

# Interest in HIV pre-exposure prophylaxis use and associated factors among people who inject drugs in Iran: a nationwide survey in 2023

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# Interest in HIV pre-exposure prophylaxis use and associated factors among people who inject drugs in Iran: a nationwide survey in 2023

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28

29 **Abstract**

30 **Background:** Despite the effectiveness of pre-exposure prophylaxis (PrEP) in  
 31 reducing HIV incidence, this intervention is inaccessible in Iran.

32 **Methods:** We examined the interest in using PrEP and associated  
 33 factors among people who inject drugs (PWID) in 2023 using data from 2,174  
 34 PWID. The main outcome was interest in using PrEP, which was divided into  
 35 three categories: interest in using PrEP under any circumstances, interest in  
 36 using PrEP if provided for free, and no interest in using PrEP.

37 **Results:** We found that 37.9% of PWID were interested in using PrEP under  
 38 any circumstances, 48.3% were interested in using PrEP if provided for free,  
 39 and 13.8% were not interested in using PrEP. Additionally, only 7.7% of  
 40 participants reported awareness of PrEP. Having high school or more  
 41 education (adjusted relative risk ratios [ARRR]: 1.92; 95% confidence interval  
 42 [CI]: 1.42, 2.61), having access to opioid agonist treatment (OAT) in the last  
 43 six months (ARRR: 1.59; 1.13, 2.25), and having sufficient HIV knowledge  
 44 (ARRR: 2.87; 2.03, 4.06) were positively associated with interest in using  
 45 PrEP under any circumstances. Similarly, having high school or more  
 46 education (ARRR: 1.50; 1.10, 2.04), having access to OAT in the last six  
 47 months (ARRR: 2.63; 1.88, 3.67), and having sufficient HIV knowledge  
 48 (ARRR: 4.53; 3.23, 6.37) were associated with interest in using PrEP if  
 49 provided for free. Health insurance was negatively associated with interest

in using PrEP under any circumstances (ARRR: 0.64; 0.47, 0.87) and with interest in using PrEP if provided for free (ARRR: 0.33; 0.23, 0.45).

**Conclusion:** The findings show a strong potential for PrEP acceptance, indicating that addressing financial and logistical barriers to free PrEP access could greatly reduce HIV among PWID.

**Keywords:** Pre-exposure prophylaxis; Harm reduction; People who inject drugs; HIV infection, Iran.

## Introduction

Pre-exposure prophylaxis (PrEP) has emerged as a significant HIV prevention strategy that has become a central part of national HIV elimination programs in recent years (1, 2). Initially approved by the US Food and Drug Administration in 2012 for HIV-negative adults at high risk of HIV, it has demonstrated 99% effectiveness in preventing HIV transmission when taken consistently daily (3). This result led the World Health Organization (WHO) to publish guidelines advocating that pre-exposure prophylaxis (PrEP) be included as part of a combined prevention strategy for people with high HIV risk (4). While oral formulations are well-established, PrEP alternatives are continually evolving. Long-acting injectable method may enhance adherence and increase the effectiveness of PrEP (5). Furthermore, the WHO emphasizes the importance of integrating PrEP as part of a comprehensive approach that encompasses routine HIV testing, counseling, and the promotion of safer sexual practices. This comprehensive approach aims to

reduce the stigma linked to HIV prevention strategies and to motivate a more significant number of at-risk individuals to consider PrEP as a suitable preventive method (6).

The HIV epidemic in Iran is concentrated in certain groups, including people who inject drugs (PWID) (7). According to the latest reports, injection drug use remains one of the main ways HIV is transmitted in Iran (7, 8). Despite the implementation of traditional strategies such as condom use, the reduction of high-risk sexual behaviors, and the use of safe needles to prevent HIV transmission, these interventions have not been sufficient to prevent HIV in the Iranian context (9) and in some other contexts (10). Opiates and stimulants are the initial substances injected by PWID in Iran (11). Needle and syringe programs (NSPs) and opiate substitution therapy are the primary components of harm reduction programs among PWID in Iran (12, 13). However, studies show that the use of harm reduction programs is still insufficient (14), and service availability varies significantly by area (13). Additionally, the recent study estimated that the prevalence of HIV among PWID in Iran is about 3.5% (15). Biomedical prevention is an additional approach, with one of the most effective recent interventions being PrEP (16, 17). PrEP is an antiretroviral medication given to HIV-negative individuals at risk of HIV infection. When taken regularly, PrEP is a cost-effective and highly effective intervention of preventing HIV among key populations (18-20).

