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Factors Associated with Intention to Initiate Pre-exposure Prophylaxis in Cisgender Women at High Behavioral Risk for HIV in Washington D.C.

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Abstract

Pre-exposure prophylaxis (PrEP) for HIV prevention is underutilized by cisgender women at risk for HIV in the United States. Published research on PrEP initiation among cisgender women at risk for HIV focuses on identifying barriers and facilitators associated with intention to initiate, but few apply a behavioral theoretical lens to understand the relative importance of these diverse factors. This study provides a *theoretically grounded* view of the relative importance of factors associated with intention to initiate PrEP. We conducted an anonymous, cross-sectional survey of 1437 cisgender women seeking care at family planning and sexual health clinics to evaluate hypothesized barriers and facilitators of PrEP initiation. We categorized cisgender women with 3 behavioral risk-factors as “high-risk” for HIV acquisition; 26.9% (N=387) met high-risk criterion. Among cisgender women in the high-risk sample, the majority were Black and single. Perceived risk of HIV acquisition was low and 13.7% reported intention to initiate PrEP. Positive attitudes toward PrEP, self-efficacy, perceived support from medical providers and social networks, and prior discussion about PrEP with medical providers were associated with intention to initiate PrEP; stigma was negatively associated. Background characteristics (other than age), risk-factors for HIV acquisition, prior awareness of PrEP, and perceived risk of HIV were not associated with

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uptake intention. These findings support interventions that center on the role of providers in the provision of PrEP and on social networks in destigmatization of PrEP use.

Keywords

Pre-Exposure Prophylaxis; Female; HIV infections; Intention; Surveys and Questionnaires; Reasoned Action Approach

The HIV epidemic among women in the United States (US) disproportionately affects women of color and HIV prevention in this population has fallen short (*AtlasPlus*, n.d.; *HIV Mortality 2017*, n.d.; Baldwin et al., 2021; Hess et al., 2017). Pre-exposure Prophylaxis (PrEP) with daily oral tenofovir disoproxil fumarate (TDF)/emtricitabine (FTC) reduces HIV transmission by up to 92% in women (Baeten et al., 2012; Murnane et al., 2013; Thigpen et al., 2012), however PrEP is disparately underutilized by women in the US, especially by women of color (*AIDSVu*, n.d.; Smith et al., 2018). In 2015, the CDC estimated that 176,670 US women would benefit from PrEP for HIV prevention, but of this estimated total only 3,400 had initiated PrEP use—translating to 98% unmet need for HIV prevention (Smith et al., 2018). Although the absolute number of women initiating PrEP has slowly increased from 1,723 in 2014 to 4,428 in 2017 (*AIDSVu*, n.d.), PrEP uptake among Black women lags far behind other racial groups (Bush et al., 2015, 2016). Between 2014 to 2017, Black women comprised only 33% of women who initiated PrEP nationally; in contrast, they represented the majority (59%) of new HIV diagnoses among US women in 2017 (*AIDSVu*, n.d.). Washington, DC (DC), where the current study was conducted, is a hotspot of the US HIV epidemic. HIV prevalence among women in the District of Columbia is 1,209 per 100,000, nearly seven-fold higher than the national average, and ten-fold higher than the national average among Black women (Bowser et al., n.d.; CDC, n.d.).

Barriers to PrEP use among women include a lack of awareness of PrEP, low perceived risk of HIV, cost, stigma, and lack of access (Aaron et al., 2018; Auerbach, 2015; E. Bradley et al., 2019; Collier et al., 2017; Flash et al., 2017; Goparaju et al., 2017; Hill et al., 2020; Hull, 2012; Koren et al., 2018; Kwakwa et al., 2016; Ojikutu et al., 2018; Patel et al., 2019; Wingood et al., 2013). The literature indicates that Black women anticipated that side effects, medical mistrust, cost, partners and providers would be important, but surmountable barriers to uptake (Aaron et al., 2018; Bradley & Hoover, 2019; Flash et al., 2017; Goparaju et al., 2015, 2017; Kwakwa et al., 2018; Ojikutu et al., 2018; Tekeste et al., 2018; Wingood et al., 2013). However, utilization remains disproportionately low and incidence of HIV disproportionately high. Despite limited understanding of the anticipated barriers to PrEP initiation, the relative importance of factors associated with intention to initiate PrEP in US women at high risk for HIV continues to be poorly understood (Elion & Coleman, 2016; Petroll et al., 2017; Turner et al., 2018). Much of the existing research focuses on identifying the factors, but few apply a behavioral theoretical lens to understand the relative importance of these varied factors. This study provides a *theoretically grounded* view of the relative importance of factors associated with intention to initiate PrEP. Thus, the purpose of this DC-based study was to gain insight into the relative impact of demographic and other background characteristics, behavioral and psychosocial factors on cisgender women's

intention to use PrEP, among cisgender women living in a high HIV prevalence community with high demonstrable risk for exposure to HIV.

We surveyed women seeking care at the family planning clinic of a tertiary care medical center and a government-sponsored sexual health clinic in DC, both of which evidenced low levels of PrEP uptake among cisgender women, but offered universal PrEP screening and same-day PrEP initiation. Both sites served predominantly Black, underserved patient populations. The primary objective was to identify the relative importance of factors associated with PrEP initiation among cisgender women with high behavioral risk for HIV acquisition in this majority Black, high HIV prevalence community, when PrEP is available to respondents. We hypothesized that there would be significant background, behavioral, and psychosocial barriers to PrEP initiation.

