposure. I know post-exposure, not pre-exposure.

(Midwife, age 38)

Never heard of it [PrEP]. Is it available here in Botswana?

(Woman living with HIV, age 38)

PrEP is the one – you mean the one which is given to somebody after she has pricked themselves with a needle or come in contact with infected blood. They use it here in Botswana.

(Midwife, age 44)

Because PrEP here we use them in cases of like a finger prick, rape, exposed somehow.

(Nurse, age 49)

Interest in PrEP

All participants were read a short description about PrEP and then asked about whether people living with HIV would be interested in this method in order to safely conceive. Interest in PrEP was expressed by almost all of the women and providers that were interviewed and responses did not differ by care settings. Providers and women voiced varying motivations for their interest in PrEP. These motivations focused on four areas: 1) Protecting sero-negative partners from HIV transmission, 2) reducing new infections, 3) putting partners at ease, and 4) achieving pregnancy as safely as possible. Providers and women living with HIV thought PrEP would be a good method to use in Botswana.

I don't even know if the government will manage to buy the tablets for them because ... they [people living with HIV] will come. They will want to plan for a safer pregnancy ... They still monitor CD4 and they want to conceive. So if PrEP is available, ah yah, they will come. ... So when is it going to start? That will be so fantastic. Now I'm waiting for that!

(Midwife, age 38)

I mean if it was to protect my partner then yes, I think it would be a great option.

(Woman living with HIV, age 24)

If it's a discordant couple and the woman wants to be pregnant, that would help and it would put the man at ease if he's the one that is negative or the woman if she is the one that is negative.

(Midwife, age 49)

Concerns about PrEP

Both women living with HIV and healthcare providers voiced some concerns about PrEP. These concerns focused at two levels: 1) individual-level concerns focused on male partners who are not living with HIV and 2) community-level concerns about acceptance of PrEP and HIV-related stigma. At the individual level, providers voiced concerns about the proper use of PrEP, a reduction in condom use, and potential medication resistance if a partner not living with HIV seroconverts. These concerns were more commonly mentioned by providers at government-supported clinics as opposed to those at either NGO-supported or tertiary educational clinics. Specifically, providers were concerned whether clients would understand

and use PrEP correctly. Providers were also worried about people living with HIV becoming more relaxed in relation to condom use and preventing HIV transmission. Providers felt that PrEP might give people a false sense of protection and that couples would engage in higher-risk sexual practices as a result. Providers also had concerns about the misuse of PrEP and resistance developing to antiretroviral drugs. At the community-level, providers were concerned about community acceptance of PrEP.

In contrast, the individual-level concerns mentioned by women focused on the acceptability of PrEP to their male partners with specific concern about whether male partners who are not living with HIV would be willing to take pills. In addition, a concern for women at both the individual and community-level was concern about HIV stigma and how this would affect their male partners. Some women felt that their partners would be unwilling to attend an HIV clinic to receive PrEP because of the stigma related to HIV and to taking HIV medications.

The only problem is how the community will accept it. Sometimes people get the information and they get it the wrong way ... It can be effective, it can work very well but people will end up now just coming to say no, now I can start having kids.

(Nurse, age 35)

I can just see people relaxing and believing that they are totally 100% protected. But couples, for the discordant couples, I think it's a great initiator, it can work for them. But just for the general population, yeah. Even the acceptance, I'm not very sure of the acceptance ...

(Doctor, age 42)

These are ARVs. So if they risk this month, he or she is on PrEP. Can't we at the end have resistance when now that person is actually HIV-positive?

(Nurse, age 49)

Some people don't like taking medication, so he may refuse, one never knows ... no, I think it will be difficult, you say he has to take them like my pills, see, he does not like clinics, so I think he will refuse.

(Woman living with HIV, age 38).

I am not sure if they [men] will be willing to just go to clinic for that [PrEP], HIV has stigma my sister, unless if the doctor gives them to me and I give him those.

(Woman living with HIV, age 31)

Discussion

HIV sero-different couples that desire children require strategies to protect their partners who are not living with HIV. PrEP may be an important SC strategy for sero-different couples in Botswana and can be offered as part of a comprehensive package of HIV prevention services. While additional research is needed to address implementation and demand generation questions, this initial work is promising. While awareness of PrEP was limited among both providers and women living with HIV in Botswana, there was

overwhelming interest in this method. Both providers and women living with HIV immediately recognized the importance of PrEP as an HIV prevention option for sero-different couples who want to conceive. That said, both groups voiced concerns that would need to be addressed in order to improve provision and uptake.

