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“I’m doing this test so I can benefit from PrEP”: exploring HIV testing barriers/facilitators and implementation of pre-exposure prophylaxis among South African adolescents

Emily Yoshioka^{1,*}, Danielle Giovenco², Caroline Kuo^{1,3,4}, Kristen Underhill⁵, Jackie Hoare⁴, Don Operario¹

¹Department of Behavioral and Social Sciences, Brown University School of Public Health, Providence, Rhode Island, USA

²Department of Epidemiology, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, USA

³Center for Alcohol and Addiction Studies, Brown University School of Public Health, Providence, Rhode Island, USA

⁴Department of Psychiatry and Mental Health, University of Cape Town, Cape Town, South Africa

⁵Columbia Law School, New York, USA

Abstract

In South Africa, adolescents are a key population in the HIV epidemic that can benefit from increased access to oral pre-exposure prophylaxis (PrEP). HIV testing is an integral component of the PrEP care continuum but adolescents in South Africa have generally low HIV testing rates; therefore, adolescents’ HIV testing attitudes and behaviours must be understood to develop strategies for effective PrEP implementation. Ten focus groups were conducted with adolescents living with HIV and HIV-uninfected adolescents ($n = 55$), and in-depth interviews were conducted with service providers ($n = 25$), adolescents living with HIV ($n = 10$) and HIV-uninfected adolescents ($n = 25$). Data were collected in the Western Cape province of South Africa from 2015–2016. Thematic framework analysis was used to understand dynamics by which South African adolescents’ attitudes toward HIV testing might influence intended uptake of PrEP and, reciprocally, to explore the implications of adolescents’ perceptions about PrEP availability for their willingness to engage in HIV testing. While South African adolescents’ current HIV testing attitudes and behaviours present barriers to intended PrEP implementation in this population, increased access to PrEP has the potential to improve their initial HIV testing rates and decrease stigma and fear around HIV testing. However, implementation of PrEP must consider specific HIV testing barriers for adolescent boys and girls, respectively. As PrEP becomes more widely available for adolescents, possible challenges noted by participants may include the potential for adolescents to reduce continued HIV testing behaviours while on PrEP and to share/use unprescribed PrEP medications among peers.

*Correspondence: emily_yoshioka@brown.edu.

Keywords

adolescent engagement; HIV testing barriers; PrEP implementation; qualitative methods

Introduction

Pre-exposure prophylaxis (PrEP) – an antiretroviral medication prescribed for HIV-negative persons to prevent HIV – has the potential to reduce new HIV cases and transform the HIV epidemic globally. Clinical trials of oral PrEP used by HIV-seronegative men or transgender women who have sex with men across six countries (Peru, Ecuador, Brazil, US, Thailand and South Africa) and cisgender heterosexual men and women in Kenya, Uganda and Botswana, found strong protection against HIV acquisition (Baeten et al., 2012; Grant et al., 2010; Thigpen et al., 2012). A systematic review and meta-analysis evaluated evidence of oral PrEP from 18 studies and found that PrEP is protective against HIV acquisition across populations, presents few significant safety risks, and is not immediately associated with increased behavioural risk-taking among PrEP users (Fonner et al., 2016). In the open-label ATTN 113 study, PrEP was found to be safe and well-tolerated by young men (ages 15–17) who have sex with men in the USA, although potential challenges to continued adherence were noted (Hosek et al., 2017).