Method

Study Design

We conducted an anonymous, tablet-based survey of a convenience sample of cisgender women 18 years of age seeking termination and/or contraceptive care at a family planning and preventative care clinic located in a tertiary care center in Washington D.C. or seeking sexual health services at a D.C. Department of Health comprehensive sexual health clinic. Prior to study initiation, we obtained institutional review board (IRB) approval from both sites (IRB#s 2017–0870 and 2017–25). Data were collected between September 2017 and March 2018, as a small-scale feasibility and implementation study in the family planning clinic (Brant et al., 2020), and from July 2018 to March 2020 at both sites. Both waiting rooms played the five-minute Centers for Disease Control “What is PrEP?” informational video (*What Is PrEP?* - *YouTube*, n.d.) looped with educational videos on contraception, HIV prevention, and sexual health to increase PrEP awareness. Research coordinators approached all female patients in the clinic waiting rooms, inquired their age, and invited all English-speaking women over age 18 to participate. The survey queried sex assigned at birth and gender identity and excluded non-cisgender female participants from completing the study. Participants watched the “What is PrEP?” video on the waiting room television or on a tablet and then completed the informed consent and survey on a tablet in the exam room while waiting for providers. The survey took approximately 25 minutes to complete and participants were compensated with a five USD gift card for their time. Participants who were interested in initiating PrEP then received counseling and laboratory screening by their clinical provider and, depending upon the site protocol, were given either a prescription and/or a 1-week supply of TDF/FTC and clinical follow-up.

Theoretical Framework

This study is guided by the Reasoned Action Approach (I. Ajzen, 2011; L. Ajzen et al., 2012; Fishbein & Ajzen, 2011), which asserts that for behaviors that are under individual control, the most proximal determinant of behavior is the intention to enact the behavior. To the extent that an individual intends to engage in a behavior, enactment of the behavior is likely if the individual has the appropriate skills and abilities and if environmental constraints are not excessive. Behavioral intentions are determined by global assessments of

attitudes, social norms, and perceived behavioral control. Global attitudes refer to a sense of favorability with regard to the behavior. Global normative perceptions refer to the perception that the behavior is acceptable to important social referents (i.e., injunctive norms) and that similar others engage in the behavior (i.e., descriptive norms). Global perceptions of behavioral control, otherwise referred to as self-efficacy, refer to the perception that one has the ability to accomplish the behavior. Global assessments are determined by underlying beliefs. Attitudes are determined by outcome expectations; normative perceptions are determined by beliefs about particular normative referents and the motivation to comply with them, and self-efficacy is determined by perceptions of ones' ability to overcome specific barriers that are likely to be present (Fishbein & Ajzen, 2010). Other variables, such as perceived risk, relationship status, and education, are considered "background variables," which are likely to impact behavior indirectly by shaping the beliefs people endorse. The assumptions of the RAA, borne out of evolution of the Theory of Reasoned Action through the Theory of Planned Behavior, have been supported by meta-analytic evidence in wide range of behavioral domains, including HIV prevention (Albarracín et al., 2001; Armitage & Conner, 2001; Chittamuru et al. 2020, Godin & Kok, 1996; McEachan et al., 2016; Sheppard et al., 1988; Teitelman et al. 2020).

Survey Tool

The RAA provides prescription for defining and measuring beliefs and behaviors, identifying the relative importance of psychosocial pathways that determine the behavior, and identifying relevant underlying beliefs that determine behavioral intentions. Behavior is defined in terms of a target (i.e., cisgender women at high behavioral risk for HIV), action (i.e., PrEP initiation), context (i.e., daily TDF/FTC use for HIV prevention), and defined period of time (i.e., the next 12 months). In this study, the development of theoretical construct measures was informed by ten focus groups (N = 54) conducted at The Women's Collective, a HIV prevention community-based organization (Hull et al., 2017). The resulting tablet-based survey consisted of 117 questions, which inquired into background, behavioral, and psychosocial constructs relevant to initiating PrEP in the next 12 months.

Survey Measures

Background factors—We assessed relevant demographic and background factors that may shape PrEP use, including race, relationship status, education level, income, perceived risk of HIV, a priori awareness of PrEP, health insurance status, transportation, housing status, and length of travel to the clinical site.

Behavioral factors—We assessed behavioral risk factors for HIV acquisition, including transactional sex, inconsistent condom use, non-monogamous sex partner(s), recent history of a sexually transmitted infection, injection drug use with shared equipment, and multiple sexual partners in the past year.

Psychosocial factors—We measured behavioral intention to initiate PrEP with the following question: "Which statement best reflects your thinking?" with response choices of "I have no intention of using PrEP for HIV prevention in the next 12 months", "I am

