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Examining the Impact of Intimate Partner Violence Type and Timing on Pre-exposure Prophylaxis Awareness, Interest, and Coercion

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Abstract

Previous research suggests that intimate partner violence (IPV) is associated with acceptability of and adherence to pre-exposure prophylaxis (PrEP). However, very few studies have examined whether the type (i.e., physical, sexual, and psychological IPV) and timing (i.e., lifetime, past-year) of IPV experiences differentially relate to PrEP awareness, interest, and perceived PrEP coercion. Therefore, the objective of this study is to examine associations between lifetime and past-year physical, sexual, and psychological IPV experiences on PrEP awareness, interest, and perceived PrEP coercion. Data were collected from an online survey administered to 210 women and men. Past-year physical IPV experiences (AOR 4.53, 95% CI 1.85, 11.11) were significantly associated with being interested in using PrEP. Lifetime sexual (AOR 3.69, 95% CI 1.62, 8.40), psychological IPV (AOR 4.70, 95% CI 1.01, 21.89), and past-year sexual IPV experiences (AOR 3.01, 95% CI 1.10, 8.27) were also significantly associated with believing a recent partner would attempt to control the participant's use of PrEP, if she or he were currently using it. Understanding that engaging in PrEP care is influenced differently by the type and timing of IPV has potential implications for PrEP candidacy guidelines and interventions.

Keywords

Intimate partner violence; HIV; PrEP

Introduction

Intimate partner violence (IPV) and HIV are recognized as two co-occurring epidemics with serious health implications among the general population and at-risk subpopulations [1].

Individuals who experience physical and/or sexual violence by an intimate partner have a heightened risk for HIV compared to individuals in nonviolent relationships [2–5]. For example, one study found that women who experience IPV were 10 times more likely to be HIV-positive than women without IPV experiences [6]. In addition to physical and sexual IPV, a few studies have demonstrated that experiencing psychological IPV can also relate to greater HIV risk [4, 7]. A burgeoning body of literature delineates direct and indirect pathways that increase HIV susceptibility and acquisition among women who experience IPV [1, 8]. For instance, women who experience IPV may have been sexually assaulted by a risky partner (e.g., HIV-positive), which directly impacts her susceptibility to HIV [1, 8]. IPV can also indirectly influence HIV susceptibility through poor mental health, as women with diminished psychological wellbeing may find it difficult to prevent unsafe sex practices with her abusive partner [1, 7]. Although experiencing IPV can elevate one's HIV susceptibility, only 11% of the CDC's HIV risk reduction interventions have integrated components addressing the effects of IPV [9]. Implementing effective HIV prevention is key for this particularly vulnerable population. Given this dearth of research, it is critical to understand how IPV may also influence effective HIV prevention efforts.

The Potential Implications of Pre-exposure Prophylaxis for Violence-Exposed Populations

Pre-exposure prophylaxis (PrEP) is a promising biomedical HIV prevention method [10, 11], with the capacity to be an effective HIV risk reduction option for individuals who experience IPV. PrEP is a daily oral emtricitabine–tenofovir medication approved by the Food and Drug Administration to reduce HIV [12]. In addition to reducing HIV risk, PrEP has other potential advantages for individuals who experience IPV. Unlike other HIV prevention methods, PrEP may allow at-risk individuals to be prescribed PrEP without informing their abusive partner and PrEP is not dependent on the timing of sexual intercourse [13]. With optimal PrEP adherence, these potential advantages could be very useful for individuals who experience sexual IPV by their partner.

Despite the potential advantages of PrEP for individuals who experience IPV, very few studies have examined the implications of PrEP among this vulnerable population. However, research from this burgeoning literature is mixed. In particular, some studies find that women who experienced IPV are more willing to use PrEP compared to women without these experiences [14–16]. While other studies found that women with a history of IPV are less likely to be interested and willing to use PrEP [17]. It is possible that these inconsistent results reflect the unique needs of these samples (i.e., nationally representative sample versus young, female family planning clinic patients). Nevertheless, research is needed to replicate and substantiate these findings because PrEP interest is a considered key step towards uptake [18]. Additionally, PrEP awareness is another step that can influence PrEP interest, willingness, and uptake. For example, individuals who are unaware or unfamiliar about PrEP may be less likely to receive PrEP [19]. While individuals who experience IPV are at risk for HIV [3–5, 20], it is unclear from current research whether this population is aware of PrEP. Ensuring that individuals who experience IPV are informed and aware of PrEP will be essential for PrEP rollout and implementation. Lastly, individuals who are in abusive relationships may experience unique barriers if they were using PrEP. In particular, some abusive partners may attempt to discourage a partner's use of PrEP [13]. A qualitative