Adolescents and young people represent a growing key population that stands to benefit from PrEP. According to the World Health Organization, more than two million adolescents (ages 10–19) are living with HIV (WHO, 2017). In 2018, there were about 510 000 new HIV infections among young people aged 10–24 (UNICEF, 2019). In South Africa, prevalence of HIV among young women aged 15–24 is 10.2% [4.6–14.8] and among young men is 3.9% [1.4–6.0] (UNAIDS, 2017a). Implementation of oral PrEP for adolescents is limited in South Africa. As South Africa prepares itself for wider PrEP availability among adolescents, the PrEP care continuum – the multiple steps necessary to optimize the full protective benefits of PrEP – must be carefully considered. Nunn et al. (2017) define the PrEP continuum of care as: (1) identifying individuals at highest risk for contracting HIV; (2) increasing HIV-risk awareness among those individuals; (3) enhancing PrEP awareness; (4) facilitating PrEP access; (5) linking individuals to PrEP care; (6), prescribing PrEP; (7) initiating PrEP; (8) adhering to PrEP; and (9) retaining individuals in PrEP care. An integral precursor to PrEP uptake is HIV testing, because PrEP cannot be prescribed until the user confirms they are HIV-negative. Furthermore, while using PrEP, individuals should continue with regular HIV testing to ensure they do not seroconvert (Underhill, Operario, Skeer, Mimiaga, & Mayer, 2010).

In recent years, South Africa has made great progress in increasing HIV testing, with 86% of people living with HIV aware of their status in 2017 compared with 66.2% in 2014 (SANAC, 2015; UNAIDS, 2017b). However, uptake of HIV testing among adolescents and young adults is low, especially among younger males (Peltzer & Matseke, 2014; Pettifor et al., 2005; Ramirez-Avila et al., 2012). According to a population-based HIV prevalence survey in South Africa, 50.6% [48.5–52.7] of young people aged 15 to 24 have tested for HIV, compared with 78.2% [76.6–79.8] of adults aged 25 to 49 (Shisana et al., 2014). Thus,

to optimize implementation of PrEP for adolescents and young people in South Africa, HIV-testing behaviours and attitudes must be evaluated and considered as a fundamental part of the PrEP package and continuum of care.

To inform implementation of PrEP programmes for adolescents in South Africa, it is important to consider the implications of current HIV testing attitudes and behaviours for adolescents' PrEP uptake and, reciprocally, how PrEP availability may influence adolescents' HIV-testing attitudes and behaviours. This study explored how the dynamics of South African adolescents' attitudes toward HIV testing might influence PrEP intentions and use, as well as exploring implications of adolescents' PrEP awareness for HIV testing.

Methods

This qualitative study was conducted in the Western Cape province of South Africa from August 2015 to September 2016. A full description of the methods is published in Giovenco, Kuo, Underhill, Hoare, and Operario (2018). We used two phases of qualitative data analysis: first, we conducted semi-structured focus groups with adolescents living with HIV ($k = 5$, 24 participants total) and with HIV-uninfected adolescents ($k = 5$, 31 participants total); thereafter, all participants were invited to have in-depth individual interviews. Ten adolescents living with HIV and 25 HIV-uninfected adolescents participated in these interviews. Interviews were also conducted with 25 clinical service providers who work with adolescents in clinic settings in the same urban township.

HIV-uninfected adolescents were recruited from an urban township and were eligible for the study if they were (a) 16 to 17 years old, and (b) self-reported HIV-negative status. Adolescents living with HIV were recruited from an adolescent HIV-treatment clinic using convenience sampling and were eligible for the study if they (a) were 16 to 17 years old; (b) self-reported HIV-positive status (yes/no/don't know/decline to answer) by responding "yes"; and (c) self-reported comfort discussing HIV status in an adolescent group setting by responding "yes" to "Would you feel comfortable discussing your HIV status in a group with other adolescents that you may or may not know?" (yes/no/not sure). Trained research staff obtained written parental consent and adolescent assent. Participants who were unable to give informed assent and/or whose parents/caregivers did not provide consent were excluded. Interviews were conducted in isiXhosa or English based on participant preference.

