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Intimate Partner Violence and Preferences for Pre-exposure Prophylaxis (PrEP) Modes of Delivery Among A Sample of Gay, Bisexual, and Other Men Who Have Sex with Men

Rob Stephenson[1,5], **Erin Rogers**[2], **Gordon Mansergh**[3], **Sabina Hirshfield**[4], **Patrick Sullivan**[2]

[1]The Center for Sexuality and Health Disparities and the School of Nursing, University of Michigan, Ann Arbor, MI, USA

[2]Rollins School of Public Health, Emory University, Atlanta, GA, USA

[3]Division of HIV/AIDS Prevention, Centers for Disease Control and Prevention, Atlanta, GA, USA

[4]Department of Medicine, SUNY Downstate Health Sciences University, Brooklyn, NY, USA

[5]Department of Systems, Populations and Leadership, School of Nursing, University of Michigan, Ann Arbor, USA

Abstract

While there is strong evidence that the experience of intimate partner violence (IPV) shapes PrEP use among heterosexual women, evidence for similar relationships among gay, bisexual and other men who have sex with men (GBMSM) is scant. In this paper we analyze baseline data from a large randomized controlled trial (RCT) of an HIV prevention intervention for GBMSM recruited from three cities (Atlanta, Detroit and New York City) to examine how the recent experience of IPV shapes their rankings of PrEP delivery options. Men were asked to rank from 1 to 8 PrEP taken by daily pill, event-based pill, injection, anal suppository (before sex), suppository (after sex), gel (penile or rectal) (before sex), and gel (after sex) and condoms. The analysis sample is 694 HIV-negative, sexually active GBMSM. Analysis considers an ordinal outcome measuring participant's ranked preferences for their future use of eight HIV prevention options. Men who experienced physical IPV preferred PrEP in pill form, while men who experienced partners monitoring their behaviors (monitoring IPV) preferred PrEP by injection. Men who experienced emotional IPV ranked PrEP by pill lower than other methods. Sexual and controlling IPV were not significantly associated with PrEP modality ranking. As more modes of PrEP delivery become available, providers should be encouraged to screen GBMSM seeking PrEP for IPV, and to provide men with the necessary information to facilitate an informed choice when deciding on a PrEP modality that will work for them and their relationship context.

Keywords

Violence; PrEP; Relationships; Gay; MSM

Rob Stephenson, rbsteph@umich.edu.

Introduction

While research on intimate partner violence (IPV) has traditionally viewed IPV through the gendered lens of male perpetrator and female victim [1], there is now a well-established body of evidence demonstrating that gay, bisexual and other men who have sex with men (GBMSM) experience IPV at rates that are substantially higher than experienced by men who do not have sex with men, and rates that are comparable to those among heterosexual women [2, 3]. Estimated prevalence for victimization of IPV among GBMSM ranges from 12% [4] to 45% [5] for physical IPV, 1.8% [6] to 33% [7] for sexual IPV, and 28% [8] to 64% [8, 9] for emotional violence. Of particular importance to GBMSM is evidence of a link between IPV and risk for HIV infection [10-14]. In a systematic review of associations between IPV experience and health outcomes among GBMSM, Buller et al. [15] found that IPV victimization was associated with increased odds of substance use (OR 1.88), being HIV-positive (OR 1.46), reporting depressive symptoms (OR 1.52), and engaging in unprotected anal intercourse (UAI) (OR 1.72). This link is especially salient because GBMSM continue to represent the group most impacted by HIV in the US, accounting for two-thirds of all new annual HIV infections each year [16].

Studies have estimated that up to one-third of all new HIV infections over 10 years could be averted if 40% of GBMSM at substantial risk for HIV infection used pre-exposure prophylaxis (PrEP) as prescribed [17]. PrEP is a daily pill-based HIV medication consumed orally to prevent acquiring HIV infection. There are recent indications that PrEP knowledge has risen among GBMSM, with increases in PrEP awareness by approximately 50% between 2014 and 2017 [18]. Levels of PrEP use have also increased substantially: among GBMSM with indications for PrEP (i.e., sexual risk behaviors or a recent STI diagnosis), the use of PrEP increased between 2014 and 2017 by approximately 500% from 6 to 35% [18].

However, while several studies have demonstrated links between IPV and HIV, and IPV and HIV risk behaviors[19], studies examining how the experience of IPV may inhibit PrEP use have focused largely on heterosexual women in resource poor environments [20, 21]. For example, Roberts et al. analyzed data from 1785 HIV-negative women enrolled in a clinical trial of PrEP among African HIV serodiscordant couples, finding that verbal, economic, and physical IPV were all associated with lower PrEP adherence [22]. Studies of heterosexual women in the US have also shown IPV to be a barrier to PrEP adoption and adherence [23].

