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Mehdi Noroozi[a], Alireza Noroozi[b], Ali Farhoudian[c], Farahnaz Mohammadi[a], Peter Higgs[d], Azam Rahmani[e], Hamid Sharifi[f], Hesam Ghiasvand[a], Farbod Fadai[g], Mohammad Abassi[h], and Bahram Armoon [i]

[a]Social Determinants of Health Research Center, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran; [b]Department of Neuroscience and Addiction, School of Advanced Technologies in Medicine, Tehran University of Medical Sciences, Tehran, Iran; [c]Substance Abuse and Dependence Research Center, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran; [d]Department of Public Health, School of Psychology and Public Health, La Trobe University, Melbourne, Australia; [e]Nursing and Midwifery Care Research Center, Tehran University of Medical Sciences, Tehran, Iran; [f]HIV/STI Surveillance Research Center, and WHO Collaborating Center for HIV Surveillance, Institute for Futures Studies in Health, Kerman University of Medical Sciences, Kerman, Iran; [g]Psychiatry, Psychosis Research Center, Department of Psychiatry, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran; [h]School of Nursing and Midwifery, Qom University of Medical Sciences, Qom, Iran; [i]Infertility and Reproductive Health Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran

ABSTRACT

Background: Little published research have assessed factors predicting the uptake of HIV-testing services for people who inject drugs (PWID) in Iranian settings. The objectives of the present study were to determine factors associated with HIV testing uptake among PWID in Tehran.

Methods: We surveyed 500 PWID in Tehran concerning demographic characteristics, drug-related and sexual risk behaviors, and HIV testing. HIV-related stigma variables were assessed using a scale consisted of 22 agree/disagree statements in three subscales including shame/blame/isolation, perceived discrimination, and equity. We used multivariate logistic regression to identify factors associated with HIV testing.

Results: Participant ages ranged from 19 to 67 years. Multivariable model shows that factors independently associated with recent HIV testing included level of education (adjusted odds ratios [aOR] 1.12, 95% CI 1.44–4.42), living status (aOR 1.91, 95% confidence interval [CI] 1.35–2.71), income (aOR 1.64, 95% CI 1.18–2.29), length of injecting career (aOR 1.3, 95% CI 1.2–2.23), and perceived risk of HIV infection (aOR 0.51, 95% CI 1.18–0.88). There was a statistically significant relationship between lower level of HIV-related stigma and HIV testing among PWID (OR 2.78, 95% CI 1.15–5.2).

Conclusions: These findings suggested a need to strengthen current HIV testing programs by social support and reducing HIV-related stigma. It is also important to modify the attitude of the public toward people living with HIV/AIDS.

Introduction

The United Nations Office on Drugs and Crime reports that there are 2 million individuals with drug dependence in Iran (Malekinejad et al., 2015). National reports estimated that of these, approximately 170,000–230,000 are people who inject drugs (PWID) (Mirahmadizadeh, Majdzadeh, Mohammad, & Forouzanfar, 2009; Nazari et al., 2016). Also, national HIV surveillance showed that despite the overall decrease in HIV infection attributed to injecting drug use in Iran, 45.5% of new HIV infections in 2014 still occurred among PWID (Haghdoost et al., 2011; Sharifi et al., 2017). HIV testing has been found to play an important role in public health strategy for prevention of HIV transmission both in general population and PWID (Kyle et al., 2015; Nazari et al., 2016). HIV testing in populations with high-risk behaviors can help to improve individuals' knowledge of their infection status and improve linkage to appropriate care, increase acceptance of treatment, and improve quality of life (Noroozi, Mirzazadeh, Hajebi & Farhoudian et al., 2016, 2017; Wu, Sun, Sullivan, & Detels, 2006). A national biobehavioral survey of PWID in 2010 showed that 65% of PWID do not know their current HIV serostatus (Shokoohi et al., 2016). Although the

benefits of HIV testing as part of routine care have been well documented, the implementation of routine HIV testing in some settings is uncommon among primary care providers (Sharma, Sullivan, & Khosropour, 2011; Wilson, Hoare, Regan, & Law, 2009). Previous studies have assessed factors associated with HIV testing among PWID in developed countries (Conserve, Sevilla, Mbwambo, & King, 2013; Li et al., 2007). HIV testing has been significantly associated with level of education, perceived HIV risk, receiving HIV/AIDS psycho-education, type of drug used, and having unprotected sex (Li et al., 2016; Ti et al., 2013). Furthermore, previous research in United States indicated that older age, multiple sexual partners, having a history of sexually transmitted infections (STIs) associated with HIV testing (Do et al., 2005; Sifakis et al., 2010). International studies showed that stigma against people living with HIV/AIDS (PLWHA) represents an important barrier to HIV test uptake (United Nations Office on Drugs and Crime, 2017). Factors associated with HIV testing in Iran have yet to be thoroughly assessed. Understanding of factors associated with the uptake of HIV testing in PWID is important for policy making and planning purposes in Iran. The objective of the present study is to identify

factors related to HIV testing including HIV-related stigma and perceived HIV risk among others in PWID in Tehran.