Among this sample of women living with HIV and HIV healthcare providers, awareness of PrEP was low. Other studies in sub-Saharan Africa have similarly found low levels of knowledge about PrEP in the context of SC among people living with HIV (Matthews et al., 2016, 2015; Schwartz et al., 2014, 2016; Wagner et al., 2016) but have usually found higher levels of knowledge among healthcare providers (Goggin et al., 2015; Ngure et al., 2017). In addition, studies have reported that some HIV-affected couples do not trust PrEP as their sole SC approach but it seems there may be greater PrEP acceptability among sero-different women than men (Schwartz et al., 2014, 2016). Informational campaigns and provider trainings will be needed to advise both women living with HIV and providers about this option.

Despite low awareness of PrEP, women living with HIV and providers were very interested in this method and the possibility that sero-different couples that desire childbearing could use it. We fully acknowledge however that interest in a method does not necessarily translate into use. In other SC programs in sub-Saharan Africa, the availability of PrEP has not led to high uptake (Ngure et al., 2017; Schwartz et al., 2017; Wagner et al., 2017). This suggests that in order to translate interest into use, strong counselling and education services would be needed as part of a larger SC service. However, these initial findings are encouraging as interest is a crucial first step.

As with any new method though, providers and women living with HIV had concerns about implementation and acceptability. Many provider concerns could be addressed through accurate education about PrEP but implementation studies will also be needed to allay fears in real-world clinic settings. In particular, providers voiced concerns about the proper use of PrEP, risk compensation, and the potential for medication resistance. The issue of PrEP adherence deserves further attention, as adherence is essential to PrEP efficacy. PrEP effectiveness is highly dependent on adherence (Grant et al., 2010; Karim et al., 2010; Thigpen et al., 2012), and so assuring adherence is key to successful outcomes. One of the benefits of PrEP for SC is that adherence does not need to be lifelong and only needs to cover periods of high risk, in this case, when trying to conceive (Haberer, 2016; Haberer et al., 2015). Results from a study in Kenya and Uganda have been encouraging with women being willing to use PrEP and highly adherent around the time of conception (Matthews et al., 2014). The literature also suggests that provider concerns about risk compensation as well as HIV medication resistance as a result of PrEP use are largely unfounded. There has been no evidence that PrEP use is associated with risk compensation (Cowan et al., 2016). In addition, provider misconceptions about the likelihood that PrEP will cause drug treatment resistance has slowed uptake (Cowan et al., 2016) even though breakthrough infections are infrequent and most likely to occur when PrEP is used during acute, undiagnosed HIV infection (Gibas, van den Berg, Powell, & Krakower, 2019). Providers are in need of accurate training about PrEP that can help dispel concerns and misinformation.

The concerns of women living with HIV centered however on the acceptability of the method to male partners who are not living with HIV and fear about HIV stigma regarding attending HIV care clinics and taking treatment. These concerns are valid as women living with HIV in Botswana perceive stigma from healthcare providers with regards to their sexual and reproductive health decisions (Gutin et al., 2019) and stigma surrounding planned pregnancy among HIV-affected couples often exists (Davies, Matthews, Crankshaw, Cooper, & Schwartz, 2017; Ddumba-nyanzi, Kaawa-ma, & Johannessen, 2016; Kawale, Mindry, Phoya, Jansen, & Hoffman, 2015). In addition, community and healthcare provider perceptions and misinformation about SC and fears about HIV transmission by people living with HIV inhibit open discussions about fertility desires and the uptake of SC counselling or services by HIV-affected couples (Beyeza-Kashesya et al., 2018; Breitnauer et al., 2015; Kimemia et al., 2019). As has been noted in other sub-Saharan African contexts, stigma can undermine the use of PrEP (Cowan et al., 2016). However, SC implementation projects have documented high uptake of SC approaches, including PrEP (Heffron et al., 2019; Schwartz et al., 2019). A SC implementation project in South Africa noted though that PrEP use has been higher among women than men and that men remain challenging to engage in care (Schwartz et al., 2017, 2019). Therefore, novel, creative, and targeted community-based efforts to reach men and build community support and awareness of PrEP are essential to expanding uptake. Community-based health outreach campaigns or home-based SC counselling may help reach men at high risk for HIV acquisition and assist in linking them to SC services. In addition, further qualitative studies with sero-different couples or sero-negative male partners will be needed to examine the feasibility of using PrEP, challenges to PrEP use including gendered social norms, and possible solutions for addressing noted challenges. Finally, provider trainings that address offering SC, and reproductive health services more generally, within a non-judgmental environment will be important to reducing HIV stigma.