The first study of the relationship between IPV and PrEP use for GBMSM was by Braksmajer et al. [24], who analyzed data from 863 men collected via a cross-sectional, internet-based survey. Men reported high rates of IPV during the prior 6 months (physical violence, 23.3%; emotional violence, 36.3%; monitoring, 45.1%; controlling, 25.3%; forced sex, 20.0%), and the experience of forced sex and emotional IPV were negatively associated with PrEP use, while the experience of partners' controlling behaviors was positively associated with PrEP use. Men experiencing controlling behavior by a partner may be using PrEP as a mechanism for protecting themselves against perceived risks of HIV acquisition from their partner, or their partner may also be controlling their PrEP use. In an analysis of data from 659 GBMSM, Kahle et al. found that, while 73.3% of men perceived that

their partner would be supportive of their PrEP use, the actual experiences of IPV were significantly associated with the perception that their partner would not support PrEP use [25]. In contrast, data from an online survey of 409 GBMSM showed that having a history of IPV was significantly associated with increased willingness to persuade a partner to initiate PrEP [26].

There are new dosing regimens for PrEP [27] and new modes of PrEP delivery on the horizon—moving away from a sole reliance of PrEP delivered by daily oral pills. While research has begun to explore GBMSM's attitudes towards new forms of PrEP delivery [28-33], missing from this literature is an understanding of how the experience of IPV shapes GBMSM's willingness to use different PrEP modalities. Also missing is an understanding of how preferences for PrEP modalities may be shaped by the form of IPV experienced. Studies with women have shown differential associations between PrEP use and the type of IPV experienced [22], and this information is needed for GBMSM to inform the tailoring of interventions that address IPV as a barrier to PrEP use. In this paper we analyze baseline data from a large randomized controlled trial (RCT) of an HIV prevention intervention for GBMSM recruited from three U.S. cities (Atlanta, Detroit and New York City) to examine how the recent experience of IPV may shape their rankings of PrEP delivery options, and to explore for the first time how different forms of IPV may shape preferences for PrEP modalities. This nuanced understanding of the associations between IPV and preferences for PrEP modality may inform intervention strategies to promote PrEP use among GBMSM.

Methods

The Mobile Messaging for Men (M-Cubed) study is a randomized controlled trial of a mobile app intervention designed to create shifts in HIV prevention and care behaviors by sending daily evidenced-based messages to GBMSM recruited from three cities: Atlanta, New York City, and Detroit. The study design, recruitment process, and data collection methods have been described in detail elsewhere (Sullivan et al. 2019) [34]. Briefly, men were recruited using a multi-model approach with a goal of recruiting a sample of GBMSM who were diverse in terms of age, race/ethnicity, and HIV risk. Recruitment included targeted online banner advertisements (e.g., Facebook), print advertisements (e.g., flyers, public transit), in-person recruitment at venues, and referrals from community partners. Study approval was obtained from the Institutional Review Board Emory University (Protocol #87684) and registered at ClinicalTrials.gov (NCT03666247).

Men recruited at community venues were offered a brief interviewer-administered screening survey, and men recruited through flyers or online venues were offered a brief online eligibility screener. Eligible men were then contacted by study staff and invited to attend an in-person baseline enrollment visit. At this visit, research staff reconfirmed eligibility criteria and reviewed consent documentation. Eligible men were men: (1) aged 18 years or older; (2) assigned male sex at birth; (3) self-reported their current gender identity as male; (4) self-reported anal intercourse with a man in the past year; (5) were current residents of the study city metropolitan area (Atlanta, Detroit or New York City); (6) planned to stay in the

city area for the duration of the study (at least 9 months); (7) owned and used an Android or iOS smartphone; and (8) were able to read and understand English without assistance.

Following consent and enrollment, all men completed a baseline behavioral survey that collected information about: (1) demographic characteristics; (2) HIV and STI status and testing history; (3) condom use with main and other sex partners; (4) PrEP use and adherence (for HIV-negative men); (5) ART use and adherence (for HIV-positive men); (6) knowledge, perceptions, beliefs, and communication with sex partners about HIV status and risk reduction; (7) mobile phone and data usage; (8) access to an Internet connection; and (9) the experience of recent (past 3-month) IPV victimization.

