PrEP Uptake among Eligible Patients Attending the Largest PrEP Clinic in Jackson, Mississippi

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Abstract

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Background

Among people at risk for HIV in the United States (US), Black people of all gender identities and sexual orientations have disproportionately high rates of new HIV infection but low uptake of pre-exposure prophylaxis (PrEP), especially in the Southern United States. There is limited research evaluating factors associated with PrEP uptake especially among Black communities.

Setting and Methods

The Open Arms Clinic in Jackson, Mississippi is the largest provider of PrEP in the state with the 6th highest rate of HIV diagnosis in the US. Open Arms systematically documented PrEP eligibility and uptake (i.e., agreed undergo a clinical evaluation for PrEP) from 2017 to mid-2020. In encounter-based analyses, we examined factors associated with PrEP uptake among those eligible based on clinic criteria using bivariate and multivariate log binomial regression. A person-based analysis was conducted using chi-square tests to compare individuals who ever vs. never accepted an offer for PrEP.

Results

Among 721 encounters where patients were eligible for PrEP, staff offered PrEP at 680 (94%) of these encounters (526 unique individuals). Eligible patients were mostly ages 25 and older (61.5%), identified as Black (73.1%), and cisgender men who have sex with men (MSM) (63.5%). Individuals accepted a PrEP offer at 58% of encounters; 65.8% of individuals ever accepted an offer. Encounters with individuals that identified as transgender/non-binary were least likely to accept a PrEP offer. Encounters with individuals who reported having sex partners living with HIV or unknown HIV status were more likely to accept PrEP offer. There was no significant difference in accepting an offer by age or race.

Conclusions

PrEP uptake in this clinic was suboptimal despite standardized methodical evaluation of eligibility. Our findings signify a critical need to enhance PrEP delivery in this region and enhance PrEP education for key groups such as transgender/non-binary individuals.

Introduction

Despite evidence demonstrating the efficacy of oral pre-exposure prophylaxis (PrEP) for HIV prevention, uptake in the United States (US) has been slow, with only an estimated 23% of eligible persons within the US using PrEP in 2019.[1,2] Low PrEP uptake is especially pronounced among Black cisgender women, Black transgender women, and Black men who have sex with men (MSM) compared to white people of all genders and sexual orientations, populations that continue to bear a disproportionally high burden of HIV.[3] In 2019, only an estimated 8% of Black Americans were prescribed PrEP compared to 63% of white Americans.[2] PrEP uptake is also low in the Southern US, a region where HIV incidence is the highest in the country.[2]

Several studies have attempted to characterize the steps in the PrEP "continuum" in the US, including uptake. In a recent meta-analysis, which pooled data from nearly 50 studies of Black MSM in the US, the overall prevalence of PrEP awareness was 50.8% and a willingness to use/intention to use PrEP was 58.2%, but the pooled prevalence of uptake was much lower at 15.5%, highlighting a major gap in the PrEP continuum.[4] Among Black cisgender women in the Southern US, only 11% had previously heard of PrEP, but once learning about PrEP, over 88% of eligible women reported willingness to use it.[5,6] However, it is unclear the extent to which willingness to use PrEP translates into PrEP uptake.

There is a growing body of literature examining factors associated with PrEP uptake. PrEP awareness has consistently been found to be associated with uptake, although these findings differed based on the study population's gender identity.[4. 5, 7, 9, 10, 11, 13, 15, 16, 19, 20, 21] Factors such as age, race, number of sex partners, frequency of condom use, relationship status, gender identity, having partners living with HIV or of unknown status, and history of STI have been consistently associated with PrEP uptake, but the direction and magnitude of these associations varies widely across studies.[4, 5, 7-11 14, 15] There is still a key gap in our knowledge of factors

associated with accepting a PrEP offer in a clinical setting, including a dearth of this type of information from the Southern US.

Mississippi has the sixth highest rate of HIV diagnosis in the US and is one of seven states identified by the US Ending the HIV Epidemic (EHE) initiative as being a geographic hotspot of HIV[2]. Despite high rates of HIV transmission, only one in five individuals with indications for PrEP use were prescribed PrEP in 2019.[2] Yet we know little about factors associated with PrEP uptake in clinical settings in Mississippi. This information can help guide PrEP providers to modify their approach to PrEP provision.

The Open Arms Healthcare Center, located in Jackson, Mississippi, is the largest PrEP provider in the state. Open Arms systematically documents PrEP eligibility and uptake, providing a unique opportunity to examine PrEP uptake and factors associated with uptake among a population of patients who were eligible and offered PrEP by clinic staff. The objectives of this analysis were to determine uptake of PrEP and factors associated with uptake among patients attending Open Arms.

