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PrEP Eligibility Among At-Risk Women in the Southern United States: Associated Factors, Awareness, and Acceptability

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Abstract

Background: Among women in the United States, non-Latina black women in the South have disproportionately high rates of new HIV infections but low use of pre-exposure prophylaxis (PrEP). Effective strategies to identify factors associated with PrEP eligibility could facilitate improved screening, offering, and uptake of PrEP among US women at risk of HIV.

Setting and methods: We applied 2014 CDC criteria for PrEP use to at-risk HIV-negative women enrolled in the Southern US sites (Atlanta, Chapel Hill, Birmingham/Jackson, Miami) of the Women's Interagency HIV Study from 2014 to 2015 to estimate PrEP eligibility and assess PrEP knowledge and acceptability. Factors associated with PrEP eligibility were assessed using multivariable models.

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Results: Among 225 women, 72 (32%) were PrEP-eligible; the most common PrEP indicator was condomless sex. The majority of PrEP-eligible women (88%) reported willingness to consider PrEP. Only 24 (11%) PrEP-eligible women had previously heard of PrEP, and only 1 reported previous use. Education level less than high school [adjusted odds ratio (aOR) 2.56; 95% confidence interval (CI): 1.22 to 5.37], history of sexual violence (aOR 4.52; 95% CI: 1.52 to 17.76), and medium to high self-perception of HIV risk (aOR 6.76; 95% CI: 3.26 to 14.05) were significantly associated with PrEP eligibility in adjusted models.

Conclusions: Extremely low PrEP awareness and use despite a high proportion of eligibility and acceptability signify a critical need to enhance PrEP education and delivery for women in this region. Supplementing CDC eligibility criteria with questions about history of sexual violence and HIV risk self-assessment may enhance PrEP screening and uptake among US women.

Keywords

HIV prevention; PrEP eligibility; PrEP awareness; PrEP acceptability; women; Southern US

INTRODUCTION

One-fifth of people living with HIV in the United States are women,¹ and women of color, particularly black women, in the South are disproportionately at risk.² A recent study demonstrated that the number of active pre-exposure prophylaxis (PrEP) prescriptions relative to new HIV diagnoses was 4-fold lower in women than men.³ Furthermore, the rate of PrEP initiation among black and Hispanic women was significantly lower than white women, suggesting that disparities in HIV diagnoses among women will continue to grow.^{4,5}

Women's low uptake of PrEP is likely multifactorial, but important components include women's knowledge and attitudes toward PrEP and challenges with identifying women with increased HIV risk. Behavioral and sociodemographic factors associated with HIV vulnerability in women include inconsistent or no condom use, recent diagnosis of a sexually transmitted infection (STI), exchange of sex for commodities, intravenous drug use (IDU), living in a high HIV prevalence region, having a history of physical or intimate partner violence, and having a partner with unknown HIV status or who has high risk behaviors (such as being a man who has sex with men or using intravenous drugs).⁶ However, clinical guidance regarding the characteristics of women who may benefit from PrEP criteria is limited in that they do not include other psychosocial and behavioral factors associated with HIV risk among women. Low PrEP awareness and underestimation/underreporting of risk behaviors are also barriers for both self-referral to PrEP services and providers delivering HIV prevention strategies.^{6,7} Although PrEP awareness among US women is noted to be 10%–20%, there are limited awareness campaigns targeting this risk group.^{8–11}

In this study, we estimated the number of PrEP-eligible women, or women who may benefit from PrEP, based on Centers for Disease Control and Prevention (CDC) criteria in a cohort of women at risk of HIV enrolled in the Southern United States and identified correlates of

PrEP eligibility. We also described PrEP awareness, acceptability, and use among PrEP-eligible women.

METHODS

Participants

The Women's Interagency HIV Study (WIHS) is a prospective observational cohort of HIV-positive and demographically similar HIV-negative cisgender women who meet risk criteria for enrollment in 10 US sites.^{12,13} Four sites in the Southern United States (Atlanta, GA; Chapel Hill, NC; Miami, FL, and Birmingham, AL/Jackson, MS) enrolled new participants between October 2013 and March 2015. Participants undergo longitudinal biannual study visits at 6-month time intervals; questionnaires are available at <https://statepiaps.jhsph.edu/wihs/index-forms.htm>.¹² All WIHS participants provided written informed consent for overall study participation, and this specific analysis was approved by the institutional review board at Emory University. The current analysis used data from all HIV-negative participants who were enrolled in Southern sites and completed a PrEP-related questionnaire in 2014–2015.