considering taking PrEP for HIV prevention in the next 12 months, but I'm not ready to take action", "I am committed to taking PrEP for HIV prevention in the next 12 months", and "I am ready to start PrEP as soon as possible". We then collapsed responses into a dichotomous variable reflecting intention (i.e., "committed" and "ready to start" = 1) We assessed *global attitudes* (i.e., "Overall, would you say that using PrEP daily to prevent HIV a good or a bad thing"), *attitudinal beliefs* (i.e., "Using daily PrEP to prevent HIV would make me feel in control of my health", "PrEP is a safe way to prevent HIV infection", "PrEP is an effective tool to prevent HIV infection"), *global injunctive norms* (i.e., "Thinking about people who are important to you, would they support or not support your using PrEP for HIV prevention in the next 12 months?"), *injunctive normative beliefs* (i.e., "How important to you is each of the following people's (doctor, main sex partner, casual sex partner, best friend, group of friends, grandmother, mother, sister, brother, peers, children, other) opinion in your decision about your using PrEP?"), *global descriptive norms* (i.e., "Thinking about people who are similar to you – how likely would they be to use PrEP for HIV prevention in the next 12 months?"), *descriptive normative beliefs* (i.e., "People would shame me if they learned that I was taking PrEP"), *global self-efficacy* (i.e., "If I really wanted to, I could use PrEP daily for HIV prevention"), and *efficacy beliefs* (i.e., "If I really wanted to, I could remember to take the pill every day", "I know where to start the process if I want to use PrEP for HIV prevention", "I could use PrEP for HIV prevention, even if my main partner didn't want me to", "I just can't take pills") using single item, 5-point semantic differentials for attitudes, and Likert scales for norms and efficacy. Response options ranged from 1 (i.e., definitely would not; strongly disagree) to 5 (i.e., definitely would/ strongly agree).

We assessed *beliefs* based on our qualitative pilot research (Hull et al., 2017) and other formative research (Auerbach et al., 2015; Goparaju et al., 2017; Wingood et al., 2013) which identified the salient *attitudinal beliefs* (i.e., outcome expectations) relevant to PrEP (i.e., effectiveness, side effects, cost), *descriptive normative beliefs* (i.e., anticipated PrEP stigma), *injunctive normative beliefs* (i.e., partner, friends, healthcare provider), and *potential barriers and facilitators to uptake* (i.e., remembering to take the pill, navigation, overcoming partner objections, feelings of control). We measured all theoretical constructs using 5-point Likert scales (strongly disagree to strongly agree), with one exception. *Injunctive normative beliefs* were calculated by multiplying beliefs about whether specific referents would support PrEP uptake (definitely would not support to definitely would support, range -2 to 2) by her rating of the motivation to comply with that referent. To assess motivation to comply, we asked respondents how important each referent's opinion was in her decision whether to use PrEP (i.e., not important at all to extremely important, range 1-5); the range for the normative belief variables is ± 10 .

Analysis

To focus on cisgender women at high behavioral risk for HIV, we categorized participants with 3 behavioral risk factors, in addition to living in a high HIV prevalence area, as "high risk". We selected 3 risk factors as any combination of 3 of the enumerated behavioral risks in a high HIV prevalence setting put cisgender women at imminent behavioral risk of HIV infection.

We performed descriptive statistics to identify the background characteristics of the sample, including age, race, and relationship status, education level, employment status, income level, and insurance status. To analyze the potential facilitators and barriers, we further divided the sample based on dichotomous intention to initiate PrEP and then tested the bivariate association with background factors, global measures of psychosocial factors, and the beliefs underlying each global measure. Bivariate analysis was performed using Fisher's exact test, Mann-Whitney U test, and Student's t-test, where appropriate.

We then conducted the binomial logistic regression analysis of the global measures (attitude, injunctive norms, descriptive norms, and self-efficacy) on intention to initiate PrEP, adjusting for the respondent's significant background factors obtained from the bivariate analysis to understand their relative importance. Additionally, we included respondents' life-time, and 12-month perceived risk of HIV infection, based on its importance in the published literature (Carley et al., 2019; Felsher et al., 2020; Hull, 2012; Kwakwa et al., 2016; Ojikutu et al., 2018; Tims-Cook, 2019) and expert opinion. We estimated the adjusted odds ratio with 95% confidence interval for each potential factor. Lastly, we tested the correlation between beliefs (i.e., among the significant global measures from the regression model) and intention to initiate PrEP. We estimated Spearman rank correlation coefficient with corresponding p-value for each belief. Significance was set at 0.05 for all analyses. All statistical analyses were conducted using SAS 9.4 (SAS, n.d.)

Results

Sample Characteristics

In total, 1480 cisgender women completed the survey; we excluded 10 participants who reported HIV positive status (established exclusion criteria) and 33 participants who did not respond regarding their intention to initiate PrEP. Figure 1 depicts the study flow. The majority (51.3%) of participants reported 2 risk factors for HIV acquisition; 1.0% (n = 14) reported 5 risk factors, 5.4% (n = 77) reported 4 risk factors, 20.6% (n = 296) reported 3 risk factors, 24.4% reported 2 risk factors, 36.6 (n = 526) reported 1 risk factor, 12% (n = 174) denied risk factors. Of the 1437 cisgender women surveyed, we categorized 26.9% (N = 387) as high behavioral risk for HIV acquisition.

Among the subsample of participants categorized as high risk (N = 387), mean age was 27.0. The greatest proportion were Black (71.9%), single (88.9%), had completed high school/GED (96.4%), reported household incomes <\$15,000 (47.1%), and were on government-sponsored health insurance (38.3%). The primary behavioral risk factors for this sample were multiple sex partners and inconsistent condom use¹; 96.1% of participants reported >1 sexual partner, 93.5% reported inconsistent condom use, 80.1% reported having casual sex partners, 38.5% reported a recent sexually transmitted infection, 9.8% reported exchanging sex for drugs of money, 9.6% reported sharing intravenous drug use equipment. Among participants categorized as high risk, 13.7% (n = 53) were committed to

¹There were no statistical differences in demographic characteristics (such as race, relationship status, educational level, income, employment status, and insurance status) between women with missing information on intention to initiate PrEP and those with complete information.

initiating PrEP in the next 12 months. Although the sample included cisgender women with significant reported behavioral risk factors, only 8.0% perceived moderate-high risk of HIV acquisition in the next 12 months and 15.3% moderate-high lifetime risk. Half (50.3%) of the sample had previously heard of PrEP (Table 1) and $n = 16$ participants reported having used PrEP in the past.

