

# Exploring pre-exposure prophylaxis (PrEP) modality preferences among black cisgender women attending family planning clinics in Chicago via a cross-sectional mixed-methods study

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## ABSTRACT

**Background** Despite pre-exposure prophylaxis (PrEP) demonstrated effectiveness, black cisgender women continue to be at an elevated risk for HIV acquisition and uptake of daily oral PrEP is low in this population in the USA. As advancements in PrEP delivery options continue, it is important to understand women's acceptability of these additional options, specifically black cisgender women, in order to inform uptake and adherence among this population at increased need of HIV prevention options.

**Setting** A cross-sectional survey among black cisgender women ages 13–45 (inclusive) attending women's health clinics in Chicago, Illinois, USA, prior to the approval of cabotegravir long-acting injectable.

**Methods** Descriptive statistics were used to describe the sample and bivariate analysis was used to detect differences between categorical and outcome variables using  $\chi^2$  test. Responses to open-ended questions were thematically coded to explore black cisgender women's attitudes and preferences between the three methods of PrEP delivery including vaginal ring, long-acting injectable and a combined method that would prevent both pregnancy and HIV.

**Results** In total, 211 cisgender women and adolescents responded to the survey. Both injections and combination pills were popular among participants, with 64.5% and 67.3% expressing interest in these forms of PrEP, respectively. The least popular method was the vaginal ring option, with 75.4% of respondents indicating that they would not consider using this modality. Overall, responses were not statistically different between the two surveys administered ( $\chi^2$  p values for injection PrEP method 0.66, combination PrEP method 0.93 and ring PrEP method 0.66) suggesting that the popularity of each method was not dependent on clinic location or the age of participants.

**Conclusion** This research provides important insights into the preferences and attitudes of different PrEP modalities among black cisgender women. As different modalities continue to be approved for use among cisgender women, more research is needed to investigate the acceptability and preferences of these different modalities in order to improve uptake and adherence among this population.

## WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Black cisgender women continue to be disproportionately impacted by HIV and under-represented in pre-exposure prophylaxis (PrEP) utilisation. As PrEP modalities increase, it is important to prepare for equitable access with a focus on improving PrEP uptake among populations in greatest need.

## WHAT THIS STUDY ADDS

⇒ Little is known about black cisgender women's preferences on PrEP modality. This study provides insights into the preferences and attitudes towards different PrEP modalities including daily pills, injection, ring and combination methods.

## HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ As PrEP modalities increase and expand beyond daily oral tablets, future research is needed to investigate the acceptability and preferences of each modality in order to improve PrEP uptake and adherence and ultimately impact HIV transmission.

## INTRODUCTION

Despite major advances in HIV prevention and treatment, racial and gender disparities in HIV/AIDS incidence continue to persist. Of the 36 801 new HIV cases in the USA in 2019, nearly 16% of all new HIV infections occurred among heterosexual women.<sup>1</sup> In particular, black cisgender women in the USA are disproportionately affected by HIV and although annual infections remained stable overall from 2015 to 2019 among this population, the rate of new HIV infections among black women is 11 times that of white women and 4 times that of Latina women.<sup>1</sup> Specific to Chicago, 85% of new HIV infections among heterosexual women in Chicago were among non-Hispanic blacks.<sup>2</sup> This demonstrates



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effective prevention methods are not adequately reaching people who could benefit most and underscores the need to develop and implement effective HIV prevention strategies for women, with a specific focus on advancing strategies among the black community.

Approved by the Food and Drug Administration (FDA) in 2012 for adult populations and then in May 2018 for adolescents, pre-exposure prophylaxis (PrEP) is a promising biomedical prevention strategy that has the potential to reduce HIV infection among HIV negative populations who are at risk for acquisition.<sup>3–5</sup> Despite previous studies demonstrating that oral PrEP can reduce HIV incidence among women who are adherent, awareness and uptake is particularly low among black women.<sup>6</sup> Barriers to oral PrEP uptake and adherence include cost, the burden of taking a daily pill, and concerns about potential health effects (both long-term and short-term effects) and have led to an underutilisation of PrEP among eligible groups.<sup>7–10</sup> Most importantly, studies have focused primarily on its use for men who have sex with men (MSM) with a lack of data for cisgender women.<sup>11</sup>

