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PrEP Stigma and logistical barriers remain significant challenges in curtailing HIV transmission among Black and Hispanic/Latinx cisgender sexual minority men and transgender women in the US

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ABSTRACT

Despite advancements in HIV prevention, such as pre-exposure prophylaxis (PrEP), there remain inequities in accessing PrEP among Black and Hispanic/Latinx cisgender sexual minority men and transgender women (SMMTW). Researchers have documented multiple barriers to PrEP uptake, yet the relative impacts of PrEP internalized stigma and logistical barriers (e.g., Cost; time) to PrEP use are understudied. It may be meaningful to investigate potential interactions between internalized stigma and logistical barriers to PrEP use. We utilized data from 827 Black and Hispanic/Latinx SMMTW ($M_{age} = 25.09$) in the US and found that greater PrEP-related internalized stigma and greater PrEP logistical barriers were independently significantly associated with lower likelihood of current PrEP use, but PrEP-related internalized stigma became a non-significant predictor when included in a multivariable model. We found a significant interaction between PrEP-related internalized stigma and logistical barriers to PrEP use, such that the association between internalized stigma and logistical barriers to PrEP use and logistical barriers to PrEP use. Findings highlight the need to reduce logistical barriers to PrEP use, and for clinicians to acknowledge the role of stigma for individuals who otherwise do not report logistical barriers.

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KEYWORDS

PrEP; stigma; internalized stigma; barriers; HIV prevention; sexual minority; transgender

Introduction

HIV continues to disproportionately affect sexual minority men and transgender women (SMMTW) in the U.S., with disparities most pronounced for Black and Hispanic/Latinx groups (CDC, 2021a). At the current rate of infection, estimates suggest that 1 in 2 Black men who have sex with men (MSM) and 1 in 5 Hispanic/Latino MSM will be diagnosed with HIV in their lifetime (Hess, Hu, Lansky, Mermin, & Hall, 2017); these racial and ethnic disparities in HIV prevalence also extend to Black and Hispanic/Latina transgender women (CDC, 2021b). One likely contributor to these observed disparities is the lack of equitable access to pre-exposure prophylaxis (PrEP), a medication that reduces the risk of HIV infection by up to 99% when taken as prescribed (CDC, 2018). Research suggests that compared to white MSM, Black and Hispanic/ Latino MSM are less likely to have discussed PrEP with a healthcare provider and less likely to have used PrEP in the past year (Kanny et al., 2019). In addition, PrEP use is low for sexually active transgender women overall, regardless of race and ethnicity (Sevelius, Poteat, Luhur, Reisner, & Meyer, 2020).

PrEP use is becoming more accepted as an HIV prevention strategy, but stigma related to PrEP use negatively impacts PrEP uptake (Mayer et al., 2020; Thomann, Grosso, Zapata, & Chiasson, 2018). Some research has related PrEP stigma to HIV stigma in that individuals who use PrEP report concerns that others will think a person is living with HIV if they take PrEP (Brooks, Cabral, Nieto, Fehrenbacher, & Landrian, 2019; Calabrese et al., 2018). Similarly, PrEP use is associated with stigmatizing attitudes around sex behavior, with people expressing concerns that others will perceive PrEP users as gay and more promiscuous (Calabrese et al., 2018; Dubov, Galbo, Altice, & Fraenkel, 2018; Furukawa et al., 2020). Researchers have observed PrEP stigma in studies of the general population, healthcare providers, and communities of MSM and transgender women, suggesting that the impact of this stigma on PrEP use is widespread (Brooks et al., 2019; Dubov et al., 2018). Importantly,

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stigmatizing attitudes toward PrEP use may be internalized by those who could benefit from PrEP and thus potentially negatively affect the likelihood of eventual PrEP uptake (Golub, 2018). Despite the assertion that internalized PrEP stigma may thwart the actual uptake of PrEP or reduce adherence to PrEP, little empirical evidence is available that confirms a direct link.