Measures

Demographics—Demographic questions assessed age and race and ethnicity (i.e., race: American Indian/Alaskan Native, Asian, Black or African American, Hawaiian/Pacific Islander, White, or other race and ethnicity: Hispanic/Latino versus non-Hispanic/Latino). Sexual orientation was assessed with the question, “Which of the following best represents how you think of yourself?” Response options included Gay or homosexual, Straight or heterosexual, Bisexual, or Other, please specify. Men were asked to report their highest level of education completed, with response options as Less than high school; High school graduate or obtained GED; Some college, Associate's Degree, or Technical Degree; Bachelor's Degree/College Degree; or Any post-graduate studies. Men were asked to describe their current employment status, with response options: Employed full-time; Employed part-time; On active duty in the U.S. Armed forces, Reserves, or National Guard; Retired; Unable to work for health reasons; Unemployed; Other. Regarding health coverage, men were asked what kind of health insurance or coverage they had (i.e., A private health plan (through an employer or purchased directly); Medicaid (for people with low incomes); Medicare (for elderly people and people with disabilities); Some other government plan (e.g., ADAP, a state government plan); TRICARE (CHAMPUS); Veteran Administration coverage; or Some other health insurance plan). Binge-drinking frequency in the past 3 months was measured with the Alcohol Use Disorders Identification Test—Consumption (AUDIT-C) [35]. For substance use, men selected from a list of drugs and could click “yes” for any substance used in the last 3 months, as well as mode of administration (i.e., smoked, snorted, swallowed, or injected). The list of substances included: *methamphetamine or other amphetamine (meth, speed, crystal, crank, ice); Downers (Valium, Ativan, Xanax); Pain killers (Oxycontin, Percocet); Hallucinogens (LSD, mushrooms, Peyote, Mescaline); Ecstasy (E, X, MDMA); Club drugs (GHB, ketamine, special K); Marijuana (pot, weed); Poppers (amyl nitrate); PCP (angel dust, wet, wicky sticks); Synthetic marijuana (herbal incense, spice, K2); Crack; Cocaine; Heroin; Heroin and cocaine injected together (speedballs); other*. Substance use was created from all drug variables reported in the past 3 months [36].

Men were asked about recent incarceration in the past 3 months and whether they had experienced any period of homelessness in the past 12 months. Men were asked whether they had ever received an HIV test and the result of their last test. Men were also asked a series of questions about their sexual behavior in the past 3 months, including number

of partners, number of partners with whom they had anal sex and number of partners with whom they had condomless anal sex. To create a variable capturing the types of sexual partners each participant had, we organized these responses based on whether men reported a main partner only, casual partner(s) only, or a combination of both a main and casual partner(s).

PrEP Use and Attitudes—Men were asked if they had heard of PrEP, and those who reported hearing about PrEP (100% of men) were asked about their previous and current use of PrEP. Adherence to PrEP among current users was assessed using the measure proposed by Wilson et al.: *in the last 30 days, on how many days did you miss at least one dose of any of your [drug name]? In the last 30 days, how often did you take your [drug name] in the way you were supposed to? (responses were numerical ranging from 0 to 30) In the last 30 days, how good a job did you do at taking your [drug name] in the way you were supposed to?* [37] *(responses: very poor, poor, fair, good, very good, excellent)*. All men who had heard about PrEP, regardless of current use, were asked to rank their preferences for using a range of modalities of PrEP delivery in the future. Men were asked, "*Below is a list that includes the currently available form of PrEP and condoms, and all the different forms of PrEP that researchers are working on. Please rank in order of the methods you would use, from most preferred (1) to least preferred (8)?*" and were asked to rank from 1 to 8 PrEP taken by daily pill, event-based pill, injection, anal suppository (before sex), anal suppository (after sex), gel (before sex), and gel (after sex) and condoms. Each specific form of PrEP was defined: Suppository—"*This would involve putting a pill the size of a daily vitamin pill into your rectum at least 30 min before or after having receptive anal sex (bottoming) to be sure it dissolved in time to reduce the risk of getting HIV*"; Gel—"*Researchers are also working on a form of PrEP that is a gel you would apply to the penis (like lubricant or lube) or put into the rectum with an applicator before and/or after sex to reduce the risk of getting HIV*"; Event-based pill—"*Researchers are also working on a form of PrEP that you would only take around the times you have sex. You would take two pills within 24 h before sex and then two separate one-pill doses in the 2 days after sex*"; Injection—"*a shot you receive every 1–3 months*": daily pill—"*a pill you take every day to prevent HIV*".