Given the under-representation of cisgender women in PrEP research efforts, there is an urgent need to better understand the unique factors that influence black cisgender women's uptake and acceptance of PrEP in order to curtail HIV-related health inequities in this population.<sup>12</sup> In order to better understand women's preferences for delivery methods of PrEP, we conducted a survey of reproductive-aged women (ages 13–45 years) attending family planning clinics and explored HIV prevention behaviour, awareness and acceptability of PrEP. Using semistructured interview format, we assessed attitudes and preferences across three different PrEP delivery strategies, including vaginal ring, long-acting injectable and a combined method that would prevent both pregnancy and HIV. Participants were also asked how these modalities compared with the daily pill option, as this was the only currently approved option at the time the study was conducted. It is important to note, as of December 2021, the FDA approved the first injectable therapy for use in both adults and adolescents, cabotegravir long-acting injectable.<sup>13</sup> The study objective was to explore and document PrEP modality preferences in a sample of black cisgender women.

## METHODS

### Setting

To examine PrEP preferences among black cisgender women in Chicago, we conducted a survey among patients at two care locations: University of Chicago Ryan Center and Planned Parenthood of Illinois family planning clinic. The sample was a convenience sample of patients who received care at one of two study locations. Data were collected between January and August 2019. After completing the survey, participants received a US\$20 gift card and a list of local PrEP-related resources.

### Study population

Eligibility was as follows: English-speaking, self-identify as African American and/or black, 13–45 years old (inclusive), live in Chicago and reported recent sexual activity (within the last 6–12 months). All participants over 18 years completed oral informed consent prior to engaging in the study. Oral informed assent was obtained for participants under the age of 18 years and a parental waiver of consent for minor participants was granted to protect the privacy of participants.

### Measures

Participants completed a quantitative survey, followed by a brief semistructured qualitative interview (online supplemental file S1). All survey data were self-reported and the study visit occurred face to face. The survey captured information about PrEP awareness, acceptability, barriers and facilitators to uptake, PrEP modality preferences and demographic and behavioural domains.<sup>14 15</sup> Finally, participants were asked their opinions on other ways to take PrEP (ie, long-acting injectable, vaginal ring and combined with a birth control pill) and how these different methods compared with the daily pill option, the only current FDA-approved method at the time of survey administration (eg, 'If a long-acting injectable (a shot that lasts a while, like the depo shot for birth control) version of PrEP was available, would you consider taking it? Why or why not? How does the injectable compare to a daily pill?'). Authors EO, AM and IA conducted participant visits. The team consisted of study coordinators<sup>3</sup> with minimum 2 years of research experience, who were master's level<sup>2</sup> and bachelor's level<sup>1</sup> and all identified as female. The team introduced themselves to the participants prior to beginning data collection, shared their interest in public health research and noted their role on the study team.

### Data analysis

Descriptive statistics were used to describe the sample and bivariate analysis was used to detect differences between categorical and outcome variables using  $\chi^2$  test. Quantitative analysis was conducted in SAS V.9.4. Responses to open-ended questions were audio recorded and transcribed verbatim; responses were thematically coded by the first author and themes were discussed with the study team to ensure consensus of code application and theme saturation.

## RESULTS

In total, 211 cisgender women and adolescents responded to the survey. Responses were not statistically different between the survey location or the age of participants ( $\chi^2$  p values for injection PrEP method 0.66, combination PrEP method 0.93 and ring PrEP method 0.66).

Long-acting injectables were a popular choice among participants with 64.5% expressing interest in this form of PrEP. Subthemes that emerged from semistructured responses in favour of injectable PrEP included not

having to take a daily pill (86.8% of favourable responses) and general preference for an injection (11.0%). Most subthemes for disinterest in an injectable form of PrEP included not liking shots (53.3% of negative responses) and having previously had a negative experience with Depo-Provera (21.3%). Similarly, combination pills that combined PrEP and birth control were also popular with 67.3% of participants willing to consider this method should it become available. Thematic reasons why a combination pill was considered included a single pill with dual prevention effects (54.9% of favourable responses) general favourability (24.7%) and convenience (16.9%). Reasons for disinterest included a desire to keep the prevention methods separate (34.6% of negative responses), general disinterest (23.2%) and currently trying to conceive or

otherwise have no need for birth control (23.2%). Far less popular was the vaginal ring option, with 75.4% of respondents indicating that they would not consider using this modality if it became available. Favourable themes for vaginal ring PrEP delivery systems included not having to take a daily pill (67.3% of favourable responses) and general interest (13.2%). Areas of disinterest included not wanting the ring in their body (60.4%) and general negative feelings about the ring (13.2%) (table 1).