study found that partners threatened to take or throw away PrEP pills [21]. This provides meaningful insight of the influence of IPV on PrEP adherence [21] since PrEP adherence is integral to efficacy and effectiveness. However, it would be advantageous for future research to build upon these lived experiences and empirically investigate whether individuals who experience IPV perceive their partner's controlling behavior as an obstacle to PrEP use. These findings could inform optimal strategies for PrEP engagement among populations who experience IPV in hopes of reducing HIV susceptibility and acquisition. Thus, there is a need to understand how interest, awareness, and unique constraints for IPV-exposed people affect PrEP engagement.

Considering Type and Timing of Intimate Partner Violence

Examining the potential differential effects of IPV type may provide additional insight for PrEP delivery. IPV experiences have been distinguished as barriers to optimal adherence to antiretroviral medication [22–24]. However, some research suggest that IPV type can differentially affect adherence to antiretroviral medication, such that experiences of sexual and emotional IPV have a stronger effect on medication nonadherence than physical IPV [25]. To date, current PrEP research rarely distinguishes which IPV type influences awareness, interest, and perceptions related to PrEP and most studies use a composite variable of all three types of IPV [14, 15, 21]. Examining the unique contributions of IPV type on PrEP-related outcomes can provide insight on whether different approaches to PrEP care should be based on IPV type.

Experiencing IPV can have short and long-term effects on one's wellbeing, however, IPV timing may be important for PrEP delivery. First, IPV screening in a clinical setting would need to be implemented in order to determine whether a PrEP candidate is in an abusive relationship. In clinical settings, IPV screening tools can vary in terms of timing. Specifically, the timing of IPV screening tools can range from past-year to ever [26]. These methodological differences in IPV screening tools may present differential effects by IPV timing. For example, PrEP interest may vary if the IPV screening questions are anchored to past-year as opposed to lifetime or ever experiences. Exploring the nuances of IPV timing is especially key, since there is no gold standard for IPV screening to date [26]. IPV is not a ubiquitous experience and IPV timing is an attribute that can help describe a relationship's dynamic. Although IPV is not considered a risk factor for PrEP according to the CDC guidelines [27], examining IPV timing on PrEP-related outcomes may help to clarify what timeframe IPV experiences should be anchored to when assessing PrEP candidacy and care.

Present Study

The present study aims to: (1) examine the association between lifetime physical, sexual, and psychological IPV experiences on PrEP-related outcomes (i.e., awareness, interest, and perceived PrEP coercion); and (2) examine the association between past-year physical, sexual, and psychological IPV experiences on PrEP-related outcomes. Sensitivity analyses were performed to ensure the direction of the exposure- outcome associations were consistent for women and men. We hypothesized that: (1) lifetime physical, sexual, and psychological IPV will be positively associated with PrEP-related outcomes; and (2) past-

year physical, sexual, and psychological IPV will be positively associated with PrEP-related outcomes.

Methods

Procedures

Two hundred and forty-six participants (138 women; 108 men) were recruited online through Mechanical Turk (MTurk) in March 2016. Amazon MTurk is a popular participant-recruitment tool utilized in social science research over the past 10 years [28]. This recruitment tool provides high-quality samples compared to traditional internet and college samples, while simultaneously producing data that meets or exceeds standards for published research [28]. Participants on Amazon MTurk can register online to take surveys for free and receive compensation. Participants were asked to complete an online survey administered through Qualtrics. The study's inclusion criteria were: (1) aged 18 and older and (2) residing in the United States. Informed consent was obtained from each participant. At the end of the interview, participants were compensated \$1 for participating in the study. Participants were also provided information on mental and violence-related services. The Yale University Human Investigation Committee approved all study procedures.

In this study, we were interested in both lifetime and past-year IPV, however, past-year IPV was restricted to those in a current relationship ($N = 144$). There were no significant differences in sample characteristics (i.e., race and ethnicity, education, participant's gender, and age) between those not in a current relationship ($N = 66$) versus those in a current relationship ($N = 144$). In addition, we removed participants who identified as lesbian, gay, or bisexual due to possible confounding between gender and sexual identity and the sample sizes for sexual minorities was small ($N = 36$).