Intimate Partner Violence—The survey included five-items pertaining to intimate partner violence. Men were asked if they experienced one or more of five intimate violence typologies—physical, sexual, emotional, monitoring and controlling—in the past 3 months by answering yes or no to the following measures: Sexual violence—"*In the past 3 months, has a partner pressured or forced you to do something sexual that you didn't want to do?*"; Physical violence—"*In the past 3 months, have arguments in your relationship escalated into any of the following: destruction of property, grabbing, restraining, pushing, kicking, slapping, punching, threats of violence or other acts of physical intimidation?*"; Emotional violence—"*In the past 3 months, has a partner insulted, criticized, threatened or yelled at you in any way?*"; Controlling violence—"*In the past 3 months, has a partner prevented you from communicating with or seeing your friends, family, or coworkers?*"; Monitoring violence—"*In the past 3 months, has a partner monitored or demanded access to your cell phone, email, social networking sites, finances or spending?*".

Analysis—Between February and October 2018, 1226 men were recruited and enrolled into the M-Cubed RCT, with 478 men from Atlanta, 335 from Detroit, and 416 from New York City. The analytic sample was initially restricted to HIV-negative, sexually active men (n = 701), as only these were asked questions on intentions for future PrEP use. However, 7 men did not have complete data on the PrEP intentions questions, resulting in a final analytic sample of 694. Analysis considers an ordinal outcome measuring participant's ranked preferences for their future use of HIV prevention options. Men were asked to rank eight HIV prevention options, including seven formulations of PrEP use, including the daily pill, event-based pills, injection, suppository (before sex), suppository (after sex), gel (before sex), or gel (after sex) and condoms, in order of their willingness to use each in the future. An ordinal regression model was fit to the ranked outcome. The key covariates of interest were five binary variables measuring the recent (past 3-month) experience of five types of IPV (i.e., physical, sexual, emotional, controlling or monitoring). Men could have reported more than one form of IPV; analysis did not assess the experience of multiple combinations of IPV due to small sample sizes across the many combinations of IPV. The model also controlled for demographic characteristics (i.e., age, race, ethnicity, employment, education and sexual identity), structural vulnerabilities (i.e., recent homelessness, recent incarceration, health insurance coverage), risk behaviors (i.e., any drug use in the past 3 months and frequency of binge drinking in the past 3 months), recent sexual behavior (i.e., sex with their main partner, sex with casual partner(s), or a combination of both a main and casual partner(s)), and current use and adherence to PrEP (i.e., currently using and adherent, currently using but not adherent, not currently using). Statistical analyses were conducted using Stata 16.0.

Results

The mean age of men was 32.9 years; 58.1% were white, 20.0% Black/African American, and 21.9% multiracial or another race (Table 1). The majority (85.5%) did not identify as Hispanic/Latino and 86.2% were employed at least part-time. Most had at least some college education (91.5%) and health insurance coverage (67.7% with private insurance and 16.9% with public insurance). Most (87.6%) identified as gay/homosexual. Regarding reported sex partners in the past 3 months, 23.6% had sex with just their main partner, 35.0% had sex with just casual partner(s), and 41.4% had sex with a combination of casual and main partners. In the past 3 months, 10.4% were recently incarcerated and 12.7% reported poly-drug use. A small proportion (11.1%) reported daily or weekly binge drinking episodes, though 34.9% reported no recent history of binge drinking. In the past 12 months, 6.5% experienced homelessness.

In terms of experiencing IPV in the past 3 months, the most frequently reported type was emotional IPV (14.3%), followed by monitoring IPV (6.6%), sexual IPV (5.7%), physical IPV (4.4%) and controlling IPV (3.1%). In terms of PrEP use, 13.1% reported currently taking PrEP and being adherent, 18.2% reported being on PrEP and not being adherent, and 68.7% reported not being on PrEP.

Men who reported experiencing physical IPV ranked PrEP in daily pill form higher (adjusted Odds Ratio [aOR] 1.35, 95% confidence interval [CI] 1.10, 4.53), while those

who experienced emotional IPV ranked PrEP in daily pill form lower (aOR 0.54, 95% CI 0.34, 0.84), compared to other PrEP modalities (Table 2). Men who reported experiencing monitoring IPV ranked PrEP in injection form higher (aOR 2.40, 95% CI 1.28, 4.50) but ranked PrEP in gel form applied after sex lower (aOR 0.55, 95% CI 0.31, 0.98). Sexual and controlling IPV were not significantly associated with PrEP modality ranking. Men who were not currently using PrEP ranked daily pill (aOR 0.15, 95% CI 0.10, 023) and injection (aOR 0.38, 95% CI 0.25, 0.58) lower, but ranked event-based pills (aOR 1.61, 95% CI 1.07, 2.41), suppository (after sex) (aOR 1.65, 95% CI 1.10, 2.49), gel (after sex) (aOR 1.57, 95% CI 1.03, 2.38) and condom use (aOR 2.64, 95% CI 1.74, 4.10) higher. Men who reported currently using PrEP but not being adherent did not report significantly different rankings than men who were using PrEP and were adherent.