The study findings should be understood in light of some limitations. This sample was drawn from a small number of providers and women living with HIV in urban Gaborone, Botswana. This likely has implications for the generalizability of the findings. However, recruitment of study participants was from six different clinics in Gaborone, covering a range of different settings. The healthcare providers who took part in this study were predominantly nurses and midwives. It is possible that these cadres of providers may have different opinions, attitudes, and levels of knowledge as compared to both higher and lower-level providers. However, since nurses provide the bulk of primary healthcare in Botswana (WHO Regional Office for Africa & African Health Observatory, 2016), the attitudes of this group are especially relevant. While the study design would have benefitted from the inclusion of men, this study was conducted amongst women living with HIV. Although we recognize that most decisions about SC will be made as a couple and that men have a great deal of say in childbearing decisions in many sub-Saharan African contexts, the larger study questions were better suited to women living with HIV, who often seek services more often than men. Future studies about PrEP should include men or both members of sero-different couples so as to provide nuance about partner dynamics and the feasibility and acceptability of PrEP from the perspective of men or both partners. At the time of this study, PrEP was not yet being offered in the public sector. It is possible that these results reflect the worst-

case scenario but that does not mean the results are not an accurate representation of the level of knowledge and attitudes that still guide most providers and women living with HIV. Finally, we did not enquire about PrEP use in the context of other low-cost SC methods. Future studies should examine these preferences.

There is a need for safe, effective strategies to reduce HIV acquisition risk. The use of PrEP for SC is an important and promising approach that can compliment existing HIV prevention services and reduce incident cases of HIV. While PrEP is not going to be the right SC method for all couples, it should be offered as one strategy that people living with HIV can choose from since viral suppression cannot be confirmed in all settings and not all individuals are able to achieve viral suppression. If the enthusiasm exhibited by women living with HIV and providers in this study is any indication, then PrEP for SC will be a welcome addition in Botswana. The Botswana MOH has taken an important first step by including PrEP for sero-different couples in its most recent HIV clinical care guidelines. We recommend that the Botswana MOH build on these guidelines and support further implementation of PrEP services in the public sector for sero-different couples. Such a scale-up would need to be combined with educational campaigns, demand creation initiatives, and additional guidance for providers which is focused on counselling and provision. With the correct support, PrEP could be a useful and effective SC option for sero-different couples in Botswana and similar contexts who desire childbearing.

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References

- Baeten JM, Donnell D, Ndase P, Mugo NR, Campbell JD, Wangisi J, ... Celum C (2012). Antiretroviral prophylaxis for HIV prevention in heterosexual men and women. *The New England Journal of Medicine*, 367(5), 399–410. 10.1056/NEJMoa1108524 [PubMed: 22784037]
- Bekker L-G, Black V, Myer L, Rees H, Cooper D, Mall S, ... Schwartz S (2011). Guideline on safer conception in fertile HIV-infected individuals and couples. *Southern African Journal of HIV Medicine*, June(40), 31–44. 10.4102/sajhivmed.v12i2.196
- Beyeza-Kashesya J, Ekstrom AM, Kaharuzza F, Mirembe F, Neema S, & Kulane A (2010). My partner wants a child: a cross-sectional study of the determinants of the desire for children among mutually disclosed sero-discordant couples receiving care in Uganda. *BMC Public Health*, 10, 247 10.1186/1471-2458-10-247 [PubMed: 20465794]
- Beyeza-Kashesya J, Wanyenze RK, Goggin K, Finocchiaro-Kessler S, Woldetsadik MA, Mindry D, ... Wagner GJ (2018). Stigma gets in my way : Factors affecting client-provider communication regarding childbearing among people living with HIV in. *PLoS One*, 1–14. 10.1371/journal.pone.0192902