Although many countries have approved the use of PrEP among key populations, including PWID (21-24), awareness and interest in using PrEP

among this group are still low (25, 26). Furthermore, systematic reviews and meta-analyses focusing on key populations have shown that PWID have the lowest use of PrEP in comparison to other key populations, including men who have sex with men (MSM) and transgender women (27). The available evidence indicates that insufficient knowledge and the lack of perceived risk of HIV transmission can constitute obstacles for PWID to uptake PrEP (25, 28). Other factors that can increase interest in using PrEP include access to health services and reducing stigma towards PrEP (26, 29) Limited studies assessed the awareness and interest in using PrEP for HIV prevention among PWIDs in lower and middle-income countries. Moreover, PrEP is not yet used as part of the HIV national prevention strategy in Iran. Before conducting this intervention among PWID, it is important to understand the interest in using PrEP among PWID. The insufficient research conducted within the local context results in a knowledge gap in understanding effective strategies for starting PrEP among PWID. Consequently, this study reports on the interest in using PrEP among PWIDs in Iran.

## **Methods and Materials**

### ***Study Design and Sampling***

This analysis utilized information from the fifth national biobehavioral surveillance survey of Iranian PWID, conducted in 14 major cities: Sari (north), Tehran (central north), Robat-Karim (central north), Shahriar (central north), Eslamshahr (central north), Karaj (central north), Tabriz (northwest),

Mashhad (northeast), Yazd (central), Kermanshah (west), Khorramabad (west), Dorud (west), Shiraz (south), Ahvaz (southwest), Kerman (southeast), Zahedan (southeast)) and Saravan (southeast) across diverse regions. Eligibility criteria included individuals who were 18 years old or older, had reported using at least one injection drug in the previous 12 months, and had a valid referral coupon following the study's protocol except for seeds. Additionally, participants who self-reported as HIV-negative at screening and whose HIV test was negative were recruited for this study. Individuals were recruited using respondent-driven sampling (RDS) between May and August 2023. RDS is a recruitment method that uses long-chain peer referrals to identify and recruit a diverse representation of PWID (30). The recruitment process began by selecting three seeds using a non-random method, with each seed given three referral coupons and trained on how to use them to recruit up to three peers. For all participating cities except Tehran, recruitment was conducted at only one study site. In Tehran, due to the high population, recruitment was conducted across three geographically separate sites, with three seeds initiating the process at each site. The final sample size for each city was determined based on its population proportion, with larger samples allocated to cities with bigger populations. Participants were compensated with 1.5 USD for their participation, followed by three coupons to distribute to their peers for recruitment. An additional 1 USD was provided to participants for each redeemed coupon. This procedure was repeated until the desired sample size was achieved.

## ***Data Collection***

Data collection for this study was conducted over four months, from May 2023 to August 2023. All interviews were conducted face-to-face using a standard questionnaire by a gender-matched interviewer in a private room. The questionnaire was in Farsi and included sections on sociodemographic data, history of incarceration, sexual behaviors, HIV status, drug use and injection practices, mental health, and access to harm reduction services, including their interest in using HIV PrEP. After the interviews, participants underwent a brief HIV counseling session and had a whole-blood sample collected via finger-stick by a certified nurse counselor. HIV testing was conducted using the SD-Bioline rapid tests from South Korea; if reactive, the Unigold HIV rapid test was used to confirm the result.

## ***Study Variables***

A brief description of PrEP was provided to participants, followed by questions on their interest in using PrEP. This briefing defined PrEP as an HIV prevention strategy, explained that it is available in long-acting injectable, daily oral, and other forms, summarized its effectiveness, and highlighted the importance of continuous adherence to all available formulations. The main outcome of the study included interest in the use of HIV PrEP. Participants were asked about their awareness of PrEP. If they were unfamiliar with it, they were given a brief overview of PrEP before being asked if they would be interested. They were asked a specific question: “Are



you interested in the use of HIV PrEP, if it is available?” With response options “interest in using PrEP under any circumstances,” interest in using PrEP if provided for free, and “no interest in using PrEP.” No interest in using PrEP was considered the reference group. Only individuals who self-reported as HIV-negative during screening were asked about their interest in using PrEP.