Previous experiences, both positive and negative, with birth control modalities were distinctly listed as reasons for and against different PrEP modalities. Birth control pills, the Nuva ring and Depo-Provera were all cited as explaining participants' preferences for, or against similar delivery devices.

**Table 1** Qualitative assessment of themes related to modalities of PrEP

| Modality and disposition  | Thematic category                                         | Frequency, (%) | Illustrative quote                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------|-----------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Injectable positive       | Not having to take a daily pill                           | 118 (86.8)     | <i>'I think the injection would be better, it's not something you have to remember everyday to get up and take it.'</i>                                                                                                                                                                                                                                                                                                                                                                                                        |
| Injectable positive       | General—no reason                                         | 15 (11.0)      | <i>'Everyday is too much. I can't remember stuff like that as I have a job and a lot going on. Shot will be better.'</i>                                                                                                                                                                                                                                                                                                                                                                                                       |
| Injectable negative       | Doesn't like shots                                        | 40 (53.3)      | <i>'I wouldn't take it because I don't like shots. And I don't like that in my body'</i><br><i>'I don't like needles. Yea, I don't like needles.'</i>                                                                                                                                                                                                                                                                                                                                                                          |
| Injectable negative       | Negative reaction because of experience with Depo-Provera | 16 (21.3)      | <i>'Me personally, no. Because the depo shot didn't work for me, that's how I got pregnant. So injections, that wouldn't be something I'd consider. Yea.'</i><br><i>'Um, just because what I know about depo, it made me gain a whole bunch of weight. And I don't know it was an injection, or what, but yea. Yea.'</i>                                                                                                                                                                                                       |
| Vaginal ring positive     | Not having to take a daily pill                           | 35 (67.3)      | <i>Yeah, because it's more easy, like to deal with...instead of like forgetting like, 'oh I forgot to take my pill'</i><br><i>'Probably the ring, because I won't remember to take the pill everyday'</i>                                                                                                                                                                                                                                                                                                                      |
| Vaginal ring positive     | General—no reason                                         | 14 (26.9)      | <i>'of course!'</i><br><i>'I don't want to take pills.'</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Vaginal ring negative     | Does not want ring in body                                | 96 (60.4)      | <i>'the ring just seems too uncomfortable'</i><br><i>'I am just not comfortable inserting things down there. It wouldn't be bad, but what about if you can feel it? I rather do the pill'</i>                                                                                                                                                                                                                                                                                                                                  |
| Vaginal ring negative     | General—no reason                                         | 21 (13.2)      | <i>'No, nope.'</i><br><i>'I don't like the vaginal ring. I don't like it.'</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Combination pill positive | Dual prevention                                           | 78 (54.9)      | <i>'Yea. Because that's killing two birds with one stone. You don't have to worry about HIV, and then it's a birth control too. So, it's really like, you're getting two things out of one.'</i><br><i>'That is a double whammy, yes! Cause instead of taking two pills a day for two different cause, you can do it in one.'</i>                                                                                                                                                                                              |
| Combination pill positive | General                                                   | 35 (24.7)      | <i>'I would definitely take it. I don't have to worry about getting pregnant or getting a disease, that's beautiful.'</i><br><i>'It won't be a problem with taking it'</i>                                                                                                                                                                                                                                                                                                                                                     |
| Combination pill positive | Convenience                                               | 24 (16.9)      | <i>'Yes. More convenient; It's practical.'</i><br><i>'Time-wise it will be effective, it's easier to have one thing over two things.'</i>                                                                                                                                                                                                                                                                                                                                                                                      |
| Combination pill negative | Want separated                                            | 17 (24.6)      | <i>'No because I am worried about the combination of the drugs'</i><br><i>'It should be separate, because women might not take it'</i>                                                                                                                                                                                                                                                                                                                                                                                         |
| Combination pill negative | Trying to conceive/no need for birth control              | 16 (23.2)      | <i>'Well me, for myself, my tubes are tied, so it really wouldn't make a difference with the pregnancy part'</i><br><i>'Because for me personally, I know this when I go to the doctor that they pushed birth control on me, but now since I am getting a little bit older and I feel like I am a lot stable than most people my age, I am not really concerned. If I was to get pregnant today, It wouldn't be harm. I not 15 or nothing, I have my own place, my own car and I wouldn't feel bad about getting pregnant'</i> |
| Combination pill negative | General                                                   | 16 (23.2)      | <i>'No- not interested'</i><br><i>'I would take the HIV prevention pill only'</i>                                                                                                                                                                                                                                                                                                                                                                                                                                              |

PrEP, pre-exposure prophylaxis.