In addition to stigma, several other barriers reduce uptake of PrEP among SMMTW. People who would benefit from PrEP must first be aware that PrEP exists and is an option for HIV prevention. The research on PrEP awareness among SMMTW has produced concerning results, with some research suggesting low awareness among populations at most significant risk of HIV acquisition (i.e., Black and Hispanic/Latinx SMMTW; Eaton et al., 2017). Moreover, studies suggest that PrEP awareness is inadequate among healthcare and social service providers (Petroll et al., 2017). Even when PrEP awareness is high, inaccurate perceptions of HIV acquisition risk and concerns about PrEP sideeffects can be barriers if an individual or their healthcare provider overestimates the potential costs and underestimates the potential benefits of taking PrEP (Felsher et al., 2018; Mayer et al., 2020). Further, even in places that have programs designated to offset PrEP costs, previous studies have demonstrated that PrEP use is lower for people who face logistical hurdles in accessing PrEP providers and filling PrEP prescriptions (Felsher et al., 2018; Marcus et al., 2019). The populations most affected by HIV also experience multiple forms of stigma and discrimination, and are at the greatest risk of facing multiple barriers to PrEP use (e.g., Lower incomes and greater rates of unemployment; Nieto et al., 2020). Multiple barriers and stigmatizing and discriminatory treatment from healthcare providers that results in medical mistrust may synergistically prevent those who need PrEP most from engaging with PrEP providers (Cahill et al., 2017).

Based on the currently available literature, it is known that logistical and stigma-related barriers are important factors in understanding PrEP linkage, uptake, and engagement. Yet, these factors represent different types of barriers to accessing healthcare, with logistical barriers being driven largely by material resources (Brooks et al., 2011; Felsher et al., 2018), and stigma barriers being driven by cognitive and social influences (Dubov et al., 2018). There exists considerable literature investigating logistical and stigma related barriers separately (e.g., Eaton et al., 2017; Felsher et al., 2018; Mayer et al., 2020; Petroll et al., 2017), but their relative and interactive effects have yet to be tested. For example, do both of these variables influence the likelihood PrEP of use when considered

simultaneously? And does the presence of logistical barriers influence the extent to which stigma barriers impact PrEP use, or vice versa? Given the well-documented influence of both of these variables, a more nuanced approach to understanding their influences on PrEP use is needed. Developing a more nuanced approach to understanding these barriers can clarify where interventions are likely to be most impactful in increasing PrEP uptake in these populations.

Current study

The primary goal of the current study was to examine the associations among PrEP-related internalized stigma, PrEP logistical barriers, and current PrEP use in a cohort of Black and Hispanic/Latinx SMMTW. In addition, we explored the associations between demographic characteristics (age, race/ethnicity, gender identity, sexual identity, education, employment, and income) and our primary variables of interest. We hypothesized that higher levels of PrEP-related internalized stigma and PrEP logistical barriers would each be associated with a lower likelihood of current PrEP use. In addition, we hypothesized that there would be a significant interaction between PrEP-related internalized stigma and PrEP logistical barriers, such that participants who reported high levels of both would be least likely to report current PrEP use.

Method

Study design and participant recruitment

Data were derived from the baseline assessment of the *Longitudinal Study of PrEP and Substance Use National Survey*, an online survey focused on HIV testing, PrEP experiences, and health among Black and Hispanic/Latinx SMMTW. Data for the baseline survey were collected between March and August 2020. Participants were included if they identified as Black and/or Latinx, were between 18–29 years old, resided in the United States, reported having had anal sex with another man in the past 12 months at the time of survey completion, and identified as male assigned at birth. All study procedures were approved by the University of Connecticut's Institutional Review Board.

Participants were recruited from national networks, listservs, and social media (Twitter, Facebook, and Instagram) with the assistance of Human Rights Campaign's expansive network of community partners. The research team also reached out to local community-based organizations, health departments, and other health centers to advertise the survey. Eligible participants were invited to participate in a self-report survey and were provided with a \$15 Amazon gift card for their participation in the baseline assessment. A total of 992 Black and Hispanic/Latinx SMMTW responded to the baseline survey. After removing participants without data on our variables of interest, our analytic sample consisted of 827 participants.