Measures

We analyzed demographic, sociobehavioral, and clinical characteristics including age, race, health insurance status, household income, marital status, education level, employment status, lifetime history of incarceration, alcohol use since the last biannual study visit, self-report of an STI diagnosis (gonorrhea, chlamydia, syphilis, and trichomonas) since the last study visit, and the following since the last study visit: experience with physical violence, sexual violence, or transactional sex (sex exchanged for drugs, money, or housing); depressive symptoms (defined as Center for Epidemiological Studies-Depression score ≥ 16); health care utilization (defined as seeing a physician or provider), noninjection drug use (including crack/cocaine, marijuana, hallucinogens, club drugs, and methamphetamines), and self-perception of HIV risk.

PrEP eligibility was defined by 2014 CDC guidelines¹⁴ using WIHS variable equivalents. Heterosexual eligibility criteria were defined as sexual intercourse with one or more male partners since the last study visit plus one of the following: inconsistent condom use with a partner whose HIV status was unknown or ongoing sexual relationship with an HIV-positive partner. Male partner risk characteristics (ie, IDU or bisexual) could not be ascertained in this analysis. Injection drug use eligibility criteria were defined by injection drug use since the last study visit plus one of the following: use of drug preparation equipment since the last study visit, been in a drug treatment program since the last study visit, or met sexual risk criteria. PrEP awareness, acceptability, and previous use were assessed using an additional questionnaire. Willingness to consider using PrEP was assessed after the women were provided a brief statement describing daily oral PrEP, its indications, and efficacy. Women were considered to be willing to use PrEP if they answered positively when asked if they would consider using it to lower HIV acquisition risk.

Analysis

We estimated the proportion of HIV-negative Southern WIHS participants with PrEP eligibility and compared demographic and sociobehavioral characteristics among women with and without PrEP eligibility using *t* tests and χ^2 tests, where appropriate. We assessed PrEP knowledge and willingness among women with and without PrEP eligibility using logistic regression models. We used multivariable logistic regression models controlling for significant factors found in bivariate analyses to determine factors associated with PrEP eligibility. SAS v 9.4 (Cary, NC) was used for analysis.

RESULTS

Demographic Characteristics

Among 863 WIHS participants enrolled in Southern sites in 2014–2015, 225 HIV-negative women were included in our analysis. The median age was 44.7 years, and 83.1% were identified as black (Table 1). Most were unmarried (67.9%), 55.1% had less than high school education, and 53.3% had health insurance. Injection drug use was rare (0.9%). One-tenth (11.1%) reported being diagnosed with an STI since their last visit.

PrEP Eligibility and Associated Factors

Overall, 72 (32%) of the women were eligible for PrEP based on the CDC guidelines. Inconsistent condom use with one or more male sexual partners was the most common eligibility criterion in this analysis (Table 2). In unadjusted analyses, education less than or equal to high school [odds ratio (OR) 2.66, 95% confidence interval (CI): 1.46 to 4.85]; having experienced physical violence (OR 2.56, 95% CI: 1.07 to 6.13), sexual violence (OR 4.74, 95% CI: 1.56 to 14.44), or transactional sex (OR 3.99, 95% CI: 1.76 to 9.06); history of incarceration (OR 1.87, 95% CI: 1.05 to 3.36); noninjection drug use (OR 2.07, 95% CI: 1.15 to 3.72); and having a medium to high self-perception of HIV risk (OR 6.35, 95% CI: 3.23 to 12.48) were significantly associated with PrEP eligibility. In multivariable analysis, education less than or equal to high school (aOR 2.56, 95% CI: 1.22 to 5.37), having experienced sexual violence (aOR 4.52, 95% CI: 1.52 to 17.76), and medium to high self-perception of HIV risk (aOR 6.76, 95% CI: 3.26 to 14.05) were independently associated with PrEP eligibility (Table 3).