Methods

Study Design, Setting and Population

This study was a cross-sectional study using data from the Open Arms Healthcare Center, located in Jackson, Mississippi. Open Arms provides holistic healthcare to underserved, underinsured, and underrepresented populations, and aims to provide LGBT people of color culturally competent care in a safe environment. The clinic has offered PrEP to patients since 2015 and is the largest PrEP provider in Mississippi.

Open Arms offers PrEP to individuals who are MSM or transgender women, diagnosed with gonorrhea, chlamydia, or syphilis, report a partner who is living with HIV, asking for PrEP, or transitioning from non-occupational post-exposure prophylaxis (nPEP). Once eligibility is determined by clinic staff, eligible patients are extended an offer by clinic staff to undergo a clinical evaluation to initiate PrEP (henceforth described as a “PrEP offer”). Prior to 2018, individuals who accepted PrEP underwent a same-day clinical evaluation including obtaining baseline labs. Individuals who were deemed clinically eligible to start PrEP were given a prescription after laboratory results were available. Starting in 2018, individuals were given a prescription for PrEP the same day as the clinical evaluation, prior to receiving the results of baseline labs.

In 2017, staff at Open Arms began systematically documenting PrEP eligibility criteria, PrEP offer, and PrEP uptake (i.e., accepted a PrEP offer; patient agreed to undergo an evaluation for PrEP) in an ancillary REDCap database, which was used until mid-2020. The REDCap database included demographic information, STI testing and diagnosis history, sexual behavior history, and whether or not someone was eligible for PrEP, offered PrEP, and accepted a PrEP offer.

For this analysis the study population comprised individuals who were patients at Open Arms from January 2017 to October 2020 (the time period when the REDCap database was used) and who were determined to be eligible for PrEP by the clinic’s criteria. This is an encounter-based dataset.

Statistical Analysis

We describe the percentage of encounters where individuals accepted a PrEP offer, among encounters where individuals were eligible and offered PrEP. We examined associations

between PrEP uptake and select demographic (e.g., age, race), clinical (e.g., history of STI), and behavioral (e.g., condom use) factors that we identified in the literature to be previously associated with PrEP uptake. To explore whether uptake of PrEP differed by select factors, we used log binomial regression with robust standard errors to estimate unadjusted and adjusted prevalence ratios and 95% confidence intervals. We included all factors of interest in the multivariate model.

In a person-based analysis, we describe the percentage of individuals who ever accepted a PrEP offer versus never accepted a PrEP offer. We compared the characteristics of patients who ever versus never accepted PrEP using chi-square tests and also reported the median number of times after the initial PrEP decline that someone later accepted a PrEP offer.

We used Stata version 17 (College Station, TX, USA) for all analyses. All tests were performed at a significance level of 0.05 This study was reviewed and approved by the University of Washington Institutional Review Board (IRB) and University of Mississippi Medical Center IRB.

Results

Between January 2017 and October 2020 there were 721 encounters where patients were eligible for PrEP; staff offered PrEP at 680 (94%) of these encounters. These 680 encounters include 526 unique individuals, and comprise the analytic datasets used for analysis.

Descriptive characteristics of encounters at which patients were offered PrEP are shown in Table 1. Most encounters were with patients ages 25 and older (61.5%), patients who identified as Black (73.1%), and cisgender men who have sex with men (MSM) (63.5%). Approximately 17% of encounters were with patients who reported having sex partners living with HIV.

Individuals accepted a PrEP offer at 395 (58%) of 680 encounters (Table 2). Encounters with individuals who were transgender or non-binary had the lowest prevalence of accepting the PrEP offer (16%); the highest prevalence of accepting the PrEP offer (93%) was during encounters where individuals reported having a sex partner who was living with HIV (Table 2). Bivariate analyses indicated that encounters with transgender/non-binary individuals were significantly less likely to accept a PrEP offer compared to those with cisgender MSM (PR=0.3; 95% CI=0.1, 0.5). Encounters with individuals who reported an STI diagnosis in the last year were less likely to accept the PrEP offer than those who had not received a diagnosis (PR=0.8; 95% CI=0.7, 1.0). Encounters with individuals who did not know their last date of HIV test (PR=1.3; 95% CI=1.1, 1.6) and encounters where individuals reported always (versus not always) using condoms for receptive vaginal or anal sex (PR=1.3; 95% CI=1.1, 1.6) were more likely to accept the PrEP offer. Encounters with individuals who reported having sex partners living with HIV or of unknown HIV status were more likely to accept the PrEP offer compared to those who did not report having these partners; this was the only factor that remained significantly associated with accepting a PrEP offer in adjusted analysis (aPR=1.9, 95% CI=1.2, 2.8). There were no significant differences in accepting a PrEP offer by race or age.