Although not the central focus of the analysis, several demographic and behavioral characteristics were also associated with PrEP modality ranking. Black/African American men ranked injection (aOR 0.64, 95% CI 0.44, 0.94) and suppository (after sex) (aOR 0.45, 95% CI 0.31, 0.65) lower, but ranked condom use (aOR 1.95, 95% CI 1.32, 2.87) higher. The only association with sexual behavior was men who had both main and casual sex partners ranking event-based PrEP higher (aOR 1.76, 95% CI 1.22, 2.53). Bisexual men ranked PrEP in daily pill form lower (aOR 0.65, 95% CI 0.43, 0.97), but ranked condom use higher (aOR 1.83, 95% CI 1.18, 2.83). No statistically significant associations were found with binge drinking, but men with recent drug use ranked condoms lower (aOR 0.44, 95% CI 0.28, 0.67). Older men ranked PrEP in injection form (aOR 0.98, 95% CI 0.97, 0.99) and condoms (aOR 0.97, 0.96, 0.99) lower, but suppository before sex (aOR 1.03, 95% CI 1.02, 1.05) and gel before sex (aOR 1.02, 95% CI 1.01, 1.04) higher. Men with higher levels of education ranked PrEP in daily pill form (bachelor’s degree aOR 0.55, 95% CI 0.31, 0.97, post-graduate studies aOR 0.43 95% CI 0.24, 0.77) and gel before sex (bachelor’s degree aOR 0.53, 95% CI 0.31, 0.91, post-graduate studies aOR 0.49 95% CI 0.28, 0.87) lower.

Discussion

As more evidence emerges documenting high levels of IPV affecting GBMSM [38], it is important to continue to examine the role of IPV as a risk factor for HIV transmission; in particular, the role that IPV plays as a barrier to effective engagement in HIV prevention. Previous studies have documented relationships between IPV and barriers to safer sex among GBMSM. In fact, GBMSM with a history of IPV have been shown to be significantly less likely to discuss safer sex with their partners than men without a history of IPV [12], and there is evidence that some GBMSM have reported experiencing sexual, physical and/or verbal abuse in response to requesting safer sex from an abusive partner [39]. In a sample of 750 GBMSM in Atlanta, Stephenson et al. (2017) identified significant associations between several forms of IPV and increased odds of reporting condomless anal intercourse [40]. IPV may alter the survivor’s perceived and actual ability to communicate about sex with their partner. In addition, it is plausible that lowered self-esteem and self-worth associated with experiencing IPV [41] could reduce the perceived need or desire to engage in safer sex. These explanations for the associations between IPV and the experience of sexual risk may also be applied to the results found here for associations between IPV and preferences for PrEP.

Men who experienced physical IPV preferred PrEP in pill form, while men who experienced monitoring IPV preferred PrEP by injection. Men who are experiencing certain types of IPV, such as monitoring, may prefer modes of PrEP delivery that can be concealed from their partner. Indeed, men who experienced monitoring IPV were less likely to rank PrEP in gel form highly, indicating that men in abusive relationships may not want to use forms of PrEP that can be noticed by their partner. These results echo the wealth of literature that has demonstrated that women in abusive relationships often prefer forms of contraception they can control or use privately (i.e., oral contraceptive pill; injectable birth control) [42, 43]. For GBMSM in abusive relationships, PrEP use may be a vital prevention strategy for protecting themselves from perceived HIV acquisition from an abusive partner, and PrEP use in forms that are not noticed by, or require the interaction of, their partner may be the most appropriate, and safest, form of PrEP delivery.

Interestingly, men who experienced emotional IPV ranked PrEP by pill lower than other methods. While further work is warranted to understand the pathways between IPV and PrEP choices—ideally with qualitative data to understand the contexts in which persons experiencing IPV are making PrEP choices—it is possible that men who experience emotional IPV may be concerned about their partner discovering their PrEP prescription, thus triggering further violence.

Consistent with prior research that has shown African American/Black GBMSM to be less likely to use PrEP [44-46], African American/Black men were the only group to prefer condoms over any form of PrEP and to rate PrEP by pill and injection lower. Sub-optimal rates of PrEP use among African American/Black men are problematic, given the high rates of HIV acquisition that is reported in that population [47] and there is an urgent need for research and public health attention aimed at creating interventions that tackle medical mistrust and provider biases as significant barriers to PrEP uptake among African American/Black GBMSM [48].