Methods

We conducted a cross-sectional survey of PWID in June and July of 2016 in Teheran. PWID were recruited using a convenience strategy at drop-in centers and "snowballing" (i.e., using participants to refer their peers to participate in the study). Study participants were required to be at least 18 years of age, had injected drugs at least once a month during last 6 months, had resided in Teheran, and were able to provide informed consent to complete the interview. Ethical approval was obtained from the Ethics Committee of Social Welfare and Rehabilitation University. Trained interviewers administered the questionnaire, which included modules on sociodemographic characteristics, injecting behaviors including frequency of injection, receptive syringe sharing (getting someone else's used syringe), syringe reuse; distributive syringe sharing (giving someone else a syringe after using), and equipment sharing (shared use of injection paraphernalia such as drug solution, filters or spoons), sexual behaviors, HIV testing, and participation in harm reduction programs. All behavioral questions referred to the 6 months prior to completing the interview.

Measures

The variables for sociodemographic status in this questionnaire were educational status (less than high school vs. upper high school), participants' employment status (employed vs. unemployed), income status (monthly income) and housing status (homeless vs. stable housing), age (years), marital status (single vs. married), age of first drug use, and length of injecting career. Access to needle and syringe program (NSP) was defined as receiving needle and syringe, and brochures or psycho-education on HIV risk reduction from harm reduction centers or outreach teams at least once during last month. HIV-related stigma variables were assessed by 22 agree/disagree statements. This scale included shame/blame/isolation, perceived discrimination, and equity subscales with a higher score indicating a lower level of HIV-related stigma. Items were summed to create total scale scores (range: 22–44, Cronbach alpha 0.75). Previous studies have used similar measures to explore HIV stigma that have been found to have good reliability and validity (Li et al., 2014; Nazari et al., 2016; United Nations Office on Drugs and Crime, 2017). Self-perceived risk of HIV infection was measured using yes/no question. The dependent variable was HIV testing, which was ascertained by the yes/no question: "Have you ever had an HIV test?" "Ever been tested" was defined as being tested for HIV and get its result at least once in lifetime before the survey. We used logistic model regression to examine the associations between HIV testing and each explanatory variable. After checking for collinearity, variables significant ($p < 0.2$) in bivariate analyses were considered for inclusion in the multivariate analysis, with adjusted odds ratios (aORs) and 95% CIs estimated using logistic regression. Variables were eliminated from the multivariate models using stepwise selection. The final models included variables that were significantly

($p < 0.05$) reported as aOR point and 95% CI. All data analyses were performed using Stata 11.

Results

A total of 520 clients participated in the study of which data were fully complete for 500. Participant ages ranged from 19 to 67 years, with a median of 32 years (interquartile range, 24–38). Forty percent of participants were never married. Of the 500 participants, 73.3% completed less than 6 years of education. Almost one-quarter (24%) of participants had a monthly income of more than 150 US dollars and almost half (42%) reported more than 2 injections per day. Average age of first drug use and first injection was 22.5 (SD 6.6) and 23.5 years old (SD 6.4), respectively. Table 1 presents demographic and drug use characteristics of the participants. Overall, 67% (95% CI 44.5%, 87.2%) of participants reported having previously been tested for HIV. In Table 2, we compared the characteristics of PWID who reported previous testing for HIV and those who had not. Participants with no previous HIV testing history were more likely to be unemployed (48% vs. 55%, $p < 0.05$), homeless (25% vs. %35, $p < 0.05$), have low monthly income status (72% vs. 55%, $p < 0.05$), have started drug injection under the age of 25 years (65% vs. 61%, $p > 0.05$), and reporting methamphetamine as main drug of use (45% vs. 35%, $p > 0.05$). The average

Table 1. Demographic and drug use characteristics of study participants ($N = 500$).

