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Who is using PrEP on-demand? Factors associated with PrEP use modality among Black and Hispanic/Latino emerging adults

Antonia E. Caba[1] · Taylor Rathus[1] · Esther Burson[2] · Philip A. Chan[3] · Lisa A. Eaton[1] · Ryan J. Watson[1]

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Abstract

Pre-exposure prophylaxis (PrEP) is a highly efficacious HIV prevention medication, yet Black and Hispanic/Latino sexual minority men's and gender diverse individuals' (SMMGD) PrEP use is limited due to factors such as PrEP barriers and anticipated PrEP stigma. Although most individuals who use PrEP take it as a daily regimen, there is evidence that many SMMGD are interested in using "on-demand" (also known as event-driven or intermittent or 2-1-1) PrEP. We used stepwise multinomial logistic regression to explore factors associated with on-demand, daily, and no PrEP use among 820 Black and Hispanic/Latino SMMGD ages 18–29 in the United States. We found that greater reported PrEP barriers were associated with higher odds of using PrEP on-demand or not using PrEP compared to daily PrEP use. More past 3-month sex partners and greater comfort telling others about PrEP use were associated with lower odds of on-demand compared to daily PrEP use. In addition, compared to daily PrEP use, more past 3-month sex partners, greater comfort telling others about PrEP use, and higher anticipated PrEP stigma were associated with lower odds of no current PrEP use compared to daily PrEP use. Findings may inform clinical practices and interventions to promote PrEP uptake and adherence.

Keywords PrEP · HIV prevention · Bisexual · On-demand · Intermittent

Introduction

Racial and ethnic disparities in HIV incidence and prevalence remain a significant health concern in the U.S. In particular, Black and Hispanic/Latino sexual minority men and gender diverse individuals (SMMGD) living in the U.S. have higher rates of HIV compared to White counterparts. 1,2 In addition to disparities in the incidence and prevalence of HIV between Black and Hispanic/Latino SMMGD and White SMMGD, there are inequities in the uptake of HIV prevention strategies for SMMGD. In particular, pre-exposure prophylaxis (PrEP) is a highly efficacious HIV prevention drug that is utilized at lower rates by Black and Hispanic/Latino SMMGD as compared to White SMMGD. 3,4 In addition, PrEP uptake remains slower among emerging adult SMMGD compared to older groups of SMMGD. 5,6 When taken every day (i.e., daily PrEP) or at least four times per week, PrEP is approximately 96% effective at preventing HIV transmission. 4,7.

Daily and on-demand PrEP regimens

Though most individuals use PrEP as a daily regimen, PrEP can also be taken on-demand around the time of sexual activity using a "2-1-1" dosing regimen, and is recommended for use by the World Health Organization. 8 The 2-1-1 regimen indicates two PrEP doses taken two to twenty-four hours before sexual activity and one dose taken each day for two days following sexual activity. This modality is efficacious in protecting against HIV transmission compared to both placebo control and daily use. 9–11 Globally, between 14% to more than 70% of SMMGD express an interest in using on-demand PrEP rather than daily PrEP. 12 On-demand PrEP may be a desirable option for Black and Hispanic/Latino SMMGD who have a lower rate of adherence to a daily PrEP regimen. 10 Furthermore, given the

✉ Antonia E. Caba
antonia.caba@uconn.edu

[1] Department of Human Development and Family Sciences, University of Connecticut, Storrs, CT, US

[2] Bronfenbrenner Center for Translational Research, Cornell University, Ithaca, NY, US

[3] Department of Medicine, Brown University, Providence, RI, US

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reduced dosing schedule, it can be more cost-effective than daily PrEP. 13,14 However, despite the known efficacy of on-demand PrEP, it is not yet recommended by the United States Food and Drug Administration (FDA).

Demographic differences in PrEP use

Although PrEP use is increasing, PrEP uptake is low among those eligible for PrEP use. 15 Furthermore, among Black and Hispanic/Latino SMMGD, PrEP uptake remains slower when compared with White SMMGD due to a variety of factors including long-standing race and ethnicity-related inequities in the provision of health care 5, 16–19. Regarding demographic disparities in PrEP uptake, among a sample of 470 men who have sex with men, bisexual men were 90% less likely than gay men to report PrEP use, although this study did not account for racial and ethnic differences in PrEP use. 15 In contrast, Raymond and colleagues did not find sexual orientation disparities in PrEP use. 6 With respect to geographic location, White sexual minority men living in the US South are more likely to use PrEP than Black and Hispanic/Latino sexual minority men in the South. Further, among sexual minority men living in the West, White sexual minority men are more likely to use PrEP compared to Black sexual minority men. 17.

PrEP use among transgender women and gender nonconforming individuals remains low, with one study reporting that only 18% of Black and Latina transgender women who had heard of PrEP had ever taken it. 20 Although Black and Latina transgender women report barriers to PrEP access similar to Black and Latino sexual minority men, such as concerns about side effects, distrust of medical establishments, and low willingness to take a pill every day, prior research has documented barriers to PrEP uptake that are specific to the transgender community. 27–29 These barriers include concerns about PrEP's interactions with gender-affirming hormones, access to transgender-competent PrEP providers, and a lack of transgender-inclusive PrEP marketing and public health messaging. 20–22.