PrEP Awareness and Acceptability

Overall, 24 (10.7%) women had heard of PrEP, including 4 (6%) women who were eligible for PrEP. Only one woman (0.4%) had previous use of PrEP. After a brief description of PrEP, 173 (76.9%) expressed willingness to consider using PrEP, including 63 (87.5%) who were PrEP-eligible. Common reasons cited for willingness to consider PrEP among the cohort included: having more control/protection from HIV (89.8%), inability to always trust sexual partners (55.6%), offered by a health care provider (35.6%), and partner was HIV-positive (35.1%).

DISCUSSION

Our study sought to estimate the proportion of PrEP-eligible women based on CDC criteria in a cohort of women at risk of HIV enrolled in the Southern United States and identify correlates of PrEP eligibility. We also sought to describe PrEP awareness, acceptability, and use among PrEP-eligible women. We found high rates of PrEP eligibility and acceptability among our sample as well as low rates of PrEP awareness. Education less than high school, history of sexual violence, and higher perception of HIV acquisition risk were found to be significantly associated with PrEP eligibility among our cohort of women at high risk of HIV.

Identification of US women at increased HIV risk is challenging due to a multitude of patient- and provider-level factors.^{11,15,16} Individual risk behaviors, such as condom use and number of sexual partners,^{9,17} comprise only part of HIV risk assessment in women. The CDC clinical practice guidelines for PrEP indicate certain factors make an individual at “substantial risk” for HIV acquisition, including high number of sex partners, low condom use, sex work, and living in a high prevalence area or network.¹⁴ However, the criteria by which heterosexual women may be considered for PrEP are largely based on male partner characteristics such as having partners who have sex with men, inject drugs, or are living with HIV.¹⁴ As suggested by Raifman and Sherman,¹⁸ these indications depend entirely on disclosures by women’s male partners and may be grossly unreliable for assessing PrEP eligibility. The 2017 update to the practice guidelines include a recent diagnosis of gonorrhea or syphilis, the only partner-independent PrEP indicator.¹⁹ Importantly, in this study, we identified additional individual characteristics that were associated with PrEP eligibility among women and could inform considerations for PrEP screening that go beyond current practice guidelines.

We found lower education level to be independently associated with PrEP eligibility. Studies in other populations have not found education level to be a correlate of either PrEP eligibility (women involved in the criminal justice system²⁰) or likelihood of PrEP use (female sex workers, injection drug users, and serodiscordant couples¹⁶). However, in a study among at-risk heterosexual men and women who attended an STI clinic in Chicago, low education level was associated with lack of interest in PrEP.²¹ Those with less than high school education were more likely to consistently or increasingly report high-risk sexual behaviors (transactional sex and unprotected anal intercourse) over time in HPTN 064,²² suggesting that education may be part of a complex set of socioeconomic challenges that influence HIV risk among women.

Intimate partner violence is known to intersect with HIV vulnerability through a variety of mechanisms.^{23,24} Women at risk of HIV who sustain trauma in relationships are less likely to have access to and be able to negotiate feasible HIV risk reduction options.⁶ Family planning clinics provide services for more than 4 million women²⁵ and are trusted sources of sexual health and preventive services.^{8,26,27} For this reason, training of family planning providers and comprehensive reproductive care, which includes offering of PrEP, may be a key component in increasing access of PrEP to women.^{7,26} For those women who are not connected to care, scale-up of educational campaigns targeted to women, which spreads the

message about PrEP, may also enhance community awareness of PrEP.^{26,28} Our findings correlating PrEP eligibility with lower educational attainment and history of sexual violence suggest that interventions beyond routine counseling will likely be needed to increase PrEP uptake among women who may most benefit.

Low individual risk perception contributing to poor PrEP adherence in the FEM-PrEP clinical trial²⁹ raised concern that low risk perception may pose a barrier to PrEP uptake for women. In the United States, low overall awareness of PrEP among women, which has been demonstrated in multiple studies,^{7,8,10,11,21,30} is a primary barrier for self-referral to PrEP services.⁶ However, congruent with our results, studies have shown that after women learn about PrEP, they express willingness to use it.^{21,27,31,32} In our study, higher risk perception was associated with PrEP eligibility, implying that most women had an awareness of risk behaviors for increased HIV acquisition. Universal PrEP education, which can include broadly targeted social media and ad campaigns, is needed to overcome barriers posed by low PrEP awareness among women to enhance self-referral for PrEP, and ultimately, uptake and utilization.