Variable	N (%)
Age (years)	
<30	210 (42)
30–39	200 (40)
≥40	90 (18)
Marital status	
Married	120 (24)
Single	200 (40)
Separated/Divorced/Widowed	180 (34)
Completed years of education	
Primary or below (less than 6)	340 (73)
Secondary school or above (6 or more)	160 (27)
Employment status	
Unemployed	390 (78)
Employed	110 (22)
Prison history	
No	100 (20)
Yes	400 (80)
Monthly income	
Less than 150 USD	380 (76)
150 USD or more	120 (24)
Age of first injecting drug use	
<25 years	300 (60)
≥25 years	200 (40)
Age of first drug use	
<25 years	350 (70)
≥25 years	150 (30)
Length of injecting career	
<5 years	230 (46)
5–10 years	200 (40)
10>	80 (14)
Main drug of use in last month	
Methamphetamine	295 (59)
Heroin	155 (31)
Others	50 (10)
Injecting frequency in last month	
≤2 per day	290 (58)
>2 per day	210 (42)
Receptive syringe sharing	125 (25)
Distributive syringe sharing	110 (22)
Shared equipment	335 (67)

Table 2. Adjusted and unadjusted correlates of HIV testing by study participants.

	HIV testing		Bivariate	Multivariate
	Yes (n = 330)	No (n = 170)	COR (95% CI)	aOR (95% CI)
Characteristics	N (%)	N (%)		
Sociodemographic variable				
Age (year)				
<30	182 (55)	102 (60)	1 (referent)	…
30–39	99 (30)	43 (25)	1.09 (0.92–1.32)	1.04 (0.78–1.82)
40+	49 (15)	25 (15)	1.22 (1.03–1.42)	0.54 (0.38–1.52)
Age (mean + SD)	30.4 ± 7.8	31.2 ± 7.2		
Completed years of education				
<6 years	198 (60)	87 (51)	1 (referent)	1 (referent)
≥6 years	132 (40)	83 (49)	1.12 (1.0–1.32)	1.12 (1.14–4.42)
Marital status				
Single	106 (32)	80 (47)	1 (referent)	1 (referent)
Married	165 (50)	51 (30)	1.12 (1.0–1.32)	1.12 (1.0–1.32)
Separated/Divorced/Widowed	59 (18)	22 (13)	1.3 (1.1–2.74)	1.3 (1.1–2.74)
Employment status				
Unemployed	158 (48)	94 (55)	1 (referent)	1 (referent)
Employed	172 (52)	76 (45)	2.3 (1.3–3.2)	1.81 (0.23–2.43)
Living status				
Stable housing	248 (75)	111 (65)	2.3 (1.3–3.2)	1.91 (1.35–2.71)
Homeless	82 (25)	59 (35)	1 (referent)	1 (referent)
Income (USD)				
>150	155 (47)	61 (36)	1.55 (1.12–2.15)	1.64 (1.18–2.29)
≤150	175 (53)	39 (64)	1 (referent)	1
Main drug of use in last month				
Methamphetamine	181 (55)	99 (58)	3.0 (0.8–10.7)	–
Heroin	116 (35)	51 (30)	1.3 (0.9–1.8)	–
Others	33 (10)	20 (12)	1	–
Age of drug use initiation (year)				
<25	185 (56)	76 (45)	0.9 (0.7–1.2)	–
≥25	145 (44)	93 (55)	1	–
Length of injecting career				
<5 years	139 (42)	63 (37)	1 (referent)	1 (referent)
5–10 years	115 (35)	51 (30)	1.22 (1.0–1.42)	1.32 (1.2–2.23)
10years>	76 (33)	73 (43)	1.3 (1.1–4.3)	1.1 (1.1–3.6)
Age of first drug injection				
<25 years	214 (65)	104 (61)	1	–
≥25 years	116 (35)	66 (39)	0.8 (0.3–2.0)	–
Access to needle and syringe program				
Yes	221 (67)	94 (55)	3.2 (1.6–6.3)	2.8 (1.2–5.4)
No	109 (33)	76 (45)	1	1 (referent)
Perceived risk of HIV infection				
Yes	148 (45)	59 (35)	1	1
No	182 (55)	111 (65)	0.43 (0.17–0.72)	0.51 (0.18–0.88)
HIV-related stigma	Not applicable	Not applicable	2.41 (1.18–4.7)	2.78 (1.15–5.2)

aOR: Adjusted odds ratio; CI: confidence interval.

age of drug use initiation among PWID reporting previous HIV testing was lower as compared to those without HIV testing experience (56 vs. 45, $p > 0.05$). Finally, the mean length of injecting career among PWID with HIV testing experience was lower compared to those reporting no previous history of HIV testing (42 vs. 37 months, $p < 0.05$).