Measures

Demographics. Participants self-reported their age, income, sex assigned at birth, gender identity, sexual orientation, employment status, and highest level of education. See Table 1 for demographic characteristics of our sample.

PrEP-related internalized stigma. Internalized stigma related to PrEP use was assessed with two

Table 1. Demographic characteristics of the analytic sample (N = 827).

Characteristic	
	<i>M</i> = 25.09
Age	SD = 2.77
	n (%)
Gender ^a	
Cisgender man	779 (94.2%)
Transgender/nonbinary	48 (5.8%)
Sexual orientation ^b	
Bisexual	98 (11.9%)
Gay or Same-Gender Loving	633 (76.5%)
Pansexual	37 (4.5%)
Queer	34 (4.1%)
Heterosexual, Questioning, or Other	25 (3.0%)
Race/Ethnicity ^c	
Hispanic/Latinx & BIPOC	289 (34.9%)
BIPOC & not Hispanic/Latinx	305 (36.9%)
Hispanic/Latinx & not BIPOC	233 (28.2%)
Employment status ^b	
Full-time	466 (56.3%)
Part-time	121 (14.6%)
Unemployed or disabled/not able to work	127 (15.4%)
Student	97 (11.7%)
Other	16 (1.9%)
Educational level ^b	
High school or less	110 (13.3%)
Some college	278 (33.6%)
College	333 (40.3%)
Graduate school	106 (12.8%)
Income	
Less than \$10,000	141 (17%)
\$10,000 to \$15,000	71 (8.6%)
\$15,001 to \$20,000	69 (8.3%)
\$20,001 to \$25,000	75 (9.1%)
\$25,001 to \$35,000	116 (14.0%)
\$35,001 to \$50,000	152 (18.4%)
\$50,001 to \$75,000	139 (16.8%)
\$75,001 to \$100,000	36 (4.4%)
\$100,001 or more	22 (2.7%)

^aParticipants were asked about their sex assigned at birth and gender identity, and responses were used to create two categories (cisgender man, transgender/nonbinary); ^b Due to low cell counts in some categories, we collapsed some categories for analyses; ^c Participants were asked about ethnicity and race, and responses were used to create three categories (Hispanic/Latinx & BIPOC, BIPOC & not Hispanic/Latinx, Hispanic/Latinx & not BIPOC) items that asked about how participants would feel/felt using PrEP: "... I would keep it a secret" and "....I would worry that people would judge me." Participants were asked to respond how much they agreed with each statement from 1 – "Strongly Disagree" to 6 – "Strongly Agree." Responses to these two items were averaged for an overall PrEP-related internalized stigma score, with higher scores indicating greater PrEP-related internalized stigma. This scale demonstrated good reliability (Cronbach's $\alpha = .80$).

Logistical barriers to PrEP use. Logistical barriers to PrEP use were assessed with nine items: (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." Participants were asked to respond how much they agreed with each statement from 1 – "Strongly Disagree" to 6 - "Strongly Agree." Responses to these nine items were averaged for a logistical barriers to PrEP use score, with higher scores indicating greater logistical barriers to PrEP use. This scale demonstrated good reliability (Cronbach's $\alpha = .82$).

Current PrEP use. All participants were asked "Have you ever heard of PrEP?" (yes or no). Those who answered yes were asked, "Have you ever taken PrEP?" (yes or no). Those who answered yes were asked, "Do you currently take PrEP?" (yes or no). Participants who had never heard of PrEP or who had never taken PrEP were coded as "no" for whether they currently take PrEP.