Our findings should be interpreted in the context of several limitations. First, there is a limited representation of younger women in the WIHS cohort. Studies of younger women have demonstrated similarly high levels of PrEP acceptability, particularly among black women.²⁷ In addition, although the seronegative participants within the Southern WIHS sites are representatives of the demographic of women at high risk of HIV acquisition in the United States, these findings may not be generalizable to women in other regions of the United States and for women who do not meet WIHS inclusion criteria. Furthermore, certain data were based on self-report and thus subject to recall and social desirability biases. Finally, we used an adaptation of the CDC clinical practice guidelines to define PrEP eligibility but could not incorporate additional partner characteristics aside from HIV status, and therefore, our study may underestimate true rates of eligibility.

In conclusion, among women surveyed in 2014–2015, we found extremely low PrEP awareness and use despite high acceptability in a population of predominantly black women in the Southern United States who were eligible for PrEP based on CDC guidelines. Our findings signify a critical need to enhance PrEP delivery for women in this region. Supplementing CDC eligibility criteria with questions about education level, history of sexual violence, and HIV risk self-assessment may enhance PrEP screening and uptake among US women. Careful history-taking by providers and enhanced education targeted to women at most risk can expand HIV prevention opportunities for US women.

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TABLE 1.

Demographic Characteristics of Study Sample (N = 225)

Characteristic	N (%) or Median (Q1–Q3)
Age (yr)	44.7 (34.9–51.1)
WHS site	
Atlanta, GA	85 (37.8%)
Birmingham, AL	25 (11.1%)
Chapel Hill, NC	49 (21.8%)
Jackson, MS	27 (12.0%)
Miami, FL	39 (17.3%)
Race	
Black	187 (83.1%)
Nonblack	38 (16.9%)
Ethnicity	
Hispanic	14 (6.2%)
Non-Hispanic	211 (93.8%)
Household income	
\$24,000	171 (79.9%)
>\$24,000	43 (20.1%)
Currently has health insurance	120 (53.3%)
Marital status [*]	
Married or partner	72 (32.1%)
Unmarried	152 (67.9%)
Highest level of education	
High school	124 (55.1%)
>High school	101 (44.9%)
Used injection drugs [†]	2 (0.9%)
No. of male sexual partners [†]	1 (1–2)
Sexually active with an HIV-positive partner	16 (7.1%)
Self-reported STI [‡]	25 (11.1%)

^{*} Classified as married/partner if legally or common law married or unmarried but living with partner; classified as unmarried if never married, divorced, widowed, or separated.

[†] Since the last biannual visit.

[‡] Self-report of STI including gonorrhea, chlamydia, syphilis, or trichomonas since the last biannual visit.

TABLE 2.

Risk Factors for PrEP Eligibility Using Adapted 2014 CDC Clinical Practice Guidelines (N = 225)

Risk Assessment for PrEP Eligibility in Heterosexual Women	N (%)
Sex with HIV-unknown status male partner within 6 mo	97 (43%)
AND	
Inconsistent condom use OR	57 (27%)
Ongoing sexual relationship with HIV-positive partner	16 (7%)
Total no. of women with PrEP eligibility*	72 (32%)

* The one participant who met PrEP eligibility criteria for individuals who use intravenous drugs also met sexual risk criteria. Total number of participants meeting PrEP eligibility therefore is not a sum of individual risk criteria as it includes women who met multiple criteria.