**Table 2** Modalities of PrEP and associations with demographic and behavioural characteristics

| Answered yes to:                                               | Interested in combination prevention (N, %) $\chi^2$ , p value<br>142 (67.3%) | Interested in injection prevention (N, %) $\chi^2$ , p value<br>136 (64.5%) | Interested in ring prevention (N, %) $\chi^2$ , p value<br>52 (24.6%) |
|----------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------|-----------------------------------------------------------------------|
| Interested in combination prevention                           | NA                                                                            | 95 (69.9%)<br>0.29                                                          | 35 (67.3%)<br>0.99                                                    |
| Interested in injection prevention                             | 95 (66.9%)<br>0.29                                                            | NA                                                                          | 35 (67.3%)<br>0.62                                                    |
| Interested in ring prevention                                  | 35 (25.7%)<br>0.99                                                            | 35 (25.7%)<br>0.62                                                          | NA                                                                    |
| STI testing in last 3 months                                   | 91 (65.5%)<br>0.56                                                            | 95 (70.9%)<br>0.09                                                          | 32 (64.0%)<br>0.63                                                    |
| STI treatment in last 3 months                                 | 17 (12.1%)<br>0.63                                                            | 19 (14.1%)<br>0.50                                                          | 6 (12.0%)<br>0.82                                                     |
| Partner with HIV last 3 months                                 | 3 (2.1%)<br>0.99*                                                             | 3 (2.2%)<br>0.99*                                                           | 2 (3.9%)<br>0.26*                                                     |
| Vaginal sex                                                    | 134 (94.4%)<br>0.65                                                           | 127 (93.4%)<br>0.71                                                         | 48 (92.3%)<br>0.60                                                    |
| Anal sex                                                       | 16 (11.3%)<br>0.57                                                            | 15 (11.0%)<br>0.70                                                          | 5 (9.6%)<br>0.83                                                      |
| Use of condoms with vaginal sex (of those who had vaginal sex) | 25 (18.7%)<br>0.50                                                            | 23 (18.1%)<br>0.72                                                          | 6 (%)<br>0.59                                                         |
| Use of condoms with anal sex (of those who had anal sex)       | 1 (6.25%)<br>0.71                                                             | 1 (6.7%)<br>0.74                                                            | 0 (0.0%)<br>0.84                                                      |
| Previously heard of PrEP                                       | 62 (44.0%)<br>0.90                                                            | 58 (43.0%)<br>0.61                                                          | 27 (52.9%)<br>0.15                                                    |
| Interested in starting PrEP                                    | 55 (39.3%)<br>0.51                                                            | 56 (41.8%)<br>0.72                                                          | 22 (43.1%)<br>0.70                                                    |
| Age categories                                                 |                                                                               |                                                                             |                                                                       |
| <18                                                            | 4 (2.9%)                                                                      | 6 (4.5%)                                                                    | 3 (6.0%)                                                              |
| Between 18 and 24                                              | 62 (44.6%)                                                                    | 54 (40.6%)                                                                  | 24 (48.0%)                                                            |
| Between 25 and 30                                              | 46 (33.1%)                                                                    | 44 (33.1%)                                                                  | 13 (26.0%)                                                            |
| ≥30                                                            | 27 (19.42%)                                                                   | 29 (21.8%)                                                                  | 20 (20.0%)                                                            |
|                                                                | 0.77                                                                          | 0.47                                                                        | 0.58                                                                  |
| Had an abortion in the last year                               | 30 (21.3%)<br>0.32                                                            | 35 (25.9%)<br>0.23                                                          | 17 (33.3%)<br>0.052                                                   |

\*Fisher's exact test is used.  
PrEP, pre-exposure prophylaxis; STIs, sexually transmitted infections.

There was a high overlap between those who were interested in combination and injection prevention methods (66.9%). For those interested in the ring method, high interest in both the injection and combination methods was seen (67.3% for both) but for those interested in either injection or combination methods, significantly lower interest in the ring method was seen (25.7%) (table 2).