There were 526 unique individuals who were offered PrEP; 346 (65.8%) ever accepted a PrEP offer and 180 (34.2%) never accepted a PrEP offer (Table 3). Among these 180 individuals, 86% were offered PrEP once, 10% were offered twice, and 4% were offered PrEP three or more times. There were no significant differences in ever vs. never accepting a PrEP offer by age or race. Transgender/non-binary individuals were the least likely to ever accept a PrEP offer (16.7% ever accepted) and cisgender MSM were the most likely to ever accept a PrEP offer (73.1% ever accepted). Of the 346 individuals who ever accepted a PrEP offer, 329 (95.1%) accepted at the first offer and 17 (4.9%) initially declined a PrEP offer and later accepted; 14

(82%) of 17 accepted a PrEP offer the second time they were offered. Notably, 28 (8.1%) of the 329 who accepted PrEP at first offer declined a subsequent PrEP offer that was made after a gap in their PrEP coverage (a median of 6 months after initiating PrEP).

Discussion

In this analysis of clinic data from the largest PrEP provider in Jackson, Mississippi, we found that patients accepted a PrEP offer at 58% of visits at which they were eligible. In our person-based analysis, we found that about 66% of patients eligible for PrEP ever accepted a PrEP offer and that vast majority (95%) of those patients accepted the PrEP offer the first time they were asked. Accepting a PrEP offer was lowest for patients who identified as transgender and highest for patients who had a partner living with HIV. These findings suggest that PrEP uptake is suboptimal even in a setting where PrEP is systematically offered, and PrEP education is provided to all patients at high risk of HIV.

PrEP uptake in this study is at the high end of what has been observed in other US studies; those studies have yielded a wide range of estimates of PrEP uptake, from 6.5% to 77%.[4, 16-19] Many of these estimates of PrEP uptake have been from populations exclusively comprised of MSM, from research studies, from a variety of clinical settings, and using different definitions of uptake (e.g., referral to PrEP provider, prescription pick-up). Our population included all individuals (regardless of gender or gender of sex partners) who presented to a clinical setting and who were determined by clinic protocol to be eligible for PrEP. Thus, contextualizing our results in the findings of other studies is somewhat difficult. Nonetheless, it is notable that in our study there were 42% of encounters where patients were eligible for PrEP but declined a PrEP offer and that one-third of patients never accepted a PrEP offer. This presents a major missed opportunity for HIV prevention. Several studies have identified a lack of PrEP awareness as a key barrier to uptake, [4. 5, 7, 9, 10, 11, 13, 15, 16, 19, 20, 21] but here patients were already engaging with the

healthcare system, received standardized education about PrEP, and were offered PrEP. This highlights other critical barriers to PrEP uptake in this population. A large body of research has attempted to characterize these barriers at all socioecological levels. Individual-level barriers (e.g., perceived risk of HIV infection, concerns of PrEP side effects [4-8, 10, 11, 14-16, 19-21, 25-28]), interpersonal-level barriers (e.g., PrEP use implies cheating to monogamous partners[14, 15, 19, 22, 25, 27]), and healthcare-level barriers (e.g., proximity to facilities, medical mistreatment[4, 7, 10, 15, 16, 19, 22]) all contribute to low uptake. Additionally, structural racism and perceived and enacted PrEP-related stigma associated with HIV, homophobia, and transphobia are barriers at all socioecological levels.[4, 7, 9, 10, 12, 16, 22, 25-27] Improving PrEP uptake necessitates approaches that address these critical hurdles.

Our findings highlighted large differences in PrEP uptake by gender identity and gender of sex partners. We found that cisgender MSM were more likely to ever accept a PrEP offer (73%), compared to cisgender women (57%) and transgender/non-binary individuals (17%). Estimates of PrEP uptake among cisgender women in the US are limited. Nationally in 2019 only about 10% of women who were eligible for PrEP (per CDC criteria) had taken PrEP,[2] highlighting a clear gap in PrEP provision. As noted above, lack of PrEP awareness may be a main driver in PrEP uptake among cisgender women,[5, 7, 9, 10, 11, 15, 16, 19-21] but in our setting where all patients were educated about PrEP, it may be that other barriers (e.g., women not perceiving themselves to be at risk for HIV) may be dominant. Transgender and non-binary populations may have unique barriers to PrEP uptake. These include concerns of side effects and interactions with hormone replacement therapy (HRT) for gender-affirming care, stigma, and prioritization of social support programs over medical care.[6, 9, 12, 27, 29,30]