Potential factors associated with PrEP use and modality: Barriers, sexual behavior, and stigma

PrEP uptake is limited by a variety of barriers at multiple socio-ecological levels. For Black and Hispanic/Latino SMMGD in particular, barriers to PrEP uptake include low educational attainment, undocumented immigration status, lack of health insurance, the prohibitive cost of PrEP, and perceived HIV and PrEP-related stigma. 23–26 In addition, intersectional experiences of racism and homophobia within and outside healthcare systems may shape Black and Hispanic/Latino SMMGD's decisions surrounding PrEP use. 27,28 Another commonly cited barrier to PrEP use is the excessive cost of the drug, which may have implications for the method of use; given the lower potential cost of on-demand PrEP relative to daily PrEP, SMMGD who experience financial barriers may choose on-demand PrEP as a way to reduce costs. 13, 14.

Prior scholarship has framed motivations for method of PrEP use around sexual behavior and anticipated sexual risk.[11, 29–32] For example, those using daily PrEP report a higher number of past 3-month sex partners compared to on-demand PrEP users. 11,30 Furthermore, SMMGD have cited low sexual risk or infrequent sex as a reason for switching to on-demand PrEP from daily PrEP. 29,31,32 In a sample of young sexual minority men ages 16–29, those who used PrEP reported a greater number of sex partners in the past six months and had higher odds of condomless sex compared to sexual minority men not taking PrEP. 19 In another sample, young sexual minority men who had ever used PrEP were more likely to report recent group sex compared to those who had never used PrEP. 18 Evidently, SMMGD who engage in sexual risk behavior are being reached for PrEP uptake. However, few studies have explored differences in number of sexual partners based on method of PrEP use.

Anticipated PrEP stigma, which includes beliefs such as a fear that one will be judged if they use PrEP, may be related to method of PrEP use for a number of reasons. By taking PrEP, users may be seen as engaging in high risk sexual behavior that can result in HIV acquisition. 23,27 Moreover, in a study of 285 predominantly White sexual minority men (that also included a minority of Black, Hispanic/Latino, and men of other racial identities and ethnicities) aged 18–25, those with no lifetime PrEP use reported greater endorsement of negative PrEP stereotypes compared to those with any lifetime PrEP use. 33 As a way to potentially eliminate potential stigma, choosing on-demand PrEP may allow Black and Hispanic/Latino SMMGD with high anticipated PrEP stigma to better conceal their PrEP use or to avoid having to fill prescriptions as often. Relatedly, because of the reduced dosing schedule, Black and Hispanic/Latino SMMGD who fear experiencing racism and discrimination in the medical setting may be able to avoid seeing medical providers as frequently when they use PrEP on-demand. It is important to note that in addition to PrEP barriers and stigma, there are other reasons why Black and Hispanic/Latino SMMGD may not take PrEP. For instance, some individuals may not meet CDC guidelines for PrEP use or may not perceive a need to take PrEP. 34 Nevertheless, financial and social barriers to PrEP uptake remain an important determinant of PrEP use and may potentially explain differences in PrEP modality.

Current study

Despite the numerous known determinants of PrEP use among Black and Hispanic/Latino SMMGD, it is unknown whether various factors (sociodemographics, sexual behavior, stigma, barriers) are associated with differences in method of PrEP use. It is important to understand other potential correlates of on-demand PrEP use given rising interest in this method and the potential for SMMGD to switch between methods. 12,31, 32 Given that PrEP uptake is lower among Black and Hispanic/Latino SMMGD compared to White SMMGD, and among emerging adult SMMGD compared to older SMMGD, a better understanding of determinants of PrEP use and method in this population may better inform interventions to promote PrEP uptake and adherence. Therefore, the purpose of the current study was to explore demographic, sexual behavior, and psychosocial factors associated with daily PrEP use, on-demand PrEP use, and no current PrEP use. Using a cross-sectional sample of 820 SMMGD aged 18–29 from the United States, we examined whether number of sexual partners, PrEP anticipated stigma, willingness to tell others about PrEP use, and barriers to PrEP use are associated with on-demand PrEP use and no current PrEP use relative to daily PrEP use. We expected that compared to those who take PrEP daily, those not currently taking PrEP and those taking PrEP on-demand would report fewer past 3-month sexual partners, greater PrEP barriers, higher anticipated PrEP stigma, and lower comfort telling others about their PrEP use.

Methods

Data for this study were drawn from the *PrEP and Substance Use National Survey.* The aim of this survey was to advance knowledge of Black and Hispanic/Latino young SMMGD's experiences with HIV testing, PrEP, substance use, mental health, and victimization. Data were collected between March and August 2020 in collaboration with the Human Rights Campaign (HRC). Eligible participants included individuals who were assigned male at birth, identified as Black and/or Hispanic/Latino, were 18–29 years of age, resided in the United States, and reported having anal sex with a man in the past 12 months. The confidential, online survey was hosted through the survey website REDCap. 35 In order to avoid fraudulent responses, such as those from bots and duplicate responders, the survey included a multi-step consent and sorting process. First, potential participants who did not meet eligibility criteria were diverted to the survey termination page. Second, two measures were developed to identify bot responses. Participants were shown a random number generated by RedCap and were asked to write the number, in words, in a textbox. In addition, participants were asked to write about their first childhood memory. These measures were screened for accuracy and completeness, respectively.