Prior to the start of each focus group and interview, facilitators provided adolescents with a clear and developmentally appropriate description of oral PrEP, including information about efficacy, side effects, HIV-testing requirements, and the importance of medication adherence. Focus groups and interviews were guided by semi-structured protocols; focus group questions explored normative beliefs and behaviours while in-depth interviews probed more personal aspects of behavioural decision-making and HIV-risk perception. Focus group discussions and individual interviews were digitally audiotaped and lasted about 60 to 90 minutes. Participants received R 150 (~USD 10) for completing focus group and/or individual interviews, respectively.

Service providers were recruited from clinic settings in the same urban township. An initial group of service providers was generated in consultation with the study team, and these initial participants referred their professional peers to the study. Service providers were eligible for the study if they (a) were at least 18 years old and (b) had at least three years' experience providing services to adolescents. Service providers were not employees of the research team. Following written consent, service providers were given a description of oral PrEP and a brief quantitative survey was administered. One-on-one interviews were then conducted in isiXhosa or English based on participant preference. Interviews lasted about 60 to 90 minutes and were digitally audiotaped. Each participant received R 300 (~USD 20).

Interviews were transcribed and translated from isiXhosa into English if needed, cleaned, and entered into NVivo 10 (QSR International, 2014) for thematic analysis. Transcripts were independently coded by two coders and assessed for inter-coder reliability. Basic participant information (e.g., HIV status, adolescent vs provider, sex) was linked to individual interview transcripts in order to contextualise these data. Data from focus group transcripts was linked to participant HIV status but not linked to sex due to the mixed-sex nature of focus group discussions (participants were labelled as "Speaker 1", "Speaker 2", etc. in the transcripts and all other identifying information was omitted). Coder training entailed the coders independently reviewing a subset of transcripts to ensure a consistent interpretation of the text and application of the coding scheme. This was supervised by a third member of the research team to resolve inconsistencies between coders. We used the Braun and Clarke (2006) thematic analysis framework for coding transcripts and interpreting findings. A code book was developed using common words, phrases, sentences and ideas. Clusters of texts were compiled under specific codes and sub-codes; meaning from these codes was formulated to produce clusters of themes presented below. All study procedures were approved by ethical review committees at participating research institutions.

Results

Participant characteristics

A full quantitative description of the study sample can be found in Giovenco et al. (2018). A total of 57 adolescents and 25 clinical service providers participated in this study. Adolescents were 16 to 17 years old, 56% female and 58% HIV-negative. Clinicians' mean age was 41 years and 96% of clinicians were female (Table 1).

Thematic findings

Three themes relevant to the overarching study aims were identified:

- Barriers to HIV testing that could challenge initiation of PrEP for adolescents in South Africa;
- The ability of PrEP availability to transform adolescents' thinking about HIV testing; and
- HIV-testing behaviour, and implications and caution regarding PrEP use for adolescents' ongoing HIV testing.

Barriers to HIV testing could challenge adolescents' PrEP initiation—

Respondents described adolescent peer norms contributing to low HIV-testing behaviours, which may further challenge PrEP initiation in this age group. One HIV-negative adolescent respondent stated in a focus group that *“most of the youth don't get along with the [idea] of testing”*. Clinicians frequently noted adolescents' resistance to undergoing HIV testing in clinics due to fear, stigma, *“stubborn[ess]”* and lack of HIV-testing education. Adolescent respondents indicated that HIV-testing attitudes and behaviours vary by sex, which may confer different barriers to PrEP initiation among girls and boys.

Testing among girls was seen as a more common practice relative to boys. HIV testing occurred during visits to family planning clinics where many girls received regular sexual and reproductive health services: *“[For] the girls ... [before] you get [the injection], you first get checked whether you're HIV positive or negative”* (HIV-negative adolescent; focus group). Because of family planning appointments, girls were normatively expected to undergo HIV testing in the context of sexual partnerships. One HIV-negative female adolescent described in a focus group boys' expectations that HIV testing was *“a girl's responsibility”*: *“Some [boys] don't want to go to the clinic, because ... they [leave] it to the girls that a person should go for family planning. They [leave] it up to the girls. So, they are not used to going”*. By contrast, boys did not want to go to the clinic because it was not a normalised practice for males. One HIV-negative female adolescent further noted in an individual interview that girls are more likely to HIV test because they are *“strong”* and *“responsible”* and commented on a community belief that *“men don't get HIV as quickly as girls”*; thereby positioning girls as more at risk for HIV than boys. This perception postures girls as the partner accountable for HIV testing in heterosexual partnerships, rather than imagining HIV testing as the responsibility of both boys and girls.