Measures

Physical IPV—The physical assault subscale of the Conflict Tactics Scale-2 (CTS-2) [29] was used to assess minor and severe forms of physical experiences in the past year and lifetime. For *past-year physical IPV*, a summary, binary variable was created: past-year physical IPV experience (yes to any physical IPV experience in the past year). For *lifetime physical IPV*, a summary, binary variable was created: lifetime physical IPV experience (yes to any physical IPV experience).

Sexual IPV—The Sexual Experiences Survey (SES) [30] was used to assess sexual IPV experiences in the past year and lifetime. For *past-year sexual IPV*, a summary, binary variable was created: past-year sexual IPV experience (yes to any sexual IPV experience in the past year). For *lifetime sexual IPV*, a summary, binary variable was created: lifetime sexual IPV experience (yes to any sexual IPV experience).

Psychological IPV—A short-form version of the Psychological Maltreatment of Women Inventory (PMWI) scale measures the frequency and severity of psychological abuse experienced by an individual in an intimate or romantic relationship in the past year and lifetime [31]. This measure has been used in previous research including samples of men

[32, 33]. For *past-year psychological IPV*, a summary, binary variable was created: past-year psychological IPV experience (yes to any psychological IPV experience in the past year). For *lifetime psychological IPV*, a summary, binary variable was created: lifetime psychological IPV experience (yes to any psychological IPV experience).

PrEP Awareness and Interest—PrEP awareness and interest were ascertained using items developed by Krakower and colleagues [34]. Participants were asked if they heard of HIV-negative persons using HIV medicines before sex to reduce their chances of getting HIV infection. Responses were recoded as No (0) or Yes (1). Participants were also asked to rate their interest in using PrEP by: Not interested at All (0), Somewhat Interested (1), and Very Interested (2). Two summary, binary variables were created: (1) PrEP Awareness (yes to heard of PrEP) and (2) PrEP interest (yes to somewhat or very interested in PrEP).

Perceived PrEP Coercion—Reproductive coercion scale developed by McCauley and colleagues [35] was modified and adapted for the PrEP context. Participants were asked if their current or most recent partner would use any of the nine acts to control their use of PrEP, if the participant was using PrEP (e.g., Your partner would hide or throw away your PrEP on purpose; tell you not to take PrEP; would leave you if you didn't stop taking PrEP; have sex with someone else if you didn't stop taking PrEP; keep you from going to the doctor to get your PrEP; physically hurt you because you did not agree to stop taking PrEP). These items demonstrated adequate internal consistency (Cronbach's alpha = 0.78). A summary, dichotomous variable was created: perceived PrEP coercion (yes to believing that your current or most recent partner would prevent you from using PrEP, if you were using it).

Demographics—Participants were asked to self-report socio-demographics. The following variables were used: gender (i.e., women, men), race and ethnicity (i.e., Black, White, Hispanic, Asian, Native Hawaiian or Other Pacific Islander, American Indian or Alaska Native, and Other), years of education (i.e., ninth grade or lower, tenth grade, eleventh grade, High School or GED, some college, graduated college, some graduate or professional school, and completed graduate or professional school), gender of sexual partners (i.e., women only, mostly women, equally men and women, mostly men, men only); and relationship status (i.e., in a romantic relationship and not in a romantic relationship).

Data Analysis

Sample demographics, prevalence, and bivariate associations with the three PrEP-related outcomes (i.e., awareness, interest, and perceived PrEP coercion) were examined. Chi square and *t* tests were used to assess bivariate associations between socio-demographics and PrEP outcomes. Less than 7% of data was missing for the gender of sexual partners and these responses were replaced with mean value for this variable. Demographic variables were assessed for confounding. If a demographic variable (i.e., gender) was significantly associated with both an IPV variable (i.e., physical, sexual, and psychological) and one of the outcomes, then the exposure-outcome association was stratified by the demographic variable and a test of conditional independence was conducted. If the stratified analysis produced a *p* value <0.05, then the stratified demographic variable was deemed a confounder

and controlled for in the multivariate analyses. Next, we conducted bivariate and multivariate logistic regressions. Only confounding, demographic variables (i.e., gender of sexual partners and relationship status) and those deemed relevant by current PrEP literature [11] (i.e., participant's gender) were included as covariates. Univariate and multivariate outliers were further assessed if their residual value exceeded two standard deviations.