Participants were recruited through national networks, mailing lists, social media platforms, state health departments, local community-based organizations, HIV centers, and other health centers. In addition, the HRC posted the survey link to its Facebook and Twitter pages. Participants were incentivized with a $15 Amazon.com gift card. Study procedures were approved by the Institutional Review Board at the University of Connecticut.

Of the 2,478 Black and/or Hispanic/Latino SMMGD aged 18–29 who entered the survey, 1,522 met eligibility criteria. Participants who completed fewer than 10% of the survey items were excluded from analysis, resulting in a sample of 992 participants. Given that the present study focuses on method of PrEP use, the final analytic sample was restricted to participants who reported on their lifetime PrEP use and who responded to the variables used in the analysis ($N = 820$). Rates of missing variables for all study variables were below 5%, and therefore we used complete case analysis. 36.

Measures

Sociodemographic variables Participants reported their age in years, gender identity, race/ethnicity, sexual orientation, and geographic region in the United States (*West, Midwest, South, Northeast*). For gender identity, we asked "What is your gender?" Response options included "gender fluid," "genderqueer," "non-binary," man," "woman," and "transgender." Due to low percentages of some gender identities, we recoded participants into the categories cisgender man and transgender, which included the response options "gender fluid," "genderqueer," "non-binary," and "transgender." To measure ethnicity, we asked participants "Are you Hispanic/Latino?" Response options included "No" and "Yes". We also measured race by asking "What is your race? (check all that apply)," with response options "American Indian or Alaska Native," "Asian," "Black or African American," "Native Hawaiian or other Pacific Islander," "White," and "None of these." We combined the race and ethnicity variables to create a new three-level race/ethnicity variable with the categories Black, Hispanic/Latino, and Black and Hispanic/Latino. We measured sexual orientation by asking participants "Which of the following best describes your sexual orientation?" Response options included "gay/same gender loving," "bisexual," "pansexual," "queer," "not sure or questioning," "heterosexual/straight," and "other." For purposes of this analysis, we recoded sexual orientation into

a three-level variable with categories gay/same gender loving, bisexual/pansexual, and other.

PrEP use and method To assess current PrEP use, we asked participants "Do you currently take PrEP?" Response options included "No" and "Yes". Participants who responded no were coded as "Not currently using PrEP" for the three-level PrEP use outcome variable. To measure PrEP regimen and dosing, we asked participants who reported current PrEP use how they typically take PrEP. Response options included "Typically take PrEP daily," "Typically take PrEP on demand (around the time that I am sexually active)," and "Sometimes take PrEP daily and I sometimes take PrEP on demand (around the time that I am sexually active)." We combined on-demand and combination PrEP use (sometimes daily and sometimes on-demand) in order to create a variable level that captured any on-demand PrEP use. Of note, patterns of results related to on-demand use were similar whether the combination group was grouped with daily PrEP users or on-demand users. In all, the three variable levels for the PrEP use outcome variable were "Not currently using PrEP' (1), "Using PrEP daily" (2), and "Using PrEP on-demand" (3).

Sexual behavior For a more nuanced understanding of sexual behavior (e.g., study inclusion criteria required all men to have had sex with other men in the past year), we included a measure of sexual behavior to operationalize overall sexual risk for HIV transmission. To do so, we asked about three sexual behaviors that can lead to HIV transmission: "In the past 3 months, how many total sex partners have you had? This includes oral, vaginal, or anal sex." Outliers were Winsorized (i.e., adjusted, not trimmed) to fall 1.5 times the interquartile range below the 25th percentile or above the 75th percentile; thus, we truncated responses at eight sexual partners.

PrEP stigma and barriers We assessed participants' comfort telling others about PrEP use, barriers to PrEP use, and PrEP anticipated stigma. We measured comfort telling others about PrEP with the item "I would feel comfortable telling others that I am taking PrEP." Response options for this item ranged from 1 (strongly disagree) to 6 (strongly agree).

We measured PrEP barriers through a nine-item scale that captured financial, social, and geographic barriers to PrEP use. We newly developed this scale based on themes that emerged from our research team's prior HIV prevention studies with Black sexual minority men. Participants reported how much they agreed with the following statements, with response options ranging from strongly disagree (1) to strongly agree (6). Items included (1) "I don't have enough time for the PrEP appointments," (2) "The PrEP clinic or doctor's office is too far away," (3) "I don't know where to get PrEP," (4) "I am concerned about how I will be treated by people at the PrEP clinic or doctor's office," (5) "I cannot afford PrEP," (6) "I have had a bad experience in the past when attempting to access PrEP," (7) "People might recognize me at the PrEP clinic or doctor's office," (8) "I am worried about my health information being kept confidential at the PrEP clinic or doctor's office.", and (9) "I don't have transportation to get to the PrEP clinic or doctor's office." A mean score was calculated to create a PrEP barriers scale with a range of 1 to 6, with higher scores indicating greater barriers to PrEP use. The Cronbach's alpha for this scale was 0.82.