In comparison to girls, boys *“hardly get [HIV] tested,”* said an HIV-negative female adolescent in an individual interview. Adolescent respondents reported low clinic use and avoidance of regular HIV testing by boys. Boys cited HIV testing as a reactive behaviour in response to a high-risk episode rather than a normalised behaviour. One adolescent described a situation that led to HIV testing:

After having sex with her, the condom broke, I continued having sex with her. After some time, I heard through people that the woman I had slept with is HIV positive. I became stressed ... I went to get tested and found that I am negative.

(HIV-negative adolescent; focus group)

Adolescents described three general barriers to HIV testing:

- fear of testing positive for HIV;
- stigma towards those who HIV test; and
- gossip by peers, nurses and community members.

Fear especially was mentioned as a reason boys avoided HIV testing. Some boys *“expect [themselves] to be [HIV] positive,”* said an HIV-negative adolescent in a focus group, and do not want to confirm their supposed status by testing. One female adolescent described her male friend's fear and avoidance of HIV testing:

Boys are really scared. And there's one who is a friend of mine. He said to me, he'd [rather] not know his [HIV] status. [Rather] than sitting in anguish over, perhaps, what if he's positive – he's going to be tossing [and] turning due to stress. But it's better if he doesn't know himself. Then I noticed that that means, boys, this is something they are scared of.

(HIV-negative female adolescent; individual interview)

Boys and girls recalled different types of testing-related stigma. Among boys, the act of seeking HIV testing might be perceived as confirming the tester's positive serostatus. One male adolescent commented:

You see, sometimes when you go inside that side where they test or if there's that tent for testing, you see. People outside in that area look at you, even people you know ... They will think you are [HIV] positive ... People are thinking that, 'He probably knows himself. He just went to verify [make sure].'

(HIV-negative adolescent; focus group)

For girls, HIV testing often resulted in stigmatizing conversations with adult service providers. For example, girls described being aggressively questioned by nurses about their sexual behaviour. One female adolescent stated:

We girls are scared of the nurses and the nurses always say: "You are this young, why do you do this and this" – they would say many things. Remember that we have that guilt conscious especially if we know that what we are doing is wrong.

(HIV-positive female adolescent; individual interview)

Stigma may manifest for adolescents through gossip in the clinics. Adolescents talked about gossip that occurs when visiting clinics where HIV testing takes place. Boys discussed fear of family, peers and community members who might question their presence at the clinic:

Like, with the boys, when we are at the youth [centre] perhaps, we are waiting over there, we are going to get jabbed with the needle... They tend to be shy perhaps to come in. Because they get that thing that, like, if they arrive [and] there are some girls, they are scared that they will be gossiped about.

(HIV-negative adolescent; focus group)

For girls, fear of gossip by peers, nurses and community members was not cited as a prominent concern. One adolescent stated:

Girls don't [care about] people's [opinions], that, "What will someone say about?" The girl tells herself that she's doing [it] for herself, and she's benefitting herself. As for the boys, the person [can] see that she's in trouble, but it's difficult for him to go the clinic. Since he is scared of people at the clinic.

(HIV-negative male adolescent; individual interview)

Potential of PrEP to transform thinking about HIV testing and HIV-testing behavior—Adolescents and clinicians both reflected that PrEP availability may improve initial HIV testing behaviour by increasing the incentive for adolescents to seek HIV testing.

