

UCLA

UCLA Previously Published Works

Title

Health Service- and Provider-Level Factors Influencing Engagement in HIV Pre-Exposure Prophylaxis Care Among Male Sex Workers

Permalink

<https://escholarship.org/uc/item/4dq6p540>

Journal

AIDS Patient Care and STDs, 35(8)

ISSN

1087-2914

Authors

Valente, Pablo K
Mimiaga, Matthew J
Chan, Philip A
[et al.](#)

Publication Date

2021-08-01

DOI

10.1089/apc.2021.0084

Peer reviewed

Health Service- and Provider-Level Factors Influencing Engagement in HIV Pre-Exposure Prophylaxis Care Among Male Sex Workers

Pablo K. Valente, MD, MPH,^{1,i} Matthew J. Mimiaga, ScD, MPH,²⁻⁵
Philip A. Chan, MD, MS,⁶ and Katie B. Biello, PhD, MPH^{1,2,7,8}

Abstract

Multilevel barriers to pre-exposure prophylaxis (PrEP) care among male sex workers (MSW) include aspects of interactions with health services and providers. We examined relationships between health service- and provider-level factors and PrEP care among MSW. Between 2017 and 2019, we enrolled 111 MSW in the Northeast United States who were not on PrEP, but expressed interest in potentially using PrEP, in a behavioral intervention to promote PrEP uptake and adherence. Using baseline data, we examined whether having a primary care provider, past year frequency of medical visits, comfort discussing sexual practices with providers, and transportation difficulties to accessing general health care were associated with PrEP use self-efficacy, anticipated barriers to PrEP uptake, adherence, and retention (linear regression), and intention to initiate PrEP (logistic regression). Models adjusted for age, race/ethnicity, sexual identity, education, and income. Participants' mean age was 34.2 [standard deviation (SD)=8.5], and 47% were non-White. Three-quarters (76%) intended to initiate PrEP within the next month. Comfort discussing sexual practices with providers was associated with PrEP use self-efficacy ($b=0.41$, $p=0.008$). Comfort discussing sexual practices with providers was negatively associated with anticipated barriers to PrEP uptake ($b=-0.29$, $p=0.006$). Transportation difficulties to accessing general health care were associated with barriers to PrEP uptake ($b=0.30$, $p=0.007$) and barriers to PrEP adherence and retention ($b=0.57$, $p<0.001$). No health service- and provider-level characteristics were associated with intention to initiate PrEP. PrEP programs targeting MSW may benefit from interventions to foster communication between MSW and providers about sexual practices and should consider structural barriers to accessing care, including lack of access to transportation.

Keywords: men who have sex with men, sex workers, HIV/AIDS, pre-exposure prophylaxis, health services, health care provider

Introduction

CISGENDER MALE SEX WORKERS (MSW, i.e., cisgender men who exchange sex for money or drugs) are disproportionately affected by HIV, with HIV prevalence estimated at 19.3% in the United States, almost 25 times higher than among the general male population.¹ Pre-exposure prophylaxis (PrEP) is highly effective to prevent HIV trans-

mission and could contribute to decreasing the burden of HIV among MSW.²⁻⁴ However, despite higher PrEP acceptability compared to other men who have sex with men (MSM),⁵ PrEP use is low among MSW,⁶ reflecting multilevel barriers to accessing health care in this population.^{7,8}

Continued access to PrEP entails moving through the PrEP care continuum,⁹ which includes initial access to PrEP health services, communication about HIV risk and PrEP with health

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

²The Fenway Institute, Fenway Health, Boston, Massachusetts, USA.

³Department of Epidemiology, Fielding School of Public Health, University of California, Los Angeles, California, USA.

⁴Department of Psychiatry and Biobehavioral Sciences, David Geffen School of Medicine, University of California, Los Angeles, California, USA.

⁵UCLA Center for LGBTQ Advocacy, Research, and Health (C-LARAH), Los Angeles, California, USA.

⁶Department of Medicine, Brown University Alpert Medical School, Providence, Rhode Island, USA.

⁷Department of Epidemiology, Brown University School of Public Health, Providence, Rhode Island, USA.

⁸Center for Health Promotion and Health Equity, Brown University School of Public Health, Providence, Rhode Island, USA.

ⁱORCID ID (<https://orcid.org/0000-0002-2058-3472>).

care providers, making regular PrEP appointments, and daily medication adherence. MSW face several unique challenges in progressing through the continuum care. For example, MSW often face substantial structural (e.g., poverty and homelessness) and psychosocial problems (e.g., substance abuse and victimization), hindering prioritization of health needs and PrEP and posing challenges to accessing health care.^{10,11} These structural barriers are compounded by insufficient access to care due, for example, to lack of insurance or under-insurance and lack of reliable transportation.⁸

Even when MSW do access health services, communication of health concerns and sexual health needs with health care providers may be challenging due to anticipated stigma in health care.⁷ For many MSW, stigma in health care can take an intersectional dimension, being related to same-sex behavior, selling sex, drug use, other aspects of MSW's identities (e.g., race and immigration status), or a combination of these.^{6,12} Experiences and perceptions of stigma in health care contribute to mistrust of health services and providers, hinder communication about HIV prevention needs, and accentuate health disparities among MSW.⁶

To date, there is a dearth of studies examining determinants of engagement in the PrEP care continuum among MSW. Understanding health service- and provider-level factors that influence engagement in PrEP care in this population is key to designing interventions to help link MSW to existing services, and to develop new PrEP programs and delivery models that meet MSW's needs. We investigated characteristics of health services and providers that influence MSW's intention to use PrEP, PrEP use self-efficacy, and anticipated barriers to PrEP uptake, retention, and adherence.