Data analysis

First, we used SPSS Statistics 23 to examine the associations between demographic characteristics (age, income, gender identity, sexual orientation, race/ethnicity, highest level of education, employment status) and our primary variables of interest (PrEP-related internalized stigma, logistical barriers to PrEP use, and current PrEP use). To test for demographic differences in PrEPrelated internalized stigma and logistical barriers to PrEP use, we used Pearson correlations for continuous demographic variables (age, income) and one-way analysis of variance (ANOVA) for categorical variables (gender identity, sexual orientation, race/ethnicity,

student status, employment status). To test for demographic differences in current PrEP use, we used binary logistic regression for continuous variables (age, income) and chi-square analyses for categorical variables (gender identity, sexual orientation, race/ethnicity, student status, employment status). All subsequent analyses controlled for demographic variables that were associated with variables of interest. Next, we used logistic regression to examine the association between PrEPrelated internalized stigma and current PrEP use, as well as the association between logistical barriers to PrEP use and current PrEP use. We examined each of these predictors in individual models (Models 1a & 1b) and simultaneously in the same model (Model 2). Then, logistic regression using the PROCESS macro (Preacher & Hayes, 2008) with bootstrapping and 5,000 resamples was used to estimate the odds of PrEP use associated with PrEP-related internalized stigma, logistical barriers to PrEP use, and their interaction.

Results

Sample demographics and preliminary analyses

On average, participants were 25 years old (M = 25.09, SD = 2.77). The sample was primarily cisgender men (94.2%) and gay or same-gender loving (76.5%). The most commonly endorsed race/ethnicity was BIPOC/ non-Hispanic/Latinx (36.9%). For full demographic characteristics of our sample, see Table 1. Means, standard deviations, and percentages for variables of interest are shown in Table 2, both for the total sample as well as disaggregated for different demographic categories. A total of 33.6% of our sample reported currently using PrEP.

PrEP-related internalized stigma, barriers to PrEP use, and current PrEP use

Table 3 presents findings when current use of PrEP was regressed on PrEP-related internalized stigma, logistical barriers to PrEP use, and their interaction. In Model 1a, greater PrEP-related internalized stigma was significantly associated with lower likelihood of current PrEP use. Similarly, in Model 1b, greater logistical barriers to PrEP use were significantly associated with lower likelihood of current PrEP use. In Model 2, when both factors were included in the same model, PrEP-related internalized stigma became non-significant while logistical barriers to PrEP use remained significant. In Model 3, there were significant main effects of both PrEP-related internalized stigma and logistical barriers to PrEP use on likelihood of current PrEP use, with greater levels of both factors being associated with lower likelihood of PrEP use. Additionally, there was significant interaction between PrEP-related internalized stigma and barriers to PrEP use. Conditional effects analyses demonstrated that the association between internalized stigma and likelihood of current PrEP use was only significant at lower levels of logistical barriers to PrEP use.

Discussion

We sought to examine the associations among PrEPrelated internalized stigma, PrEP logistical barriers, and current PrEP use among 827 Black and Hispanic/ Latinx SMMTW who lived in the United States.

Demographic relations to PrEP use

We found distinct differences in PrEP use across participant demographics. After controlling for other covariates, younger participants reported greater PrEPrelated internalized stigma and logistical barriers, and they were less likely to use PrEP, than older participants. Participants with higher levels of education and who worked full-time reported lower PrEP-related internalized stigma, lower logistical barriers, but higher PrEP use. In contrast, people who were unemployed/disabled/unable to work, in the lowest education category (high school or less), and those who reported lower income were all less likely to use PrEP. These findings are consistent with prior research on predictors of logistical barriers and PrEP use among PrEP SMMTW, and particularly SMMTW of color (Holloway et al., 2017; Nieto et al., 2020; Philbin et al., 2016; Quinn et al., 2019). Furthermore, given that health insurance is frequently tied to employment in the United States, it is plausible that participants who reported being unemployed/disabled/unable to work lacked sufficient insurance and income to obtain PrEP. Taken together, these findings suggest that structural factors influence access to PrEP and, as such, that structural interventions are needed to address inequities in access. Of note, we corroborated and extended these earlier findings that highlighted demographic differences in PrEP use to include their relative associations with PrEP use in the context of both structural and internalized barriers to PrEP use.