Results of the univariate logistic regression analyses are shown in Table 2. Marital status, higher educational levels, higher monthly income, length of injecting career, perception of HIV infection risk, level of HIV-related stigma, and higher frequency of access to NSP in the last year were associated with HIV testing. Also, Table 2 describes the multivariate logistic analyses of variables in relation to HIV testing among PWID. For adjusting of confounders, we ran the multivariate logistic analyses. The factors that were statistically significant ($p < 0.2$) in univariate analyses were included in the multivariate model. In the final multivariable model, factors independently associated with recent HIV testing included level of education (aOR 1.12, 95% CI 1.44–4.42), living status (aOR 1.91, 95% CI 1.35–2.71), income (USD) (aOR 1.64, 95% CI 1.18–2.29), length of injecting career (aOR

1.3, 95% CI 1.2–2.23), and perceived risk of HIV infection (aOR 0.51, 95% CI 1.18–0.88). There was a statistically significant relationship between lower level of HIV-related stigma with HIV testing among PWID (OR 2.78 95% CI 1.15–5.2). Lower levels of HIV-related stigma increased 2.78 times odds of HIV testing. Also, not having perceived HIV risk could increase odds of HIV testing to 50% among PWID (aOR 0.51, 95% CI 0.18–0.88).

Discussion

Our findings revealed that one-third of our recruited PWID reported not being tested for HIV within the lifetime. These findings are consistent with results of the PWID biobehavioral survey in 2010 (Shokoohi et al., 2016).

Based on our study, those PWID who are single, unemployed, and homeless were less likely to be tested in the past 12 months. This is in line with findings of a study in China showing low socioeconomic status decreases the odds of HIV testing uptake (Song et al., 2011). We found that higher education levels were associated with HIV testing, also consistent with a previous

Chinese research (Zhang et al., 2013). This may be because they perceived that were at risk for HIV infection. Similarly, our study demonstrated that the low socioeconomic status was positively associated with HIV testing.

We observed an association between marital status and HIV testing. In our study, unmarried PWID were significantly less likely to undergo HIV testing than married ones. Collectively, these findings are consistent with another conducted in South Africa (Makusha et al., 2017). We also found a significant association between perceived risk of HIV infection and HIV testing. Our results suggest that awareness of HIV risk increased testing. A study by Song et al. (2011) showed that the perception of risk of HIV infection is associated with HIV testing. These results suggested that we should strongly focus on health education about HIV/AIDS among PWIDs and improve their HIV risk awareness.

Lastly, our study mirrors previous data collected from men who have sex with men in China that found HIV-related stigma could impact the uptake of HIV testing in PWID (Li et al., 2014). The general population may believe that punishment was an appropriate response toward PLWHA (Lee et al., 2005). A majority of service providers may have negative attitudes toward people living with HIV and have the perception of being stigmatized due to working with HIV-positive people (Li et al., 2007). Result of our study suggests that effective interventional measures should be adopted to improve HIV testing, targeting PWID with a lower educational background. More efforts should focus on to encourage service providers and the society to abolish discrimination and stigma toward PWIDs. Perhaps, a more achievable goal, for promoting HIV testing, would be reducing stigma and discrimination toward PWID within health-care settings (Jorjoran Shushtari et al., 2017). There are several limitations to this study. Like any observational study, we can only report factors associated with HIV testing. Furthermore, our data were based on participants' self-report and therefore may be subject to recall and/or social desirability bias (Nazari et al., 2016). We might also misclassify PWID based on drug-related characteristics as it was based on their self-report. This may lead to attenuating the true differences in the effect of the two groups.

Conclusions

These findings suggest an urgent need to strengthen current HIV testing programs by HIV psycho-educations and HIV-related stigma reduction interventions. It is also important to improve the attitude of the public toward PLWHA.

Disclosure of potential conflicts of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

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Informed consent

Informed consent was obtained from all individual participants included in the study.

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Notes on contributor

Study concept and design: BA and MN; analysis and interpretation of data: AR and HGG; and initial draft of the manuscript: AF, AM, AN, and FM. Critical revision and approval of final submitted version of the manuscript: PH and AN.

ORCID

Bahram Armoon http://orcid.org/0000-0001-5467-9889

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