Adolescents expressed that PrEP may “*encourage [adolescents] to go for [HIV] testing*” (HIV-negative female adolescent; individual interview) and “*that everyone will want to get [HIV] tested in order to get this thing that will protect them [from] HIV*” (HIV-negative adolescent, focus group). Another adolescent said, “[W]hen hearing about ... PrEP [adolescents] can be so encouraged to go and test, they know ... ‘Let me go and test, so that I can get this PrEP’” (HIV-negative male adolescent; individual interview). A clinician echoed this potential:

They will do the test because they know that they’re going to benefit than to just to do the test because one wants to know where are you standing about your status.

This one, they will know that, “Okay. I’m doing this test because I want to know where I’m standing so that I can benefit from the PrEP.

Although fear, stigma and gossip may still be barriers to HIV testing for adolescents as this clinician noted, PrEP may offer enough benefits in exchange for HIV testing. While PrEP availability may not dismantle fear, stigma or gossip associated with a lack of HIV testing, PrEP can provide enough of a pay-off for adolescents to HIV test despite those barriers.

Clinicians predicted a shift in motivation for HIV testing in adolescents, away from reactive testing because of a risky encounter and towards proactive testing because of the availability of PrEP. They commented that boys especially, who generally engage in reactive HIV testing, may view HIV testing as a proactive effort towards HIV prevention. For example, one clinician stated:

Until now, testing has been pretty much reactive and [PrEP] would then put into a boat of being proactive. You get tested when you’re sick or when a crisis happens or when you have to be tested. Whereas if you did a [PrEP] roll out like this, it in some ways would make again, I don’t know if acceptability is the right word, but it would standardize. Where you go and you do a campaign and you say we’ve got this – and again, it’s solution offering – we’ve got this system where for your life choices we can offer you something that’s gonna give you much better protection ... Much better protection for when you become sexually active. Let’s just check your status.

As suggested in this quote, PrEP availability may reframe HIV testing as an empowering and health-promoting behaviour for adolescents, which contrasts with current views of HIV testing as an indication of potential HIV infection. One clinician described this shift in HIV testing due to PrEP:

The [HIV] negative teens that I’m thinking of, they know about risky behaviour, they know about their partner possibly having been with someone else. They know that they have at some point been at risk of getting infected. They’re terrified of going to get tested. If they’re doing something to protect themselves and the clinician says, “If you’re taking PrEP you need to come regularly for a test.” I think they’ll be more likely actively doing something.

Participants revealed that PrEP could introduce an alternative narrative for why adolescents seek HIV testing. As described earlier, a dominant narrative for boys who seek testing is to confirm or disconfirm a suspicion about their HIV-positive status. One adolescent described

a more empowering shift in the narrative for HIV testing as an entry point into PrEP initiation:

[T]hey will go to the clinic and then get tested - maybe [they] get a negative [result], then they will get PrEP, then come out. So, it won't be a problem. Even your boys won't care that, like, "Oh, he's using the medication!" They would know that it's PrEP. Because it's going to have that thingy: if I found – if I have found out that I am [HIV] negative – [then] I get that PrEP treatment – it will help me remain negative. It – it will be helpful. So if it could be like that, the [desire] to go – it would actually be good.

(HIV-positive male adolescent; individual interview)

Implications and caution regarding PrEP implementation for ongoing HIV testing—Participants described two possible challenges relating to future PrEP roll-out. First, adolescents and clinicians expressed concern that PrEP availability might motivate initial HIV testing but that PrEP users would cease subsequent HIV-testing behaviour. One adolescent described such a scenario:

So, let me say this now, [let me] put it this way – because I don't [think] that a person would want to go [get tested] again – "I got tested, [my friend], I'm HIV negative. I'm taking PrEP. I'm safe."

(HIV-positive female adolescent; individual interview).

Another adolescent noted PrEP users' potential sense of security and complacency, especially when they believe their sexual partners are HIV-negative:

Interviewer: Now, do you think that people could bother themselves to go for testing when they are already using PrEP?