Related to social identities, transgender participants reported greater logistical barriers than cisgender participants, but they did not differ in PrEP use. Although our sample of transgender women reported similar types of logistical barriers to PrEP access compared to

Table 2. Means, Standard	Deviations, and	Test Statistics of	Comparisons	between	Demographic	Groups on	Study	Predictors and
Outcome Variables								

	PrEP-related Internalized Stigma				Log	gistical l	Barriers	9 Use	Current PrEP Use				
	М	SD	F	df	р	М	SD	F	df	р	%	χ2	р
Total Sample	2.16	1.29	-	-	-	2.15	1.02	-	-	-	33.3%	-	-
By gender	-	-	3.26	825	.07	-	-	4.12	825	.04	-	1.70	.19
Cisgender man	2.26	1.40	-	-	-	2.13	1.02	-	-	-	34.1%	-	_
Transgender/nonbinary	1.89	1.34	-	-	-	2.44	1.08	-	-	-	25.0%	-	_
By sexual orientation	-	-	10.54	822	<.001	-	-	5.55	822	<.001	-	8.41	.08
Bisexual	2.83	1.44	-	-	-	2.40	1.05	-	-	-	23.5%	-	-
Gay or Same-Gender Loving	2.14	1.34	-	-	-	2.06	1.00	-	-	-	35.7%	-	-
Pansexual	2.30	1.52	-	-	-	2.57	1.13	-	-	-	29.7%	-	-
Queer	1.63	0.86	-	-	-	2.34	1.05	-	-	-	38.2%	-	-
Heterosexual, Questioning, or Other	3.24	1.94	-	-	-	2.53	0.90	-	-	-	20.0%	-	_
By race/ethnicity	-	-	1.37	824	.20	-	-	0.93	824	.40	-	2.65	.27
Hispanic/Latinx & BIPOC	2.23	1.39	-	-	-	2.21	0.98	-	-	-	32.2%	-	-
BIPOC not Hispanic/Latinx	2.16	1.42	-	-	-	2.13	1.10	-	-	-	37.0%	-	-
Hispanic/Latinx not BIPOC	2.36	1.37	-	-	-	2.09	0.96	-	-	-	30.9%	-	-
By employment status	-	-	4.12	822	.003	-	-	7.91	822	<.001	-	18.57	.001
Full-time	2.10	1.33	-	-	-	1.99	1.01	-	-	-	38.3%	-	-
Part-time	2.45	1.43	-	-	-	2.46	0.98	-	-	-	31.8%	-	-
Unemployed or disabled/not able to work	2.29	1.51	-	-	-	2.32	1.05	-	-	-	18.2%	-	-
Student	2.64	1.45	-	-	-	2.35	0.96	-	-	-	29.9%	-	-
Other	2.00	1.11	-	-	-	1.85	1.10	-	-	-	43.8%	-	_
By education level	-	-	4.98	823	.002	-	-	9.76	823	<.001	-	13.78	.003
High school or less	2.68	1.60	-	-	-	2.50	1.14	-	-	-	26.4%	-	_
Some college	2.13	1.33	-	-	-	2.19	0.98	-	-	-	29.5%	-	_
College	2.25	1.42	-	-	-	2.11	1.03	-	-	-	35.1%	-	-
Graduate school	2.04	1.15	-	-	-	1.77	0.82	-	-	-	47.2%	-	-

cisgender counterparts (e.g., Concerns about side effects, distrust of medical establishments), prior research has documented transgender-specific logistical barriers to PrEP uptake (Cahill et al., 2020; Sevelius et al., 2016; Poteat et al., 2019). These transgenderspecific logistical barriers include a desire for transgender-inclusive healthcare providers and HIV prevention messaging, concerns about interactions with genderaffirming hormones, and competing medical priorities (Cahill et al., 2020; Sevelius et al., 2016; Poteat et al., 2019). Future research should explore the nuances of logistical bartiers to PrEP uptake as they may differ across gender identtiies.

Bisexual participants reported greater PrEP-related internalized stigma and logistical barriers than gay participants, and bisexual participants were marginally less likely to use PrEP. Given prior evidence that bisexual men are less likely to use PrEP than gay men (Feinstein, Moran, Newcomb, & Mustanski, 2019; Grov, Rendina, Jimenez, & Parsons, 2016), the current findings point to internalized stigma and logistical barriers as potential explanations. Similarly, heterosexual participants also reported greater PrEPrelated internalized stigma and logistical barriers than gay and queer participants, and pansexual participants reported greater logistical barriers than gay participants. Additional research is needed to understand why MSM of different sexual identities report different levels of PrEP-related internalized stigma and logistical barriers.