Covariates of interest included a range of sociodemographic variables, age at interview ( $< 30$  vs.  $\geq 30$  years old), sex (male vs. female), marital status (currently married vs. single/divorced/widowed), educational level (less than high school vs. high school or more), employment status (unemployed, having a temporary job vs. having a permanent job), having health insurance (yes vs. no), history of homelessness in 12 months (yes vs. no), sex partner (main partners vs. casual partner), lifetime arrest/incarceration (yes vs. no), history of condomless sex with casual partners in last 6 months (yes vs. no), age at first drug use ( $< 18$  vs.  $\geq 18$ ), receptive needle/syringe sharing in last 6 months (yes vs. no), last 6-month daily injection (yes vs. no), last 3-month non-fatal overdose (yes vs. no), last 3-month primary drug injected (opioids vs. stimulants), last 6-month access to opioid agonist therapy (OAT) (yes vs. no), Lifetime experience of HIV test (yes vs. no), HIV knowledge (insufficient vs. sufficient), and aware of PrEP (yes vs. no). Receptive needle/syringe sharing in the past six months was defined as self-reporting the use of a needle or syringe that had previously been used by another person within the six months prior to the survey. The HIV knowledge was assessed using a

standard questionnaire with eight questions (31). Sufficient knowledge was considered to answer all ten questions correctly.

### ***Statistical Analysis***

Descriptive statistics were employed to compare the characteristics of participants stratified by interest in the use of HIV PrEP. The descriptive statistics, including the prevalence estimates shown in Table 1, are based on RDS-weighted data derived with the RDS-II estimator using RDS-A software version 0.42 (32). The RDS-II estimator was used to calculate RDS-weighted point estimates and 95% CI (33). The number of eligible peers in each participant's social network was used as the network size parameter for the weighting procedure, and these weights were calculated appropriately. The bivariable and multivariable multinomial logistic regression models were run without RDS weighting data. First, a bivariable multinomial logistic regression model was used to test the associations between each covariate and the outcome variable. Covariates with P values of 0.2 or less were included in the multivariable multinomial logistic regression models (34), and P values of 0.05 or less were considered statistically significant. Covariates were added to the model one at a time based on their statistical significance and contribution to model fit using a forward stepwise approach for variable selection (entry criterion:  $P < 0.20$ ; retention criterion:  $P \leq 0.05$ ). As a result, only the variables that remained significant in the final model are reported. Additionally, we included covariates that showed a significant association ( $P < 0.2$ ) with any of the non-reference outcome categories in pairwise

comparisons against the reference outcome in the final multivariable model. For example, a variable might be linked to "Interest under any circumstances," but not to "Interest if provided for free." To assess their fully adjusted effects across all outcome comparisons, these variables were retained in the final model. In the multinomial logistic regression models, no interest in using PrEP was considered the reference group. Crude relative risk ratios (RRR), adjusted relative risk ratios (aRRR), and 95% confidence interval (CI) were reported. Stata 17 was used for all analyses. Under the adjusted covariates, these aRRRs should be interpreted as the relative risk of experiencing one outcome compared to the reference outcome.

### ***Ethical Considerations***

Study staff ensured confidentiality by using anonymous questionnaires and obtaining informed consent from participants for data collection. They were told that their decision to decline participation would not affect them in any way. They were assured that they could refuse to answer any questions they wanted and stop the interview at any time. The Kerman University of Medical Sciences research ethics committee reviewed and approved the protocol and procedures for the current study (Ethics Code: IR.KMU.REC.1401.216). In addition, all methods were performed in accordance with the relevant guidelines and regulations.

## **Results**

### ***Characteristics of the sample***

Among 2,174 PWID, most participants (95.9%) were men and aged more than 30 years old (94.2%) (Table 1). About two-thirds (66.1%) had less than a high school education, and 76.1% were single, divorced, or widowed. Most participants (86.4%) had temporary employment and did not have health insurance (81.6%). Over two-thirds (70.7%) had been incarcerated in their lifetime, and 48.1% had a history of homelessness in the last year. Nearly half (48.3%) reported daily injections in the last six months, with opioids as the primary drug injected in the last three months (96.1%). Only 7.7% were aware of PrEP.

### ***Interest in using PrEP***

The prevalence of interest in using PrEP under any circumstances, interest in using PrEP if provided for free, and no interest in using PrEP use was 37.9% (95% CI: 35.8, 39.9), 48.3% (95% CI: 46.2, 50.4), and 13.8% (95% CI: 12.3, 15.2), respectively (Table 1).