In our encounter-based analysis, the only factors other than gender that were significantly associated with PrEP uptake were condom use and having a partner living with HIV, with the

latter being the only factor significantly associated with PrEP uptake in adjusted analyses. Given that over 90% of individuals with partners living with HIV accepted the PrEP offer, we hypothesize that these individuals specifically sought care at the clinic in order to start PrEP. Notably, both person and encounter-based analyses found no significant difference in PrEP uptake by race and age. Multiple studies have observed differential uptake of PrEP by age and race[10, 11, 21, 23] but a large national study conducted by Weiss and colleagues found that PrEP use did not vary by race after adjusting for demographic and geographic factors, which may indicate that studies finding racial differences in PrEP uptake are impacted by geographic confounders and lack of access to PrEP services.[17]

There are several limitations that may influence the analysis of the results of the study. First, these data are from a single clinical site in Jackson, Mississippi, and results may not be able to be extrapolated broadly, though these data do come from the largest PrEP provider in Mississippi. Second, because this analysis leveraged data collected for clinical purposes, we were not able to examine other factors' association with PrEP uptake. For example, our analysis did not include urban/rural residence information, insurance status, or substance use history. Third, our data only describe PrEP uptake and we do not know reasons why people did not accept the PrEP offer (e.g., did not perceive a need for PrEP, did not want to return to the clinic for quarterly visits, etc.). However, this study still provides important insights into this first step of the "PrEP continuum". A key strength of our study is that the clinic systematically documented PrEP eligibility criteria, PrEP offers, and acceptance of the offer, allowing us to gain a comprehensive look at PrEP uptake.

In summary we found that overall PrEP uptake was suboptimal in this clinical setting where PrEP eligibility and offers were systematically documented. There was no significant difference in uptake by age or race in our study population. However, uptake differed by gender and

gender of sex partners and was lowest among cisgender women followed by transgender/non-binary individuals, highlighting the importance of addressing the needs of transgender/non-binary populations to improve PrEP uptake. Individuals reporting sexual partners living with HIV were most likely to accept a PrEP offer and may have sought care at Open Arms specifically for PrEP services. Supplementing clinic eligibility criteria with questions about social economic status, substance use history, and reasons for denying a PrEP offer may enhance screening and uptake among the clinic population and highlight potential areas of intervention. Our findings highlight the importance of standardized education of PrEP use and the need to specialize care to address low uptake among cisgender women and transgender patients.

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Table 1. Characteristics of Encounters where Patient was Eligible for Pre-Exposure Prophylaxis (PrEP) and Offered a Prescription (N=680)

Characteristics	**Study Population (N=680)**
	N (%)
Age (years)	
<25	262 (38.5)
>=25	418 (61.5)
Race	
Black	493 (73.1)
White	159 (22.8)
Other*	28 (4.2)
Gender and Gender of Sex Partners	
Cisgender Men	563 (82.8)
Cisgender men who have sex with men	431 (63.5)
Cisgender men who have sex with women	31 (4.6)
Cisgender men who have sex with women and men	100 (14.7)
Cisgender Women	79 (11.6)
Cisgender women who have sex with men	61 (9.0)
Cisgender women who have sex with women	3 (0.4)
Cisgender women who have sex with women and men	15 (2.2)
Transgender/Non-Binary individuals	38 (5.6)
Transgender/Non-Binary individuals who have sex with men	31 (4.6)
Transgender/Non-Binary individuals who have sex with women and men	7 (1.0)
Date of last HIV test	
Within the past 12 months	261 (34.5)
>12 months ago	62 (8.2)
Unknown	357 (47.2)
Has sex partner(s) living with HIV	
Yes	45 (5.9)
No	127(16.8)
Unknown	508 (67.1)
STI diagnosis in prior 12 months**	
Yes	105 (15.4)
No	575 (84.6)
Diagnosis at current visit	
Syphilis	76 (11.2)
Gonorrhea	67 (9.9)
Chlamydia	86 (12.6)
Condom use for receptive anal or vaginal sex	
Always	52 (7.7)
Not always	458 (67.4)
Not applicable	170 (25.0)
Condom use during receptive vaginal sex	
Always	15 (2.0)
Not always	157 (20.7)
Not applicable	508 (67.1)

Condom use during receptive anal sex	
Always	41 (5.4)
Not always	337 (44.5)
Not applicable	302 (39.9)