Speaker: *They won't be bothered much. But there are people who are "why should I doubt myself? Since I don't – I am not sleeping with anyone [HIV] positive. So it's obvious that I am [HIV] negative."* (HIV-negative female adolescent; individual interview)

Adolescents described that peers who are equipped with the "mentality that PrEP is not 100% [effective]" will be more compelled to continue HIV testing. These adolescents may continue HIV testing to confirm their HIV-negative status. One exchange with an adolescent highlights this reasoning:

Interviewer: So, you think you may maybe stop, for example take an HIV test, because you are now using PrEP?

Speaker: *No ... because they are 90%. So, you wouldn't be sure with it, like if you have sex without using a condom, so you will not know your [status] then you will just go and test.* (HIV-negative male adolescent; individual interview)

Participants also noted that use of unprescribed medications is a possible challenge associated with further implementation. As PrEP becomes more widely known, adolescents cautioned that sharing or stealing PrEP pills may occur. Adolescents that want PrEP but are

deterred by initial and continued HIV testing required for prescription may ask friends or peers to share prescribed PrEP medication in order to circumvent the HIV testing requirement. Most adolescent respondents noted that they personally would not share PrEP pills with anyone. However, they described situations where their peers might ask for, share, or steal PrEP pills, as one adolescent stated:

As you mentioned the fact that a friend will come and say I must pour her some pills, maybe other person is afraid to go to the clinic, she is afraid of testing, maybe the results will be positive, and she will go to her friend and her friend will not be knowing the treatment is not being shared, she will come and say “Friend, please pour me PrEP, I hear that there is a PrEP, whatever, please give me half,” and she will give her, it’s because she is scared of going and get tested, so that she can get her PrEP.

(HIV-negative female adolescent; individual interview)

Discussion

This research study explored the role of HIV-testing behaviours as a consideration for future PrEP programmes for adolescents in South Africa. This is an important issue for guiding PrEP implementation strategies in South Africa given low rates of HIV testing among adolescents, coupled with the need for adolescents to know their HIV-negative status prior to PrEP initiation. We found three main themes from our qualitative analysis. First, adolescents and service providers described overall low HIV testing behaviours among adolescents, and gender-related factors, as contributing to reluctance and fear of HIV testing. These issues present key barriers to initial PrEP uptake by adolescents. Second, PrEP availability has the potential to transform HIV-testing attitudes and behaviours for adolescents in South Africa. Initially, PrEP may incentivize adolescents to undergo HIV testing because of the potential “pay-off” of PrEP. HIV testing for PrEP may consequently be re-framed as a proactive step in an adolescent’s health decisions. Furthermore, PrEP may offer a counter-narrative for why adolescents are HIV testing – i.e., as an empowered step toward protecting themselves rather than an indication of possible HIV infection. Third, adolescents cited possible complications of widespread PrEP availability among adolescents. Participants noted that PrEP use might lead to lower engagement in continued HIV testing, and that sharing or stealing of PrEP medication might occur between peers.

There is a growing body of evidence citing the feasibility of and need for PrEP programmes among adolescents. PrEP research for young people has largely been focused in the US on young men who have sex with men (MSM) – a population much different from South African adolescents (Bekker, Gill, & Wallace, 2015). In the US-based ATN 113 demonstration and safety study of oral PrEP, Hosek et al. (2017) found PrEP to be acceptable among 15- to 17-year-old MSM, although problems remained with adherence. PlusPills, an open-label safety and feasibility study of oral PrEP for adolescents aged 15 to 19 was recently conducted in South Africa. Gill et al. (2017) found that PrEP was safe and tolerable in those who continued use, although adherence was an issue, in the PlusPills study.