The impacts of PrEP internalized stigma and logistical barriers on PrEP use

Our first notable finding in relation to our study predictors of interest was that greater PrEP-related internalized stigma and logistical barriers were each individually associated with a lower likelihood of using PrEP; yet, when they were included in the same model, only logistical barriers remained significant. This finding suggests that, although internalized stigma can play a role in whether or not someone uses PrEP, ultimately the extent to which they experience logistical barriers to accessing PrEP plays a larger role.

Second, contrary to our hypothesis, we did not find that participants who reported high levels of both PrEP internalized stigma and logistical barriers were least likely to report current PrEP use. Instead, we identified that the association between PrEP-related internalized stigma and likelihood of current PrEP use was only significant at lower levels of logistical barriers. This suggests that, when someone experiences few logistical barriers and therefore has unrestricted access to PrEP, other factors like internalized stigma may play a larger role in determining whether they use PrEP. Programmatic efforts to address PrEP uptake frequently target logistical barriers (e.g., Health care coverage, transportation to clinic). While this approach is necessary, efforts must also address psychological and emotional barriers, as failing to do so undermines our delivery of highly effective forms of HIV prevention. And, in the

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Table 3. Bivariate and Multivariable Mode	ls Testing the Relation	s Between Demographics	, Stigma, and Barrie	ers on Current PrEP Use							
	Current Use of PrEP										
	Model 1a	Model 1b	Model 2	Model 3							

	Model 1a			M	Model 1b			odel 2		Model 3		
	B(SE)	<i>p</i> value	OR	B(SE)	<i>p</i> value	OR	B(SE)	<i>p</i> value	OR	B(SE)	<i>p</i> value	OR
PrEP-related Internalized Stigma	17(.06)	.006	.85	-	-	-	07(.07)	.31	.94	38(.14)	.01	.68
Logistical Barriers to PrEP Use	-	-	-	44(.09)	<.001	.64	41(.09)	<.001	.66	75(.17)	<.001	.47
Internalized Stigma x Barriers	-	-	-	-	-	-	-	-	-	.14(.05)	.01	1.15
Age	.04(.03)	.20	1.04	.05(.03)	.11	1.06	.05(.03)	.129	1.05	.05(.03)	.14	1.05
Income	.04(.05)	.36	1.04	.01(.05)	.83	1.01	.01(.05)	.823	1.01	.02(.05)	.71	1.02
Gender (cisgender man = reference)	-	-	-	-	-	-	-	-	-	-	-	-
Transgender/nonbinary	.44(.36)	.22	1.56	.33(.37)	.36	1.40	.36(.37)	.327	1.43	37(.37)	.32	.69
Sexual orientation (Gay/Same-Gender Loving = reference)	-	-	-	-	-	-	-	-	-	-	-	-
Bisexual	45(.26)	.08	.64	43(.26)	.10	.65	40(.27)	.129	.67	39(.27)	.14	.68
Pansexual	12(.38)	.74	.88	.03(.39)	.95	1.03	.02(.39)	.956	1.02	.01(.39)	.98	1.01
Queer	.06(.38)	.87	1.07	.27(.39)	.49	1.31	.23(.39)	.555	1.26	.26(.39)	.51	1.30
Heterosexual/questioning/other	41(.53)	.44	.66	38(.53)	.48	.69	32(.54)	.546	.72	35(.53)	.52	.71
Employment status (Full-time employed = reference)	-	-	-	-	-	-	-	-	-	-	-	-
Part-time employed	.06(.26)	.81	1.06	.12(.26)	.64	1.13	.13(.26)	.611	1.14	.19(.26)	.48	1.20
Unemployed/disabled or unable to work	79(.29)	.006	.45	80(.29)	.01	.45	80(.29)	.006	.45	78(.29)	.01	.46
Student	06(.29)	.84	.94	09(.30)	.76	.91	07(.30)	.820	.93	02(.30)	.95	.98
Other employment status	.37(.52)	.49	1.44	.27(.54)	.61	1.31	.28(.53)	.604	1.32	.32(.53)	.55	1.37
Educational level (High school or lower = reference)	-	-	-	-	-	-	-	-	-	-	-	-
Some college	.005(.27)	.99	1.01	03(.27)	.91	.97	06(.27)	.834	.94	05(.27)	.86	.95
College	.17(.27)	.54	1.18	.12(.27)	.65	1.13	.12(.27)	.669	1.12	.12(.27)	.66	1.13
Graduate	.50(.33)	.14	1.64	.36(.34)	.29	1.43	.36(.34)	.289	1.43	.38(.34)	.26	1.47