Methods

Participants and procedures

We report on baseline data from 111 MSW in Rhode Island and Massachusetts recruited between May 2017 and July 2019 for a behavioral intervention to promote PrEP initiation and facilitate PrEP adherence. Participants were recruited at online (e.g., Craigslist and male escort websites) and offline venues (e.g., community-based organizations, bars, and other venues where MSW solicit clients) and using snowball techniques. Individuals >18 years of age, who self-reported being HIV negative, exchanged sex for money or drugs with another man in Rhode Island and reported at least one episode of condomless sex with an HIV-positive or status unknown partner in the past 3 months, were not taking PrEP at enrollment and expressed interest in potentially using PrEP as an HIV prevention tool, lived in the New England area, and were English speakers could participate in the baseline assessment.

After written informed consent, participants met with research staff in a private location at participating research centers or community-based organizations for a pre-randomization audio computer-assisted interviewing (ACASI) survey examining sociodemographics, sexual and drug use behaviors, health care access, beliefs about PrEP, barriers and facilitators to PrEP care, and psychosocial characteristics (e.g., mental health and stigma). Participants received \$30 for completing the baseline assessment. The Institutional Review Board at Brown University approved study materials and procedures.

Measures

Engagement in PrEP care (dependent variables)

Intention to initiate PrEP. We assessed intention to initiate PrEP with the following question: "How likely are you to begin taking PrEP in the next month?" Participants who responded they were "very" or "extremely" likely to initiate PrEP were classified as intending to initiate PrEP.

PrEP use self-efficacy. We assessed PrEP use self-efficacy with an adaptation of the previously validated HIV Treatment Adherence Self-Efficacy Scale¹³ to examine participants' confidence in their ability to take PrEP daily despite challenges (e.g., when not feeling well and when using drugs or alcohol). Possible scores ranged from 0 to 10, higher scores indicating higher PrEP use self-efficacy (Cronbach's $\alpha=0.94$).

Anticipated barriers to PrEP uptake. Based on a literature review, our previous research on PrEP implementation, and in collaboration with community partners, we developed a series of items to evaluate different dimensions of barriers to PrEP uptake. We designed nine items assessing anticipated barriers to PrEP uptake, including issues related to scheduling medical visits and cost. Response options on a 5-point scale ranging from "very easy" to "very hard" resulted in a global *anticipated barriers to PrEP uptake* score ranging from 0 to 10, where higher scores indicated greater anticipated barriers (Cronbach's $\alpha=0.94$). Using principal component analysis (PCA) with varimax rotation, we identified three components of anticipated PrEP uptake barriers (Eigenvalues >1.0): making initial appointment (four items); interacting with health services (three items); and structural barriers (i.e., cost and transportation; two items). Final items and respective component loadings are shown in Supplementary Data.

Anticipated barriers to PrEP adherence and retention in care. We also created 12 items assessing anticipated barriers to remaining in PrEP care and adhering to PrEP. Responses on a 5-point scale ("very easy" to "very hard"), led to an overall *anticipated barriers to PrEP adherence and retention* score ranging from 0 to 10; higher scores indicate greater barriers. Subsequent PCA dropped three items that were deemed less relevant and identified three orthogonal components of adherence and retention barriers (Eigenvalues >1.0): attending regular appointments (four items); daily medication adherence (three items); and PrEP-related costs (two items; Supplementary Data).

Health system- and provider-level factors (independent variables)

Current access to health care. We assessed current access to health care with questions about insurance status (yes/no), having a primary care provider (PCP) or regular medical provider (yes/no), and frequency of visits to medical provider in the past year, with ordinal responses options "none," "once," "2-4 times," or "4+ times."

Level of comfort discussing sexual practices with providers. We assessed comfort discussing sexual practices with providers with the question, "How comfortable do you feel discussing with a healthcare provider that you have had sex with men?" (5-point scale where higher scores indicate higher level of comfort).

Transportation difficulties to accessing general health care. We assessed transportation difficulties to accessing general health care with a question about how often participants forewent a medical appointment due to transportation in the past 3 months. Participants who did not seek health care in this period were asked about how often transportation would be an issue if they needed to access care. Response options on a 4-point scale ranged from 0 to 3, such that higher scores represented higher experienced (i.e., for participants who sought care in the period) or anticipated (i.e., for those who did not) transportation difficulties to accessing general health care.

Covariates. We also collected self-reported data on relevant covariates, including age, race/ethnicity, sexual identity, income, educational attainment, time engaging in sex work, and previous sexually transmitted infections (STI) diagnosis.