Men who were not currently on PrEP ranked pill and injection lower, but ranked pre-sex suppository and gel higher, suggesting that there may be men who see the protective benefits of PrEP but are waiting for modes of delivery that better suit their preferences and needs before adopting PrEP. These results are similar to recent studies that have shown that GBMSM report greater support for long-acting injection and event-based forms of PrEP [49]. The results are a call to action for free, universal PrEP in pill format, and availability of a wider range of PrEP formats. Furthermore, just as family planning counseling is a healthcare norm for informed contraceptive choice, once there is a wider range of PrEP options available, HIV prevention counseling should also include an informed choice discussion to empower men to choose the method that best suits their needs and lifestyle. HIV prevention counseling should also acknowledge the role of IPV shaping the ability to engage in prevention, screening men for IPV and providing appropriate counseling for men who may be in abusive relationships.

There are several potential limitations to this study. Participants ranked eight modalities of PrEP, and while the validity of the highest and lowest rankings tend to be strong (i.e. people know what they really like and what they really don’t) there is the potential for random

ordering in the middle items. Further qualitative work could help disentangle reasons behind the preferred orderings. The sample was of GBMSM recruited to test the efficacy of a mobile app, and men did not have to be actively seeking PrEP or express an interest in PrEP as eligibility criteria. Associations between IPV and PrEP modality preferences may be different for men who have an active interest in PrEP. The survey collected data from an individual perspective, preventing an examination of dyadic influences on IPV and PrEP preferences; more research attention is needed to understand how dyadic and relationship factors may shape the relationships between IPV and PrEP preferences, and also to examine how the experience of multiple forms of IPV may shape preferences for PrEP modality. The survey did not collect information on the perpetration of IPV, so it was not possible to examine associations between IPV perpetration, or bi-directional IPV, and PrEP preferences. Social desirability bias may have discouraged men from reporting their experiences of IPV, although the prevalence of IPV identified is similar to that in other studies of IPV among GBMSM [6, 8, 9]. The survey was also cross-sectional, limiting identification of the causal relationship between IPV and preferences for PrEP choices.

Conclusion

There are clear associations between the experience of IPV and preferences for PrEP modality among this sample of GBMSM. The results highlight several future needs. Further research is needed to fully understand the pathways between IPV and PrEP preference, and to understand PrEP desires of men who perpetrate IPV. In terms of behavioral health and safety, HIV prevention counseling should take steps to include screenings and resources for IPV. As more modes of PrEP delivery become available, providers should be encouraged to screen GBMSM seeking PrEP for IPV, and to provide men with the necessary information to facilitate an informed choice when deciding on a PrEP modality that will work for them and their relationship context.

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Table 1

Demographic and behavioral characteristics of sample of HIV-negative, sexually active, men who have sex with men (n = 694)

	N (%) or mean (SD)
Age	32.98 (10.9)
Race	
White	403 (58.1)
African American/black	139 (20.0)
Multiracial/other	152 (21.9)
Hispanic	
No	593 (85.5)
Yes	101 (14.6)
Employment	
Employed	598 (86.2)
Unemployed	64 (9.2)
Retired/other	32 (4.6)
Education	
High school or less	59 (8.5)
Some college	190 (27.4)
Bachelor's degree	255 (36.7)
Post-graduate studies	190 (27.4)
Homeless in past 3 months	
No	649 (93.5)
Yes	45 (6.5)
Health insurance	
Private	470 (67.7)
Uninsured	107 (15.4)
Public	117 (16.9)
History of incarceration	
No	622 (89.6)
Yes	72 (10.4)
Binge drinking frequency	
Never	242 (34.9)
Less than monthly	245 (35.3)
Monthly	130 (18.7)
Weekly or daily	77 (11.1)
Drug use	
No	606 (87.3)
Yes	88 (12.7)
Sexual identity	
Gay/homosexual	608 (87.6)
Bisexual or other	86 (12.4)

	N (%) or mean (SD)
Sex partners in the past 3 months	
Main partners only	164 (23.6)
Casual partners only	243 (35.0)
Main and casual partners	287 (41.4)
Recent IPV	
Physical	31 (4.4)
Sexual	40 (5.7)
Emotional	99 (14.3)
Monitoring	46 (6.6)
Controlling	23 (3.3)
Current PrEP use	
Currently using and adherent	91 (13.1)
Currently using and not adherent	126 (18.2)
Not currently using	477 (68.7)

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Table 2

Ordinal logistic regression model of ranked preferences for future HIV prevention among a sample of HIV-negative, sexually active MSM (N = 694)

