

## Prevalence of HIV infection in inmates with history of injection drug use and evaluation of risk factors, in Isfahan, Iran

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### ABSTRACT

**Objective:** HIV/AIDS is a serious problem for prison populations in the world. Studies show a significantly higher prevalence of HIV among prisoners than the general population. Injection drug users (IDUs) in prison are high risk population for HIV transmission because of their risky behavior such as needle sharing for drug injection. In this study, we determined the prevalence of HIV-Ab among prisoners with history of IDU in Isfahan provincial prisons and evaluated risk factors for HIV transmission among them.

**Methodology:** In a cross-sectional study, in March 2009, 970 inmates with history of drug injection in prison, who agreed to participate in our study, completed demographic and risk factors questionnaire. Blood samples were obtained from them. Then samples were tested for the presence of HIV-Ab by using ELISA and positive ELISA results were confirmed by western blot. Odds ratio and logistic regression were used for data analysis and P-value < 0.05 considered significant.

**Result:** The overall prevalence of HIV-Ab among IDUs in our study was 6.4%. Needle sharing was determined as significant risk factor (OR:1.97 ,95%CI:1.06-3.66).

**Conclusion:** According to our results and relatively high prevalence of HIV infection, educational and needle/syringe exchange program also tracing infected inmates in prisons should be an essential action for control and prevention of HIV in high risk population such as Injection drug users.

**KEY WORDS:** HIV, Injection drug users (IDUs), Prison.

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### INTRODUCTION

HIV/AIDS is a serious problem for prisoners in the world.<sup>1</sup> Studies show a significantly higher prevalence of HIV among prisoners than the general population which shows 6:1 and 10:1 in USA and France respectively.<sup>2</sup> Prisons are extremely high risk environments for transmission of HIV due to overcrowding, poor nutrition, limited access to health care, continued drug use and Needle sharing.<sup>1</sup> Injection Drug Users (IDUs) in prison have an important role in transmission of blood born infections such as HIV. Studies show that the vast majority of HIV in prisons have occurred among

injection drug users (IDU), because of their high risk behaviors such as needle sharing, unprotected sex and tattooing.<sup>3</sup>

According to the report of WHO, one out of every ten new HIV infections in community is caused by injecting drug use and in some countries in Eastern Europe and Central Asia over 80% of all HIV infections is related to drug users that who either has a history of incarceration or come to the prison latter<sup>4</sup> and also studies have showed that concentrated HIV epidemic occurs among injection drug users (IDUs) and male sex workers.<sup>5</sup>

HIV in Iran such as other countries is a problem that essentially needs more attention especially in prisons. Based on the international reports the incarceration rate in Iran is 333 in 100000 people that 45% of prisoners have drug-related crimes, 64% have history of drug use, 17-23% are IDU while 95% of them are reported to share needles for drug injection and 65% of them have tattoo.<sup>6</sup> The factors mentioned above bring about risky conditions to HIV transmission among Iranian prisoners. Therefore it is essential to estimate the prevalence of infection in a population in which infectious disease preventive programs including HIV have been proposed. According to the epidemiological studies, the reported prevalence of HIV infection among IDUs in Iranian prisoners has been variable. In local studies HIV prevalence of IDU inmates in Mashhad was 7% and in Hamedan it was 0.9%.<sup>7,8</sup>

In current study we determined prevalence of HIV-Ab in IDU prisoners in Isfahan province prisons including Central Prison that is a major prison in central region of Iran and Asad Abad prison in 2009, We also evaluated risk factors mentioned above for HIV transmission among IDU.