Analysis plan

We examined associations between characteristics of participants' interactions with health services and providers, and engagement in PrEP care using logistic regression for dichotomous outcomes (intention to use PrEP) and linear regression for continuous ones (PrEP use self-efficacy, anticipated barriers to PrEP uptake, and anticipated barriers to PrEP adherence/retention). Independent variables of interest included having a PCP, frequency of visits to health care provider in the last year, comfort discussing sexual practices with providers, and transportation difficulties to accessing general health care. We did not examine insurance status as an independent variable because 96% of participants were insured, primarily on public insurance. Multivariable analyses included all independent variables of interest (as described above), as well as age, race/ethnicity, sexual identity,

TABLE 1. CHARACTERISTICS OF A SAMPLE OF MALE SEX WORKERS IN THE US NORTHEAST

	Total sample	Intention to initiate PrEP (n=84)	No intention to initiate PrEP (n=27)	p
Age, mean (SD; range=20–57 years)	34.2 (8.5)	34.5 (9.0)	33.2 (7.0)	0.47
Years in sex work, mean (SD; range=1 month–43 years)	9.2 (8.9)	9.3 (9.2)	9.0 (7.7)	0.86
Race/ethnicity, n (%)				0.95
Non-Latinx White	59 (53)	44 (75)	15 (25)	
Latinx	24 (22)	18 (75)	6 (25)	
Non-Latinx Black	12 (11)	9 (75)	3 (25)	
Multiracial/other	16 (14)	13 (89)	3 (11)	
Sexual identity, n (%)				0.02
Bisexual	49 (44)	38 (78)	11 (22)	
Gay	21 (19)	20 (95)	1 (5)	
Straight	21 (19)	15 (71)	6 (29)	
Do not know/other	20 (18)	11 (55)	9 (45)	
Educational attainment, n (%)				0.02
Less than high school	25 (23)	14 (56)	11 (44)	
High school or GED	40 (36)	32 (80)	8 (20)	
Some college	30 (27)	23 (77)	7 (23)	
College degree or higher	16 (14)	15 (94)	1 (6)	
Annual household income, n (%)				0.22
<\$6,000	66 (60)	47 (71)	19 (29)	
\$6,000–\$11,999	22 (20)	18 (82)	4 (18)	
\$12,000 or higher	23 (21)	19 (83)	4 (17)	
STI diagnosis in the past year, n (%)				0.29
Yes	10 (9)	9 (90)	1 (10)	
No	101 (91)	75 (74)	26 (26)	
Insurance status, n (%)				0.25
Insured	107 (96)	82 (77)	25 (23)	
Uninsured	4 (4)	2 (50)	2 (50)	
Level of comfort discussing sexual practices with health provider, n (%)				0.09
Extremely uncomfortable	19 (17)	13 (68)	6 (32)	
Uncomfortable	14 (13)	8 (57)	6 (43)	
Undecided	13 (12)	10 (77)	3 (23)	
Comfortable	37 (33)	30 (81)	7 (19)	
Extremely comfortable	28 (25)	23 (82)	5 (18)	
Transportation difficulties to accessing general health care, n (%)				0.69
Never	44 (40)	34 (77)	10 (23)	
Rarely	10 (9)	7 (70)	3 (30)	
Sometimes	19 (17)	11 (58)	8 (42)	
Often	38 (34)	32 (84)	6 (16)	

GED, high school equivalency; PrEP, pre-exposure prophylaxis; SD, standard deviation; STI, sexually transmitted infection.

income, and educational attainment. We used multivariate (i.e., multiple outcomes) regressions to model the effect of independent variables of interest on the scale components of anticipated barriers to PrEP uptake and PrEP adherence/retention. SPSS was used for all analyses.

Results

Our sample included all 111 MSW who completed the baseline assessment. The mean age of our sample was 34.2 (SD=8.5) years and participants reported engaging in sex work for an average of 9.2 (SD=8.9) years. About half of our sample was White ($n=59$, 53%), 24 (22%) were Latinx, and 12 (11%) were Black. Forty-nine (44%) participants identified as bisexual, and 21 (19%) as gay and straight each. Most participants ($n=65$, 59%) had a high school education or less and 66 (60%) reported annual income of \$6,000 or less. Ten participants (9%) reported a diagnosis of at least one STI in the past year. Almost all participants had health insurance ($n=107$, 96%) and about half had a regular medical provider or PCP ($n=53$, 48%). Most ($n=65$, 59%) reported being comfortable or extremely comfortable discussing sexual practices with a provider and 57 (51%) reported transportation difficulties to accessing general health care “sometimes” or “often.” Table 1 shows participants’ sociodemographics and other behavioral characteristics.

Engagement in PrEP care

Overall, 76% of our sample intended to initiate PrEP within the next month (Table 2). Gay-identified MSW and individuals with higher educational attainment were more likely to intend to initiate PrEP (Table 1). No hypothesized health service- and provider-related characteristics were associated with intention to initiate PrEP (Tables 1 and 3).

Comfort discussing sexual practices with providers was positively associated with PrEP use self-efficacy [adjusted $b=0.41$, 95% confidence interval (CI): 0.11–0.70]. Having a PCP, frequency of visits to health services, and transportation difficulties to accessing general health services were not associated with PrEP use self-efficacy (Table 3).

