

Prevalence and Correlates of HIV Infection Among Male Injection Drug Users in Detention in Tehran, Iran

P. Kheirandish, MD,* S. A. Seyedalinaghi, MD,* M. Hosseini, PhD,† M. R. Jahani, MD,‡
H. Shirzad, MD,§ M. Foroughi, MD,* M. R. Seyed Ahmadian, MD,§ H. Jabbari, MD,*
M. Mohraz, MD,* and W. McFarland, MD, PhD¶

Objective: To measure HIV prevalence and characterize associated risk behaviors among injection drug users (IDU) upon detention in Tehran, Iran.

Methods: A cross-sectional survey included 459 male IDU arrested by police during a police sweep in Tehran in 2006. A questionnaire was completed, and blood was collected for HIV testing.

Results: Overall HIV prevalence was 24.4% (95% confidence interval 20.5–28.6). Factors independently associated with HIV infection included history of using an opioid in jail (adjusted odds ratio 2.11, 95% confidence interval 1.26–3.53) and older age (adjusted odds ratio 2.79 for 25–34, 3.01 for 35–44, 4.62 for \geq 45 yr).

Conclusions: This study supports that incarceration is contributing to the increased spread of HIV. Harm reduction programs should be urgently expanded, particularly among incarcerated IDU.

Key Words: HIV, injection drug users, prevalence, risk factors, Iran
(*J Acquir Immune Defic Syndr* 2010;53:273–275)

INTRODUCTION

Unlike in much of the world today, the HIV epidemic is expanding in Iran.¹ More than 17,000 cases have been reported so far, although the true number of persons living with HIV is estimated to be many times higher.² The vast majority of reported cases have occurred among injection drug users (IDU),^{1,2} with the next largest categories being the wives of IDU and their children. Estimates of HIV prevalence among IDU in Iran range from 1% to 30%.^{3–6} The situation is exacerbated by the proximity of Iran to Afghanistan, the source of the majority of the global heroin supply. Iran also has

one of the highest per capita opioid use rates in the world and an increasing number of injecting opioid users.^{7,8}

HIV is usually more prevalent in prison populations than in the surrounding communities because of the high proportion of IDU present in these institutions.⁵ Prison populations are also dynamic, with vast numbers young men and women moving between the prison setting and vulnerable communities. These attributes of prison populations, a high proportion of IDU and a high turnover of inmates, may contribute to the spread of HIV infection among prisoners and among their communities.⁵ To more effectively target HIV prevention programs, we assessed the prevalence of infection, relevant drug practices, and sexual risk behavior among male IDU upon detention in Tehran, Iran.

METHODS

Methods of the survey have been described by Jahani et al.⁹ In brief, our study is a cross-sectional survey of male IDU detained by police during a “sweep” in Tehran, Iran in 2006. Participants agreed to estimate the prevalence of HIV and associated risk factors for infection. Records were kept separate from the jail system, and referrals for treatment and care were given through the university medical center. The study was approved by the Ethics Committee of the Tehran University Medical School.

Upon entry to the mandatory detoxification center, we offered serologic screening for HIV antibody. Samples were first screened using an enzyme-linked immunosorbent assay (Biotest AG, Dreieich, Germany). HIV-positive samples were confirmed by Western blot (Diagnostic, Berlin, Germany). A questionnaire recorded demographic information, imprisonment history, injecting drug risk behaviors, and questions regarding HIV sexual risk behaviors. Of 499 inmates approached, 459 (92.0%) consented to participate and provided a specimen.

In the center, detoxification was implemented without use of methadone for the 3-month period. The condition was similar to mandatory drug rehabilitation throughout the 1980s and 1990s in Iran. However, since 2000, harm reduction programs have been gradually established in Iran.¹⁰

Data were entered and analyzed using STATA (8.0, College Station, TX, USA). HIV point prevalence was calculated as the number of confirmed HIV-positive individuals divided the number of test results overall and stratified by demographic characteristics, incarceration history, and drug use and sexual risk behaviors. Because of high levels of

Received for publication December 1, 2008; accepted April 30, 2009.

From the *Iranian Research Center for HIV/AIDS (IRCHA), Department of Infectious and Tropical Diseases, Tehran University of Medical Sciences, Tehran, Iran; †Department of Epidemiology and Biostatistics, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran; ‡Department of medicine, Baghiyat-Allah University, Tehran, Iran; §Research Center-Head Quarter of Police Force Medicine, Tehran, Iran; and ¶CAPS and Institute for Global Health, University of California, San Francisco, CA.

Supported by a Tehran University of Medical Sciences and Health Services Grant and a Dariush Research Institute, grant number 801/86/7056.