Bivariate Results

Background factors, including race, relationship status, income, distance to/from clinics, insurance status, transportation, and housing status were not associated with uptake intention. (data not shown). Slightly older age (29.2 vs. 26.6 years) was, however, associated with intention to initiate PrEP ($p < .05$). Neither short-term nor lifetime perceived risk of HIV acquisition were associated with intention to initiate PrEP. A priori awareness of PrEP was not associated with uptake intention, however prior discussion about PrEP with a medical provider was positively associated with intention to initiate PrEP ($p < 0.05$). Neither the total number of reported risk factors nor specific behavioral risk factors (Table 1) were associated with uptake intention.

Positive global attitudes toward PrEP ($p < .01$) and attitudinal beliefs that PrEP is a “safe” ($p < .01$) and “effective tool” ($p < .01$) to prevent HIV and that PrEP would make participants feel “in control of (their) health” ($p < .01$) were associated with intention to initiate PrEP (Table 2). Global perceived injunctive norms and normative beliefs about support from medical providers and social networks (partner, mother, best friend, and sister) were also positively associated with uptake intention ($p < .01$, Table 2). While global descriptive norms were positively associated with intentions, fear that their community would shame them for using PrEP was negatively associated with intention to initiate PrEP ($p = .01$). Lastly, self-efficacy, specifically determination to successfully take PrEP ($p < .01$), daily ($p < .01$), even if it caused abdominal pain ($p < .01$) or if (their) partner did not want (them) to use it ($p < 0.01$), was positively associated with intention to initiate PrEP (Table 2).

Multivariate Results

Results from the logistic regression analysis (Table 3) showed that after adjusting for age, the discussion of PrEP with a medical provider, and perceived risk of HIV acquisition in the next 12 months, global measures of attitude (aOR = 2.36; 95% CI = 1.27–4.37), descriptive norms (aOR = 1.75; 95% CI = 1.26–2.43), and self-efficacy (aOR = 1.66; 95% CI = 1.0–2.76) were positively associated with intention to initiate PrEP, while injunctive norms (aOR=0.981; 95%CI= 0.672–1.431) were not significant. Within the significant psychosocial pathways (i.e., attitudes, descriptive norms, efficacy), individual attitudinal beliefs positively correlated with intention to initiate PrEP ($p < 0.01$), as did self-efficacy beliefs ($p < 0.01$), other than knowledge of where to start the process for PrEP (ns). We also found a significant negative correlation between the descriptive normative belief fear of being shamed for PrEP use and intention to initiate PrEP ($r_s = -0.22$; $p < .01$).

Discussion

Our study found that the majority of a sample (N= 387) of cisgender women at higher behavioral risk for HIV acquisition were single, Black, and with household incomes below the federal poverty level—consistent with the population of cisgender women who acquire HIV in DC and much of the United States. Among these participants, despite significant behavioral risk factors, perceived risk of HIV acquisition was low and only 13.7% reported intention to initiate PrEP. Positive attitudes toward PrEP, self-efficacy to use PrEP, and prior discussion about PrEP with a medical provider were associated with intention to initiate PrEP; conversely, stigma was negatively associated. Background characteristics (other than age), barriers to access, risk-factors for HIV acquisition, prior awareness of PrEP, and perceived risk of HIV were not associated with uptake intention. Injunctive norms, namely the support of the social network in the decision to initiate PrEP, were not significant in the multivariable analysis.

The findings of this research offer insight into potential avenues for improving cisgender women's disparate and underutilization of PrEP. Critically, PrEP use is predicated on an understanding and acknowledgement of HIV risk. Despite multiple behavioral risk factors for HIV acquisition, we found that cisgender women at behavioral high risk for HIV had relatively low both short-term and lifetime perceived risk of HIV. This disconnect between risk behavior and perceived risk is consistent with findings of studies in US women in the literature (Auerbach et al., 2015; Bogorodskaya et al., 2020; E. Bradley et al., 2019; Collier et al., 2017; Flash et al., 2017; Goparaju et al., 2015; Hill et al., 2020; Nydegger et al., 2020). Kwakwa et. al found that of predominantly African-American individuals presenting for HIV testing in Philadelphia, women were significantly less likely to assess themselves to be at high risk for HIV acquisition based on their reported risk factors than an independent assessor (8% vs. 60%) (Kwakwa et al., 2016). Similarly, Hirschorn and colleagues reported that of women presenting to a STI clinic or emergency department in Chicago, 90% reported low or no risk of HIV acquisition, despite 93% reporting inconsistent condom use (Hirschhorn et al., 2019). This disconnect between HIV risk and perceived HIV risk may be self-protective insofar as individuals routinely engage in optimistic biases regarding health risks. The disconnect may also relate to the complex and multi-level nature of HIV risk. Indeed, in other geographic contexts, the behaviors evidenced in this study may not pose a significant risk for HIV. It is well known that high community level prevalence magnifies the extent to which any particular behavior is "risky." Communication efforts that highlight the complex relationship between individual- and community-level risk may be a fruitful strategy for promoting individual's more accurate evaluations of their HIV risk.