Descriptive scale statistics and frequencies of anticipated barriers to PrEP uptake are shown in Table 2. Level of comfort discussing sexual practices with health care providers was negatively associated with anticipated barriers to PrEP uptake (adjusted $b=-0.29$, 95% CI: -0.49 to -0.09; Table 3). In multivariate analysis of the subscales of PrEP uptake barriers, comfort discussing sexual practices with provider was associated with anticipated barriers related to interacting with health services and providers (adjusted $b=-0.55$, 95% CI: -0.80 to -0.31) and marginally associated with making initial appointment (adjusted $b=-0.23$, 95% CI:

TABLE 2. MEASURES OF ENGAGEMENT IN PrEP CARE AND FREQUENCIES OF ANTICIPATED BARRIERS TO PrEP UPTAKE, ADHERENCE, AND RETENTION AMONG MALE SEX WORKERS IN THE US NORTHEAST

	n (%)	Mean (SD)
Intention to initiate PrEP within 1 month	84 (76)	
PrEP use self-efficacy (range=0–10)		7.58 (2.25)
Anticipated barriers to PrEP uptake (range=0–10)		2.80 (1.60)
C1 Making initial appointment (range=0–10)		2.32 (1.81)
Finding out more information about PrEP ^a	1 (1)	
Finding a health care provider who could provide PrEP ^a	11 (10)	
Making an appointment with a health care provider to get PrEP ^a	6 (6)	
Keeping an appointment with a health care provider to get PrEP ^a	11 (10)	
C2 Interacting with health services and health providers (range=0–10)		2.17 (1.95)
Talking to a health care provider about PrEP ^a	10 (9)	
Picking up a prescription for PrEP ^a	4 (4)	
Talking with a financial advocate to assist in getting PrEP paid for ^a	4 (4)	
C3 Structural barriers (range=0–10)		4.69 (2.82)
Finding transportation to get to a PrEP appointment ^a	27 (25)	
Paying for costs associated with PrEP ^a	49 (45)	
Anticipated barriers to PrEP adherence and retention (range=0–10)		3.70 (1.98)
C1 Attending regular appointments (range=0–10)		2.91 (2.24)
Making regular appointments with a health care provider to stay on PrEP ^a	5 (5)	
Finding transportation to get to PrEP appointments ^a	30 (27)	
Finding transportation to get to the pharmacy ^a	17 (16)	
Picking up monthly prescriptions for PrEP ^a	9 (8)	
C2 Daily medication adherence (range=0–10)		3.77 (2.24)
Remembering to take a PrEP pill every day ^a	5 (5)	
Taking PrEP every day even if I have some side effects ^a	31 (28)	
Taking PrEP every day even if I am on a “binge” ^a	23 (21)	
C3 PrEP-related costs (range=0–10)		5.16 (3.31)
Paying for costs associated with a medical visit ^a	40 (36)	
Paying for costs associated with PrEP ^a	42 (38)	

^aFrequency of participants who anticipated being “hard” or “very hard” to overcome each specific barrier. PrEP, pre-exposure prophylaxis; SD, standard deviation.

TABLE 3. RELATIONSHIP BETWEEN MEASURES OF ACCESS TO HEALTH CARE AND ENGAGEMENT IN PrEP CARE AMONG MALE SEX WORKERS IN THE US NORTHEAST

	Unadjusted OR (95% CI)	p	Adjusted ^a OR (95% CI)	p
DV: Intention to initiate PrEP (yes/no)				
Having primary care provider	1.19 (0.50 to 2.85)	0.69	0.72 (0.24 to 2.15)	0.56
Frequency of medical visits (past 12 months)	1.00 (0.66 to 1.50)	0.98	0.95 (0.59 to 1.53)	0.82
Comfort discussing sexual practices with provider	1.30 (0.96 to 1.75)	0.09	1.34 (0.93 to 1.92)	0.12
Transportation difficulties to accessing general care	1.07 (0.77 to 1.49)	0.69	1.18 (0.80 to 1.73)	0.40
	b (95% CI)	p	Adjusted b (95% CI)	p
DV: PrEP use self-efficacy				
Having primary care provider	0.06 (−0.81 to 0.92)	0.90	−0.65 (−1.50 to 0.20)	0.13
Frequency of medical visits	0.22 (−0.19 to 0.62)	0.29	0.20 (−0.19 to 0.59)	0.31
Comfort discussing sexual practices with provider	0.49 (0.20 to 0.77)	0.001	0.41 (0.11 to 0.70)	0.008
Transportation-related barriers to general care	−0.03 (−0.36 to 0.30)	0.86	0.18 (−0.14 to 0.50)	0.26
DV: Anticipated barriers to PrEP uptake				
Having primary care provider	−0.60 (−1.19 to 0.00)	0.05	−0.22 (−0.80 to 0.36)	0.45
Frequency of medical visits (12 months)	−0.14 (−0.43 to 0.15)	0.34	−0.12 (−0.39 to 0.14)	0.37
Comfort discussing sexual practices with provider	−0.35 (−0.56 to −0.15)	0.001	−0.29 (−0.49 to −0.09)	0.006
Transportation difficulties to accessing general care	0.41 (0.19 to 0.62)	<0.001	0.30 (0.08 to 0.51)	0.007
DV: Anticipated barriers to PrEP adherence and retention				
Having primary care provider	−0.25 (−1.00 to 0.51)	0.52	0.15 (−0.55 to 0.85)	0.67
Frequency of medical visits (past 12 months)	−0.21 (−0.57 to 0.15)	0.24	−0.20 (−0.52 to 0.12)	0.22
Comfort discussing sexual practices with provider	−0.18 (−0.44 to 0.09)	0.19	−0.10 (−0.35 to 0.14)	0.41
Transportation difficulties to accessing general care	0.71 (0.46 to 0.96)	<0.001	0.57 (0.31 to 0.84)	<0.001