Correspondence to: Dr. H. Jabbari, MD, Iranian Research Center for HIV/AIDS (IRCHA), Imam Khomeini Hospital, Keshavarz Boulevard, Tehran, Iran (e-mail: jabbarihassain@yahoo.com).

Copyright © 2010 by Lippincott Williams & Wilkins

“decline to answer” and missing data for many sensitive questions, we chose to code variables as 1 = acknowledging behavior, 0 = not acknowledging behavior (i.e., “no,” “decline to answer,” and missing). Although we recognize this approach may misclassify many negative responses, it provided the advantages of conserving data for analysis and giving minimum estimates for risk behaviors. After description of the variables by proportions and 95% confidence intervals (CI), we conducted logistic regression analyses to determine associations with HIV infection. Variables associated with HIV infection in bivariate analysis at the $P \leq 0.10$ level were included as potential independent predictors. The final model retained those variables associated with HIV infection at the $P < 0.05$ level.

RESULTS

Demographic characteristics and risk behaviors of detained IDU are described in Table 1. Of the 459 participants, 112 (24.4%) were HIV positive (95% CI: 20.5–28.6) (Table 1). Also, 68.6% participants did not know their previous HIV test result. At the $P < 0.10$ level, HIV infection was associated with age, past history of incarceration, and history of using an opioid in jail. Acknowledging having sex in jail was borderline significant. We did not detect associations between HIV infection and other demographic characteristics, type of drugs used, injection practices, history of sexually transmitted disease, or other sexual behaviors.

In multivariate analysis that included all variables associated with HIV infection at $P \leq 0.10$ in bivariate analysis, history of using an opioid in jail (adjusted odds ratio 2.11, 95% CI: 1.26–3.53) and older age (adjusted odds ratio 2.79 for 25–34, 3.01 for 35–44, 4.62 for ≥ 45 yr) remained independently associated with HIV infection ($P < 0.05$).

DISCUSSION

Our study, like that of Zamani et al,¹¹ with a 24.4% HIV prevalence, higher than found in some previous studies in Iran,^{3,6} provides compelling data that incarceration is a major contributor to the spread of HIV among IDU in Iran. Past history of incarceration accounted for the highest fraction of HIV infections detected (91 of 112), and reported history of opioid use in jail was the only risk factor significantly associated with infection. Jails may serve as amplifiers of HIV transmission by leading to the sharing of injection equipment with large numbers of persons, many of whom may already be infected with HIV acquired from previous incarceration or from the outside community. Imprisonment is a common and recurring event for most IDU. Over 60% of IDUs in a 12-city study in low- and middle-income countries reported a history of imprisonment, and in one Australian study, IDU reported an average of five imprisonments.^{5,12} In 10 European cities, injecting drugs while in prison was associated with HIV infection.¹³ In another study in Thailand, incarceration was independently associated with HIV infection.¹⁴ Our findings are therefore corroborated by many studies around the world.^{15–18}

However, a particular concern for Iran is the incarceration of large number of noninjecting opioid users (8). Otherwise noninjecting opium users may be compelled to inject while in jail to abate withdrawal symptoms because of

TABLE 1. Characteristics, Behaviors, and HIV Seroprevalence Among Injection Drug Users Upon Detention, Tehran, Iran, 2006