- Botswana MOH, & Masa. (2016). Handbook of the Botswana Integrated HIV Clinical Care Guidelines. Gaborone, Botswana.
- Breitnauer BT, Mmeje O, Njoroge B, Darbes LA, Leddy A, & Brown J (2015). Community perceptions of childbearing and use of Safer conception strategies among HIV-discordant couples in Kisumu, Kenya. *Journal of the International AIDS Society*, 18(1), 1–7. 10.7448/IAS.18.1.19972
- Cohen MS, Chen YQ, McCauley M, Gamble T, Hosseinipour MC, Kumarasamy N, ... Fleming TR (2011). Prevention of HIV-1 infection with early antiretroviral therapy. *The New England Journal of Medicine*, 365, 493–505. 10.1056/NEJMoa1105243 [PubMed: 21767103]
- Cowan FM, Delany-moretlwe S, Sanders EJ, Mugo NR, Guedou FA, Alary M, ... Bekker L (2016). PrEP implementation research in Africa: what is new? *Journal of the International AIDS Society*, 19(Suppl 6), 1–11. 10.7448/IAS.19.7.21101
- Crankshaw TL, Mindry D, Munthree C, Letsoalo T, & Maharaj P (2014). Challenges with couples, serodiscordance and HIV disclosure: Healthcare provider perspectives on delivering safer conception services for HIV-affected couples, South Africa. *Journal of the International AIDS Society*, 17, 1–7. 10.7448/IAS.17.1.18832
- Davies NECG, Ashford G, Bekker L-G, Chandiwana N, Cooper D, Dyer SJ, ... van Zyl DS (2018). Guidelines to support HIV-affected individuals and couples to achieve pregnancy safely: Update 2018. *Southern African Journal of HIV Medicine*, 19(1), 1–26. 10.4102/sajhivmed.v19i1.915
- Davies NECG, Matthews LT, Crankshaw TL, Cooper D, & Schwartz SR (2017). Supporting HIV prevention and reproductive goals in an HIV-endemic setting: Taking safer conception services from policy to practice in South Africa. *Journal of the International AIDS Society*, 20(Suppl 1), 36–42. 10.7448/IAS.20.2.21271
- Ddumba-nyanzi I, Kaawa-ma D, & Johannessen H (2016). Barriers to communication between HIV care providers (HCPs) and women living with HIV about child bearing: A qualitative study. *Patient Education and Counseling*, 99, 754–759. 10.1016/j.pec.2015.11.023 [PubMed: 26680756]
- Dedoose. (2016). Dedoose Version 7.5.16, web application for managing, analyzing, and presenting qualitative and mixed method research data Los Angeles, CA: SocioCultural Research Consultants, LLC Retrieved from www.dedoose.com
- Elul B, Delvaux T, Munyana E, Lahuerta M, Horowitz D, Ndagije F, ... Asiimwe A (2009). Pregnancy desires, and contraceptive knowledge and use among prevention of mother-to-child transmission clients in Rwanda. *AIDS (London, England)*, 23 Suppl 1, S19–S26. 10.1097/01.aids.0000363774.91376.dc
- Gaolathe T, Wirth KE, Holme MP, Makhema J, Moyo S, Chakalisa U, ... Wang R (2017). Botswana's progress toward achieving the 2020 UNAIDS 90-90-90 antiretroviral therapy and virological suppression goals: A population-based survey. *Lancet HIV*, 3(May 2016), 221–230. 10.1016/S2352-3018(16)00037-0
- Gibas K, van den Berg P, Powell V, & Krakower D (2019). Drug Resistance During HIV Pre-Exposure Prophylaxis. *Drugs*, 79(6), 609–619. 10.1007/s40265-019-01108-x. [PubMed: 30963509]
- Goggin K, Finocchiaro-Kessler S, Staggs V, Woldetsadik MA, Wanyenze RK, Beyeza-Kashesya J, ... Wagner GJ (2015). Attitudes, Knowledge, and Correlates of Self-Efficacy for the Provision of Safer Conception Counseling Among Ugandan HIV Providers. *AIDS Patient Care and STDs*, 29(12), 651–660. 10.1089/apc.2015.0089 [PubMed: 26588429]
- Government of Botswana. (2011). Botswana Second Generation HIV Antenatal Sentinel Surveillance Technical Report, 2011. Gaborone, Botswana.
- Government of Botswana. (2014). HAART Patient Update Summary July 2014. Gaborone, Botswana.
- Grant RM, Lama JR, Anderson PL, McMahan V, Liu AY, Vargas L, ... Glidden DV (2010). Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *The New England Journal of Medicine*, 363, 2587–2599. 10.1056/NEJMoa1011205 [PubMed: 21091279]
- Gutin SA, Harper GW, Bitsang C, Moshashane N, Harries J, & Morroni C (2019). Perspectives about childbearing and pregnancy planning amongst people living with HIV in Gaborone, Botswana. *Culture, Health & Sexuality*, 0(0), 1–17. 10.1080/13691058.2019.1650202
- Gutin SA, Namusoke F, Shade SB, & Mirembe F (2014). Fertility Desires and Intentions among HIV-Positive Women during the Post-natal period in Uganda. *African Journal of Reproductive Health*, 18(3), 67–77. [PubMed: 25438511]