^aAdjusting for age, race/ethnicity, sexual identity, income, educational attainment, and other independent variables of interest. aOR, adjusted odds ratio; CI, confidence interval; DV, dependent variable; OR, odds ratio; PrEP, pre-exposure prophylaxis.

−0.49 to 0.03, $p=0.08$; Table 4). Transportation difficulties to accessing general health care were positively associated with overall anticipated barriers to PrEP uptake (adjusted $b=0.30$, 95% CI: 0.08–0.51; Table 3), largely explained by a positive association with anticipated structural barriers to PrEP (adjusted $b=1.00$, 95% CI: 0.62–1.37; Table 4). The bivariate marginal association between having a PCP and anticipated PrEP uptake barriers ($b=-0.60$, 95% CI: −1.19 to 0.00, $p=0.05$) did not persist after adjusting for covariates (Table 3). Although frequency of medical visits in the past 12 months was not associated with overall anticipated barriers to PrEP uptake, there was a marginal association with structural barriers to PrEP uptake (adjusted $b=-0.46$, 95% CI: −0.92 to 0.01, $p=0.05$; Table 4).

Frequencies of anticipated PrEP adherence and retention barriers are reported in Table 2. Of the health service- and provider-related characteristics examined, only transportation difficulties to accessing general health care were associated with anticipated PrEP adherence and retention barriers overall (adjusted $b=0.57$, 95% CI: 0.31–0.84), and with anticipated barriers related to attending regular medical appointments (adjusted $b=0.90$, 95% CI: 0.61–1.18) and related to PrEP costs ($b=0.54$, 95% CI: 0.18–1.00) more specifically (Tables 3 and 4). While comfort discussing sexual practices with providers was not associated with overall anticipated barriers to PrEP adherence and retention, there was a marginal negative association with barriers related to daily medication adherence (adjusted $b=-0.29$, 95% CI: 0.60–0.02, $p=0.06$; Table 4). Similarly, frequency of

medical visits in the past year had a marginal effect on anticipated barriers to PrEP adherence and retention related to PrEP costs (adjusted $b=-0.51$, 95% CI: −1.08 to 0.06, $p=0.08$; Table 4).

Discussion

Our study adds to the limited literature on engagement in PrEP care among MSW. We contribute to the understanding of characteristics of MSW's interactions with health services and providers who may influence engagement in the PrEP care continuum. While these health service- and provider-level factors were not predictive of intention to initiate PrEP, there were significant associations with PrEP use self-efficacy and anticipated barriers to PrEP uptake, adherence, and retention. According to health behavior theory, PrEP use self-efficacy and barriers to PrEP uptake and adherence may impact PrEP use and persistence directly (i.e., not through behavioral intentions),^{14,15} further widening the gap between PrEP willingness and intention and actual use among MSW.⁵ That is, addressing barriers to PrEP care at the health services and provider levels is key to ensuring that MSW who intend to initiate PrEP can actually do so.

In our study, having a PCP was not associated with PrEP use intention, self-efficacy, or barriers to engagement in PrEP care. These null findings may be due to many MSW and other MSM preferring to access HIV prevention services from providers other than their PCP⁷ because of anticipated stigma related to sexual behaviors from providers.¹⁶ Moreover,

TABLE 4. ASSOCIATIONS BETWEEN CHARACTERISTICS OF HEALTH CARE ACCESS AND SPECIFIC COMPONENTS OF (A) ANTICIPATE BARRIERS TO PrEP UPTAKE MEASURE AND (B) ANTICIPATED BARRIERS TO PrEP ADHERENCE AND RETENTION AMONG MALE SEX WORKERS IN THE US NORTHEAST