We measured PrEP anticipated stigma using three items that were previously adapted from a larger HIV stigma scale that measured different types of stigma related to HIV. [37] Items included statements such as "If I used PrEP, I would be worried that people would think I was gay," 2) "If I used PrEP, I would keep it a secret," and 3) "If I used PrEP, I would worry that people would judge me." Response options ranged from 1 (*strongly disagree*) to 6 (*strongly agree*). A mean score was calculated to create an anticipated stigma scale with a range of 1 to 6, with higher scores indicating higher anticipated PrEP stigma. Cronbach's alpha for this scale was 0.79.

Analytic plan

We conducted a one-way ANOVA with Tukey post-hoc comparisons to compare sexual behavior and PrEP stigma and barrier variables across the three PrEP method groups. We then performed a three-step multinomial logistic regression analysis in SPSS version 27 in order to understand factors associated with on-demand versus daily PrEP use. The first step included only the demographic variables of age, geographic region, and sexual orientation as predictors of PrEP use method in order to identify potential associations between demographic factors and PrEP use. The second step included these variables plus past 3-month sexual behavior. Finally, the third step of the model included these demographic covariates, sexual behavior, PrEP anticipated stigma, comfort telling others about PrEP use, and PrEP barriers. Given that prior research on on-demand PrEP use has largely focused on sexual activity as a determinant of on-demand compared to daily PrEP use, we wanted to explore whether these stigma and barrier-related factors were associated with PrEP use and method above and beyond sexual behavior. Significance was defined as $p < .05$.

Across study variables, there were some differences between participants who were included in this study and those who were excluded due to missing data. Participants

who were missing on lifetime PrEP use, PrEP stigma, PrEP barriers, and comfort telling others about PrEP consistently differed in respect to race/ethnicity and region. In all these cases, participants who were missing were more likely to be Black (compared to Hispanic/Latino or Black and Hispanic/Latino) and from the Midwest, South, or Northeast (compared to the West). Of note, we adjusted our three-step multinomial logistic regression models for region.

Results

Table 1 displays the sample's demographic characteristics. Among those currently taking PrEP, 14.9% reported taking PrEP on-demand or as a combination of daily and on-demand use, while 85.1% reported taking PrEP daily. The mean age of the sample was 25.1 years ($SD = 2.8$). With respect to sexual orientation, most participants identified as gay or same gender loving (76.5%). A majority (94.1%) of participants identified as cisgender men. Participants' races/ethnicities were evenly distributed, with 34.9% identifying as Hispanic/Latino and Black, 37.0% as Black, and 28.2% as Hispanic/Latino. Most participants reported living in the Southern United States (50.9%), followed by the West (26.2%), Northeast (12.4%), and Midwest (10.5%).

Table 2 presents frequencies and significance tests from one-way ANOVAs with Tukey post-hoc comparison for the sexual behavior and PrEP stigma and barriers variables stratified by PrEP modality. There was a statistically significant difference in past 3-month sexual partners ($F(2, 817) = 30.07$, $p < .001$). Compared to participants using daily PrEP, participants taking on-demand PrEP ($p = .017$) and participants not taking PrEP ($p < .001$) reported fewer mean past-3-month sex partners. There was no statistically significant difference in past 3-month sexual partners between the on-demand and no current PrEP use groups ($p = .656$). The groups also differed significant with respect to comfort telling others about PrEP use ($F(2, 817) = 28.64$, $p < .001$). The mean value for the daily PrEP group was statistically significantly higher than the on-demand PrEP ($p < .001$) and the no current PrEP use ($p < .001$) groups. There was no statistically significant difference in comfort telling others about PrEP use between the on-demand and no current PrEP use group ($p = .955$). The PrEP modality groups also differed with respect to anticipated PrEP stigma ($F(2,$

Table 2 Mean sexual partners, comfort telling others about PrEP use, anticipated PrEP stigma, and PrEP barrier values stratified by PrEP modality

	Not taking PrEP	Taking PrEP daily	Taking PrEP on-demand or combination
Variable	Mean (*SD*)	Mean (*SD*)	Mean (*SD*)
Past 3-month sex partners	2.4 (2.3)[a]	3.8 (2.7)[a,b]	2.7 (2.2)[b]
Comfort telling others about PrEP use	2.7 (1.6)[a]	5.5 (1.0)[a,b]	4.6 (1.5)[b]
Anticipated PrEP stigma	2.2 (1.3)[a]	2.0 (1.1)[a]	2.4 (1.3)
PrEP barriers	2.3 (1.0)[a]	1.7 (0.8)[a,b]	2.4 (1.2)[b]

Groups with the same letter across rows were statistically significantly different at the $p < .05$ level