### **Factors associated with interest in using PrEP under any circumstances**

Bivariable multinomial logistic regression showed that interest in using PrEP under any circumstances was significantly associated with being male, being single/divorced/widowed, having a high school education or more, having a temporary or permanent job, not having health insurance, having a casual partner, not having lifetime incarceration, not having history of condomless sex with casual partners in last six months, having needle/syringe

sharing in the previous six months, access to OAT in the last six months, having a history of HIV test, and having sufficient HIV knowledge (Table 2).

The multinomial logistic regression showed that interest in using PrEP under any circumstances was significantly associated with high school education (ARRR: 1.92; 95% CI: 1.42, 2.61), lack of health insurance (ARRR: 0.64; 95% CI: 0.47, 0.84), access to OAT in the last six months (ARRR: 1.59; 95% CI: 1.13, 2.25), and sufficient HIV knowledge (ARRR: 2.87; 95% CI: 2.03, 4.06) (Table 3).

#### **Factors associated with interest in using PrEP if provided for free**

Bivariable multinomial logistic regression showed that interest in using PrEP, if provided for free, was significantly associated with being male, being single/divorced/widowed, having a high school education and more, having a temporary or permanent job, not having health insurance, having a history of homelessness in the last year, having a casual partner, not having a history of condomless sex with casual partners in last six months, having a daily injection in the last six months, access to OAT in the last six months, having experience of non-fatal overdose in last three months, primary drug injected in the past 3 months, having a history of HIV test, having sufficient HIV knowledge and aware of PrEP (Table 2).

The multinomial logistic regression showed that interest in using PrEP if provided for free was significantly associated with high school education (ARRR:1.50; 95% CI: 1.10, 2.04), not having health insurance (ARRR:0.33;

95% CI: 0.23, 0.45), having access to OAT in the last six months (ARRR: 2.63; 95% CI: 1.88, 3.67), and having sufficient HIV knowledge (ARRR: 4.53; 95% CI: 3.23, 6.37) (Table 3).

## Discussion

We found that only one in 13 PWID in Iran were previously aware of PrEP. Once the intervention was explained to them, nearly 40% were interested in using PrEP under any circumstances, and nearly half were interested in using PrEP if provided for free. We also found that interest in the use of HIV PrEP without being free was significantly associated with high school education and, more, not having health insurance, having access to OAT in the last six months, and having sufficient HIV knowledge. If offered for free, interest in using PrEP was significantly associated with high school education, not having health insurance, having access to OAT in the last six months, and having sufficient HIV knowledge.

The fact that approximately 40% of respondents expressed interest in using PrEP regardless of having to pay for it underscores the strength of the perceived benefits to individuals in reducing the risk of HIV transmission. Then, the interest in using PrEP is a significant finding for policymakers. Although recent studies showed a notable interest in using PrEP, especially if cost barriers were removed (35, 36), the interest in using PrEP in our study was different from other studies, with interest rates of 59% in San Francisco (26), 63% in Baltimore (35), and 65% in Connecticut (37). Low baseline awareness cannot be the only explanation for the difference because our

modeling showed that basic awareness alone was not significantly associated with interest. Instead, this suggests that a deeper level of precise, comprehensive knowledge may be required to transition from basic awareness to genuine interest in using PrEP, which may not have been achieved in our study (where familiarity was below 8%). Evidence that stigma continues to be a barrier to interest in using PrEP further complicates this (38). This finding is consistent with a previous study in Iran. It has been shown that stigma is one of the main barriers to PrEP uptake among high-risk groups for HIV, such as PWID in Iran (39). Furthermore, studies have demonstrated that factors such as PrEP awareness, knowledge, perceived HIV risk, perceived need for PrEP, and social factors play crucial roles in individuals' intention to use PrEP (40, 41). A previous national survey showed that harm reduction programs, such as HIV testing, are still inadequate, which may show gaps in perceived HIV risk or awareness among PWID (42). These findings underscore the importance of addressing social, financial, and informational barriers to enhance the uptake of PrEP and reduce the incidence of HIV among key populations, especially for PWID. Additionally, our findings suggest that removing financial barriers could immediately produce a substantial impact at the real population level that surpasses what awareness campaigns alone can achieve. Moreover, it is essential to address sociocultural barriers to PrEP utilization, as neglecting this issue could reduce the potential advantages of biomedical prevention strategies.