- Haberer JE (2016). Current concepts for PrEP adherence in the PrEP revolution: from clinical trials to routine practice. *Current Opinion in HIV and AIDS*, 11(1), 10–17. 10.1097/COH.0000000000000220 [PubMed: 26633638]
- Haberer JE, Bangsberg DR, Baeten JM, Curran K, Koechlin F, Amico KR, ... O'Reilly K (2015). Defining success with HIV pre-exposure prophylaxis: a prevention-effective adherence paradigm. *AIDS (London, England)*, 29(11), 1277–1285. 10.1097/QAD.0000000000000647
- Heffron R, Ngure K, Velloza J, Kiptinness C, Quame-amalga J, Oluch L, ... Mugo N (2019). Implementation of a comprehensive safer conception intervention for HIV-serodiscordant couples in Kenya: uptake, use and effectiveness. *JIAS*, 22(e25261), 1–10. 10.1002/jia2.25261
- Kaida A, Laher F, Strathdee SA, Janssen PA, Money D, Hogg RS, & Gray G (2011). Childbearing intentions of HIV-positive women of reproductive age in Soweto, South Africa: The influence of expanding access to HAART in an HIV hyperendemic setting. *American Journal of Public Health*, 101, 350–358. 10.2105/AJPH.2009.177469 [PubMed: 20403884]
- Karim QA, Karim SSA, Frohlich JA, Grobler AC, Mansoor LE, Kharsany ABM, ... Trial C (2010). Effectiveness and Safety of Tenofovir Gel, an antiretroviral microbicide, for the prevention of HIV Infection in women. *Science*, 329, 1168–1174. [PubMed: 20643915]
- Kawale P, Mindry D, Phoya A, Jansen P, & Hoffman RM (2015). Provider attitudes about childbearing and knowledge of safer conception at two HIV clinics in Malawi. *Reproductive Health*, 12(17), 1–7. 10.1186/s12978-015-0004-0 [PubMed: 25561377]
- Keiser O, Chi BH, Gsponer T, Boule A, Orrell C, Phiri S, ... Westfall A (2011). Outcomes of antiretroviral treatment in programmes with and without routine viral load monitoring in southern Africa. *AIDS*, 25, 1761–1769. 10.1097/QAD.0b013e328349822f [PubMed: 21681057]
- Keogh SC, Urassa M, Roura M, Kumogola Y, Kalongoji S, Kimaro D, ... Zaba B (2012). The impact of antenatal HIV diagnosis on postpartum childbearing desires in northern Tanzania: A mixed methods study. *Reproductive Health Matters*, 20, 39–49. [PubMed: 23177679]
- Kimemia G, Ngure K, Baeten JM, Celum C, Dew K, Njuguna N, ... Heffron R (2019). Perceptions of pregnancy occurring among HIV-serodiscordant couples in Kenya. *Reproductive Health*, 16(85), 1–8. 10.1186/s12978-019-0751-4. [PubMed: 30621726]
- MacCarthy S, Laher F, Nduna M, Farlane L, & Kaida A (2009). Responding to her question: A review of the influence of pregnancy on HIV disease progression in the context of expanded access to HAART in sub-Saharan Africa. *AIDS and Behavior*, 13.
- Matthews LT, Bajunirwe F, Kastner J, Sanyu N, Akatukwasa C, Ng C, ... Kaida A (2016). “I Always Worry about What Might Happen Ahead”: Implementing Safer Conception Services in the Current Environment of Reproductive Counseling for HIV-Affected Men and Women in Uganda. *BioMed Research International*, 2016, 1–9. Retrieved from <http://search.ebscohost.com/login.aspx?direct=true&site=eds-live&db=asx&AN=113562725>
- Matthews LT, Beyeza-Kashesya J, Cooke I, Davies N, Heffron R, Kaida A, ... Weber S (2017). Consensus statement: Supporting Safer Conception and Pregnancy For Men And Women Living with and Affected by HIV. *AIDS and Behavior*. 10.1007/s10461-017-1777-7
- Matthews LT, Burns BF, Bajunirwe F, Kabakyenga J, Bwana M, Ng C, ... Kaida A (2017). Beyond HIV-serodiscordance: Partnership communication dynamics that affect engagement in safer conception care. *PloS One*, (1), 1–17. 10.1371/journal.pone.0183131
- Matthews LT, Crankshaw T, Giddy J, Kaida A, Smit J. a, Ware NC, & Bangsberg DR (2013). Reproductive decision-making and periconception practices among HIV-positive men and women attending HIV services in Durban, South Africa. *AIDS and Behavior*, 17(2), 461–470. 10.1007/s10461-011-0068-y [PubMed: 22038045]
- Matthews LT, Heffron R, Mugo NR, Cohen CR, Hendrix CW, Celum C, ... Team S (2014). High Medication Adherence During Periconception Periods Among HIV-1 – Uninfected Women Participating in a Clinical Trial of Antiretroviral Pre-exposure Prophylaxis. *J Acquir Immune Defic Syndr*, 67(1), 91–97. [PubMed: 25118795]
- Matthews LT, Moore L, Milford C, Greener R, Mosery FN, Rifkin R, ... Smit JA (2015). “If I don’t use a condom ... I would be stressed in my heart that I’ve done something wrong”: Routine Prevention Messages Preclude Safer Conception Counseling for HIV-Infected Men and Women in South Africa. *AIDS and Behavior*, 19, 1666–1675. 10.1007/s10461-015-1026-x [PubMed: 25711300]