Consistent with what we found in our study, awareness of PrEP among women in the US is troublingly low, ranging from 0 to 33% (E. Bradley et al., 2019). Established barriers to PrEP use among women include this lack of awareness of PrEP, as well as low perceived risk of HIV, cost, lack of access, and stigma (Aaron et al., 2018; Teitelman et al., 2021; Auerbach et al., 2015; Bogorodskaya et al., 2020; E. Bradley et al., 2019; Calabrese et al., 2018; Chittamuru et al., 2020; Collier et al., 2017; Garfinkel et al., 2016; Goparaju et al., 2015, 2017; Hill et al., 2020; Hull et al., 2017; Johnson et al., 2020; Kwakwa et al., 2016, 2018; Nydegger et al., 2020; Ojikutu et al., 2018; Patel et al., 2019.; Rubtsova et

al., 2014; Willie et al., 2017; Wingood et al., 2013). Contrary to the existing literature on PrEP for cisgender women in resource rich settings, we did not find that background factors contributing to access, such as income, distance from the clinical site, and transportation, significantly impacted intention to initiate PrEP. Although this may stem from the clinical settings where PrEP was readily available without financial consideration, this finding has significant implications for identifying successful avenues for future interventions.

Concern about potential stigma was the only anticipated barrier that we found to be negatively associated with intention to initiate PrEP. Stigma as a significant barrier to PrEP initiation is consistent with earlier published research that reported women's concerns for potential stigma related to taking a "HIV medication" and PrEP's association with sexual infidelity or "promiscuity" (Auerbach et al., 2015; E. Bradley et al., 2019; Calabrese et al., 2018; Chittamuru et al., 2020; Goparaju et al., 2017; Smith et al., 2012). Similar to our findings, Calabrese et. al. found that women's anticipated disapproval by others was associated with lower interest in and intention to use PrEP, as well as less comfort discussing PrEP with their medical provider. Conversely, Calabrese et. al. found that intention to initiate PrEP was greatest when women anticipated low levels of both stereotypes of PrEP-users and PrEP stigma (Calabrese et al., 2018). This finding highlights the importance of the support of the social network and underscores the importance of community-based interventions that focused on the destigmatization of PrEP and HIV prevention. This finding also underscores the importance of highlighting non-behavioral, non-stigmatized HIV risk factors in efforts to shape risk perceptions and raise awareness of PrEP as a prevention option. HIV prevention communication that focuses on raising awareness of the ways high community level prevalence impacts individual HIV risk may circumvent defensiveness, promote more accurate perceptions of HIV risk, and undermine stigma associated with HIV prevention via PrEP.

The implications of this research for practice are numerous and multi-level in their focus. Our results illustrate the importance of a healthcare providers' recommendation of PrEP for HIV prevention. Though prior awareness of PrEP was not associated with uptake intention, prior conversation with a health care provider about PrEP was positively associated with intention to initiate PrEP and weighed more heavily on intention to use PrEP than the influence of the social network, including partner, close family, and best friend in the bivariate analysis. This finding emphasizes the importance of the role of medical providers in PrEP education and promotion, as the source of PrEP knowledge is critically important for shaping intentions, confirms women's anticipation of the importance of provider recommendation (Aaron et al., 2018), and echoes the findings of qualitative research (Flash et al., 2017; Goparaju et al., 2017; Wingood et al., 2013).

Positive attitudes and beliefs about PrEP were associated with intention to initiate PrEP, echoing recent findings by Teitelman and colleagues (Teitelman et al., 2020). We posit that the lack of association between perceived risk of HIV acquisition PrEP intention is likely why cisgender women have not responded to risk-related messaging about PrEP. The association between positive beliefs, namely that PrEP will keep cisgender women safe and make them feel in control of their health, and intention to initiate PrEP, suggests a need for PrEP social marketing and messaging for cisgender women that is

sex positive and based in health promotion, specifically messaging that addresses the needs and perceptions of cisgender women, rather than fear-based messaging that presumes acknowledgement of one's HIV risk. Our results suggest that efforts to bolster PrEP uptake among cisgender women should address norms around HIV prevention and PrEP and provide navigation support to bolster engagement in the PrEP cascade. Such efforts could include intervention activities that reshape normative perceptions among cisgender women, and/or activities that reshape normative expectations of partners (i.e., relationships norms) and communities (i.e., families, peers, etc.). Other efforts could focus on building skills and/or efficacy perceptions for initiating and continuing PrEP use. Given the notable import of provider recommendations of PrEP, intervention efforts focused on increasing the quality of provider's communication with patients about HIV prevention are critically important. There is limited literature on PrEP messaging for cisgender women, however, sex positive, health promotion focused social marketing campaigns have been successful in men who have sex with men and transgender women (Phillips et al., 2020).

In the multivariate analysis, we found that descriptive norms were a significant predictor if uptake intentions, while injunctive norms were not. We interpret this finding as related to the private nature of PrEP use. Injunctive norms refer to perceptions of how others expect one to behave; descriptive norms refer to the influence of perceptions of what others are doing with regard to the behavior. In the context of PrEP use, individuals may be less concerned about behaving in a manner that conforms to the injunctive norms of their social network in a context where their behavior is private. On the other hand, individuals have experiential evidence that people who are at risk for HIV will be stigmatized by their community if their risk behaviors become known. As a result, the relative weight of the support of family, partners, and the social network may be overshadowed by concern for potential PrEP stigma.