The findings from the multivariable multinomial logistic regression analysis highlighted the significant effect of education level and HIV knowledge on individuals' interest in using PrEP as a strategy against HIV transmission. The results indicated that individuals with higher levels of education were more inclined to consider using PrEP than those with lower education. As mentioned in previous studies, these results show a potential link between education and health literacy in influencing preventive health behavior (43, 44). Moreover, the positive relationship between HIV knowledge and interest in using PrEP, demonstrated in previous studies, highlights the critical role of education in shaping individuals' attitudes and behaviors toward preventive strategy (25, 45). Education may foster an understanding of complex health information which promotes the understanding of how PrEP may be used to prevent HIV, which in turn may drive interest. Additionally, the association between knowledge of HIV and interest in using PrEP highlights the critical role of education in people's attitudes and behaviors toward preventive health measures. By implementing this strategy, we can improve individuals' awareness of HIV and PrEP, thereby increasing their interest in using PrEP and contributing to improved public health outcomes.

In addition, the multinomial logistic regression showed that interest in using PrEP was significantly associated with having access to OAT. Furthermore, the association between OAT access and increased interest in using PrEP underscores the integration of HIV prevention efforts. Some studies showed that individuals with a history of OAT utilization might benefit from targeted



interventions integrating PrEP education within the existing healthcare services (37, 46). This finding is especially important in the Iranian context, where OAT serves as a primary harm reduction delivery channel for PWID and is mainly administered by government-supported treatment centers (47). This association highlights the effectiveness of integrated programs in preventing HIV. Since OAT users already receive structured healthcare services, these facilities are the ideal places to include PrEP education and improve access in Iran (48). Additionally, individuals undergoing OAT often engage with healthcare services focused on substance use treatment and preventive health initiatives. Such involvement creates an environment where conversations about HIV prevention, including PrEP, are more likely to occur. Moreover, those in OAT programs may be more aware of their health risks and the significance of preventive measures, which can boost their interest in obtaining PrEP. Furthermore, people who are on OAT are also probably used to administering their medications on a regular schedule for a chronic condition (49). This prior experience may reduce the perceived barriers associated with treatment frequency and adherence challenges frequently connected to long-term preventive measures such as PrEP, thereby enhancing their willingness to use it. Integrating PrEP education within OAT services may enhance knowledge of PrEP and facilitate access to this method. By implementing this plan, we can use the existing framework of OAT services to enhance interest and access to PrEP, thereby enhancing overall HIV prevention efforts.

We also found that individuals with health insurance were significantly less likely to express interest in using PrEP, whether provided for free or at a cost. This finding indicates the role of health insurance coverage in shaping perceptions of preventive healthcare services such as PrEP. The inverse relationship between health insurance status and interest in PrEP uptake underscores the need for further investigation into the underlying factors driving this disparity. In contrast to the results of our study, previous studies emphasized the positive role of having health insurance in key populations (36, 50) receiving PrEP. This difference probably suggests that health insurance in Iranian PWID functions primarily as a proxy marker for higher Socio-Economic Status (SES) and established engagement with formal healthcare systems, rather than merely indicating affordability or access barriers as is often the case in other contexts. Individuals with formal employment usually have comprehensive coverage through the Social Security Organization in Iran. However, marginalized populations often depend on subsidized national health insurance plans that might offer more limited coverage. Considering this SES indicator, there are several reasons why insured individuals may be less interested in using PrEP: they may have a lower personal risk profile compared to uninsured groups, or they could have a higher baseline level of general health literacy, decreasing their perceived need for a new intervention like PrEP. Addressing these barriers through focused interventions and education campaigns could help reduce the PrEP uptake gap among those with health insurance, resulting in more

equitable access to HIV prevention programs in all populations. Furthermore, collaborating with health insurance providers to deliver PrEP-related educational materials to their members can enhance awareness and understanding of this preventive method.

Our study has limitations. First, the cross-sectional design of this study precludes the establishment of causal relationships. Second, a noticeable proportion of participants surveyed were introduced to PrEP for the first time through this study, which may influence their perceptions of interest in using PrEP. Finally, we could not evaluate the perceived risk of HIV acquisition during the data collection process. Because of this limitation, our model cannot show how this factor impacts preventive behaviors (like using PrEP). To better understand the barriers and motivators of PrEP use, future studies should include validated tools to assess risk perception in this group.