- Mayondi GK, Wirth K, Morroni C, Moyo S, Ajibola G, Diseko M, ... Lockman S (2016). Unintended pregnancy, contraceptive use, and childbearing desires among HIV-infected and HIV-uninfected women in Botswana: a cross-sectional study. *BMC Public Health*, 16(44), 1–10. 10.1186/s12889-015-2498-3 [PubMed: 26728978]
- Miles MB, Huberman AM, & Saldana J (2014). *Fundamentals of Qualitative Data Analysis In Qualitative Data Analysis: A Methods Sourcebook* (pp. 69–104). Thousand Oaks, CA: Sage Publications.
- Mills EJ, Nachega JB, Bangsberg DR, Singh S, Rachlis B, Wu P, ... Cooper C (2006). Adherence to HAART: A systematic review of developed and developing nation patient-reported barriers and facilitators. *PLoS Medicine*. 10.1371/journal.pmed.0030438
- Mindry D, Wanyenze RK, Beyeza-Kashesya J, Woldetsadik MA, Finocchiaro-Kessler S, Goggin K, & Wagner GJ (2017). Safer Conception for Couples Affected by HIV : Structural and Cultural Considerations in the Delivery of Safer Conception Care in Uganda. *AIDS and Behavior*, 21(8), 2488–2496. 10.1007/s10461-017-1816-4 [PubMed: 28597343]
- Moustakas C (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage.
- National AIDS Coordinating Agency. (2014). *Botswana 2013 Global AIDS Response Report: Progress Report of the National Response to the 2011 Declaration of Commitments on HIV and AIDS*. Gaborone.
- Nattabi B, Li J, Thompson SC, Orach CG, & Earnest J (2012). Between a rock and a hard place : stigma and the desire to have children among people living with HIV in northern Uganda. *J Int AIDS Soc*, 15(2), 1–11. 10.7448/IAS.15.2.17421
- Ngunjiri K, Kimemia G, Dew K, Njuguna N, Mugo N, Celum C, ... Heffron R (2017). Delivering safer conception services to HIV serodiscordant couples in Kenya: perspectives from healthcare providers and HIV serodiscordant couples. *Journal of the International AIDS Society*, 20(0), 52–58. 10.7448/IAS.20.2.21309
- Rodger AJ, Cambiano V, Bruun T, Vernazza P, Collins S, Lunzen J. Van, ... Zangerle R. (2016). Sexual Activity Without Condoms and Risk of HIV Transmission in Serodifferent Couples When the HIV-Positive Partner Is Using Suppressive Antiretroviral Therapy. *JAMA*, 316(2), 171–181. 10.1001/jama.2016.5148 [PubMed: 27404185]
- Schaan MM, Taylor M, Gungqisa N, & Marlink R (2016). Personal views about womanhood amongst women living with HIV in Botswana. *Culture, Health & Sexuality*, 18(2), 173–185. 10.1080/13691058.2015.1072247
- Schwartz SR, Bassett J, Holmes CB, Yende N, Phofa R, Sanne I, & Van Rie A (2017). Client uptake of safer conception strategies: implementation outcomes from the Sakh'umndeni Safer Conception Clinic in South Africa. *Journal of the International AIDS Society*, 20(2), 43–51. 10.7448/IAS.20.2.21291
- Schwartz SR, Bassett J, Mutunga L, Yende N, Mudavanhu M, Phofa R, ... Rie A. Van. (2019). HIV incidence, pregnancy, and implementation outcomes from the Sakh ' umndeni safer conception project in South Africa : a prospective cohort study. *The Lancet HIV*, 6(7), e438–e446. 10.1016/S2352-3018(19)30144-4 [PubMed: 31160268]
- Schwartz SR, Bassett J, Sanne I, Phofa R, Yende N, & Van Rie A (2014). Implementation of a safer conception service for HIV-affected couples in South Africa. *AIDS (London, England)*, 28 Suppl 3, S277–85. 10.1097/QAD.0000000000000330
- Schwartz SR, West N, Phofa R, Yende N, Sanne I, & Bassett J (2016). Acceptability and preferences for safer conception HIV prevention strategies : a qualitative study. *International Journal of STD & AIDS*, 27(11), 984–992. 10.1177/0956462415604091 [PubMed: 26384950]
- Smith JA, Flowers P, & Larkin M (2009). *Interpretive phenomenological analysis: Theory, method and research*. London: Sage.
- Taulo F, Berry M, Tsui A, Makanani B, Kafulafula G, Li Q, ... Taha TE (2009). Fertility intentions of HIV-1 infected and uninfected women in Malawi: A longitudinal study. *AIDS and Behavior*, 13 10.1007/s10461-009-9547-9
- Tesfaye L, Admassu M, Getachew A, & Sharma HR (2012). Fertility desires and family planning demand among HIV-positive clients in follow-up care at antiretroviral treatment unit in Gondar university hospital, Ethiopia. *Vulnerable Children and Youth Studies*, 7, 20–35.