Logistic regression models were conducted to examine whether lifetime physical, sexual, and psychological IPV experiences predicted three PrEP outcomes (i.e., awareness, interest, perceived PrEP coercion), while controlling for covariates. Next, logistic regression models were conducted to examine whether past-year physical, sexual, and psychological IPV experiences predicted three PrEP outcomes (i.e., awareness, interest, perceived PrEP coercion), while controlling for covariates. Sensitivity analyses were conducted by stratifying each model by gender. This would ensure similar directionality for women and men. Gender was also tested as an effect modifier on the associations between IPV and PrEP outcomes. All analyses were conducted using SAS [36].

Results

Sample Characteristics and Associations with PrEP Outcomes

Table 1 displays the sample characteristics for 210 women and men. The average age of the participants was 35.4 (SD 12.1). The racial and ethnic makeup was: 5.2% Black, 9.1% Hispanic, 76.2% White, and 9.5% Other. More than half of the sample had finished college or attended graduate school (60.9%). More than two-thirds of the sample was in a romantic relationship (73.3%).

Nearly one in seven (13.8%) participants reported being aware of PrEP, 30.9% were interested in using PrEP, and 22.2% of the participants believed that their current or most recent partner would prevent them from using PrEP (Table 1). There were no significant gender differences in prevalence of PrEP awareness ($\chi^2 = 0.27$, $p > 0.05$), interest ($\chi^2 = 1.75$, $p > 0.05$), and perceived PrEP coercion ($\chi^2 = 1.08$, $p > 0.05$).

Associations Between IPV and PrEP Outcomes

Lifetime IPV Experiences—Unadjusted and adjusted logistic regressions were performed to investigate the effects of lifetime IPV experiences on PrEP awareness, interest, and perceived PrEP coercion, while controlling for covariates (Tables 2, 3, 4). These analyses included the total sample of 210 women and men. Unadjusted results showed that lifetime psychological IPV experiences (OR 2.44, 95% CI 1.06, 5.59, $p < 0.05$) was significantly associated with interest in using PrEP (Table 3). After accounting for covariates and other forms of IPV, this relationship became non-significant (AOR 2.35, 95% CI 0.93, 5.95, $p > 0.05$). Unadjusted results showed that lifetime physical (OR 2.98, 95% CI 1.49, 5.94, $p < 0.001$), sexual (OR 5.11, 95% CI 2.37, 11.02, $p < 0.001$), and psychological IPV experiences (OR 8.02, 95% CI 1.86, 34.49, $p < 0.001$) were significantly associated with believing a recent partner would use a PrEP coercive act (Table 4). Adjusted results showed that lifetime sexual (AOR 3.69, 95% CI 1.62, 8.40, $p < 0.001$) and psychological IPV (AOR 4.70, 95% CI 1.01, 21.89, $p < 0.05$) experiences remained significantly associated with PrEP

coercion. There were no significant associations between any forms of lifetime IPV and PrEP awareness ($p>0.05$; Table 2). Gender did not modify any of the lifetime IPV and PrEP awareness, interest, and perceived PrEP coercion ($p>0.05$; Tables 2, 3, 4).

Past-Year IPV Experiences—We also examined if past-year IPV experiences among individuals in current relationships were associated with PrEP awareness, interest, and perceived PrEP coercion, while controlling for covariates (Tables 2, 3, 4). These analyses were restricted to those in a current relationship ($n = 144$). Unadjusted results showed that past-year physical (OR 6.73, 95% CI 3.11, 14.55, $p<0.001$) and sexual IPV experiences (OR 5.65, 95% CI 2.42, 13.21, $p<0.001$) were significantly associated with PrEP interest (Table 3). After accounting for covariates and all forms of IPV, only past-year physical IPV (AOR 4.53, 95% CI 1.85, 11.11, $p<0.001$) remained significantly associated with being interested in using PrEP. Unadjusted results showed that past-year sexual IPV (OR 3.26, 95% CI 1.39, 7.65, $p<0.001$) was significantly associated with believing a recent partner would use a PrEP coercive act (Table 4). In the adjusted model, the relationship between past-year sexual IPV and PrEP coercion remained significant (AOR 3.01, 95% CI 1.10, 8.27, $p<0.05$). There were no significant associations between any forms of past-year IPV and PrEP awareness ($p>0.05$; Table 2). Gender did not modify any of the past-year IPV and PrEP awareness, interest, and perceived PrEP coercion ($p>0.05$; Tables 2, 3, 4).