## Conclusions

While prior awareness of PrEP was low, most PWID were interested in using PrEP once made aware of its potential efficacy in preventing getting HIV through sex or sharing injection equipment. This finding demonstrates to policymakers the importance of integrating PrEP into national harm reduction programs and how it can reduce HIV incidence in this key population by lowering costs and expanding access. Our country, therefore, must examine the conditions for the inclusion of PrEP in the national harm reduction program. A complex association between education level, access to

OAT, HIV knowledge, and health insurance coverage affects people's motivation to use PrEP as a preventive intervention for HIV transmission. These findings emphasize the need to overcome educational, information, and access barriers to increase PrEP use and support effective HIV prevention strategies among key populations. This can be achieved through educational campaigns and collaboration with various organizations.

## **List of abbreviations**

**PrEP:** Pre-exposure prophylaxis

**WHO:** World Health Organization

**PWID:** People who inject drugs

**RDS:** Respondent-driven sampling

**RRR:** Crude relative risk ratios

**ARRR:** Adjusted relative risk ratios

**OAT:** Opioid agonist therapy

## **Statements and Declarations:**

### **□ Ethical Approval**

The Ethics committee of Kerman University of Medical Sciences approved the study protocol (Ethics code: IR.KMU.REC.1401.443).

### **□ Consent for publication**

Not applicable

#### □ **Availability of data and materials**

All data generated or analyzed during this study are included in this published article.

#### □ **Competing Interests**

The authors declare that they have no competing interests.

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#### □ **Authors' contributions**

"**H.M.**: Contribution to the work's acquisition, analysis, and design, and confirmation of the sent version. **S.M.**: Contribution to the work's acquisition, design, and confirmation of the sent version. **F.T.**: Contribution to the work's acquisition, design, and confirmation of the sent version. **M.B.**: Contribution to the work's acquisition, design, and confirmation of the sent version. **N.N.**: Contribution to the work's acquisition, design, and confirmation of the sent version. **H.M.**: Contribution to the work's acquisition, design, and confirmation of the sent version. **N.S.**: Contribution to the work's acquisition, design, and confirmation of the sent version. **M.K.**: Contribution to the design, and confirmation of the sent version. **A.H.**: Contribute to the conception and design of the work, revise the drafted work, and confirm the sent version.

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Not applicable

#### ☐ **Participate declarations**

Not applicable

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**Table 1.** Interest in the use of HIV pre-exposure prophylaxis (PrEP) by sociodemographic characteristics, HIV risk and injection-related factors, and harm reduction utilization among people who inject drugs (PWID) in Iran, 2023.

Variable	Total N (%)	Interest in using PrEP		
		Interest in using PrEP under any circumstances n (RDS* adjusted %)	Interest in using PrEP if provided for free n (RDS adjusted %)	No interest in using PrEP n (RDS adjusted %)
<b>Overall</b>	2,174	824 (37.9)	1,051 (48.3)	299 (13.8)
<b>Current age (years)</b>				
< 30	125 (5.8)	49 (5.6)	54 (5.5)	22 (9.5)
≥ 30	2,049 (94.2)	775 (94.4)	997 (94.5)	277 (90.5)
<b>Sex</b>				
Male	2,084 (95.9)	793 (94.9)	1,012 (95.3)	279 (91.6)
Female	90 (4.1)	31 (5.1)	39 (4.7)	20 (8.4)
<b>Education</b>				
Less than high school	1,441 (66.1)	502 (37.1)	709 (34.5)	223 (21.2)
High school or more	738 (33.9)	321 (62.9)	340 (65.5)	76 (78.8)
<b>Marital Status</b>				
Currently married	519 (23.9)	221 (26.2)	192 (22.9)	106 (21.9)
Single/divorced/widowed	1,654 (76.1)	602 (73.8)	859 (77.1)	193 (78.1)
<b>Current employment</b>				
Unemployed	82 (4.7)	20 (1.5)	27 (0.5)	35 (0.8)
Having a temporary job	1,496 (86.4)	570 (86.1)	732 (93.1)	51 (86.8)
Having a permanent job	153 (8.9)	72 (12.4)	51 (6.4)	30 (12.4)
<b>Having health insurance</b>				
No	1,763 (81.6)	637 (73.8)	923 (89.8)	203 (74.8)
Yes	398 (18.4)	181 (26.2)	124 (10.2)	93 (25.2)
<b>History of homelessness, last year</b>				
No	1,126 (51.9)	487 (64.5)	443 (57.3)	496 (58.6)
Yes	1,046 (48.1)	337 (35.5)	606 (42.7)	103 (41.4)
<b>Sex partner</b>				
Main partner	1,083 (61.5)	405 (69.4)	517 (75.6)	161 (65.5)
Casual partners	679 (38.5)	258 (30.6)	352 (24.4)	69 (34.5)