## METHODOLOGY

A cross-sectional study was conducted, according to self-report and confirmation by head of prison's healthcare, among the inmates with a history of intravenous drug use and current IDUs in Isfahan central prison and Asad Abad prison in March 2009. The study comprised an interview and blood testing. Since most of our participants had sclerosis in peripheral vessels, blood sampling was drawn from the femoral vein by the health personnel of the prison setting which were trained for safety sampling and filling questionnaire. Study was performed on 970 incarcerated IDUs. 5ml Blood samples were sent to Immunology and Virology laboratory of Infectious Diseases Research Center of Isfahan (IDRC) on ice to be tested by EILSA (Diapro-Italy).

Serum samples were separated and tested for the presence of HIV-Ab, either in the same day or aliquot and freeze in -20 to be done latter. Also western blotting was performed on reactive samples in HIV-Ab tests. IDU prisoners were also asked information about their sociodemographic characteristics and HIV-related risk factors. These information were collected by standardized questionnaires that were administrated though face-to-face interviews. Questionnaires were double entered and then checked for accuracy by specialists and its reliability was confirmed by using Chronbach alpha = 0.74.

The study protocol and informed consent forms were approved by the Ethical committee of Isfahan University of Medical Sciences in Iran. Participation in the study was on a voluntary basis and informed consent was obtained from all participants. The privacy and confidentiality during interviews were guaranteed. Each questionnaire and test tube had an anonymous identification code, which was used for reporting laboratory results, too. Statistical analysis was performed using SPSS for windows (Version 16.0, 2007, SPSS Inc, Chicago, IL, USA). Bivariate analysis was used to evaluate association between being HIV positive and related risk factors. The variables that were significant in the Bivariate analysis ( $P$ -value <0.05) were included in the multiple logistic regression to estimate adjusted odds ratio (OR) and 95% confidence intervals (CI).

## RESULTS

A total of 970 incarcerated IDUs participated in our study. Sociodemographic characteristics of the participants were as follow and mentioned in Table-I; the mean age of population study were 32.87 years (Range: 18-67) that 53.71% (521) of them had been married. Four hundred sixty (47.42%) of them had been married once, 34 (3.5%) were married twice and 5 (0.5%) had been married more than twice. Among participants, 2.9% (n=29) were illiterate, among literates, 24.32% (n=236) were

Table-I: The Socio demographic characteristics of participants

	HIV(Neg)	HIV(Pos)
Age(Mean±SD)	32.65±8.20	33.1±8.33.
Illiterate	28(2.88%)	1(0.1%)
Literate	562(57.93%)	41(4.2%)
Missing Data		
Single	381(39.27%)	38(3.91%)
Married	497(51.23%)	24(2.47%)
Missing Data		

Table-II: Bivariate association between potential risk factors and HIV seropositivity

HIV(Pos)	HIV(Neg)	P-Value	
History of Tattooing	43(69.37%)	521(59.54%)	0.13
History of Cupping	26(41.93%)	340(39.08)	0.67
History of Ear piercing	38(61.29%)	407(46.83)	0.03*
History of illegal sex	45(72.58%)	630(71.67%)	0.72
History of sharing needle	32(51.61%)	320(36.48%)	0.01*
History of Organ donation	22(35.48%)	352(40.64%)	0.54
History of drug injection	57(91.93%)	668(75.82%)	0.004*
History of imprisonment	51(82.25%)	620(70.61%)	0.03*
Multiple incarceration (Mean±SD)	5.63±5.94	4.32±4.49	0.046*
Duration of recent incarceration (month)(Mean±SD)	28.51±31.67	25.08±32.74	0.30
Total Duration of incarceration (Mean±SD)	6.93±4.36	5.22±4.67	<0.0001**

\* P-value < 0.05

in Elementary level, 26.08% (n=253) in Junior high school level, 10.2% (n=99) in High school level and 1.54% (n=15) had university studies. Also 14.74% of participants have history of traveling to other countries.

The overall prevalence of HIV-Ab among IDUs in our study was 6.4% (n=62). Table-II, shows the prevalence of HIV risk factors. Among the participants, 69.17% had history of imprisonment and the median total duration of incarceration was 6.075 years (Range 0.08-35). 74.74% had history of drug injection previously and 40.13% had drug injection in prison. The mean IV injections were 54 times per month while 36.22% were using needle sharing for drug injection.