When age and behavioural or sexual history factors were examined for associations with each PrEP modality,

no significant relationships were identified. Factors that were similar across preference for PrEP modalities included sexually transmitted infection testing and treatment in the last 3 months, vaginal or anal sex in the last 3 months, use of condoms for either vaginal or anal sex, having heard of PrEP prior to the study and interest in starting PrEP (pill method). Participants who indicated that they were not interested in using PrEP as a daily pill did express interest in other forms of PrEP delivery, for example, among those interested in the injection

method, 37.0% of women originally expressed disinterest in using a separate PrEP pill. Similar results were seen for women interested in the combination pill but not the single-use pill (40.3%), while fewer women were interested in the ring but not the daily separate pill (13.7%).

## DISCUSSION

HIV prevention efforts to date in the USA, specifically PrEP scale-up initiatives, have not had a sufficient impact on uptake among black cisgender women.<sup>16</sup> In the context of sustained rates of HIV among black cisgender women and low uptake of daily oral PrEP, additional effective and desirable HIV prevention tools are needed. This study contributes data on black cisgender women's preferences for PrEP modalities, including the daily oral pill, LAI, vaginal ring, and combination methods. At the time this study was conducted the only approved method was the daily oral pill, so the other options, despite being currently in development, were presented as theoretical options.

Our study documented interest in different PrEP modalities among black cisgender women. In our study, women preferred injections (64.5%) and a combination of birth control and PrEP (67.3%) while the majority of participants (75.4%) cited the vaginal ring as being their least preferred option. Findings on modality preference have been mixed, with Irie finding black women preferred oral PrEP with LAI being the second preferred modality and in a study in the Southern USA, black women had a slight preference for LAI versus oral PrEP.<sup>17 18</sup> Preference for LAI over daily oral PrEP has been established in other priority populations, such as MSM.<sup>19–21</sup> Cole *et al* found among 2506 MSM respondents 75% indicated a willingness to use LAI versus daily oral PrEP.<sup>19</sup>

Based on responses in our study, women's previous experiences with birth control methods were commonly cited as reasons for and against different PrEP modalities. Given the research on the acceptability and implementation of contraceptive modalities over the past several decades, it is possible that offering various delivery options of PrEP may improve uptake and adherence among women and perhaps align with contraceptive preferences.<sup>22–24</sup>

PrEP is a biomedical HIV prevention option, which requires medical provider involvement to access. Our study was limited to the preferences of women and did not include provider perspectives. Prior qualitative studies assessed providers' opinions on PrEP modality and several barriers were documented with LAI PrEP including insurance issues, side effects, workflow impact and appointment adherence.<sup>25 26</sup> Despite these barriers, providers also shared advantages of LAI PrEP such as increased privacy and absence of the need for pill adherence.<sup>25</sup> As PrEP uptake is low among women, increasing options for HIV prevention may enhance uptake. Addressing barriers to access, from both the

provider and patient perspectives, will be important to PrEP implementation.

## Limitations

These results should be considered in light of the study's limitations. First, our sample size is small which limited statistical power, variability in responses and the inability to detect subgroup differences. Second, participants were recruited from two sexual health centres in an urban area and, therefore, our findings should not be interpreted as generalisable to black cisgender women in totality. For instance, participants in this study may be better connected to sexual health information and as a result, have more knowledge and acceptability of PrEP overall compared with black cisgender women not attending a sexual health centre. Third, all data were self-reported and may be subject to social desirability; however, to mitigate socially desirable responses, quantitative data were collected via computer-assisted self-interviewing. Finally, at the time of survey administration, participants were informed that the only currently approved and recommended form of PrEP was the daily oral pill. As stated above, in December 2021 (after the study was conducted), the FDA approved the first LAI PrEP.<sup>13 27</sup> Had this information been available and known to participants at the time of survey administration, it is possible that acceptability and preferences towards the LAI PrEP modality may have been different. In addition, since we explored theoretical preferences for the various PrEP modalities and did not provide information about their relative costs or efficacy, our findings should be replicated in order to develop strategies to improve PrEP uptake.

## CONCLUSION

This study provides insight into preferences for and attitudes of PrEP modalities among black cisgender women, including adolescent and young women. As advancements in PrEP delivery options continue, it is important to understand the acceptability of additional options among subpopulations with disparate rates of HIV. Study findings have the potential to inform PrEP uptake and adherence as well as development, research and clinical implementation for black cisgender women.

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