Variable	Daily pill aOR (95% CI)	Event-based pill aOR (95% CI)	Injection aOR (95% CI)	Suppository (before sex) aOR (95% CI)	Suppository (after Sex) aOR (95% CI)	Gel (before sex) aOR (95% CI)	Gel (after sex) aOR (95% CI)	Condom aOR (95% CI)
Daily PrEP use								
Using, adherent	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Not using daily PrEP	0.15 [0.10,0.23] *	1.61 [1.07, 2.41] *	0.38 [0.25, 0.58] *	1.50 [1.00, 2.24] *	1.65 [1.10, 2.49] *	1.20 [0.80, 1.79]	1.57 [1.03, 2.38] *	2.64 [1.74, 4.01] *
Using PrEP, not adherent	0.88 [0.54,1.44]	0.95 [0.59, 1.52]	0.77 [0.47, 1.27]	1.13 [0.71, 1.82]	1.33 [0.82, 2.17]	0.92 [0.58, 1.47]	1.32 [0.82, 2.14]	0.96 [0.60, 1.54]
Intimate partner violence								
Sexual	1.35 [0.74,2.43]	0.68 [0.38, 1.21]	1.49 [0.81, 2.72]	0.79 [0.45, 1.39]	0.57 [0.32, 1.03]	1.09 [0.63, 1.89]	1.13 [0.65, 1.99]	1.12 [0.62, 2.00]
Physical	2.23 [1.10,4.53] *	0.73 [0.34, 1.55]	0.88 [0.42, 1.84]	0.94 [0.44, 1.99]	1.49 [0.74, 2.98]	0.91 [0.45, 1.87]	1.00 [0.49, 2.03]	0.56 [0.26, 1.19]
Emotional	0.54 [0.34, 0.84] *	0.88 [0.56, 1.39]	1.11 [0.69, 1.78]	1.09 [0.70, 1.71]	1.33 [0.85, 2.07]	1.07 [0.69, 1.65]	1.45 [0.93, 2.25]	1.17 [0.74, 1.86]
Controlling	1.12 [0.48, 2.64]	0.69 [0.30, 1.57]	0.77 [0.33, 1.76]	1.40 [0.62, 3.20]	1.35 [0.60, 3.04]	0.69 [0.31, 1.57]	1.21 [0.51, 2.90]	0.87 [0.36, 2.11]
Monitoring	1.61 [0.89, 2.92]	1.39 [0.77, 2.52]	2.40 [1.28, 4.50] *	0.77 [0.43, 1.40]	0.73 [0.40, 1.35]	0.99 [0.55, 1.76]	0.55 [0.31, 0.98] *	0.47 [0.26, 0.88]
Age	0.99 [0.98, 1.01]	0.99 [0.98, 1.01]	0.98 [0.97, 0.99] *	1.03 [1.02, 1.05] *	1.01 [0.99, 1.02]	1.02 [1.01, 1.04] *	1.01 [0.99, 1.02]	0.97 [0.96, 0.99] *
Race								
White	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Black	0.68 [0.47, 0.99]	1.26 [0.88, 1.81]	0.64 [0.44, 0.94] *	1.73 [1.20, 2.50] *	0.45 [0.31, 0.65] *	1.40 [0.97, 2.01]	0.87 [0.60, 1.26]	1.95 [1.32, 2.87] *
Multiracial or other	0.65 [0.46, 0.93] *	0.96 [0.67, 1.37]	0.75 [0.52, 1.09]	1.53 [1.08, 2.18] *	0.84 [0.59, 1.19]	1.64 [1.14, 2.34] *	1.23 [0.85, 1.77]	1.19 [0.83, 1.73]
Hispanic	0.81 [0.53, 1.21]	1.11 [0.74, 1.66]	0.92 [0.61, 1.40]	1.01 [0.68, 1.51]	1.08 [0.73, 1.60]	0.99 [0.66, 1.50]	1.02 [0.67, 1.53]	1.22 [0.80, 1.86]
Employment								
Employed	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Unemployed	0.83 [0.52,1.34]	1.36 [0.84, 2.19]	1.21 [0.72, 2.06]	1.21 [0.74, 2.02]	0.88 [0.54, 1.44]	0.76 [0.48, 1.23]	0.53 [0.33, 0.84] *	1.07 [0.66, 1.73]
Other	1.06 [0.55, 2.04]	1.02 [0.52, 2.03]	0.91 [0.46, 1.80]	1.17 [0.62, 2.24]	0.65 [0.33, 1.27]	0.92 [0.46, 1.86]	0.90 [0.42, 1.52]	1.20 [0.65, 2.24]
Education								
High school graduate or less	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Some college	0.81 [0.46, 1.43]	0.84 [0.49, 1.45]	1.21 [0.72, 2.06]	1.03 [0.61, 1.74]	1.03 [0.60, 1.77]	0.75 [0.44, 1.28]	1.38 [0.81, 2.38]	1.01 [0.57, 1.79] *
Bachelor's degree	0.55 [0.31, 0.97] *	1.20 [0.70, 2.05]	1.35 [0.79, 2.28]	0.99 [0.58, 1.69]	1.35 [0.78, 2.32]	0.53 [0.31, 0.91] *	1.03 [0.60, 1.78]	1.15 [0.64, 2.03]
Post graduate studies	0.43 [0.24, 0.77] *	1.56 [0.89, 2.74]	1.47 [0.84, 2.58]	0.97 [0.55 1.70]	1.41 [0.80, 2.50]	0.49 [0.28, 0.87] *	1.23 [0.69, 2.17]	1.07 [0.59, 1.95]