About 69.58% had unsafe sex, among them, 43% had history of anal sex with another man (MSM), 64.4% had sex with commercial sex workers and sexual partner of 30.9% of them had history of IV drug abuse. According to self reports, 30.9% of them had ever used condom during sex. Within all studied persons with IDU history, 13.3% had a single sexual partner and the others had two or more, in their lifetime.

The odds Ratio for risk factors of IDUs using the logistic Regression Model was mentioned in Table-III. Variables shown in the table were controlled for basic demographic characteristics.

## DISCUSSION

Epidemiological studies show that HIV prevalence among prisoners is significantly higher than in general population.<sup>2</sup> Among prisoners, injection drug users (IDUs) have important role in spread of HIV in prisons because of their risky behaviors such as needle sharing. In current study, we determined HIV prevalence in IDUs was 6.4% that correlate with similar study in Mashhad by

Rahbar et al . According to their results, HIV-Ab prevalence was 7%.<sup>7</sup> Also Pour Ahmad et al in three province in Iran (Isfahan, Chaharmahal Bakhtiary and Lorestan), showed that 6.4% of prisoners who had been imprisoned for various drug-related crimes were HIV- Ab positive in 2003.<sup>9</sup> But, there are several studies in Iran that show lower rates of HIV-Ab among IDUs prisoners. Alizadeh et al showed that prevalence of HIV-Ab was 0.9% in Hamedan.<sup>8</sup> Khani et al determined HIV-Ab prevalence 1.2% in Zanzan.<sup>10</sup> Also seroprevalence of HIV-Ab among injection drug users in detention center in Tehran was 24%.<sup>11</sup> As such results from different studies in our country show variability of HIV prevalence in different areas.

The distinct feature in our study in comparison with other similar studies in Iran is the high number of participants that all of them had history of intravenous addiction. As such our study is one of the first large-scale prevalence studies of HIV infections among incarcerated IDU in Iran.

Studies show that there was an association between high-risk behaviors and infection with HIV. Among these behaviors, intravenous drug injection, using shared syringes and needles, unsafe sexual relationships with men and women are important.<sup>7,10,12</sup>

We found syringe sharing's for drug injection inside prison as main risk factors for HIV infection, which is mentioned in other studies.<sup>7,13</sup> In prisons,

Table-III: Multiple logistic regressions of potential risk factors for HIV seropositivity

Variable	OR	95% CI
History of Ear piercing	1.36	0.73-2.56
History of sharing needle	1.97	1.06-3.66*
Total duration of incarceration	1.05	0.90-1.00

\* P-value < 0.05

syringes are used by many individuals thus the risk of syringe contamination by HIV is much higher in prison than outside where syringes are used by one or two peoples. It is concluded that, the inaccessibility to new needle/syringe in prisons and needle sharing is the main risk factor for HIV infection in prisoners. Needle/exchange program can decrease needle sharing among inmates in prisons in many countries. In our country Harm reduction program such as needle/exchange started in 2003 to reduce needle/sharing.<sup>14</sup>

We also noticed same gender sexual practice among drug users, with 43% of IDUs in our study had history of sex with another man in their lifetime which is much higher from 8% reported by Zamani et al in Tehran.<sup>13</sup> Although this practice did not show any additional risk for HIV infection in our samples, but studies in other countries has confirmed that male IDUs who have sex with other men are at great risk of acquiring HIV and transmitting the virus sexually to broader populations. Also 30.9% of our participants had used condom during sex that shows inadequate Knowledge for preventing action for HIV transmitting that was noted in Kolahi et al study.<sup>15</sup>

Other important risk factors for HIV transmission including tattooing, history of imprisonment, and total duration of incarceration were not determined as significant risk factor in our study.

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