Table 1 Sample demographic characteristics (N = 820)

	Total sample ($N = 820$)	Not taking PrEP ($n = 545$)	Taking PrEP daily ($n = 234$)	Taking PrEP on-demand or combination ($n = 41$)
Age, mean (*SD*)	25.1 (2.8)	24.8 (2.8)	25.6 (2.7)	25.1 (2.7)
Race/ethnicity				
Black	303 (37.0)	190 (34.9)	96 (41.0)	17 (41.5)
Hispanic/Latino	231 (28.2)	161 (29.5)	64 (27.4)	6 (14.6)
Hispanic/Latino and Black	286 (34.9)	194 (35.6)	74 (31.6)	18 (43.9)
Sexual orientation				
Gay/Same gender loving	627 (76.5)	404 (74.1)	197 (84.2)	26 (63.4)
Bisexual or pansexual	134 (16.3)	100 (18.3)	23 (9.8)	11 (26.8)
Other	59 (7.2)	41 (7.5)	14 (6.0)	4 (9.8)
Gender identity				
Cisgender man	772 (94.1)	509 (93.4)	228 (97.4)	35 (85.4)
Transgender	48 5.9	36 (6.6)	6 (2.6)	6 (14.6)
Region				
West	215 (26.2)	148 (27.2)	58 (24.8)	9 (22.0)
Midwest	86 (10.5)	62 (11.4)	22 (9.4)	2 (4.9)
South	417 (50.9)	272 (49.9)	125 (53.4)	20 (48.8)
Northeast	102 (12.4)	63 (11.6)	29 (12.4)	10 (24.4)

2. Comfort telling others about PrEP use	0.07		
3. PrEP anticipated stigma	−0.01	−0.53**	
4. PrEP barriers	0.08*	−0.31**	0.40**

*$p < .05$, **$p < .01$

Table 4 Multinomial logistic regression model predicting the association between demographic covariates and PrEP modality

	Not taking PrEP ($n = 545$)				On-demand PrEP ($n = 41$)			
	B	SE	OR	95% CI	B	SE	OR	95% CI
Age	-0.11	0.03	0.90***	(0.85, 0.95)	-0.06	0.06	0.94	(0.83, 1.07)
Region								
South	Reference				Reference			
West	0.20	0.19	1.22	(0.84, 1.77)	-0.03	0.44	0.97	(0.41, 2.27)
Midwest	0.31	0.28	1.36	(0.79, 2.34)	-0.55	0.78	0.58	(0.13, 2.68)
Northeast	0.02	0.25	1.02	(0.62, 1.68)	0.74	0.44	2.09	(0.87, 4.98)
Sexual orientation								
Gay/Same-gender loving	Reference				Reference			
Bisexual/pansexual	0.70	0.25	2.02**	(1.24, 3.29)	1.22	0.43	3.40**	(1.48, 7.82)
Other	0.31	0.33	1.36	(0.72, 2.56)	0.75	0.61	2.12	(0.64, 6.70)

*$p < .05$, **$p < .01$, ***$p < .001$

PrEP method reference group is daily PrEP

Table 5 Multinomial logistic regression model predicting the association between demographic covariates, sexual behavior, and PrEP modality

	Not taking PrEP ($n = 545$)				On-demand PrEP ($n = 41$)			
	B	SE	OR	95% CI	B	SE	OR	95% CI
Age	-0.13	0.03	0.88***	(0.83, 0.94)	-0.08	0.06	0.93	(0.82, 1.05)
Region								
South	Reference				Reference			
West	0.23	0.20	1.26	(0.85, 1.86)	-0.01	0.44	1.00	(0.42, 2.35)
Midwest	0.13	0.29	1.13	(0.65, 1.98)	-0.70	0.78	0.5	(0.11, 2.32)
Northeast	0.06	0.26	1.06	(0.63, 1.78)	0.76	0.45	2.15	(0.89, 5.17)
Sexual orientation								
Gay/Same-gender loving	Reference				Reference			
Bisexual/pansexual	0.71	0.26	2.03**	(1.22, 3.38)	1.24	0.43	3.46**	(1.49, 8.02)
Other	0.30	0.34	1.35	(0.70, 2.62)	0.75	0.61	2.12	(0.64, 7.04)
Past 3-month sex partners	-0.24	0.03	0.79***	(0.74, 0.84)	-0.19	0.07	0.83**	(0.72, 0.96)

*$p < .05$, **$p < .01$, *** $p < .001$

PrEP method reference group is daily PrEP

Table 6 Multinomial logistic regression model predicting the association between demographic covariates, sexual behavior, and PrEP variables, and PrEP modality