Variable	N* (%)	HIV+ (N)	HIV seroprevalence % (95% CI)
Total	459 (100)	112	24.4 (20.5–28.6)
Age group†			
17–24 yrs	65 (14.5)	7	10.8 (4.4–20.9)
25–34 yrs	231 (51.7)	57	24.7 (19.3–30.8)
35–44 yrs	107 (23.9)	29	27.1 (19.0–36.6)
≥ 45 yrs	44 (9.5)	16	36.4 (22.4–52.2)
Marital status			
Single	166 (37.1)	33	19.9 (14.1–26.8)
Married	176 (39.4)	46	26.1 (19.8–33.3)
Divorced	101 (22.6)	30	29.7 (21.0–39.6)
Widowed	4 (0.9)	0	0.0 (0.0–60.2)‡
Education level			
Illiterate	32 (7.2)	10	31.3 (16.1–50.0)
Did not complete high school	327 (73.7)	84	25.7 (21.0–30.8)
Completed high school or higher	85 (19.1)	14	16.5 (9.3–26.1)
Drugs reported ever used (local name)			
Opium (taryak)	367 (80.0)	90	24.5 (20.2–29.30)
Boiled opium resin (shireh)	98 (21.4)	25	25.5 (17.2–35.3)
Opium resin (sookhteh)	79 (17.2)	18	22.8 (14.1–33.6)
Heroin	343 (74.7)	86	25.1 (20.6–30.0)
“Crack” (purer form of heroin)	73 (15.9)	14	19.2 (10.9–30.1)
Hashish	130 (28.3)	26	20.0 (13.5–27.9)
Buprenorphine (norgeezak)	446 (97.2)	108	24.2 (20.3–28.5)
Buprenorphine + steroids (afzoor)	9 (2.0)	1	11.1 (0.3–48.2)
Methamphetamine (crystal)	17 (3.7)	3	17.7 (3.8–43.4)
Morphine	11 (2.4)	3	27.3 (6.0–61.0)
Other drug	62 (13.5)	12	19.4 (10.4–31.4)
Reported ever sharing needles	53 (11.6)	14	26.4 (15.3–40.3)
Reported ever sharing equipment	119 (25.9)	32	26.9 (19.2–35.8)
Reported ever sharing needles or equipment	122 (26.6)	32	26.2 (18.7–35.3)
Reported past history of incarceration	341 (74.3)	91	26.7 (22.0–31.4)
Reported history of using an opioid in jail†	87 (18.9)	32	36.8 (26.7–47.8)
Reported history of injection in jail	28 (6.1)	10	35.7 (18.6–55.9)
Reported past access to new syringes in jail	314 (68.4)	73	23.2 (18.7–28.3)
Reported ever having sex	351 (76.5)	89	25.4 (20.9–30.2)
Reported sex only with wife	341 (74.3)	89	26.1 (21.5–31.1)
Reported sex with commercial sex worker	107 (23.3)	26	24.3 (16.5–33.5)
Reported history of male-male sex	23 (5.0)	7	30.4 (13.2–52.9)
Reported history of male-male sex in jail	25 (5.4)	9	36.0 (17.1–57.5)
Reported history of sex in jail§	23 (5.0)	9	39.1 (19.7–61.5)
Reported history of genital discharge	37 (8.1)	9	24.3 (11.8–41.2)
Reported history of STD	35 (7.6)	7	20.0 (8.4–36.9)

*Subgroups do not always add up to total due to missing data.

† $P \leq 0.01$

‡One-sided 97.5% CI

|| $P = 0.10$

the difficulty of clandestine smoking and scarcity of sufficient raw opium.¹⁹ Such noninjectors may also be mixing with higher prevalence injecting populations for the first time. Of note in our data is that 80.0% of IDU reported past use of opium. In a study in Shiraz, Iran, IDU were more likely to have been to prison than noninjecting drug users (41% vs. 7%); however, 91% of all IDU and noninjection drug users ever imprisoned reported using drugs while in prison.¹⁹

The effectiveness of harm reduction programming in a prison setting has been supported through research in many countries, such as Iran.^{20,21} Therefore, Iran has started a number of harm reduction programs for tackling the HIV epidemic among IDUs. Methadone maintenance therapy and needle exchange programs have been established in many prisons. Likewise, condom distribution exists, but it should be expanded. There are more than 60 triangular clinics (sexually transmitted infections, HIV/AIDS, drug abuse) across Iran, but it is unclear how many of these have initiated needle exchange programs.^{10,21} Large numbers of participants in this study did not previously know their HIV serologic status, with testing therefore directly benefiting their health and potentially slowing secondary transmission.

We note that a major limitation of our data is the potential for severe under-reporting of risk behaviors in the jail setting because of their illegal and highly sensitive nature. Social desirability response bias may also account for the lack of association between HIV infection and needle and equipment sharing. Such limitations may be true to an even greater extent for sexual behaviors. Sex outside of marriage is illegal in Iran, and other studies have noted the strong reluctance to divulge sexual risk behavior in surveys.²² Male-male sexual behavior in particular is highly stigmatized and illegal. It is therefore notable that nearly 1 in 5 acknowledge engaging in sex with sex workers and 1 in 20 in male-male sex. Moreover, we found at least a borderline association between HIV infection and acknowledging having sex while in jail. Although sexual behaviors may be contributing to HIV transmission among IDU inside and outside jails, we believe it is very likely to be under-reported in our study. In addition to the risk of acquiring HIV through sex, the high rate of marriage among IDU in our study underscores the risk of transmission from IDU to their wives. Appropriate and accurate ways of measuring sexual behavior as well as the prevention of sexual transmission of HIV in the Iranian context is an area requiring basic research.

Other limitations to our data include limited recall, not knowing the timing of infection in relation to the reported risk behaviors and to incarceration, and the representativeness of our sample to the wider IDU population of Tehran. It may be the case, for example, that IDU from higher socio-economic status are under-represented because of the areas and nature of the police sweeps. Finally, a major limitation is that our sample did not include female IDU, a population very difficult to sample in the Middle East region.

