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Psychosocial Barriers to Pre-exposure Prophylaxis (PrEP) Uptake: The Roles of Heterosexual Self-Presentation, Sexual Risk, and Perceived Peer PrEP Use

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Abstract

Several challenges have emerged in ensuring uptake of preexposure prophylaxis (PrEP) for HIV prevention. By applying the health belief model, the present study assessed associations between novel psychosocial variables and PrEP use among gay and bisexual men. Logistic regression analyses indicated that heterosexual self-presentation, sexual risk, PrEP conspiracy beliefs, and perceived peer PrEP use were positively associated with PrEP use. Greater understanding of the psychosocial barriers to PrEP use for unique at-risk populations can facilitate the development of socially informed prevention strategies.

Keywords

preexposure prophylaxis; health belief model; heterosexual self-presentation; peer use; sexual risk

Prevention of HIV has been greatly enhanced in recent years through the development and availability of preexposure prophylaxis (PrEP). PrEP is a medication that, if taken daily, enormously reduces the risk for an HIV infection to become established in the body following exposure to the virus (Baeten, Haberer, Liu, & Sista, 2013). A recent meta-analysis suggests that consistent use of PrEP leads to a 3.33 times reduction in HIV infection rates (Fonner et al., 2016). Despite the effectiveness of PrEP in preventing new HIV infections, uptake of PrEP (that is, individuals beginning PrEP use) remains a challenge across the United States and abroad. Despite its potential benefits, PrEP is highly

stigmatized, with PrEP use being seen as a marker of promiscuity by many potential users (Eaton et al., 2017). It is critical to understand barriers and facilitators of PrEP use among men who have sex with men (MSM) to enhance uptake of PrEP and reduce new HIV infections. In the present study, we use the health beliefs model (Becker, Drachman, & Kirscht, 1974) to examine four variables critical to understanding PrEP uptake: heterosexual self-presentation, sexual risk behaviors, peer norms, and PrEP conspiracy beliefs.

The health belief model (Hochbaum, Rosenstock, & Kegels, 1952; Janz & Becker, 1984) generally focuses on how perceived threats and perceived expectations influence steps taken to reduce one's risk for specific health conditions. The health belief model was developed in the mid-1900s, in an effort to expand the existing work on treatment to include factors such as beginning the use of medication, adherence to medication, physicianpatient communication, and disease screening (Rosenstock, 1974). Since its development, the health belief model has been used to investigate myriad topics, including HIV risk behavior changes (Rosenstock, Strecher, & Becker, 1994), diabetes management (Cerkoney & Hart, 1980), and vaccination of children (Smith et al., 2011), among many other topics, demonstrating its versatility in application. Although numerous expansions to the health belief model have been developed (Burns, 1992; Carmel, Shani, & Rosenberg, 1994; Sohler, Jerant, & Franks, 2015), the core constructs include perceived threats, benefits, and barriers. Perceived threats include perceptions of how likely one is to be affected by a health condition, in this case, contraction of HIV. Perceived expectations include both perceived benefits as well as perceived barriers to engaging in the health behavior. In the present study, we investigate several specific perceived expectations related to PrEP use.

Although the number of sexual partners is often framed as a risk factor for HIV transmission, MSM who report having more sexual partners have been suggested to report higher rates of condom use (Lachowsky et al., 2015) and generally higher uptake of PrEP (Morgan, Moran, Ryan, Mustanski, & Newcomb, 2018). In the health belief model, this is explained by increased perceived threat of a health condition increasing the likelihood to engage in related health-promoting behaviors (condom use and PrEP use). For an individual who has more casual sex partners, there is a perceived increase in risk for exposure to HIV, whereas for a person who has few sexual partners, PrEP may be perceived as unnecessary when weighted against potential barriers to using PrEP. Thus, consistent with the health belief model, increased sexual risk may be positively associated with PrEP use.

MSM may avoid sexual health help-seeking for HIV if they strongly endorse the masculine norm of heterosexual self-presentation (Dillon et al., 2019; Parent, Torrey, & Michaels, 2012). Heterosexual self-presentation—a focus on wanting to appear to others to be heterosexual and aversion to being perceived as gay— has been framed to be an aspect of toxic masculinity (Kupers, 2005). Within the health beliefs model, heterosexual self-presentation may present a perceived barrier to PrEP uptake, such that seeking a PrEP prescription may be seen as an "outing" behavior, similar to the findings observed for HIV testing. Indeed, in a previous study on HIV testing, elevations in heterosexual self-presentation were associated with reduced likelihood of being tested for HIV by approximately two times per each scale unit (Parent et al., 2012). Thus, heterosexual self-presentation reflects the perceived barrier construct with the health belief model and

may present a critical barrier to PrEP uptake, such that greater heterosexual self-presentation would be associated with lower likelihood to use PrEP.