	Not taking PrEP ($n = 545$)				On-demand PrEP ($n = 41$)			
	B	SE	OR	95% CI	B	SE	OR	95% CI
Age	-0.12	0.03	0.89***	(0.83, 0.95)	-0.06	0.07	0.94	(0.83, 1.07)
Region								
South	Reference				Reference			
West	0.25	0.21	1.28	(0.84, 1.94)	0.003	0.45	1.00	(0.42, 2.40)
Midwest	0.27	0.30	1.31	(0.72, 2.37)	-0.54	0.79	0.58	(0.12, 2.74)
Northeast	0.15	0.29	1.16	(0.66, 2.04)	0.85	0.46	2.35	(0.94, 5.83)
Sexual orientation								
Gay/Same-gender loving	Reference				Reference			
Bisexual/pansexual	0.52	0.28	1.68	(0.96, 2.92)	1.02	0.45	2.77*	(1.15, 6.68)
Other	0.04	0.37	1.04	(0.51, 2.14)	0.48	0.63	1.61	(0.47, 5.56)
Past 3-month sex partners	-0.28	0.04	0.75***	(0.70, 0.81)	-0.23	0.07	0.80**	(0.69, 0.92)
Comfort telling others about PrEP use	-0.57	0.10	0.57***	(0.47, 0.69)	-0.53	0.15	0.59***	(0.44, 0.79)
PrEP barriers	0.75	0.11	2.12***	(1.69, 2.64)	0.79	0.19	2.19***	(1.50, 3.20)
Anticipated PrEP stigma	-0.39	0.10	0.68***	(0.56, 0.82)	-0.31	0.17	0.73	(0.53, 1.02)

*$p < .05$, **$p < .01$, ***$p < .001$

PrEP method reference group is daily PrEP

817) = 3.955, $p = .020$). The mean anticipated stigma value for the no current PrEP use group was higher than that of the daily PrEP use group (p = .029), but the daily PrEP and on-demand PrEP (p = .126) and on-demand and no current PrEP use (p = .700) groups did not differ significantly. Finally, the PrEP groups' mean PrEP barriers scores were statistically significantly different (F(2, 817), = 29.07, $p < .001$). Participants in the daily PrEP group reported statistically significant lower PrEP barrier scores compared to those in the no current PrEP use ($p < .001$) and daily PrEP ($p < .001$) groups. There was no significant difference in PrEP barriers scores between the no current PrEP use and on-demand PrEP groups ($p = .771$).

Table 3 displays correlations between the study's main independent variables. PrEP anticipated stigma and PrEP barriers were negatively and significantly correlated with comfort telling others about PrEP use. PrEP barriers were positively and significantly correlated with anticipated PrEP stigma and past 3-month sex partners.

Tables 4, 5 and 6 display multinomial logistic regression results. In the block containing demographic covariates alone (Table 4), higher age was associated with lower odds of no current PrEP use compared to daily PrEP use ($OR = 0.90$, 95% CI [0.85, 0.95]). Compared to gay and same gender loving men, bisexual and pansexual SMMGD participants had higher odds of not using PrEP ($OR = 2.02$, 95% CI [1.24, 3.29]) or using PrEP on-demand ($OR = 3.40$, 95% CI [1.48, 7.82]) compared to using daily PrEP.

In the block containing demographic covariates and information about past 3-month sexual partners (Table 5), higher age was again associated with lower odds of no current PrEP use compared to daily PrEP use ($OR = 0.88$, 95% CI [0.83, 0.94]). In addition, bisexual and pansexual participants had higher odds of not using PrEP ($OR = 2.03$, 95% CI [1.22, 3.38]) or using PrEP on-demand ($OR = 3.46$, 95% CI [1.49, 8.02]) compared to using PrEP daily. A higher number of past 3-month sex partners was associated with lower odds of not using PrEP (OR = 0.79, 95% CI [0.74, 0.84]) or using PrEP on-demand ($OR = 0.83$, 95% CI [0.72, 0.96]) compared to using PrEP daily.

Table 6 displays the multinomial regression model that includes demographic covariates, information about past 3-month sexual partners, and PrEP variables. Higher age was associated with lower odds of no current PrEP use ($OR = 0.89$, 95% CI [0.83, 0.95]) compared to taking PrEP daily. Bisexual participants had higher odds of taking PrEP on-demand compared to taking PrEP daily ($OR = 2.77$, 95% CI [1.15, 6.68]). A greater number of sexual partners was associated with lower odds of no current PrEP use ($OR = 0.75$, 95% CI [0.70, 0.81]) and lower odds of taking PrEP on-demand ($OR = 0.80$, 95% CI [0.69, 0.92]) compared to taking PrEP daily. Greater PrEP anticipated stigma was associated with lower odds of no current PrEP use compared to taking PrEP daily ($OR = 0.68$, 95% CI [0.56, 0.82]). Of note, this finding is counter to the mean scores reported in Table 2. Greater PrEP barriers were associated with higher odds of no current PrEP use compared to daily PrEP use ($OR = 2.12$, 95% CI [1.69, 2.64]) and higher odds of on-demand PrEP use compared to daily PrEP use ($OR = 2.19$, 95% CI [1.50, 3.20]). Finally, greater comfort telling others about PrEP use was associated with lower odds of no current PrEP use ($OR = 0.57$, 95% CI [0.47, 0.69]) compared to daily PrEP use and lower odds of on-demand PrEP use compared to daily PrEP use ($OR = 0.59$, 95% CI [0.44, 0.79]). The final model was significant, X^2 (20) = 201.33, $p < .001$, Nagelkerke $R^2 = 0.276$.