	(a) Anticipated barriers to PrEP uptake, individual components ^a			(b) Anticipated barriers to PrEP adherence and retention, individual components ^b		
	C1: Making initial appointment	C2: Interacting with health services and health providers	C3: Structural barriers to PrEP uptake	C1: Attending visits to health services	C2: Daily medication adherence	C3: PrEP-related costs
Having primary care provider ^c	-0.46 (-1.19 to 0.26)	-0.29 (-0.99 to 0.41)	0.41 (-0.58 to 1.42)	0.27 (-0.51 to 1.03)	-0.41 (-1.29 to 0.46)	0.96 (-0.27 to 2.19)
Frequency of medical visits (12 months) ^c	0.01 (-0.32 to 0.35)	-0.09 (-0.41 to 0.23)	-0.46 [†] (-0.92 to 0.01)	-0.16 (-0.52 to 0.19)	-0.12 (-0.53 to 0.28)	-0.51 [†] (-1.08 to 0.06)
Comfort discussing sexual practices with provider ^c	-0.23 [†] (-0.49 to 0.03)	-0.55 ^{**} (-0.80 to -0.31)	0.05 (-0.31 to 0.40)	-0.01 (-0.28 to 0.27)	-0.29 [†] (-0.60 to 0.02)	0.14 (-0.30 to 0.57)
Transportation difficulties to accessing general health care ^c	0.04 (-0.23 to 0.31)	0.18 (-0.08 to 0.43)	1.00 ^{**} (0.62 to 1.37)	0.90 ^{**} (0.61 to 1.18)	0.17 (-0.15 to 0.50)	0.54 [*] (0.08 to 1.00)

^aMultivariate model with three components of anticipated barriers to PrEP uptake measure as outcomes.

^bMultivariate model with three components of anticipated barriers to PrEP adherence and retention measure as outcomes.

^cUnstandardized multivariate linear regression coefficients in models adjusting for age, race/ethnicity, sexual identity, income, educational attainment, and other independent variables of interest.

[†] $p \leq 0.08$, ^{*} $p < 0.05$, ^{**} $p < 0.001$.

PrEP, pre-exposure prophylaxis.

many PCPs may not have sufficient training in clinical management of PrEP and provide suboptimal care,¹⁶ making PrEP prescription by specialists preferable in some circumstances.^{17,18} Still, some patients may prefer to access PrEP care in generalist clinics due to stigma associated with health centers specialized in HIV-/STI-related care.¹⁹ PCPs also have important roles in identifying and referring at-risk individuals, managing other physical and mental health issues, and coordinating interdisciplinary care, and, as such, should be considered in future efforts to address MSW's general and PrEP-related health needs.

Similar to previous research among MSM,^{7,20,21} we found that lack of comfort discussing sexual practices with health care providers was associated with lower PrEP use self-efficacy and greater barriers to PrEP uptake. Communication challenges in patient-provider relationships are more likely to affect MSW at higher health and social vulnerability (e.g., multiple stigmatized identities and concomitant substance use).^{6,22-24} Effective communication with health care providers about sexual practices and behaviors that may constitute clinical indications for PrEP is essential for engagement in HIV prevention care, including HIV testing and PrEP initiation.²⁵ Health care providers are also well positioned to provide PrEP adherence support and have had a positive role in several promising PrEP adherence interventions.²⁶ This may explain the marginal negative association between comfort discussing sexual practices with providers and anticipated barriers related to daily PrEP adherence. In that sense, interventions to improve providers' communication skills and decrease provider stigma related to sexual behaviors may be promising to create affirming clinic environments for MSW to access PrEP.^{22,25} PrEP delivery programs should also consider initiatives to increase MSW's self-efficacy to initiate and maintain potentially difficult conversations with providers. Future research should examine subgroups of MSW for whom communication with providers about sex is most challenging (e.g., straight vs. gay identified, MSW who inject drugs, etc.) to identify individuals in greatest need of such interventions.

Transportation difficulties to accessing general health care were also associated to anticipated barriers to PrEP uptake, adherence, and retention, particularly with structural barriers to uptake and cost-related barriers to adherence and retention. Inadequate access to transportation reflect broader structural problems such as poverty and insufficient availability of public transportation and health services, which constitute barriers to general and PrEP-related care in themselves. Such broader structural problems may also underlie the marginal associations between frequency of medical visits in the past 12 months and structural barriers to PrEP uptake and barriers to PrEP adherence and retention related to PrEP costs we observed. MSW may experience increased structural and transportation-related barriers to accessing care during periods of heightened HIV risk (e.g., severe substance use), when PrEP would be most beneficial.¹⁰ To reach populations of MSW who may be experiencing these challenges, initiatives such as provision of transportation vouchers,^{27,28} mobile health clinics,²⁹ pharmacy-based PrEP provision,³⁰ telehealth adherence support,³¹ and online PrEP prescriptions³² may be promising. Future studies should evaluate the role of these strategies as part of multipronged interventions to promote PrEP initiation and adherence among MSW.

Our study is not without limitations. We drew our sample from one metropolitan region in the US Northeast only, and therefore our findings may not generalize to other populations of MSW. Moreover, we report on data from the baseline assessment of a behavioral PrEP intervention with MSW, and by design, all participants reported some level of interest in taking PrEP, which may limit our ability to draw conclusions regarding MSW not at all interested in PrEP. Previous research has highlighted the distinction between hypothetical interest in PrEP and intentions to initiate PrEP, the latter being a more proximal determinant of actual PrEP use.³³ Indeed, despite relative homogeneity regarding interest in PrEP, we found substantial variability in intentions to use PrEP, which enabled the examination of determinants of progression through the PrEP care continuum in our sample. Finally, we did not evaluate other potential health service-related barriers to accessing HIV prevention, such as mistrust in health providers and previous experiences of discrimination in health care, characteristics that we believe should be examined in future studies.