Peer norms are powerful motivators for health behavior and an integral aspect of the health beliefs model (Boone & Lefkowitz, 2004). That is, individuals are more likely to engage in a health-promoting behavior if they perceive that the behavior is the norm for their own peer group. With regard to PrEP, peer use of PrEP may serve to decrease barriers to PrEP uptake insomuch as high PrEP use among peers is indicative of low stigmatization of PrEP among one's peer group.

PrEP is also the subject of a number of concerns about its long-term safety, which may represent a perceived barrier to use in the health belief model. In particular, communities that have been historically marginalized by health organizations may be concerned about the truth of targeted messages and fear potential conspiracies about treatments such as PrEP. An initial study found that interest in PrEP was negatively related to endorsement that "the CDC cannot be trusted to tell gay communities the truth about PrEP" among Black MSM and trans women who have sex with men (Eaton et al., 2017). Considering the potential for such conspiracy-related beliefs to discourage PrEP use, current use of PrEP may be negatively associated with PrEP conspiracy beliefs.

The Present Study

The present study sought to apply the health belief model to assess the degree to which model determinants impact PrEP uptake among a sample of MSM. We aimed to understand the influence of heterosexual self-presentation, sexual risk behaviors, peer norms, and PrEP conspiracy beliefs in PrEP use. Consistent with the literature reviewed earlier, we hypothesized that participants' reports of heterosexual self-presentation and PrEP conspiracy beliefs would be associated negatively with current PrEP use and that sexual risk and perceived peer PrEP use would be positively with current PrEP use.

Method

Participants

The final analytic sample used to assess our hypothesis consisted of 458 men who reported having sex with men during their lifetimes. Participants ranged in age from 18 to 69 (M= 31.68, SD= 8.70) years. On a subjective socioeconomic status scale, participants reported the full range of potential responses, from 1 to 100 (M= 52.72, SD= 21.21). Regarding race/ethnicity, most participants identified as White (65.5%), followed by Black/African American (11.1%), Asian/Asian American (8.7%), Hispanic/Latino (7.2%), multiracial (4.8%), American Indian/Alaska Native (0.7%), Native Hawaiian or other Pacific Islander (0.9%), and another race/ethnicity (0.4%), or declined to report a race/ethnicity (0.4%).

Participants identified as gay (43.7%), bisexual (50.9%), and heterosexual (5.5%). All heterosexual participants endorsed that they had sexual contact with men in the past. Most participants reported that they were dating and not cohabiting (37.6%) or single (34.9%), with fewer reporting that they were married/partnered/cohabiting (27.5%). In all, 72%

of the sample reported that they were currently seeking out men as sexual partners for hookups (including those who were single and those who had an open relationship if in a relationship). An analysis of variance, F(2, 455) = 11.48, p < .001, indicated that men who were married/partnered/cohabiting were less likely to be seeking sexual partners (57.9%) compared with single (72.5%) and dating (82.6%) men, who did not differ from one another. Thus, we controlled for relationship status (0 = married/partnered/cohabiting, 1 = single, or dating and not cohabiting) in analyses. Online supplemental materials present additional analyses on participants.

Measures

Heterosexual self-presentation.

Heterosexual self-presentation was measured using the Heterosexual Self-Presentation scale of the Conformity to Masculine Norms Inventory– 46 (Parent & Moradi, 2009). This scale measures the desire to be perceived as heterosexual and the aversion to being perceived as gay (sample item: "It would be awful if someone thought I was gay"). The Heterosexual Self-Presentation scale has six items, and responses are made on a 4-point scale (1 = *strongly disagree*, 4 = *strongly agree*). Cronbach's α using available item analysis (Parent, 2013) for responses to items on the Heterosexual Self-Presentation scale was .85.

PrEP conspiracy beliefs.

PrEP conspiracy beliefs were measured using items developed by Eaton et al. (2017). Two items measure skepticism about PrEP (items: "The CDC cannot be trusted to tell gay communities the truth about PrEP" and "When it comes to PrEP, drug companies are lying and taking advantage of us"). Responses to the items are on a 4-point scale (1 = *strongly disagree*, 4 = *strongly agree*). In a prior study, PrEP conspiracy beliefs scores were endorsed by a notable portion of MSM participants (Eaton et al., 2017). Cronbach's α using available item analysis for the two PrEP conspiracy beliefs items was .70.