Finally, we found that background variables such as race and education were not significantly associated with intention to utilize PrEP. Though we anticipated the possibility of direct relationships between background variables and intention to use PrEP, this finding is theoretically consistent with the RAA, which posits mediation of background variables by attitudes, norms, and efficacy (L. Ajzen et al., 2012; Fishbein & Ajzen, 2011) In other words, cisgender women with different life experiences (i.e. socio-demographics) will likely hold different beliefs that lead to different evaluations of PrEP's utility, perceptions of community support for PrEP, and expectations of efficacy. In our analyses, we estimated the impact of background, behavioral and psychosocial, factors in a single model to understand their relative import. Thus, future research should focus on understanding whether and how psychosocial determinants may mediate the impact of other factors. Identifying these mechanisms is a critical step in identifying strategies for interventions to increase PrEP uptake among cisgender women, which are responsive to their needs and experiences. For example, the direct relationship between relationship status and intentions was a non-significant. Relationship status may, however, impact PrEP uptake intentions indirectly by shaping the beliefs cisgender women endorse. Future research should seek to understand how and why psychosocial determinants of PrEP vary among cisgender women to inform the development and implementation of responsive HIV prevention efforts.

Limitations

This study focused on a population of majority Black, reproductive-age cisgender women of lower socio-economic status in a high HIV prevalence community in Washington D.C. and is likely more generalizable to a commensurate urban population. Our results are limited by the cross-sectional data and the close-ended design of the questionnaire. We sought to understand the factors associated with PrEP uptake by making PrEP universally available in the clinic. Approximately 10% of all cisgender women seen during the study period received prescription for PrEP and/or a 1-week supply. The majority of the cisgender women declined to participate in the cohort study, however, therefore, we are unable to correlate the psychosocial determinants of uptake with initiation based on the chart review. Our outcome, behavioral intention, has been demonstrated to significantly correlate with behaviors in a wide range of behavioral domains (Sheeran, 2002). We do not believe that our results are confounded by respondent bias, as the most common response for declining to participate was a lack of time. It also is notable that the global attitude measure could have been more specific to the respondents' PrEP initiation, rather than its more general focus on whether using PrEP daily to prevent HIV a good or bad thing. Lastly, the research team verbally queried potential participants if they had previously completed the survey, however, as no identifying information was collected there was no process in place to ensure that no participants completed the survey more than once.

Conclusions

We did not find that demographic and other background factors (i.e., perceived risk) or behavioral risks were associated with intention to initiate PrEP among cisgender women at high risk for HIV acquisition. Psychosocial factors and healthcare provider support, however, were strongly positively associated with intention to initiate PrEP. Our findings have significant implications for PrEP messaging and development of interventions that center on the roles of both providers and social networks in the destigmatization and provision of PrEP.

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DECLARATIONS & COMPLIANCE WITH ETHICAL STANDARDS:

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PARTICIPATION OF HUMAN SUBJECTS/CONSENT: IRB approval was obtained from the respective IRBs prior to initiation of the study and maintained throughout IRB#s 2017-0870 and 2017-25. Written consent was obtained from all participants.

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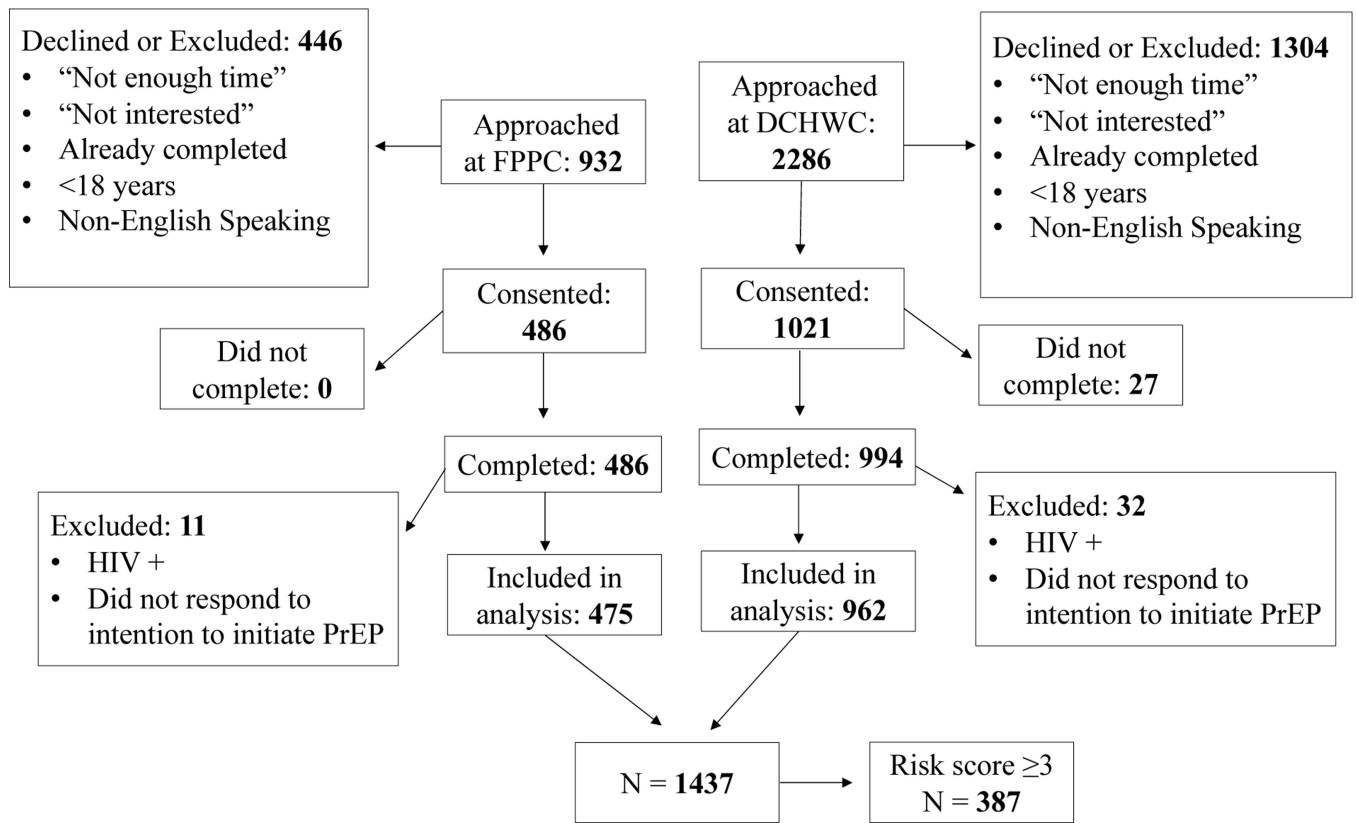