Conclusions

Despite these limitations, our findings contribute to the understanding of the influence of characteristics of interactions with health services and providers in the PrEP care continuum among MSW. Almost a decade after initial Food and Drug Administration (FDA) approval of PrEP for HIV prevention for at-risk individuals, uptake among MSW remains low. The rapid increase in PrEP use among the larger population of MSM recently³⁴ fueled by prioritization of PrEP as part of the HIV prevention toolkit suggests that concerted efforts to increase engagement in the PrEP care continuum can be effective to link MSW to PrEP services as well. Given the increased HIV burden among MSW, targeted PrEP rollout of PrEP for MSW may be a cost-effective and equity-oriented strategy for reducing HIV transmission among MSM in general.⁴ Strategies to expand PrEP access among MSW should account for barriers to accessing health services, including cost and transportation, and interacting with health care providers. Since these barriers are rooted in structural processes (e.g., stigma and poverty) that may not be easily modifiable at the individual level, addressing health service- and provider-level barriers to PrEP care will require efforts targeting health systems, policies, and PrEP delivery models. To this end, initiatives such as provider training and education programs, and innovative forms to provide general and PrEP provision services and adherence support will be key to mitigating health disparities experienced by MSW.

Authors' Contributions

P.K.V.: conceptualization, formal analysis, and writing—original draft. M.J.M.: supervision, writing—editing and review, and funding acquisition. P.A.C.: supervision, writing—editing and review, and funding acquisition. K.B.B.: conceptualization, supervision, writing—editing and review, and funding acquisition. All authors have read and approved the article.

Acknowledgments

The authors would like to thank research participants, staff, and collaborating community-based organizations for their invaluable contributions to this study.

Disclaimer

The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Author Disclosure Statement

The authors declare no conflicts of interest.

Funding Information

This work was supported by the National Institute of Mental Health of the National Institutes of Health (R34MH110369; MPI: Mimiaga/Biello/Chan).

Supplementary Material

Supplementary Data

References

- Oldenburg CE, Perez-Brumer AG, Reisner SL, et al. Global burden of HIV among men who engage in transactional sex: A systematic review and meta-analysis. *PLoS One* 2014;9:e103549.
- Grant RM, Lama JR, Anderson PL, et al. Preexposure chemoprophylaxis for HIV prevention in men who have sex with men. *N Engl J Med* 2010;363:2587–2599.
- Grant RM, Anderson PL, McMahan V, et al. Uptake of pre-exposure prophylaxis, sexual practices, and HIV incidence in men and transgender women who have sex with men: A cohort study. *Lancet Infect Dis* 2014;14:820–829.
- Goedel WC, Mimiaga MJ, King MRF, et al. Potential impact of targeted HIV pre-exposure prophylaxis uptake among male sex workers. *Sci Rep* 2020;10:5650.
- Peng P, Su S, Fairley CK, et al. A Global estimate of the acceptability of pre-exposure prophylaxis for HIV among men who have sex with men: A systematic review and meta-analysis. *AIDS Behav* 2018;22:1063–1074.
- Underhill K, Morrow KM, Collieran C, et al. A qualitative study of medical mistrust, perceived discrimination, and risk behavior disclosure to clinicians by U.S. male sex workers and other men who have sex with men: Implications for biomedical HIV prevention. *J Urban Health* 2015;92:667–686.
- Biello KB, Oldenburg CE, Mitty JA, et al. The “safe sex” conundrum: Anticipated stigma from sexual partners as a barrier to PrEP use among substance using MSM engaging in transactional sex. *AIDS Behav* 2017;21:300–306.
- Underhill K, Morrow KM, Collieran CM, et al. Access to healthcare, HIV/STI testing, and preferred pre-exposure prophylaxis providers among men who have sex with men and men who engage in street-based sex work in the US. *PLoS One* 2014;9:e112425.
- Nunn AS, Brinkley-Rubinstein L, Oldenburg CE, et al. Defining the HIV pre-exposure prophylaxis care continuum. *AIDS (London, England)* 2017;31:731.
- Underhill K, Guthrie KM, Collieran C, Calabrese SK, Operario D, Mayer KH. Temporal fluctuations in behavior, perceived HIV risk, and willingness to use pre-exposure prophylaxis (PrEP). *Arch Sex Behav* 2018;47:2109–2121.
- Landers S, Closson EF, Oldenburg CE, Holcomb R, Spurlock S, Mimiaga MJ. HIV prevention needs among street-based male sex workers in Providence, Rhode Island. *Am J Public Health* 2014;104:e100–e102.
- Valente PK, Edeza A, Klasko-Foster L, et al. Sexual orientation and social network size moderate associations between stigma and problematic alcohol use among male sex workers in the US Northeast: An observational study. *Sex Health* 2020;17:429–436.
- Johnson MO, Neilands TB, Dilworth SE, Morin SF, Remien RH, Chesney MA. The role of self-efficacy in HIV treatment adherence: Validation of the HIV Treatment Adherence Self-Efficacy Scale (HIV-ASES). *J Behav Med* 2007;30:359–370.
- Ajzen I. The theory of planned behavior. *Organ Behav Hum Decis Process* 1991;50:179–211.
- Fishbein M. An integrative model for behavioral prediction and its application to health promotion. In: DiClemente RJ, Crosby RA, Kegler MC, editors. *Emerging Theories in Health Promotion Practice and Research*. New York: Jossey-Bass/Wiley; 2009. p. 215–234.
- Pleuhs B, Quinn KG, Walsh JL, Petroll AE, John SA. Health care provider barriers to HIV pre-exposure prophylaxis in the United States: A systematic review. *AIDS Patient Care and STDs* 2020;34:111–123.
- Hoffman S, Guidry JA, Collier KL, et al. A clinical home for preexposure prophylaxis: Diverse health care providers’ perspectives on the “purview paradox.” *J Int Assoc Provid AIDS Care* 2015;15:59–65.
- Krakower D, Ware N, Mitty JA, Maloney K, Mayer KH. HIV providers’ perceived barriers and facilitators to implementing pre-exposure prophylaxis in care settings: A qualitative study. *AIDS Behav* 2014;18:1712–1721.
- Kenison TC, Badenhop B, Safo S. Unlocking HIV pre-exposure prophylaxis delivery: Examining the role of HIV providers in pre-exposure prophylaxis care. *AIDS Patient Care STDs* 2020;34:251–258.
- Krakower D, Oldenburg C, Mimiaga M, et al. Patient-provider communication about sexual behaviors and pre-exposure prophylaxis: Results from a national online survey of men who have sex with men in the United States. Poster presented at the 8th International AIDS Society Conference on HIV Pathogenesis, Treatment and Prevention, Vancouver, British Columbia, Canada; 2015.
- Wade Taylor S, Mayer KH, Elsesser SM, Mimiaga MJ, O’Cleirigh C, Safren SA. Optimizing content for pre-exposure prophylaxis (PrEP) counseling for men who have sex with men: Perspectives of PrEP users and high-risk PrEP naïve men. *AIDS Behav* 2014;18:871–879.
- Calabrese SK, Tekeste M, Mayer KH, et al. Considering stigma in the provision of HIV pre-exposure prophylaxis: Reflections from current prescribers. *AIDS Patient Care STDs* 2019;33:79–88.
- Edelman EJ, Moore BA, Calabrese SK, et al. Primary care physicians’ willingness to prescribe HIV pre-exposure prophylaxis for people who inject drugs. *AIDS Behav* 2017;21:1025–1033.
- Zhang C, McMahon J, Fiscella K, et al. HIV pre-exposure prophylaxis implementation cascade among health care professionals in the United States: Implications from a systematic review and meta-analysis. *AIDS Patient Care STDs* 2019;33:507–527.
- Krakower DS, Mayer KH. The role of healthcare providers in the roll out of preexposure prophylaxis. *Curr Opin HIV AIDS* 2016;11:41–48.
- Marcus J, Buisker T, Horvath T, et al. Helping our patients take HIV pre-exposure prophylaxis (PrEP): A systematic review of adherence interventions. *HIV Med* 2014;15:385–395.