Sexual risk.

Sexual risk was measured using an index transformed from 11 items asking about behavioral risks for HIV seroconversion as presented in the article by Basten et al. (2018). Items include the quantity of one-night stands, multiple-time casual partners, and sex buddies (an individual the person has sex with regularly) with whom the respondent has had sex in the last 6 months. If the participants answered more than one for any of these categories of sexual partners, additional items asked if the respondent was the receptive sexual partner and how often they used a condom ($1 = always \ used \ a \ condom, 5 = never \ used \ a \ condom$). In the present study, scores on the sexual risk index (SRI) ranged from 0 to 7.80 (M = 1.12, SD = 1.26, Mdn = 1.00). The full formula for calculating HIV seroconversion risk is presented in the article by Basten et al., (2018).

Perceived peer PrEP use.

Participants were asked how many of their gay or bisexual male friends use PrEP, using a percentage scale in 10% intervals of 10 (1 = less than 10%, 10 = more than 90%). This form

of assessment is often used to assess perceived peer behavior (Fleary, Heffer, McKyer, & Newman, 2010).

Procedure

The present study was approved by the University of Texas at Austin Institutional Review Board. Data from 492 participants were collected from Amazon Mechanical Turk (MTurk). Inclusion criteria were set to a prior MTurk task approval rating of 95% and geographic location in the United States. Participants were compensated with \$1.50 credited toward their MTurk accounts in exchange for participation. Thirty-two participants who reported that they had been diagnosed with HIV and four participants who did not report a sexual orientation identity were deleted from the data set, and their data were not used in any of the analyses presented.

Results

Table 1 presents descriptive statistics and bivariate correlations among the variables. Examining the simple bivariate correlations indicates that heterosexual self-presentation, sexual risk, and perceived PrEP use were positively associated with PrEP use, and PrEP conspiracy beliefs were negatively associated with such use. To examine the research hypothesis, we used multiple logistic regression. Relationship status was entered in the first block as a control variable, and the focal predictors of heterosexual self-presentation, PrEP conspiracy beliefs, sexual risk, and perceived peer PrEP use were entered in the second block. Current use of PrEP was the dependent variable. We used the Hosmer-Lemeshow test to assess model specification; the nonsignificant result of this test, y2(8) = 13.8411, p =.098, indicated that the model adequately fit the data. The likelihood ratio test for the model was significant, $y^2(5) = 211.46$, p < .001. We also assessed the degree to which the fit of the model improved when the four study predictors were added to a model containing the control variable (relationship status). The likelihood ratio test indicated that the fit of the model improved when the four study predictors were added to the model, $y^2(4) = 210.90$, p < .001. In addition, the accompanying McFadden's pseudo R^2 value of 0.401 indicates that inclusion of the four study predictors improved the fit of the model by 40%. Results of the logistic regression are presented in Table 2. Heterosexual self-presentation was associated with using PrEP, such that for each unit increase in heterosexual self-presentation an individual's odds of reporting current PrEP increased by 68%. PrEP conspiracy beliefs was also associated with using PrEP, such that for each unit increase in conspiracy beliefs, the odds of reporting current PrEP use increased by 45%. Sexual risk was associated with using PrEP, such that for each unit increase on the SRI, the odds of current PrEP use increased by 139%. Peer use was associated with using PrEP, such that for each unit increase (additional 10% of friends using PrEP), the odds that an individual would report current PrEP use increased by 67%.

Discussion

The goal of the present study was to understand how understudied variables related to health beliefs can influence use of PrEP. Consistent with the hypothesis, sexual risk behavior and

peer use of PrEP were associated with increased likelihood to use PrEP Inconsistent with the hypotheses, PrEP conspiracy beliefs were associated with increased likelihood of using PrEP. Also, somewhat unexpectedly, heterosexual self-presentation was associated with PrEP use but in a direction opposite to that anticipated; higher heterosexual self-presentation was associated with greater use of PrEP in the sample. The first two results are consistent with previous research. First, individuals who engage in more frequent sexual risk behaviors consistently adopt safer sex practices. Thus, is it unsurprising that those scoring higher on the SRI would report greater PrEP use? As such, this finding is positive for public health, as individuals among those likely to be exposed to HIV due to frequent sexual activities may recognize the importance of using PrEP to protect themselves from HIV. Second, peer use was positively associated with PrEP use. Though PrEP use is stigmatized, having a social network in which PrEP use is commonplace can reduce stigma-related barriers to PrEP use. Third, contrary to the study by Eaton et al. (2017), conspiracy beliefs were positively associated with PrEP use. As PrEP is still a relatively new medication, the findings suggest that patients may have skepticism about its safety and legitimacy though this may not impact uptake substantially.