Note: In Models 1a and 1b, PrEP-related internalized stigma and logistical barriers to PrEP use were tested as separate predictors of current PrEP use; in Model 2, PrEP-related internalized stigma and logistical barriers to PrEP use were tested simultaneously as predictors of current PrEP use; in Model 3, the interaction between PrEP-related internalized stigma and logistical barriers to PrEP use was included as a predictor; all analyses controlled for demographic characteristic that were associated with variables of interest.

process of assessing the needs of a patient population, we must take care to not overlook the challenges being experienced by all patients regardless of logistical barriers.

Limitations

Despite the contributions of this study in expanding our understandings of the relations between demographics, PrEP internalized stigma, logistical barriers, and PrEP use, we acknowledge notable limitations. First, these data are drawn from a national, but nonprobability, sample of SMMTW in the US-the individuals who participated in this study had access and resources to complete an online survey about their PrEP experiences. Thus, SMMTW without Internet access or resources to complete an online survey (likely those who are the most vulnerable to acquiring HIV) were not represented in our study. Second, we are unable to document the temporality of our associations or changes or relations over time given the cross-sectional nature of our study. Following participants over time to better understand the long-term impact of PrEP internalized stigma and logistical barriers can better inform the utility of prevention and intervention programs that seek to curb the disparity in access and uptake of PrEP.

Conclusion

These findings can be used to help inform intervention efforts to increase PrEP uptake in key populations. As advances are made in HIV prevention and treatment, the landscape for providing services must evolve as well. One component of this change is to tailor our understanding of services and the provision of interventions that support PrEP uptake. Based on the current findings, a comprehensive logistical needs assessment has the potential to improve efforts to increase PrEP uptake. Although PrEP navigators provide support services for accessing HIV prevention services (Pagkas-Bather et al., 2020), these services are not ubiquitous and are vulnerable to programmatic cuts. Moreover, these services are typically limited in their scope (e.g., Limited to conducting intakes/risk assessments, addressing provider/lab costs, coordinating referrals) with no or few resources for addressing stigma-related concerns. In addition, our findings highlight the need for multilevel interventions to address structural inequities, PrEP stigma (among SMMTW and healthcare providers), and logistical barriers, particularly among populations that are most vulnerable to these challenges (e.g., Younger people, transgender women, bisexual men, people of lower socioeconomic status). Given the interactive effect found between logistical barriers and

internalized stigma in our study, researchers should continue to consider studying the impact of both as they may uniquely and synergistically thwart PrEP uptake and adherence. Until we are able to address the range of factors that restrict access to PrEP among those who need it most, we are likely to continue to observe disparities in PrEP use as well as HIV incidence.

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No potential conflict of interests were reported by the authors.

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Declaration of interest statement

The authors declare no conflicts or special interests.

Authors' contributions

RW and LE designed the study, collected all data, and contributed to writing the manuscript. CC conducted data analyses and interpretation and wrote portions of the manuscript. RM, BF, and AC wrote portions of the introduction and discussion. All authors edited and critically reviewed the manuscript.

Ethics and consent to participate

This study was reviewed and approved by the Institutional Review board of the University of Connecticut.

Availability of data and materials

Data collection is ongoing and data will not currently be shared.

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