Discussion

The present study examined the associations between IPV experiences and PrEP-related outcomes (i.e., awareness, interest, perceived PrEP coercion) among women and men residing in the U.S. Our findings indicate that the relationships between IPV type and timing and PrEP-related outcomes is nuanced. Specifically, in the multivariate models, lifetime IPV experiences were not associated with being interested in using PrEP as an HIV prevention method. However, people who experience physical IPV in the past year were more likely to be interested in using PrEP. Further, experiences of sexual IPV was consistently related to perceived PrEP coercion in both lifetime and past-year time anchors. Lifetime psychological IPV experiences were also associated with perceiving one's partner would prevent hypothetical PrEP use. To date, no study has looked at the differential effects of both IPV type and timing in the context of PrEP. Our findings shed light on how experiences of various types and timing of IPV may impact one's attitude and potential engagement in PrEP as an HIV prevention method.

Interestingly, women and men who experience sexual IPV felt their partner would prevent their potential PrEP use. This finding is consistent with reproductive coercion literature indicating that women with IPV experiences are more likely to have a partner who is controlling their reproductive choices through various behaviors such as poking holes in condoms [37, 38]. In the context of PrEP, abusive partners who use sexual violence against their romantic partner may use coercive tactics to discourage PrEP use. Although perceived PrEP coercion is hypothetical, it may have significant implications on providing PrEP to women and men with sexual IPV experiences. While outside the scope of the present study, PrEP uptake (i.e., receiving PrEP prescription from pharmacy) may be low among those who experience sexual IPV if they are concerned about their partner's controlling behavior. PrEP

uptake is a necessary step for adherence and low uptake can negatively impact the effectiveness of PrEP for this vulnerable population. It is important for behavioral scientists who specialize in HIV prevention and IPV to develop effective and safe strategies for prospective PrEP patients with experiences of sexual IPV.

Lifetime psychological IPV experiences were positively associated with perceived PrEP coercion, however, past-year psychological IPV was not associated with this outcome. Psychologically abusive relationships could include harmful behaviors like isolation from social networks and controlling victim's sexual health [39]. Women and men with these experiences may have felt a lack of power and decision-making in these relationships. It is possible that the social and emotional implications of psychologically abusive tactics can make an abused woman and man believe their partner would try their personal use of PrEP. This perception of a partner controlling one's use of PrEP is problematic and underscores the importance of developing safe PrEP strategies when PrEP is being prescribed to those who experienced psychological IPV.

Past-year physical IPV experiences were positively associated with being interested in PrEP, but lifetime physical IPV experiences did not relate. Some studies suggest that physical IPV experiences are significantly associated with HIV risk behaviors [40]; in addition, perpetrators of physical IPV are more likely to also report HIV risk behaviors [41, 42]. Individuals who experience physical IPV in the past year may be aware of these risky HIV behaviors and thus are interested in PrEP as a prevention method. Understanding the implications of past-year IPV experiences on PrEP interest is important since 11.8% of HIV infection cases among women may be attributed to past-year IPV [40].

Previous research indicates that psychological IPV often co-occurs with physical IPV, in both lifetime [43–45] and recent accounts [46]. For example, physical IPV was 64 times more likely to occur on days when psychological IPV occurred and the co-occurrence of physical and sexual IPV was least frequent among women currently experiencing IPV [46]. It is possible that psychological IPV co-occurred with physical IPV in both time points (i.e., recent and lifetime), and thus did not emerge as statistically significant.

These findings should be interpreted in light of the study limitations. The cross-sectional study design does not allow causal inferences to be made. All of the study variables were self-reported. Since IPV reporting can be influenced by social desirability bias, the prevalence of IPV could be under-reported. It is important to note that self-report measures for IPV are the most common methods [47]. The frequency and severity of IPV was not accounted for in the analyses. It may be useful for future research studies to build upon our findings and test a dose–response relationship between IPV severity and PrEP-related outcomes like interest and acceptability. Past-year IPV was reported by participants in current relationships, however, we cannot say with absolute certainty that the current partner was also the abusive partner. Although the relationship length was greater than 12 months for each participant in this group, some participants reported having more than one person and these concurrent partners could be the abusive partner. Perceived PrEP coercion was measured as a hypothetical situation since the majority of our sample were not prescribed PrEP at the time of the interview. Participants can only speculate on what their partner might

do. It will be important for future research to replicate these analyses among men and women currently using PrEP. It would also be useful for research to capture the frequency and severity of PrEP coercion on the day to day level among individuals currently using PrEP in order to assess whether PrEP coercion impacts daily adherence to PrEP, especially among violence-exposed populations. Our sample was recruited using MTurk and may not be representative of the U.S. population. While there are some similarities between our sample and the U.S. population such as the proportion of White individuals (76% vs. 77.1%) and females (51.9% vs. 50.8%) respectively [48], it is important for future research to replicate our findings with a more diverse and representative sample of the U.S. HIV epidemic. Further, the inclusion criteria for the study did not include high-risk attributes (e.g., transactional sex, injection drug use) and was limited to U.S. residents. Therefore, these findings may not be generalizable to individuals living in other geographical locations. Future studies can adapt our research methods (i.e., recruitment via MTurk) to target individuals living in other countries and specific high-risk groups (e.g., transactional sex workers, injection drug users).