Discussion

This is among the first studies to explore how PrEP stigma and barriers are associated with different modalities of PrEP use among Black and Hispanic/Latino SMMGD. Despite evidence for SMMGD's interest in using PrEP on-demand, little is known about factors associated with on-demand compared to daily PrEP use among Black and Hispanic/Latino SMMGD. Furthermore, prior research examining motives for using on-demand PrEP has primarily focused on sexual behavior and sexual risk. In this study, we explored whether factors above and beyond sexual behavior, such as comfort telling others about PrEP use, PrEP barriers, and PrEP anticipated stigma, are associated with on-demand PrEP use relative to daily PrEP use, and no current PrEP use relative to daily PrEP use. We found significant differences in these PrEP-related variables across PrEP modality. In addition, bisexual participants had higher odds of using PrEP on-demand compared to using PrEP daily. These results suggest that on-demand PrEP should be considered as a valuable alternative to a daily PrEP regimen, particularly for Black and Hispanic/Latino SMMGD with infrequent sexual activity or for those who are able to effectively anticipate sexual activity. [8,30] Overall, on-demand PrEP can provide Black and Hispanic/Latino SMMGD with choice and flexibility in their HIV prevention practices.

We found that higher PrEP barriers were associated with higher odds of on-demand PrEP use relative to daily PrEP use. In other words, Black and Hispanic/Latino SMMGD may experience fewer barriers to using on-demand PrEP compared to daily PrEP. The PrEP-related barriers we measured included financial, geographic, time-based, and sociomedical barriers to PrEP use. On-demand PrEP is likely to be more cost-effective than daily PrEP over time, given that it is taken surrounding sexual activity rather than every day. [13,14] For Black and Hispanic/Latino SMMGD who

experience financial barriers to PrEP access, using PrEP on-demand may be one way to reduce the cost of PrEP prescriptions. Likewise, for Black and Hispanic/Latino SMMGD who have difficulty accessing PrEP-related appointments due to lack of time or transportation, using PrEP on-demand could extend time between appointments or pharmacy visits. Last, our barriers measure included items pertaining to the socio-medical aspects of taking PrEP, such as reporting negative experiences when attempting to access PrEP, concern over being treated poorly at the doctor's office, concern about confidentiality of health information, and fear of being recognized at medical appointments. It is possible that participants with these concerns were more likely to take PrEP on-demand in order to limit time spent at medical appointments and thus reduce the likelihood of these events occuring. Furthermore, it is well documented that many Black and Hispanic/Latino SMMGD report experiencing HIV and sexuality-related stigma in healthcare settings, and that such stigma is associated with lower PrEP use. 23,28 As anticipated, we found that greater PrEP barriers were associated with higher odds of no current PrEP use compared to daily PrEP use. This finding demonstrates that, consistent with prior research, financial, geographic, time-based, and socio-medical constraints remain a barrier to PrEP use among Black and Hispanic/Latino SMMGD.

We extend prior findings about the relationship between PrEP stigma and PrEP use to better understand how anticipated PrEP stigma is associated with method of PrEP use. In the multinomial regression analysis, higher anticipated PrEP stigma was significantly associated with lower odds of no current PrEP use compared to daily PrEP use. However, the participants who were not currently taking PrEP reported a statistically significantly higher mean anticipated PrEP stigma score compared to the daily PrEP use group. Therefore, the mean scores and regression results are contradictory. It could be that the presence of covariates influenced the direction of the parameter estimate. In addition, there was no significant difference in anticipated PrEP stigma between the daily and on-demand groups. Further research is necessary to understand how anticipated PrEP stigma interacts with factors such as social identities, sexual behavior, and PrEP barriers to influence PrEP use and PrEP modality.

We found that having more past 3-month sex partners was associated with lower odds of on-demand PrEP use and no current PrEP use compared to daily PrEP use. This finding is consistent with previous studies that have identified sexual behavior differences between on-demand and daily PrEP users 11, 29–31 and between those using PrEP and those not currently using PrEP. 18,19 As highlighted in the literature on PrEP continuation and discontinuation, the relationship between number of sex partners and method of PrEP use may be driven by perceived HIV risk. For instance, Black and Hispanic/Latino SMMGD who have fewer sex partners may perceive themselves to be at lower risk of contracting HIV, and thus may not perceive a need to take PrEP every day. 29–31 Although on-demand PrEP is still not recommended by the FDA, this modality could be appealing to Black and Hispanic/Latino SMMGD who experience a reduction in sexual partners or who are able to plan PrEP use around their sexual activity.

Above and beyond number of sexual partners, greater comfort telling others about PrEP use was associated with lower odds of using PrEP on-demand relative to using daily PrEP and lower odds of not using PrEP compared to using daily PrEP. Comfort telling others about one's PrEP use may be driven by both heterosexism and PrEP stigma, particularly within Black and/or Hispanic/Latino communities. For example, previous studies have found that among Black SMMGD, those who do not want family, friends, or religious communities to know they are gay or are having sex with other men avoid may avoid disclosing their PrEP use. 33,38 Thus, low comfort disclosing PrEP use to others could drive individuals to choose on-demand PrEP–because it is taken less frequently and is therefore potentially more concealable than daily PrEP–or to not use PrEP at all.