Variable	Daily pill aOR (95% CI)	Event-based pill aOR (95% CI)	Injection aOR (95% CI)	Suppository (before sex) aOR (95% CI)	Suppository (after Sex) aOR (95% CI)	Gel (before sex) aOR (95% CI)	Gel (after sex) aOR (95% CI)	Condom aOR (95% CI)
Homeless	1.04 [0.56, 1.92]	1.14 [0.63, 2.06]	0.71 [0.40, 1.24]	1.08 [0.59, 1.97]	0.96 [0.54, 1.72]	1.67 [0.94, 2.98]	1.07 [0.60, 1.89]	0.84 [0.45, 1.57]
Health insurance								
Private	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Public	0.96 [0.63, 1.45]	0.85 [0.56, 1.28]	0.70 [0.46, 1.06]	1.32 [0.86, 2.00]	1.35 [0.90, 2.03]	1.08 [0.71, 1.64]	1.18 [0.79, 1.78]	1.09 [0.71, 1.68]
Uninsured	0.62 [0.41, 0.95]	0.95 [0.63, 1.44]	0.96 [0.63, 1.45]	1.28 [0.85, 1.94]	1.33 [0.67, 2.05]	1.04 [0.69, 1.58]	1.41 [0.94, 2.13]	0.93 [0.60, 1.43]
History of arrest	1.12 [0.70, 1.77]	1.25 [0.79, 1.99]	0.80 [0.50, 1.30]	0.92 [0.58, 1.47]	1.14 [0.72, 1.79]	0.85 [0.54, 1.35]	0.77 [0.49, 1.23]	1.24 [0.76, 2.02]
Binge drinking								
Never	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Less than monthly	0.77 [0.55, 1.08]	1.22 [0.88, 1.69]	1.16 [0.83, 1.63]	1.00 [0.72, 1.39]	0.96 [0.69, 1.33]	1.12 [0.81, 1.56]	0.85 [0.61, 1.18]	0.92 [0.65, 1.29]
Monthly	1.19 [0.80, 1.78]	1.30 [0.87, 1.94]	1.08 [0.72, 1.61]	1.06 [0.71, 1.59]	0.75 [0.50, 1.12]	0.89 [0.60, 1.33]	0.80 [0.54, 1.20]	0.90 [0.60, 1.36]
Daily or weekly	0.80 [0.49, 1.32]	1.22 [0.75, 1.97]	1.04 [0.63, 1.71]	0.88 [0.54, 1.43]	0.71 [0.43, 1.15]	0.94 [0.57, 1.54]	0.91 [0.56, 1.48]	1.42 [0.85, 2.38]
Drug use	0.94 [0.61, 1.44]	1.05 [0.69, 1.60]	1.74 [1.11, 2.72]	1.12 [0.73, 1.72]	1.25 [0.82, 1.91]	0.98 [0.65, 1.47]	1.52 [1.00, 2.30]	0.44 [0.28, 0.67] *
Sexual identity								
Gay or homosexual	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Bisexual or other	0.65 [0.43, 0.97] *	1.22 [0.80, 1.86]	0.69 [0.45, 1.06]	0.89 [0.59, 1.35]	1.06 [0.70, 1.60]	1.19 [0.79, 1.80]	0.87 [0.57, 1.33]	1.83 [1.18, 2.83] *
Sex partners in the past 3 months								
Main partner only	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Casual partner(s) only	0.82 [0.57, 1.19]	1.30 [0.90, 1.88]	0.93 [0.64, 1.36]	1.11 [0.77, 1.62]	1.51 [1.04, 2.20]	0.80 [0.55, 1.16]	0.77 [0.53, 1.11]	1.07 [0.73, 1.56]
Main & casual partners	1.02 [0.71, 1.47]	1.76 [1.22, 2.53] *	1.06 [0.72, 1.52]	0.86 [0.60, 1.23]	1.01 [0.70, 1.46]	0.70 [0.49, 1.01]	0.68 [0.47, 0.98]	1.12 [0.77, 1.62]

aOR adjusted odds ratio, *95% CI* 95% confidence interval

* P-value significant at < 0.05