Nevertheless, this is one of the first studies to examine the differential effects of IPV type and timing on PrEP-related outcomes. In particular, examining IPV type allowed further examination outside of the composite variable approach to show that multiple types of IPV can be associated with PrEP-related outcomes but at different times. This study adds to the nascent body of literature addressing the implications of IPV on PrEP as a viable HIV prevention method.

If replicated in larger and more diverse populations, our findings can have important implications for the PrEP candidacy guidelines and care. IPV type and timing can influence whether a person is interested in PrEP as an HIV prevention option. These findings could assist clinicians if IPV became a behavioral risk factor for PrEP candidacy. Specifically, both lifetime and past-year IPV experiences need to be examined since assessing only one-time frame can potentially miss potential PrEP candidates. Further, interest in PrEP is an important first step but it may not inform optimal execution of a daily regimen [16]. Women and men who experience IPV may be concerned about their partner's ability to control their PrEP. Therefore, clinicians need to take precautions and develop safety protocols for patients who experienced IPV while taking PrEP. This can be accomplished if PrEP providers partner with IPV service organizations to ensure an optimal referral system in which PrEP patients who experienced IPV can receive violence-related support from the IPV service organizations. In the same light, women and men who experienced IPV and express PrEP interest to IPV service organizations can be referred to partnering PrEP providers. PrEP may be a viable option for those who experienced IPV but it will be key for future research to identify and devise effective and safe ways for this vulnerable population to use PrEP in order to reduce their HIV susceptibility and acquisition.

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Table 1

Prevalence and associations of sample characteristics with PrEP outcomes

	PrEP outcomes					
	Total sample ^a , N (%)	PrEP awareness ^b , N (%)	χ^2 or <i>t</i>	PrEP interest ^b , N (%)	χ^2 or <i>t</i>	PrEP coercive acts ^b , N (%)
Overall	210 (100)	29 (13.8)	–	65 (30.9)	–	46 (22.2)
Age, <i>M</i> (<i>SD</i>)	35.4 (12.1)	34.9 (10.7)	0.27	34.1 (11.4)	1.75	37.9 (13.5)
Gender			0.18		2.94	0.04
Women	109 (51.9)	14 (12.8)		28 (25.7)		23 (21.7)
Men	101 (48.1)	15 (14.9)		37 (36.6)		23 (22.8)
Race and ethnicity			0.37		3.38	1.65
Black	11 (5.2)	2 (18.8)		6 (54.5)		4 (36.3)
White	160 (76.2)	22 (13.8)		46 (28.8)		33 (21.0)
Other	20 (9.5)	3 (15.0)		7 (35.0)		4 (20.0)
Hispanic	19 (9.1)	2 (10.5)		6 (31.6)		5 (26.3)
Education			4.54		7.41	9.15
Less than 12th	1 (0.5)	0 (0.0)		0 (0.0)		1 (100.0)
HS diploma or GED	15 (7.1)	5 (26.7)		5 (33.3)		5 (33.3)
Some college	66 (31.4)	8 (12.1)		26 (39.4)		11 (16.9)
Finished college	87 (41.4)	10 (11.5)		25 (28.7)		20 (23.3)
Some graduate school	16 (7.6)	4 (25.0)		6 (37.5)		6 (37.5)
Finished graduate school	25 (11.9)	3 (12.0)		3 (12.0)		3 (12.5)
Relationship status			0.33		0.85	1.53
In a romantic relationship	154 (73.3)	20 (13.0)		44 (28.6)		36 (23.8)
Not in a romantic relationship	56 (26.7)	9 (16.1)		21 (37.5)		10 (17.9)
Lifetime IPV						
Physical IPV	98 (46.7)	18 (18.4)	3.20	36 (36.7)	2.87	31 (31.9)
Sexual IPV	36 (17.1)	8 (22.2)	2.58	16 (44.4)	3.70*	18 (50.0)
Psychological IPV	165 (78.6)	22 (13.3)	0.15	57 (34.6)	4.65*	44 (27.2)
Past-year IPV						
Physical IPV	48 (31.2)	8 (16.7)	0.84	27 (56.3)	26.17**	15 (31.3)