Heterosexual self-presentation was related to PrEP use in an unanticipated positive direction. In a prior study (Parent et al., 2012), heterosexual self-presentation was associated with lower likelihood of asking a physician for an HIV test among HIV negative MSM. In the present study, heterosexual self-presentation was associated with *greater* likelihood of using PrEP. It is possible that masculinity-related variables have a more complex relationship with PrEP use than HIV testing. For example, PrEP use as a preventative medication may be seen more as a responsible precaution, whereas a positive HIV test may be interpreted as a marker of irresponsible sexual behavior. Or, PrEP use may be seen as an indicator of sexual availability and sexual success, whereas being HIV positive may decrease the number of potential partners due to persisting stigma about HIV. Clearly, more research is needed to understand the construction of gender as it applies to PrEP and how this might be harnessed to increase PrEP uptake among the most at-risk groups.

The present study must be interpreted in light of its limitations. First, the use of cross-sectional data means that definitive causal inferences cannot be made from the results. Further longitudinal research would help address the temporal dimensions of the impact of gender role conformity and other psychosocial factors on PrEP use, particularly factors that may shift over time such as sexual behavior. Second, use of Amazon's MTurk to obtain our sample may have resulted in leaving out some gay and bisexual men who cannot or do not use the Internet, perhaps older men and those of very low socioeconomic status.

Despite support for previous research that sexual risk and perceived peer use are positively associated with PrEP use, the findings of this study indicated that heterosexual self-presentation was positively associated with PrEP. This finding is not consistent with previous research (Parent et al., 2012) and suggests that the relationship between masculinity and HIV prevention among MSM is more complicated within the context of specific practices but creates the opportunity of integrating appeals to masculine identity (e.g., responsibility and self-reliance) into prevention efforts for at-risk groups previously missed by HIV prevention campaigns. Within the context of the HIV prevention research, these

results indicate that further investigation into how psychosocial factors, particularly gender roles, influence PrEP uptake is an important contribution to HIV prevention. The health belief model, including expansions of the model to include variables such as identity and future consequences (Orji, Vassileva, & Mandryk, 2012), which are relevant to medication use (Horne et al., 2013; Scherman & Löwhagen, 2004), are also crucial to explore.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Public Significance Statement

Preexposure prophylaxis (PrEP) is effective in reducing risk for acquisition of HIV. However, patient uptake of PrEP remains below ideal levels. In this study, heterosexual self-presentation, sexual risk, and perceived peer PrEP use were all positively associated with PrEP use.

Table 1

Correlations and Descriptive Statistics

Variable	2	3	4	3	9	М	SD
1. Relationship status	.13 **	.13** .11*	05	80.	04	1.28 0.45	0.45
2. Heterosexual self-presentation		.21 **	.21 ** .20 **	.22 **	.27** 1.94 0.73	1.94	0.73
3. PrEP conspiracy beliefs			.18**	.18** .14**	21** 2.46	2.46	0.80
4. Sexual risk				.33 **	.50**	1.21 1.26	1.26
5. Perceived peer PrEP use					.52**	3.03	2.28
6. PrEP use						1.74	1.74 0.44

Note. PrEP = preexposure prophylaxis. Relationship status was coded as 0 = single or dating, not cohabitating, 1 = married/partnered/cohabitating. PrEP use was coded as 0 = not using PrEP, 1 = using PrEP.

p < .05. p < .05. p < .01.

Table 2

Results of Logistic Regression Predicting PrEP Use

Predictor	В	SE B	Wald's χ^2	df	SEB Wald's χ^2 df Odds ratio	95% CI
Constant	-6.18 0.73	0.73	71.24	1	0.00	
Relationship status	-0.21	0.33	0.42	-	0.81	[0.43, 1.54]
Hetero. Self-pres.	0.52	0.21	6.26	_	1.68	[1.12, 2.51]
PrEP Conspiracy	0.37	0.20	3.60	_	1.45	[1.02, 2.19]
Sexual Risk	0.87	0.13	45.09	-	2.39	[1.91, 3.16]
Peer PrEP use	0.51	0.07	56.45	-	1.67	[1.46, 1.91]

Note. R² = .395 (McFadden); CI = confidence interval; Hetero. Self-pres. = heterosexual self-presentation. Relationship status coded as 0 = single or dating, not cohabitating; 1 = married/partnered/cohabitating.