Increasing HIV testing must be a component of a PrEP programme implementation strategy for adolescent use in South Africa. Ramirez-Avila et al. (2012) found that uptake of HIV testing among youth was low in an adult outpatient clinic routine HIV programme, especially for boys aged 12 to 17. Similar to findings in the current study, Strauss, Rhodes, and George (2015) found that barriers to HIV testing among adolescents included stigma and discrimination attached to testing, and fear of a positive HIV test result. The gendered attitudes towards HIV testing that boys and girls described in this study mirror gendered attitudes towards HIV testing that adult men and women in South Africa have been found to hold as well (e.g., HIV testing as women's responsibility) (Fleming, Colvin, Peacock, & Dworkin, 2016; Treves-Kagan et al., 2017). It is important to recognise that gendered norms around HIV testing and prevention are deeply situated and continue to be reproduced as adolescents transition to adulthood. Thus, the findings in this study are relevant in light of the documented challenges of HIV testing in South Africa and the role of testing as a prerequisite for PrEP initiation.

It should be noted that the clinical findings concerning PrEP, patterns of HIV testing, and PrEP implementation operate in the context of other existing HIV-prevention technologies (e.g., condoms, voluntary male medical circumcision) that are being aggressively implemented in South Africa (SANAC, 2015). A full suite of HIV-prevention approaches that align with a "status-neutral" approach to HIV (where prevention and care engagement are approached in the same way for those living with as those who are not) is necessary in the implementation of PrEP (Myers et al., 2018).

Increasing access to PrEP necessitates physically and socially accessible HIV-testing sites and clinics for adolescents. As PrEP is dispensed via intervention and programming there may be an uptick in HIV testing among adolescents. Thus, health clinics and clinicians must be prepared to expand to this population their capacity to provide developmentally appropriate and sensitive HIV testing, risk reduction counselling, and referrals. Framing of HIV testing and PrEP for adolescents should be developmentally appropriate. Health communication should include messaging around HIV testing and PrEP as positive for health (i.e., gain-framing) rather than not testing as negative for health (i.e., loss-framing), forward thinking, and taking control of one's body (Lovette et al., 2019). Due to the stigma that adolescents reported facing when undergoing HIV testing in clinics, providers must be sensitive to the specific needs of adolescents and barriers to HIV testing for them, and must provide non-judgmental sexual health counselling.

Previous research introduced causes for concern regarding PrEP implementation (Cowan et al., 2016; Tetteh et al., 2017; Venter, 2018), which are relevant for the design of future PrEP programmes for adolescents. Discontinued HIV testing may occur after ongoing PrEP use so there must be structures for continued testing such as, for example, offering or incentivizing testing prior to prescription refills, creating accessible and available testing sites, and delivering developmentally appropriate education on why continued HIV testing is important. As longer acting and different modalities of PrEP are developed (Baeten et al., 2016; Cohen, 2018; Jackson & McGowan, 2015; Trezza, Ford, Spreen, Pan, & Piscitelli, 2015), there must be continued HIV testing as well as mechanisms to ensure continued HIV testing. Overall, there must be education alongside implementation in order to publicly and

socially legitimize PrEP as an appropriate form of HIV prevention, and HIV testing as an integral part thereof. Due to stigmas surrounding HIV and adolescent sexuality (Mahajan et al., 2008; Pantelic, Boyes, Cluver, & Meinck, 2017; Parker & Aggleton, 2003), education must promote PrEP as a healthy and viable HIV-prevention option for adolescents. Education to prevent sharing or stealing of antiretroviral medication for “off-market PrEP” use will also be necessary (Kurtz, Buttram, & Surratt, 2014; Mullins, Zimet, Lally, & Kahn, 2016). Education must ensure that adolescents are aware of the dangers of using off-market PrEP — including the potential to create drug resistant strains of HIV (if they are HIV positive and taking off-market PrEP) (Abbas, Hood, Wetzel, & Mellors, 2011; Dimitrov, Boily, Mâsse, & Brown, 2012) — and the lack of proper monitoring of liver toxicity while using off-market PrEP (Abbas et al., 2011; Ryom et al., 2016; Underhill et al., 2010).