Despite these potential limitations, our data provide a basis to advocate for enhanced HIV prevention action in Iran. The very high HIV prevalence found in our survey lends strong support to launching additional needle exchange programs, expanding methadone programs, renewing education

to help establish cleaning norms before sharing of works, and promoting condom use.

REFERENCES

- UNAIDS Update 2004. Islamic Republic of Iran: Epidemiological Fact Sheets on HIV/AIDS and Sexually Transmitted Disease. Available at: http://data.unaids.org/Publications/Fact-Sheets01/iran_en.pdf. Accessed May 12, 2005 and January 7, 2007.
- Gouya MM. National Report on HIV and AIDS Cases. Tehran, Iran: Disease Management Center, Ministry of Health and Medical Education, 2008.
- Khani M, Vakili MM. Prevalence and risk factors of HIV, hepatitis B virus and hepatitis C virus infections in drug addicts among Zanjan prisoners. *Arch Iranian Med*. 2003;6:1-4.
- Miller M, Mella I, Moi H, et al. HIV and hepatitis c virus risk in new and longer-term injecting drug users in Oslo, Norway. *JAIDS*. 2003;33:373-379.
- Kate Dolan K, Kite B, Black E, et al. HIV in prison in low-income and middle-income countries. *Lancet Infect Dis*. 2007;7:32-41.
- Rowhani Rahbar A, Rooholamini S, Khoshnood K. Prevalence of HIV infection and other blood-borne infections in incarcerated and non-incarcerated injection drug users (IDUS) in Mashhad, Iran. *Int J Drug Policy*. 2004;15:151-155.
- Zamani S, Kihara M, Gouya MM, et al. Prevalence of and factors associated with HIV-1 infection among drug users visiting treatment centers in Tehran, Iran. *AIDS*. 2005;19:709-16.
- Razzaghi EM, Rahimia Movaghar A, Craig Green T, et al. Profiles of risk: a qualitative study of injecting drug users in Tehran, Iran. *Harm Reduct J*. 2006;3:12.
- Jahani MR, Kheirandish P, Hosseini M, et al. HIV seroconversion among injection drug users in detention, Tehran, Iran. *AIDS*. 2009;23:538-540.
- Nassirimanesh B, Trace M, Roberts M. The rise of harm reduction in the Islamic Republic of Iran. Briefing Paper Eight. Oxford, UK: The Beckley Foundation Drug Policy Programme, 2005.
- Zamani S, Kihara M, Gouya MM, et al. High prevalence of HIV infection associated with incarceration among community-based injecting drug users in Tehran, Iran. *J Acquir Immune Defic Syndr*. 2006;42:342-346.
- March JC, Oviedo-Joekes E, Romero M. Factors associated with reported hepatitis C and HIV among injecting drug users in ten European cities. *Enferm Infecc Microbiol Clin*. 2007;25:91-97.
- Wodak A, Cooney A. Effectiveness of sterile needle and syringe programming in reducing HIV/AIDS among injecting drug users, World Health Organization Evidence for Action Technical Papers. Geneva: World Health Organization, 2004.
- Beyrer C, Jittiwutikarn J, Teokul W, et al. Drug use, increasing incarceration rates, and prison-associated HIV risks in Thailand. *AIDS Behav*. 2003;7:153-161.
- UNAIDS. AIDS epidemic update December 2002. Geneva: UNAIDS, 2002.
- Adjei AA, Armah HB, Gbagbo F, et al. Correlates of HIV, HBV, HCV and syphilis infections among prison inmates and officers in Ghana: a national multicenter study. *BMC Infect Dis*. 2008;8:33.
- Taylor A, Goldberg D, Emslie J, et al. Outbreak of HIV infection in a Scottish prison. *BMJ*. 1995;310:289-292.
- Dolan K, Wodak A. HIV transmission in a prison system in an Australian state. *Med J Aust*. 1999;171:14-17.
- Day C, Nassirimanesh B, Shakeshaft A, et al. Patterns of drug use among a sample of drug users and injecting drug users attending a General Practice in Iran. *Harm Reduct J*. 2006;3:2.
- Rehm J, Betteridge G, Stöver H, et al. *Prison Needle Exchange: Lessons from a Comprehensive Review of the International Evidence and Experience*. Montreal: Canadian HIV/AIDS Legal Network, 2004.
- Eshtrati B, Taghizadeh Asl R, Anne Dell C, et al. Preventing HIV transmission among Iranian prisoners: Initial support for providing education on the benefits of harm reduction practices. *Harm Reduct J*. 2008;5:21.
- Hajiabdolbaghi M, Razani N, Karami N, et al. Insights from a survey of sexual behavior among a group of at-risk women in Tehran, Iran, 2006. *AIDS Educ Prevent*. 2007;19:519-530.