Total sample ^a , N (%)		PrEP outcomes					
		PrEP awareness ^b , N (%)	χ^2 or <i>t</i>	PrEP interest ^b , N (%)	χ^2 or <i>t</i>	PrEP coercive acts ^b , N (%)	χ^2 or <i>t</i>
Sexual IPV	30 (19.5)	5 (16.7)	0.44	18 (60.0)	18.03 ^{**}	13 (43.3)	7.83 ^{**}
Psychological IPV	106 (68.8)	13 (12.3)	0.16	35 (33.0)	3.30	28 (27.2)	1.99

M mean, *SD* standard deviation

* *p* 0.05;

** *p* 0.01

^aColumn percentages

^bRow percentages

Table 2

Associations of intimate partner violence with PrEP awareness

	OR (95% CI)	AOR (95% CI)	Interaction models		
			Model 1 AOR (95% CI)	Model 2 AOR (95% CI)	Model 3 AOR (95% CI)
Lifetime IPV experiences ^b					
Physical IPV	2.07 (0.92, 4.62)	2.63 (0.92, 7.55)	1.39 (0.38, 5.08)	2.63 (0.90, 7.70)	2.62 (0.92, 7.48)
Sexual IPV	2.08 (0.84, 5.16)	1.84 (0.69, 4.94)	1.84 (0.68, 4.99)	3.77 (0.98, 14.44)	1.84 (0.69, 4.93)
Psychological IPV	0.84 (0.33, 2.10)	0.41 (0.13, 1.35)	0.41 (0.12, 1.35)	0.41 (0.12, 1.36)	0.36 (0.08, 1.54)
Gender	0.85 (0.39, 1.85)	0.87 (0.37, 1.96)	0.39 (0.10, 1.43)	1.23 (0.48, 3.11)	0.70 (0.13, 3.66)
Physical IPV * gender			3.85 (0.72, 20.44)		
Sexual IPV * gender				0.24 (0.04, 1.63)	
Psychological IPV * gender					1.32 (0.20, 8.64)
Past-year IPV experiences ^c					
Physical IPV	1.57 (0.60, 4.13)	1.57 (0.48, 5.12)	1.13 (0.28, 4.69)	1.57 (0.48, 5.16)	1.57 (0.48, 5.13)
Sexual IPV	1.45 (0.48, 4.37)	1.21 (0.33, 4.42)	1.24 (0.34, 4.54)	1.40 (0.32, 6.13)	1.29 (0.35, 4.82)
Psychological IPV	0.81 (0.30, 2.20)	0.64 (0.22, 1.93)	0.63 (0.21, 1.91)	0.64 (0.21, 1.92)	0.38 (0.09, 1.51)
Gender	0.63 (0.24, 1.64)	0.68 (0.26, 1.82)	0.51 (0.15, 1.72)	0.75 (0.25, 2.24)	0.30 (0.05, 1.73)
Physical IPV * gender			2.30 (0.31, 16.93)		
Sexual IPV * gender				0.61 (0.05, 8.03)	
Psychological IPV * gender					3.51 (0.42, 29.24)

OR odds ratio, AOR adjusted odds ratio, IPV intimate partner violence

* $p < 0.05$,

**

 $p < 0.01$,

 $p < 0.001$ ^aRow percentages^bAdjusted for participant's gender and relationship status^cAdjusted for participant's gender. Bold values are significant

