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Correlates of willingness to initiate pre-exposure prophylaxis and anticipation of practicing safer drug- and sex-related behaviors among high-risk drug users on methadone treatment

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ABSTRACT

Background: Although people who use drugs (PWUD) are key populations recommended to receive pre-exposure prophylaxis (PrEP) to prevent HIV, few data are available to guide PrEP delivery in this underserved group. We therefore examined the willingness to initiate PrEP and the anticipation of HIV risk reduction while on PrEP among high-risk PWUD.
Methods: In a cross-sectional study of 400 HIV-negative, opioid dependent persons enrolled in a methadone program and reporting recent risk behaviors, we examined independent correlates of being willing to initiate PrEP.
Results: While only 72 (18%) were aware of PrEP, after being given a description of it, 251 (62.7%) were willing to initiate PrEP. This outcome was associated with having neurocognitive impairment (aOR = 3.184, $p = 0.004$) and higher perceived HIV risk (aOR = 8.044, $p < 0.001$). Among those willing to initiate PrEP, only 12.5% and 28.2%, respectively, indicated that they would always use condoms and not share injection equipment while on PrEP. Consistent condom use was associated with higher income (aOR = 8.315, $p = 0.016$), always using condoms with casual partners (aOR = 6.597, $p = 0.001$), and inversely associated with ongoing drug injection (aOR = 0.323, $p = 0.027$). Consistent safe injection, however, was inversely associated with age (aOR = 0.948, $p = 0.035$), ongoing drug injection (aOR = 0.342, $p < 0.001$), and perceived HIV risk (aOR = 0.191, $p = 0.019$).
Conclusions: While willingness to initiate PrEP was high and correlated with being at elevated risk for HIV, anticipated higher risk behaviors in this group even while on PrEP suggests that the next generation of HIV prevention approaches may need to combine biomedical and behavioral components to sustain HIV risk reduction over time.

1. Introduction

From the outset of the HIV epidemic, substance use disorders, including the injection of drugs, has fueled HIV transmission and disease progression (Degenhardt et al., 2013; Kamarulzaman and Altice, 2015). Despite people who use drugs (PWUD) contributing less to HIV incidence in the U.S. recently (Centers for Disease Control and Prevention, 2014), they remain a priority population for HIV prevention because of potential HIV transmission associated with preventable drug-related (e.g., needle-sharing) and sex-related (e.g., condomless sex) risk behaviors (Alipour et al., 2013; Marshall et al., 2014; Nadol et al., 2016; Volkow and Montaner, 2011). PWUD are affected by multi-level barriers to treatment and prevention such as stigma, discrimination, and social marginalization, thus posing a formidable challenge to access HIV services (Calabrese et al., 2016; Van Boekel et al., 2013). Failing to effectively intervene with PWUD has resulted in poor individual outcomes and threatens public health by increasing the likelihood continued HIV transmission by PWUD who remain undiagnosed or off treatment

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with persistent HIV viremia. High-risk PWUD, and the communities in which they live, would greatly benefit from building on existing evidence-based primary HIV prevention interventions and expanding new approaches for HIV prevention.

The recent availability of pre-exposure prophylaxis (PrEP) – the daily self-administration of antiretroviral medication for primary HIV prevention (CDC, 2014) – provides an unprecedented opportunity to curtail the HIV epidemic. Findings from recent PrEP trials have demonstrated that taking PrEP daily significantly reduces HIV transmission among those at substantial risk of acquiring HIV infection, such as men who have sex with men (MSM), people who inject drugs (PWID), sex workers, and transgender people (Baeten et al., 2012; Choopanya et al., 2013; Grant et al., 2010; Thigpen et al., 2012; Van Damme et al., 2012). Consequently, the Centers for Disease Control and Prevention (CDC) recommends PrEP in PWUD and provides clinical practice guidelines on the use of PrEP for HIV prevention (CDC, 2014).

Despite PrEP's efficacy and coverage by insurance in the U.S., uptake by PWUD has been strikingly low (Kirby and Thornber-Dunwell, 2014). A new PrEP cascade (Liu et al., 2012) suggests that PrEP uptake and optimal protective effect requires a high level of user awareness, willingness to initiate, and ability to remain highly adherent to the medication (Peng et al., 2012). Most recent studies that focus on PrEP uptake factors are concentrated on samples of MSM (Ferrer et al., 2016; Goedel et al., 2016; Gredig et al., 2016; Hoagland et al., 2016; Peng et al., 2012; Young et al., 2013), with limited research among high-risk PWUD (Kuo et al., 2016; Stein et al., 2014). For example, Stein et al. (2014) found that 47% of PWUD reported being willing to use PrEP and that a higher perception of HIV susceptibility was associated with an increased willingness to initiate PrEP (Stein et al., 2014). Among older people who inject drugs (PWID), Kuo et al. (2016) found that only 13.4% had ever heard of PrEP and 71% were likely to take PrEP (Kuo et al., 2016). Furthermore, prior studies have not evaluated how people anticipate their risk-related behaviors will change if they start PrEP. The original PrEP trial affirming its efficacy in PWUD was conducted among PWUD enrolled in a methadone maintenance program (MMP) where high-risk individuals are concentrated and readily available for primary HIV prevention (Choopanya et al., 2013). We therefore sought to better understand factors related to PrEP uptake (e.g., knowledge about and willingness to initiate PrEP) in a sample of PWUD in a MMP. Such findings are necessary to guide future implementation of PrEP among high-risk PWUD in the context of common drug treatment settings.