Figure 1.
Study Flow

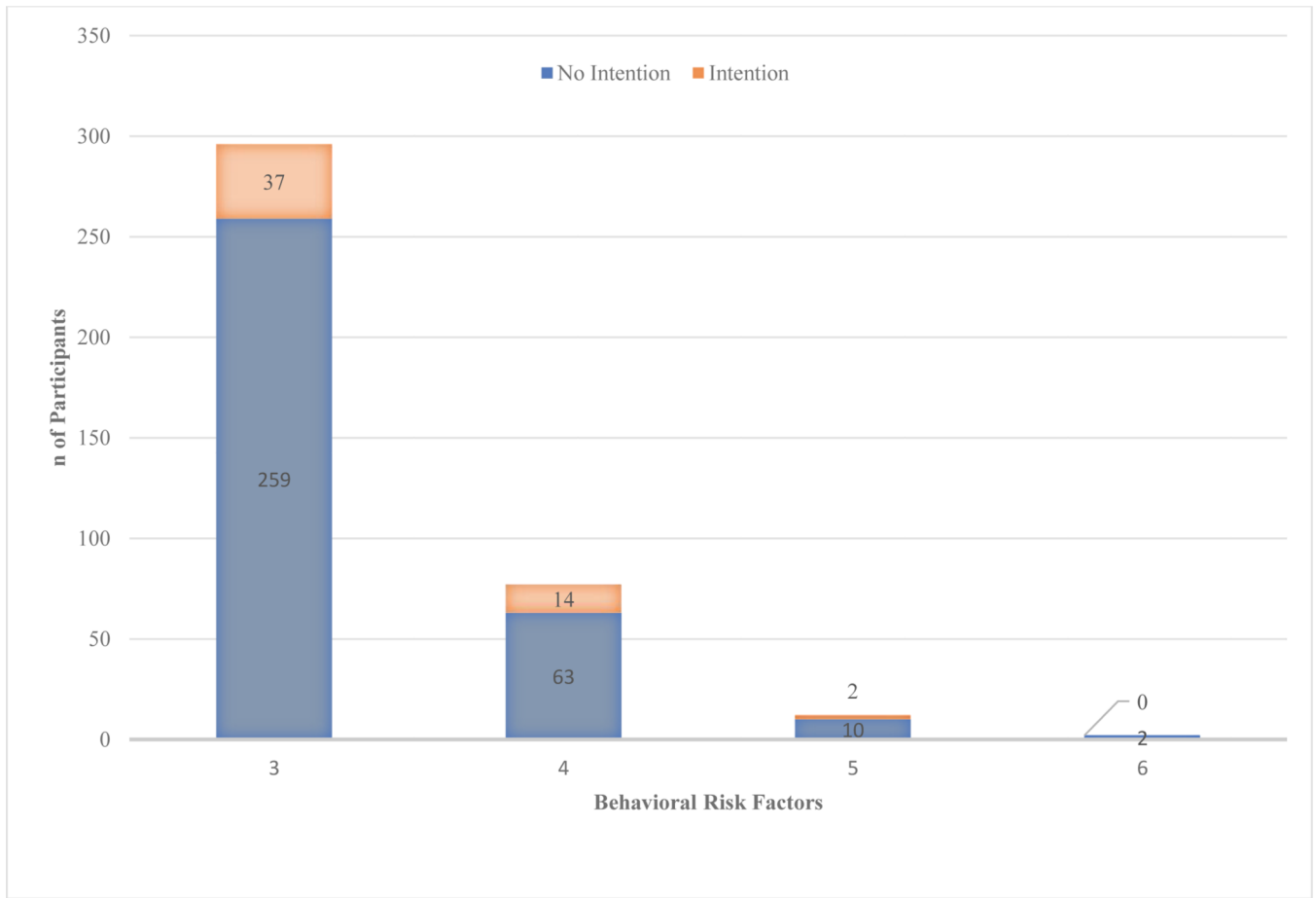


Figure 2.
 Bivariate Association between Total Number of Behavioral Risk Factors for HIV Acquisition by Intention to Initiate PrEP among Participants Reporting 3 Risk Behaviors (N = 387)

Table 1

Bivariate Associations between Background and Behavioral Characteristics and Intention to Initiate PrEP among Respondents with 3 Risk Factors