27. Biello KB, Bazzi AR, Mimiaga MJ, et al. Perspectives on HIV pre-exposure prophylaxis (PrEP) utilization and related intervention needs among people who inject drugs. *Harm Reduct J* 2018;15:55.
28. Richardson S, Seekaew P, Koblin B, Vazquez T, Nandi V, Tieu H-V. Barriers and facilitators of HIV vaccine and prevention study participation among young Black MSM and transwomen in New York City. *PLoS One* 2017;12:e0181702.
29. Yu SWY, Hill C, Ricks ML, Bennet J, Oriol NE. The scope and impact of mobile health clinics in the United States: A literature review. *Int J Equity Health* 2017;16:178–178.
30. Farmer EK, Koren DE, Cha A, Grossman K, Cates DW. The pharmacist's expanding role in HIV pre-exposure prophylaxis. *AIDS Patient Care STDs* 2019;33:207–213.
31. Marcus JL, Hurley LB, Hare CB, et al. Preexposure prophylaxis for HIV prevention in a large integrated health care system: Adherence, renal safety, and discontinuation. *J Acquir Immune Defic Syndr (1999)* 2016;73:540–546.
32. Wille L, Parent MC. Online prescriptions to HIV pre-exposure prophylaxis and pre-exposure prophylaxis uptake. *AIDS Patient Care STDs* 2020;34:499–501.
33. Rendina HJ, Whitfield THF, Grov C, Starks TJ, Parsons JT. Distinguishing hypothetical willingness from behavioral intentions to initiate HIV pre-exposure prophylaxis (PrEP): Findings from a large cohort of gay and bisexual men in the U.S. *Soc Sci Med* 2017;172:115–123.
34. Finlayson T, Cha S, Xia M, et al. Changes in HIV pre-exposure prophylaxis awareness and use among men who have sex with men—20 urban areas, 2014 and 2017. *Morb Mort Wkly Rep* 2019;68:597.

Address correspondence to:

Katie B. Biello, PhD, MPH

Center for Health Promotion and Health Equity

Brown University School of Public Health

121 South Main Street

Box G-S121-8

Providence, RI 02912

USA

E-mail: katie_biello@brown.edu