Moving forward, PrEP research needs to evaluate the most conducive environments for adolescents to test for HIV. During ongoing use of PrEP, HIV-testing continuation should also be studied to assess what barriers exist for continued HIV testing and what can be changed. In order for PrEP to reach its full potential for adolescents in South Africa, there must be research into effective, scalable interventions and provision of PrEP for young people. As research expands, the challenges of research with adolescents must be recognised. For adolescents, especially in the context of South Africa, cultural and historical facets must be addressed and incorporated into rollout of PrEP interventions and programming. Adolescents are also in a unique stage of identity development and, therefore, HIV prevention and PrEP must be considered within this specific life stage. Parental engagement and rights must also be considered in PrEP provision for adolescents, and where there are both cultural and legal considerations to take into account.

This study has important limitations in its application to future research and practice. First, the adolescent participants were required to have consent from a parent or caregiver to participate. Thus, the transferability of findings to adolescents who do not feel comfortable seeking parental/caregiver consent to participate must be considered. Second, none of the adolescents were currently using PrEP so all data is subject to their own perceptions of what they had heard about PrEP. Also, because this study took place prior to the release of any demonstration or efficacy data on PrEP use among adolescents in South Africa, the findings may change once adolescent PrEP programmes are more widely available and recognised. Third, we did not systematically collect detailed information about providers’ work histories such as years in service or current employment information.

Conclusions

While multiple factors might currently dissuade South African adolescents from HIV testing, PrEP offers the potential to transform thinking about HIV testing and HIV-testing behaviour, allowing adolescents to become active agents in their sexual health decision-making. While stigma, fear and gossip push adolescents away from HIV testing, PrEP has the potential to incentivize adolescents to consider HIV testing as a priority and eventually shift perceptions of testing from reactive, scary and immoral to proactive, non-intimidating and healthy. Oral PrEP for adolescents in South Africa has great promise in reducing HIV transmission among a key population while also increasing the acceptability and practice of

HIV testing. Additional research is necessary to consider broader implementation issues for adolescent PrEP including training for providers, adolescent-friendly testing and clinical spaces, costs of PrEP medication and programmes, supply-chain issues, and medication adherence concerns. As basic research on PrEP continues to advance, new medication formulations, scientific commitment, and financial investment in PrEP for adolescents are essential for maximising the population-level impact of this HIV-prevention strategy.

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Table 1:

Participant characteristics

Variable	<i>n</i> (%)
Adolescents (<i>n</i> = 57)	
Age	
16	32 (56%)
17	25 (44%)
Sex	
Female	32 (56%)
Male	24 (42%)
Transsexual or intersex	1 (2%)
HIV status	
HIV-negative	33 (58%)
HIV-positive	24 (42%)
Race	
Black African	55 (96.5%)
White	2 (3.5%)
Education	
Grade 0	1 (2%)
Grade 6	1 (2%)
Grade 7	2 (3.5%)
Grade 8	16 (28%)
Grade 9	23 (40%)
Grade 10	11 (19%)
Grade 11	2 (3.5%)
Grade 12	1 (2%)
Clinical service providers (<i>n</i> = 25)	
Age [mean (range)]	41 (30–63) years
Sex	
Female	24 (96%)
Male	1 (4%)
Race	
Black African	12 (48%)
White	10 (40%)
Other	3 (12%)
Education	
Less than grade 12	2 (8%)
Grade 12	7 (28%)
Certificate/diploma	3 (12%)
Bachelor's or Honours degree	3 (12%)
Master's degree	5 (20%)
Doctoral degree	3 (12%)

Variable	<i>n</i> (%)
Other	2 (8%)
Profession	
Doctor	10 (40%)
Counselor	7 (28%)
Nurse	4 (16%)
Other	4 (16%)

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