- Thigpen MC, Kebaabetswe PM, Paxton L, Smith DK, Rose CE, Segolodi TM, ... Brooks JT (2012). Antiretroviral preexposure prophylaxis for heterosexual HIV transmission in Botswana. *The New England Journal of Medicine*, 367(5), 423–434. 10.1056/NEJMoa1110711 [PubMed: 22784038]
- UNAIDS. (2018). Botswana Country Factsheet 2018. Retrieved May 31, 2019, from <http://www.unaids.org/en/regionscountries/countries/botswana>
- Upton RL, & Dolan EM (2011). Sterility and Stigma in an Era of HIV / AIDS: Narratives of Risk Assessment among Men and Women in Botswana. *African Journal of Reproductive Health*, 15(1), 95–102. [PubMed: 21987943]
- Wagner GJ, Linnemayr S, Goggin K, Mindry D, Sarah JB, & Robinson FE (2017). Prevalence and Correlates of Use of Safer Conception Methods in a Prospective Cohort of Ugandan HIV-Affected Couples with Fertility Intentions. *AIDS and Behavior*, 21(8), 2479–2487. 10.1007/s10461-017-1732-7 [PubMed: 28229244]
- Wagner GJ, Woldetsadik MA, Beyeza-Kashesya J, Goggin K, Mindry D, Finocchiaro-Kessler S, ... Wanyenze RK (2016). Multi-level Correlates of Safer Conception Methods Awareness and Attitudes among Ugandan HIV Clients with Fertility Intentions. *African Journal of Reproductive Health*, 20(1), 40–51. [PubMed: 28190955]
- WHO. (2015). Guideline on When To Start Antiretroviral Therapy and on Pre-Exposure Prophylaxis for HIV. Geneva <https://doi.org/9789241509565>
- WHO Regional Office for Africa, & African Health Observatory. (2016). Comprehensive Analytical Profile: Botswana. Retrieved from http://www.who.afro.who.int/profiles_information/index.php/Botswana:Index