Table 3

Associations of intimate partner violence with PrEP interest

	OR (95% CI)	AOR (95% CI)	Interaction models		
			Model 1 AOR (95% CI)	Model 2 AOR (95% CI)	Model 3 AOR (95% CI)
Lifetime IPV experiences ^b					
Physical IPV	1.62 (0.92, 2.99)	1.06 (0.53, 2.11)	1.31 (0.53, 3.22)	1.04 (0.52, 2.08)	1.06 (0.52, 2.13)
Sexual IPV	2.04 (0.98, 4.26)	1.88 (0.85, 4.17)	1.89 (0.85, 4.22)	3.34 (0.98, 11.44)	1.92 (0.86, 4.30)
Psychological IPV	2.44 (1.06, 5.59)*	2.35 (0.93, 5.95)	2.32 (0.92, 5.86)	2.34 (0.92, 5.91)	7.49 (1.54, 36.32)**
Gender	0.60 (0.33, 1.08)	0.54 (0.29, 1.00)	0.67 (0.28, 1.62)	0.65 (0.33, 1.29)	3.23 (0.56, 18.42)
Physical IPV * gender			0.64 (0.19, 2.19)		
Sexual IPV * gender				0.37 (0.08, 1.78)	
Psychological IPV * gender					0.12 (0.02, 1.00)
Past-year IPV experiences ^c					
Physical IPV	6.73 (3.11, 14.55)***	4.53 (1.85, 11.11)***	5.30 (1.70, 16.58)**	4.71 (1.90, 11.68)***	4.53 (1.85, 11.11)***
Sexual IPV	5.65 (2.42, 13.21)***	2.62 (0.98, 6.99)	2.61 (0.97, 6.99)	4.17 (1.20, 14.53)*	2.62 (0.98, 7.01)
Psychological IPV	2.14 (0.93, 4.90)	0.95 (0.36, 2.48)	0.96 (0.37, 2.51)	0.93 (0.36, 2.45)	0.95 (0.26, 3.44)
Gender	0.53 (0.26, 1.07)	0.75 (0.34, 1.66)	0.87 (0.31, 2.50)	0.75 (0.17, 3.43)	0.75 (0.17, 3.43)
Physical IPV * gender			0.69 (0.14, 3.47)		
Sexual IPV * gender				0.29 (0.04, 1.96)	
Psychological IPV * gender					0.99 (0.17, 5.85)

Bold values are significant

OR odds ratio, AOR adjusted odds ratio, IPV intimate partner violence

* $p < 0.05$,** $p < 0.01$,*** $p < 0.001$ ^aRow percentages^bAdjusted for participant's gender and relationship status

c₂ Adjusted for participant's gender

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Table 4

Associations of intimate partner violence with PrEP coercive acts

	OR (95% CI)	AOR (95% CI)	Interaction models		
			Model 1 AOR (95% CI)	Model 2 AOR (95% CI)	Model 3 AOR (95% CI)
Lifetime IPV experiences ^b					
Physical IPV	2.98 (1.49, 5.94) ^{***}	1.46 (0.67, 3.19)	2.35 (0.74, 7.50)	1.19 (0.51, 2.76)	1.46 (0.67, 3.19)
Sexual IPV	5.11 (2.37, 11.02) ^{***}	3.69 (1.62, 8.40) ^{***}	3.71 (1.63, 8.47) ^{***}	9.56 (2.52, 36.30) ^{***}	3.69 (1.62, 8.40)
Psychological IPV	8.02 (1.86, 34.49) ^{***}	4.70 (1.01, 21.89) [*]	4.70 (1.01, 21.88) [*]	4.69 (1.01, 21.87) [*]	4.88 (0.59, 40.59)
Gender	0.94 (0.49, 1.81)	0.87 (0.42, 1.78)	1.51 (0.46, 4.98)	1.32 (0.06, 1.13)	0.93 (0.05, 16.10)
Physical IPV * gender			0.41 (0.09, 1.83)		
Sexual IPV * gender				0.20 (0.04, 1.06)	
Psychological IPV * gender					0.92 (0.05, 17.40)
Past-year IPV experiences ^c					
Physical IPV	1.78 (0.82, 3.86)	0.99 (0.38, 2.60)	1.45 (0.44, 4.79)	0.99 (0.38, 2.61)	0.98 (0.37, 2.58)
Sexual IPV	3.26 (1.39, 7.65) ^{***}	3.01 (1.10, 8.27) [*]	2.99 (1.08, 8.24) [*]	3.45 (1.02, 11.89) [*]	3.24 (1.15, 9.05) [*]
Psychological IPV	1.87 (0.78, 4.48)	1.42 (0.55, 3.65)	1.46 (0.56, 3.77)	1.41 (0.55, 3.64)	0.78 (0.22, 2.73)
Gender	0.91 (0.43, 1.93)	1.09 (0.50, 2.41)	1.51 (0.56, 4.11)	1.21 (0.48, 3.04)	0.44 (0.09, 2.14)
Physical IPV * gender			0.40 (0.07, 2.17)		
Sexual IPV * gender				0.69 (0.11, 4.13)	
Psychological IPV * gender					3.40 (0.54, 21.03)

Bold values are significant

OR odds ratio, AOR adjusted odds ratio, IPV intimate partner violence

* $p < 0.05$,** $p < 0.01$,*** $p < 0.001$ ^a Row percentages

Adjusted for participant's gender
Adjusted for participant's gender and relationship status
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