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TABLE 3. Demographic, Sociobehavioral, and Clinical Factors Associated With PrEP Eligibility (N = 225)

Characteristic	PrEP Ineligible (N = 163), N (%) or Median (Q1–Q3)	PrEP Eligible (N = 72), N (%) or Median (Q1–Q3)	Unadjusted OR (95% CI)	aOR (95% CI)
Age (yr)	44.7 (35.3–51.4)	44.4 (34.5–50.9)	1.01 (0.98 to 1.04)	—
Race				
Black	130 (85.0%)	57 (79.2%)	0.67 (0.33 to 1.38)	—
Non-Black	23 (15.0%)	15 (20.8%)	Ref	
Marital status				
Married or partner	54 (35.3%)	18 (25.4%)	Ref	—
Unmarried*	99 (64.7%)	53 (74.7%)	1.61 (0.86 to 3.01)	
Highest level of education				
High school	73 (47.7%)	51 (70.8%)	2.66 (1.46 to 4.85)	2.56 (1.22 to 5.37)
>High school	80 (52.3%)	21 (29.2%)	Ref	Ref
Current employment				
No	94 (61.8%)	54 (75.0%)	1.85 (0.99 to 3.46)	—
Yes	58 (38.2%)	18 (25.0%)	Ref	
Household income				
≤\$24,000	113 (77.4%)	58 (85.3%)	1.69 (0.78 to 3.68)	—
>\$24,000	33 (22.6%)	10 (14.7%)	Ref	
Health insurance				
No	68 (44.4%)	37 (51.4%)	Ref	—
Yes	85 (55.6%)	35 (48.6%)	0.76 (0.43 to 1.33)	
Alcohol use [‡]				
Abstain	64 (41.8%)	27 (37.5%)	Ref	—
0–7 drinks/week	59 (38.6%)	21 (29.2%)	0.84 (0.43 to 1.65)	
>7 drinks/week	30 (19.6%)	24 (33.3%)	1.90 (0.94 to 3.82)	
Non-injection drug use [‡]				
No	112 (73.2%)	41 (55.9%)	Ref	Ref
Yes	41 (26.8%)	31 (43.1%)	2.07 (1.15 to 3.72)	1.48 (0.70 to 3.12)
Seen a health care provider [‡]				

Characteristic	PrEP Ineligible (N = 163), N (%) or Median (Q1-Q3)	PrEP Eligible (N = 72), N (%) or Median (Q1-Q3)	Unadjusted OR (95% CI)	aOR (95% CI)
No	42 (27.5%)	21 (29.2%)	1.09 (0.59 to 2.02)	—
Yes	111 (72.6%)	51 (70.8%)	Ref	—
Self-reported STI [§]				
No	140 (91.5%)	60 (83.3%)	Ref	—
Yes	13 (8.5%)	12 (16.7%)	2.15 (0.93 to 4.99)	—
Depressive symptoms [¶]				
No	90 (58.8%)	33 (45.8%)	Ref	—
Yes	63 (41.2%)	39 (54.2%)	1.69 (0.96 to 2.97)	—
Ever incarcerated				
No	74 (48.4%)	24 (33.3%)	Ref	Ref
Yes	79 (51.6%)	48 (66.7%)	1.87 (1.05 to 3.36)	1.14 (0.56 to 2.34)
Physical violence [‡]				
No	141 (92.8%)	60 (83.3%)	Ref	Ref
Yes	11 (7.2%)	12 (16.7%)	2.56 (1.07 to 6.13)	1.89 (0.61 to 5.88)
Sexual violence [‡]				
No	147 (96.7%)	62 (86.1%)	Ref	Ref
Yes	5 (3.3%)	10 (13.9%)	4.74 (1.56 to 14.44)	4.52 (1.52 to 17.76)
Transactional sex [‡]				
No	142 (92.8%)	55 (76.4%)	Ref	Ref
Yes	11 (7.2%)	17 (23.6%)	3.99 (1.76 to 9.06)	2.05 (0.77 to 5.45)
Self-perception of HIV risk [¶]				
No to low	135 (88.2%)	39 (54.2%)	Ref	Ref
Medium to high	18 (11.8%)	33 (45.8%)	6.35 (3.23 to 12.48)	6.76 (3.26 to 14.05)

* Defined as never married, widowed, single, separated, or divorced.

[‡] Since the last biannual visit.

[‡] Including crack/cocaine, marijuana, hallucinogens, club drugs, and methamphetamines since the last biannual visit.

[§] Self-report of STI including gonorrhea, chlamydia, trichomonas, or syphilis since the last biannual visit.

[¶] Defined as Center for Epidemiologic Studies-Depression score ≥ 16.

Self-perception of HIV risk based on participant's subjective assessment of experiences since the last biannual visit.

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