<b>Lifetime incarceration</b>				
No	637 (29.3)	288 (38.8)	267 (42.5)	82 (38.0)
Yes	1,535 (70.7)	535 (61.2)	783 (57.5)	217 (62.0)
<b>History of condomless sex with casual partners in last 6 months</b>				
No	509 (71.3)	226 (79.9)	246 (61.0)	37 (65.6)
Yes	204 (28.7)	48 (20.1)	119 (39.0)	37 (34.4)
<b>Age at first drug use, years</b>				
< 18	1,462 (67.2)	566 (72.9)	695 (67.3)	201 (61.6)
≥18	712 (32.8)	285 (27.1)	356 (32.7)	98 (38.4)
<b>Receptive needle/syringe sharing, last 6 months</b>				
No	1,849 (86.8)	657 (91.1)	932 (94.9)	260 (87.9)
Yes	279 (13.2)	151 (8.9)	103 (5.1)	25 (12.1)
<b>Daily injection in last 6 months</b>				
No	1,099 (51.7)	459 (66.4)	463 (58.5)	177 (70.9)
Yes	1,025 (48.3)	357 (33.6)	551 (41.5)	177 (29.1)
<b>Experience of non-fatal overdose, last year</b>				
No	2,010 (93.5)	752 (91.3)	991 (95.3)	267 (94.9)
Yes	140 (6.5)	64 (8.7)	50 (4.7)	26 (5.01)
<b>Primary drug injected, last 3 months</b>				
Stimulants	68 (3.9)	29 (7.9)	19 (3.8)	20 (15.6)
opioids	1,640 (96.1)	611 (92.1)	821 (96.2)	208 (84.4)
<b>Opioid agonist treatment, last 6 months</b>				
Monthly or less	637 (29.3)	205 (21.6)	379 (27.4)	53 (22.4)
Weekly or daily	1,537 (70.7)	619 (78.4)	672 (72.6)	246 (77.6)
<b>HIV knowledge**</b>				
Insufficient	1,311 (60.3)	520 (65.1)	539 (66.7)	252 (77.3)
Sufficient	863 (39.7)	304 (34.9)	512 (33.3)	47 (22.7)
<b>History of HIV test, lifetime</b>				
No	412 (19.0)	153 (25.8)	154 (22.2)	105 (32.1)
Yes	1,762 (81.0)	671 (74.2)	897 (77.8)	194 (67.9)
<b>Aware of PrEP</b>				
No	1,987 (92.3)	732 (90.4)	990 (93.2)	265 (89.5)
Yes	164 (7.7)	82 (9.6)	57 (6.79)	25 (10.5)

\* Respondent-driven sampling

\* \* Measured using an 8-item set of questions covering basic knowledge of HIV/AIDS transmission and prevention

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**Table 2:** Bivariable multinomial logistic regression of associated factors with interest in the use of HIV preexposure prophylaxis (PrEP) and associated factors among people who inject drugs in Iran, 2023, (n = 2,174).