Variable	Total (N=387)	
	M	SD
Background Characteristics		
Age	27.0	7.3
	n	%
Race		
Black/African American	274	71.9
White/Caucasian	51	13.9
Multiple Races/Other	56	14.7
Relationship status		
Married/Living together	23	6.0
Divorced/S eparated/Widowed	20	5.2
Single/Never Married	343	88.9
Education		
Grade less than 12	14	3.6
Grade 12/GED	164	42.5
Some college/Associate or Technical Degree	92	23.8
Bachelor’s Degree	77	19.9
Post-graduate studies	39	10.1
Employment		
Employed full-time	161	42.0
Employed part-time	99	25.8
Student	33	8.6
Unemployed/Homemaker/ Retired	90	23.5
Income		
0–\$14,999	164	47.1
15,000–29,999	60	17.2
30,000–49,999	81	23.3
>50,000	43	12.4
Health insurance		
None	103	26.3
Private	89	23.2
Public	147	38.3
Other	47	12.2
Risk Behaviors		
	n	%

Variable	Total (N=387)	
Background Characteristics		
	M	SD
Injection drug use and/or needle sharing	37	9.6
Inconsistent condom use	362	93.5
History of STI	149	38.5
Transactional Sex	38	9.8
>1 sexual partner	372	96.1
Casual sexual partner(s)	310	80.1
	M	10%, 90%
Number of partners	3	2, 7
Number of risk behaviors	3	3, 4
Perceived Risk		
	M	SD
Perceived HIV risk - lifetime ¹	1.9	.7
Perceived HIV risk - next year ¹	1.6	.7
Awareness of PrEP		
	n	%
Awareness of PrEP	188	50.3
Awareness of PrEP from a medical provider ²	59	31.4
PrEP discussion with a medical provider in the past year ²	51	27.1

¹Range: 1–4

²Includes participants who responded ‘yes’ to “Before today, have you ever heard of people who do not have HIV taking PrEP to reduce the risk of getting HIV?”

Table 2

Bivariate Association between Attitudes, Norms, and Self-Efficacy and Intention to Initiate PrEP among Respondents with 3 Risk Factors

Variable	Total (N=387)		No PrEP intent (n= 334)		PrEP Intent (n=53)		p
Attitudes ¹	M	SD	M	SD	M	SD	
Global attitude	4.2	.9	4.1	.9	4.8	.7	<.01
Attitudinal belief- feel in control	3.9	1.1	3.8	1.1	4.8	.6	<.01
Attitudinal belief- safety	4.1	1.0	4.1	1.0	4.8	.6	<.01
Attitudinal belief- efficacy	4.2	.9	4.1	.9	4.6	.8	<.01
Norms							
Injunctive norm- global ¹	4.0	1.1	3.9	1.1	4.5	.9	<.01
Injunctive normative beliefs: Top-five important people ²							
Medical Provider	6.9	3.7	6.6	3.7	9.1	2.1	<.01
Partner	5.3	4.4	4.9	4.4	8.0	3.1	<.01
Best friend	4.7	4.1	4.3	4.1	6.9	3.6	<.01
Sister	4.2	4.5	3.9	4.5	6.1	4.3	<.01
Mother	4.1	4.8	3.8	4.7	5.7	4.4	.01
Descriptive norm- global ¹	3.3	1.2	3.2	1.2	4.1	1.1	<.01
Descriptive normative belief- shame ¹	2.0	1.2	2.0	1.2	1.6	1.1	<.01
Self-Efficacy ¹							
Self-Efficacy- global	4.2	1.0	4.1	1.0	4.7	.6	<.01
Efficacy belief- daily pill	4.1	1.1	4.0	1.1	4.7	.7	<.01
Efficacy belief- stomachache	3.2	1.4	3.0	1.4	4.2	1.1	<.01
Efficacy belief- initiate process	3.8	1.2	3.8	1.2	3.8	1.4	.91
Efficacy belief- partner resistance	4.4	1.0	4.3	1.0	4.8	.6	<.01
Efficacy belief- pill burden	1.8	1.1	1.9	1.2	1.3	.8	<.01

¹Range: 1–5

²Range: ±10

Table 3

Associations of Background & Psychosocial Factors with Intention to Initiate PrEP among Respondents with 3 Risk Factors

Background & Psychosocial Variables	OR	95% Wald CI	
Age	1.04	1.00	1.09
PrEP discussion with a medical provider in the past year ²	2.83	1.20	6.68
Perceived Risk Score of HIV for the next 12 months ^{1 †}	0.76	0.46	1.25
Global Attitude Score ^{2 †}	2.36	1.27	4.37
Global Injunctive Norm Score ^{2 †}	0.98	0.67	1.43
Global Descriptive Norm Score ^{2 †}	1.75	1.26	2.43
Global Self-Efficacy Score ^{2 †}	1.66	1.00	2.76

[†]The estimated odds ratio indicates the odds of behavioral intention to initiate PrEP for every one level increase in the score.

¹Range: 1–4

²Range: 1–5

Table 4

Associations between Intention to Initiate PrEP and Beliefs within Significant Psychosocial Pathways among Respondents with 3 Risk Factors

Beliefs	ρ	p
Attitudinal Beliefs ²		
Attitudinal belief- feel in control	0.39	<.01
Attitudinal belief- safety	0.28	<.01
Attitudinal belief- efficacy	0.23	<.01
Descriptive Normative Beliefs ¹		
Descriptive normative belief- shame	-0.22	<.01
Self-Efficacy Beliefs ²		
Efficacy belief- daily pill	0.21	<.01
Efficacy belief- stomachache		<.01
Efficacy belief- initiate process	-0.02	.68
Efficacy belief- partner resistance	0.18	<.01
Efficacy belief- pill burden	-0.20	<.01

¹Range: 1-4

²Range: 1-5