*Other race includes American Indian/Alaskan Native (N=2), Asian (N=1), Native Hawaiian or Other Pacific Islander (N=1), More than One Race (N=10), and unknown/not reported (N=15).
**STI diagnoses include chlamydia (genital, rectal, and/or pharyngeal), gonorrhea (genital, rectal, and/or pharyngeal), and syphilis

Table 2. Characteristics of Encounters where Patients Accepted vs. Did Not Accept a PrEP Offer (N=680)

Characteristics	N	Accepted PrEP Offer N=395	Did not accept PrEP offer N=285	PR (95% CI)	Adjusted PR (95% CI)
	N	N (row %)	N (row %)		
Overall	**680**	**395 (58.0%)**	**285 (42.0%)**		
Age (years)					
<25	262	152 (58.0)	110 (42.0)	Reference	Reference
>=25	418	243 (58.1)	175 (41.9)	1.0 (0.9, 1.1)	1.1 (0.8, 1.4)
Race					
Black	493	290 (58.8)	203 (41.2)	Reference	Reference
White	159	88 (55.4)	71 (44.7)	0.9 (0.8, 1.1)	1.0 (0.8, 1.3)
Other	28	17 (60.7)	11 (39.3)	1.0 (0.8, 1.4)	1.0 (0.6, 1.6)
Gender and Gender of Sex Partners					
Cisgender MSM	431	270 (62.7)	161 (37.4)	Reference	Reference
Cisgender MSW	31	20 (64.5)	11 (35.5)	1.0 (0.8, 1.4)	1.0 (0.6 , 2.1)
Cisgender MSMW	100	54 (54.0)	46 (46.0)	0.9 (0.7, 1.1)	1.1 (0.8, 1.5)
Cisgender women	79	45 (57.0)	34 (43.0)	0.9 (0.7, 1.1)	1.4 (0.9, 2.1)
Transgender/nonbinary individuals	38	6 (15.8)	32 (84.2)	0.3 (0.1, 0.5)	0.4 (0.6, 2.4)
Date of last HIV test					
Within past 12 months	261	134 (51.3)	127 (48.7)	Reference	Reference
>12 months ago	62	32 (51.6)	30 (48.4)	1.0 (0.8, 1.3)	1.2 (0.8, 1.8)
Unknown	357	229 (64.2)	128 (35.9)	1.3 (1.1, 1.4)	1.2 (0.9, 1.5)
Has sex partner(s) living with HIV					
Yes	45	42 (93.3)	3 (6.7)	2.1 (1.7, 2.6)	1.9 (1.2, 2.8)
No	127	57 (44.9)	70 (55.1)	Reference	Reference
Unknown	508	296 (58.3)	212 (41.7)	1.3 (1.1, 1.6)	1.3 (0.9, 1.9)
STI diagnosis in prior 12 months					
Yes	105	52 (49.5)	53 (50.5)	0.8 (0.7, 1.0)	1.0 (0.6, 1.6)
No	575	343 (59.7)	232 (40.4)	Reference	Reference
Condom use for receptive anal or vaginal sex					
Always	52	37 (71.2)	15 (28.9)	1.3 (1.1, 1.6)	1.2 (0.7, 2.3)
Not always	458	251 (54.8)	207 (45.2)	Reference	Reference
Not applicable	170	107 (63.0)	63 (37.1)	1.2 (1.0, 1.3)	1.3 (0.8, 2.1)

CI, confidence interval; MSM, men who have sex exclusively with men; MSMW, men who have sex with men and women; MSW, men who have sex exclusively with women; PR, prevalence ratio

Table 3: Characteristics of Individuals who Ever Versus Never Accepted a PrEP offer (N=526)

Characteristic	Total	Ever Accepted N = 346	Never Accepted N = 180	P-value*
	N	**N (row %)**	**N (row %)**	
Overall	**526**	**346 (65.8)**	**180 (34.2)**	
Age at first visit				0.66
<25	209	135 (64.6)	74 (35.4)	
>=25	316	210 (66.5)	106 (33.5)	
Race				0.66
Black	369	247 (66.9)	122 (33.1)	
White	130	82 (63.1)	48 (36.9)	
Other	26	16 (61.5)	10 (38.5)	
Gender and Gender of Sex Partners				<0.05
Cisgender MSM	309	226 (73.1)	83 (26.9)	
Cisgender MSW	31	20 (64.5)	11 (35.5)	
Cisgender MSMW	79	51 (64.6)	28 (35.4)	
Cisgender women	76	43 (56.6)	33 (43.4)	
Transgender/non-binary individuals	30	5 (16.7)	25 (83.3)	

MSM, men who have sex exclusively with men; MSMW, men who have sex with men and women; MSW, men who have sex exclusively with women

*From chi-square test