Variable	Interest in using PrEP under any circumstances		Interest in using PrEP if provided for free	
	Crude risk ratios <sup>a</sup> (95% CI <sup>b</sup> )	P-value	Crude risk ratios <sup>a</sup> (95% CI <sup>b</sup> )	P-value
<b>Current age (years)</b>				
< 30	Ref		Ref	
≥30	1.25 (0.75- 2.11)	0.391	1.46 (0.87- 2.11)	0.144
<b>Sex</b>				
Male	Ref		Ref	
Female	0.54 (0.30- 0.97)	0.040	0.53 (0.30- 0.93)	<0.001
<b>Marital status</b>				
Currently married	Ref		Ref	
Single/divorced/widowed	1.49 (1.12- 1.98)	0.0051	2.45 (1.84- 3.26)	<0.001
<b>Education level</b>				
Less than high school	Ref		Ref	
High school or more	1.87 (1.39- 2.54)	<0.001	1.40 (1.05- 1.88)	0.021
<b>Current employment</b>				
Unemployed	Ref		Ref	
Having a temporary job	5.14 (2.89- 9.11)	<0.001	4.89 (2.88- 8.27)	<0.001
Having a permanent job	4.20 (2.09- 8.41)	<0.001	2.20 (1.12- 4.32)	0.022
<b>Having health insurance</b>				
No	Ref		Ref	
Yes	0.62 (0.46- 0.83)	<0.002	0.29 (0.21- 0.39)	<0.001
<b>History of ever homelessness in the last year</b>				
No	Ref		Ref	
Yes	1.31 (1.00- 1.17)	<0.050	2.60 (1.99- 1.73)	<0.001
<b>Sex partner</b>				
Main partners	Ref		Ref	
Casual partner	1.48 (1.07- 2.05)	0.016	1.58 (1.16- 2.17)	0.004
<b>Lifetime arrest/incarceration</b>				
No	Ref		Ref	
Yes	0.67 (0.52- 0.93)	0.017	1.10 (0.82- 1.48)	0.487
<b>History of condomless sex with casual partners in last 6 months</b>				
No	Ref		Ref	

Yes	0.21 (0.12- 0.36)	<0.001	0.28 (0.29- 0.80)	<0.005
<b>Age at first drug use</b>				
< 18	Ref		Ref	
≥18	0.93 (0.70- 1.24)	0.641	1.05 (0.79- 1.38)	0.723
<b>Receptive needle/syringe sharing, last 6 months</b>				
No	Ref		Ref	
Yes	2.39 (1.52- 3.73)	<0.001	1.41 (0.72- 1.81)	0.551
<b>Daily injection in the last 6 months</b>				
No	Ref		Ref	
Yes	1.17 (0.89- 1.54)	0.240	1.80 (1.38- 2.34)	<0.001
<b>Experience of non-fatal overdose, last 3 months</b>				
Yes	Ref		Ref	
No	0.87 (0.54- 1.40)	0.580	0.51 (0.31- 0.84)	0.009
<b>Primary drug injected, last 3 months</b>				
Stimulants	Ref		Ref	
Opioids	1.23 (0.91- 1.44)	0.070	1.21 (0.99- 1.46)	0.062
<b>Access to opioid agonist therapy in the last 6 months</b>				
No	Ref		Ref	
Yes	1.53 (1.09- 2.15)	0.012	2.61 (1.89- 3.61)	<0.001
<b>HIV knowledge</b>				
Insufficient	Ref		Ref	
Sufficient	3.13 (2.22- 4.41)	<0.001	5.09 (3.64- 7.11)	<0.001
<b>History of HIV test, lifetime</b>				
No	Ref		Ref	
Yes	2.37 (1.79- 3.18)	<0.001	3.15 (2.35- 4.22)	<0.001
<b>Aware of PrEP</b>				
No	Ref		Ref	
Yes	1.18 (0.74- 1.89)	0.473	0.61 (0.37- 1.01)	0.051

a: The reference group for the risk ratios was not interested in using PrEP.

b: Confidence Interval

Table 3: Multivariable nominal logistic regression of associated factors with interest in the use of HIV preexposure prophylaxis (PrEP) and associated factors among people who inject drugs in Iran, 2023, (n = 2,174).

Variable	Interest in using PrEP under any circumstances		Interest in using PrEP if provided for free	
	adjusted risk ratios <sup>a</sup> (95% CI <sup>b</sup> )	P-value	adjusted risk ratios <sup>a</sup> (95% CI <sup>b</sup> )	P-value
<b>Education level</b>				
Less than high school	Ref		Ref	
High school or more	1.92 (1.42-2.61)	<0.001	1.50 (1.10-2.04)	0.010
<b>Having health insurance</b>				
No	Ref		Ref	
Yes	0.64 (0.47-0.87)	0.004	0.33 (0.23-0.45)	<0.001
<b>Access to opioid agonist therapy in the last 6 months</b>				
No	Ref		Ref	
Yes	1.59 (1.13-2.25)	0.008	2.63 (1.88-3.67)	<0.001
<b>HIV knowledge</b>				
Insufficient	Ref		Ref	
Sufficient	2.87 (2.03-4.06)	<0.001	4.53 (3.23-6.37)	<0.001

a: The reference group for the risk ratios was not interested in using PrEP.

b: Confidence Interval