2. Methods

2.1. Participants

Between June and July 2016, a convenience sample of 400 participants was recruited at Connecticut's largest MMP. Screening eligibility included: i.) being 18 years or older, ii.) reporting HIV-uninfected, iii.) reporting drug- or sex-related HIV risk behaviors in the past 6 months, and iv.) being able to understand, speak, and read English. All patients were stabilized on methadone to treat opioid dependence. Among the 438 MMP clients approached, 28 did not meet eligibility criteria and an additional 10 either did not agree to study participation or chose not to complete the entire survey, leaving 400 individuals for the final analytical sample.

2.2. Study setting and procedures

Participants were recruited at the APT Foundation, which provides methadone maintenance treatment to over 7000 patients in the greater New Haven, Connecticut community. Convenience sampling was used to recruit participants through flyers, peers, word-of-mouth, and direct referral from counselors. Screening was conducted by trained research assistants in a private room at APT Foundation or by phone. Individuals who met inclusion criteria and expressed interest in participating completed informed consent procedures in person and were administered a 45-min survey (range: 40–60 min) using an audio computer-assisted self-interview (ACASI). All participants were reimbursed for the time and effort needed to participate in the survey. The study protocol was approved by the Institutional Review Board at the University of Connecticut and received board approval from APT Foundation, Inc.

2.3. Measures

Covariate measures included were based on prior research. In addition to demographic and social characteristics, we assessed health insurance status, visits to health care providers in the past 12 months and current methadone dose. We assessed whether participants were prescribed any medication (other than methadone) in the past 30 days and, for those who were, we assessed medication adherence using a self-reported, validated three-item scale developed by Wilson et al. (2016). Summary scales were calculated as the mean of the three individual items with higher score indicating better adherence (0–100) (Wilson et al., 2016).

Neurocognitive impairment (NCI) was measured using the Brief Inventory of Neurocognitive Impairment (BINI), which is a brief, 54-item self-reported measure of neuropsychological symptoms (Copenhaver et al., 2016). The overall BINI score, which was obtained by summing responses to all items, was converted to age-adjusted standardized scores (i.e., z-scores) based on normative data. Participants with an age-adjusted z-score $\geq$0.5 were classified as moderately to severely neurocognitively "*impaired*", whereas those with a z-score <0.5 were classified as "*not impaired*" (Dwan et al., 2015). The overall internal consistency (Cronbach's alpha) for the BINI scale was 0.97. Depressive symptoms were assessed using the 20-item Center for Epidemiological Studies Depression Scale (CES-D), with $\geq$16 indicative of moderate to severe depression (Radloff, 1977). The overall internal consistency (Cronbach's alpha) for the scale was 0.92.

Alcohol use disorders were measured using the validated 10-item Alcohol Use Disorders Identification Test (AUDIT), with standard cut-offs $\geq$8 for men and $\geq$4 for women suggestive of an AUD (Babor et al., 2001). The overall international consistency for the AUDIT was 0.92. Current drug- and sex-related risk was assessed for the past 30 days using an adapted version of the HIV risk-taking behavior scale (HRBS) (Ward et al., 1990). Risk perception for HIV was measured by the question "*What do you think your current risk of getting HIV is?*" with possible options being "*no risk as all*", "*moderate risk*", or "*high risk*". Participants' satisfaction with previous HIV prevention methods was assessed using the question "*Are you satisfied with your current method of HIV protection (e.g., condom use, clean needle use)?*"

Participants were asked about their awareness and previous use of PrEP. Their willingness to initiate PrEP was assessed after providing a brief description of PrEP (Appendix). After reviewing this description, participants were asked to respond to a statement "*I would be interested in taking PrEP to reduce my current risk of HIV infection*" on a five-point Likert scale. Their score was further dichotomized as "*Yes*" (strongly agree and agree) and "*No*" (strongly disagree, disagree, and neutral). Some further hypothetical questions were asked to assess participants' anticipation of "always using condoms" and "never sharing injection equipment" while on PrEP: "*How confident are you that you would always use condoms while on PrEP?*", and "*How confident are you that you would stop sharing needles or works completely while on PrEP?*" The 5-point Likert