We found that compared to gay/same gender loving participants, bisexual participants had higher odds of using PrEP on-demand compared to using PrEP daily. Although much of the existing research on PrEP use does not differentiate bisexual men from other subgroups of SMMGD, extant research demonstrates that bisexual men are less familiar with and less likely to use daily PrEP than gay men. 15,30,39 There may be several reasons for the higher odds of on-demand PrEP use among bisexual participants relative to gay participants. Bisexual Black and Hispanic/Latino SMMGD may have different social networks whose members may be less aware of PrEP compared to the social networks gay Black and Hispanic/Latino SMMGD belong to. It may also be that bisexual Black and Hispanic/Latino SMMGD do not consider themselves to be candidates for daily PrEP if they are not consistently engaging in condomless anal sex. In addition, those who are prescribed PrEP must meet certain criteria of being high risk for contracting HIV, and physicians may not perceive bisexual Black and Hispanic/Latino SMMGD as candidates for PrEP in comparison to other subgroups of SMMGD such as gay men.

Finally, of the participants who reported currently taking PrEP, 14.9% reported taking PrEP on-demand. Although our study does not provide information about awareness of or motives for on-demand PrEP use, a variety of factors may drive this finding. Namely, providers and patients may be unaware of on-demand use or its efficacy. Furthermore, because on-demand PrEP is not recommended by the FDA,

it could be that providers are not willing recommend this method to patients. Nevertheless, this finding demonstrates that on-demand PrEP is in use among a portion of the Black and Hispanic/Latino SMMGD population, and further research should continue to explore factors that drive on-demand compared to daily PrEP use.

The present study highlights the importance of disaggregating barriers and facilitators of PrEP use by PrEP method, as well as by sexual orientation. In understanding who among Black and Hispanic/Latino SMMGD is using PrEP on-demand as opposed to daily PrEP, we will be better able to reach and to intervene among those individuals to improve PrEP uptake and adherence. For instance, if bisexual SMMGD are more likely to use PrEP on-demand as opposed to a daily regimen, intervention efforts can focus on targeting bisexual Black and Hispanic/Latino SMMGD and improving their awareness of on-demand PrEP.

Limitations

Despite this study's novel contributions, it is not without limitations. First, data were drawn from a cross-sectional, non-probability sample. As a result, findings are not generalizable to all Black and Hispanic/Latino SMMGD ages 18 to 29, particularly those who are not connected to social media or to community organizations serving SMMGD individuals. Our findings are limited by the small sample sizes for some groups, such as the on-demand PrEP group ($n = 41$) and the number of bisexual participants among the on-demand group ($n = 11$); caution should be taken when attempting to interpret the findings in the model comparing participants using PrEP on demand and daily PrEP. Future research should continue to sample among the population of Black and Hispanic/Latino SMMGD who use PrEP on-demand in order to further understand their experiences.

An additional limitation is the uncertainty associated with the group of SMMGD who reported using PrEP both daily and on-demand, which we combined with those who reported only on-demand use. The exact nature of their PrEP use is unknown. For example, these participants could have been prescribed PrEP for daily use, but decided to take PrEP on-demand of their own volition or at a medical provider's recommendation. Alternatively, they may actually be switching between daily and on-demand regimen by occasionally taking PrEP every day, and occasionally taking it before and after sexual activity. Relatedly, there may be a discrepancy in reporting of PrEP regimen, such that participants may report taking PrEP a certain way but may actually not be following that particular regimen. Future research on methods of PrEP use should further explore the nuances between daily, on-demand, and combined daily and on-demand uses.

Finally, this study did not provide information about Black and Hispanic/Latino SMMGD's PrEP modality choices or preferences, and instead focuses only on current PrEP modality. There may be discrepancies in individuals' preferences for PrEP modality and what modality they actually use. More research should be undertaken to understand discordance and concordance in Black and Hispanic/Latino SMMGD's PrEP preferences and actual use in order to inform interventions that promote PrEP uptake and adherence.

Conclusions

Our findings demonstrate that above and beyond sexual behavior, there are numerous factors associated with using PrEP on-demand or not taking PrEP compared to daily PrEP use. We found that a greater number of sexual partners in the past 3 months and greater comfort telling other about PrEP use was associated with lower odds of taking PrEP on-demand or not taking PrEP compared to taking PrEP daily. Greater PrEP barriers were associated with higher odds of taking PrEP on-demand or not taking PrEP compared to taking PrEP daily. Bisexuality was also associated with higher odds of using PrEP on-demand compared to daily. Taken together, these findings highlight the importance of considering method of PrEP use in HIV prevention research in order to better target and tailor strategies for PrEP uptake and adherence in under-reached and diverse populations.

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Declarations

Conflict of interest The authors have no disclosures to report.

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