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Shared Drug Injection inside Prison as a Potent Associated Factor for Acquisition of HIV Infection : Implication for Harm Reduction Interventions in Correctional Settings

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Introduction

Iran has faced a rapidly growing HIV/AIDS epidemic particularly among injecting drug users (IDUs). Since 1987, more than 15,500 cases of HIV/AIDS have been reported to the Center for Disease Management with an additional 2,000 AIDS patients dying of the disease. More than 94% of HIV/AIDS reported cases are male. Among those with a known transmission route, 87% were IDUs and 9% reported acquiring the infection through sexual contact¹⁾. Reports show that the number of people with HIV/AIDS has been sharply increasing in recent years²⁾ and an estimate in 2006 indicates that more than 66,000 people with HIV/AIDS are living in Iran^{1,3)}.

Although opium smoking has a centuries-old tradition in Iran, increased availability of heroin, along with its low price in recent years, has led to an explosion of heroin dependency and its injecting use. According to the rapid situation assessment conducted in 1999, there were 1.8 million drug users in Iran of which 9-16% practiced injecting drugs, giving an estimated number of 200,000 IDUs in Iran⁴⁾. The epidemic of injecting drug use in Iran should not only be examined at a national level but also in the wider regional context in that Iran's neighboring country, Afghanistan, is the main producer of opium in the world⁵⁾ and drugs have been heavily trafficked to Iran and through Iran to other

countries⁶⁾. According to the World Drug Report by the United Nations Office for Drugs and Crime (UNODC), opium production is now highly concentrated in Afghanistan's southern provinces especially in Helmand province, with the dubious distinction of more drug cultivation than entire countries such as Myanmar, Morocco or even Colombia⁷⁾.

At the same time, drug-related offences are abundant in Iran, with a report in 2001 showing that over 300,000 individuals were arrested on drug-related charges and the number of people convicted of drug-related offences constitutes 47% of the total prison population in Iran⁶⁾. Though the average number of prisoners in Iran has been moderately reduced in recent years, there is still a high turn over of prisoners entering and exiting prisons⁸⁾. The Iran Prisons Organization reports that there were, on average, 135,000 prisoners in 230 prisons and correctional settings at any point in time in Iran during the 2004 to 2005 Persian fiscal year, and about 600,000 prisoners entered and exited prisons during this period⁸⁾.

In response to the intertwined epidemics of HIV infection and injecting drug use, Iranian health policy makers have adopted a harm reduction approach and have initiated a number of interventions to control further transmission of HIV infection among the large IDU population⁸⁻¹¹⁾. Notably, tri-angular clinics (where integrated services are provided to IDUs, people living with HIV/AIDS and sexually transmitted infections (STIs)¹²⁾ have been expanding across the country; methadone maintenance therapy (MMT) is now being scaled up in community and correctional settings; an integrated bio-behavioral HIV surveillance has been set up for IDUs; and there is greater involvement of non-governmental organizations (NGOs) in HIV preven-

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tion among IDUs including outreach and needle and syringe programs through drop-in centers^{3,11,13}).

While there have been a range of HIV prevention interventions for IDUs in Iran, at the time of our investigation, there was little available data on HIV prevalence or its risk factors in Iran. Consequently, a collaborative research project (called the HADI Project) was established between Department of Global Health and Socio-epidemiology at Kyoto University School of Public Health in Japan and the Center for Disease Management at Ministry of Health in Iran to investigate HIV prevalence and behavioral and contextual risk factors of the infection among drug users in Iran. The project later found another major collaborating partner at Nagoya City University in Japan, and other research partners including the Iranian National Center for Addiction Studies and the Persepolis Society in Iran.

This article reviews the overall findings of phase I and phase II of the HADI Project and further discusses the impacts of these findings on health policy relating to incarcerated drug users in Iran. Further details of the study methods and results can be found in the original research reports^{14,15}.

Methods

This research project is an example of socio-epidemiological studies^{16,17} in which qualitative and quantitative methodologies are integrated in order to produce a clearer insight into health conditions within a complex social context. An obvious example is the transmission of HIV and other blood-borne infections among injecting drug users whose sub-cultures and social life are relatively unknown to the researchers. In this research project, a sequential strategy was used, starting with a preliminary qualitative phase and then followed by a main quantitative phase, which was given greater priority or weight in the final analysis and in related policy reports. However, qualitative inquiries were effectively applied in preliminary work to obtain a deeper insight into the living conditions of drug users, their norms and sub-culture in regard to HIV risk-related behaviors. Based on the results of the preliminary qualitative phase, the overall plan for the quantitative phase was finalized and a culturally-sensitive questionnaire was developed.

Participants and settings

Phase I.

Between late October 2003 and May 2004, drug users attending three public out-patient drug treatment centers in Tehran were recruited into the study. Drug users were eligible for participation if they had used illicit drugs during the previous month, and were seeking drug treatment for the first time in those centers. The

recruitment sites were public drug treatment centers, each representing a subdivision of out-patient health facilities for drug users organized by the Ministry of Health or the State Welfare Organization.

Phase II.

The survey was conducted in the *Shoosh* area in south-central Tehran, a relatively poor area where there is a high concentration of migrants and drug users¹³. In October 2004, a further sample of drug users was recruited at the drop-in center and at parks and streets in the area.

Data collection

After obtaining informed consent, each respondent was confidentially interviewed by an experienced interviewer using a structured questionnaire. The questionnaire was developed from a questionnaire produced by Family Health International for use with IDUs¹⁸. Modifications to the original questionnaire were made following the findings of the preliminary qualitative study conducted among 19 drug users. The revised questionnaire was pre-tested for its reliability and those questions producing inconsistent responses were excluded.

HIV testing

On completion of the 20-minute long interview, consenting participants were counseled and then the trained interviewer took an oral mucosal transudate sample. In addition to information given during the counseling, participants received an educational pamphlet and a confidential code for receiving the oral HIV test result.

Oral samples were obtained using the OraSure oral fluid specimen collection device (OraSure Technologies, Inc., Beaverton, OR, USA). Collected samples were kept cool until shipped in batches to Nagoya City University of Japan for testing. All samples were tested for HIV-1 with ELISA (Oral Fluid Vironostika HIV-1 Microelisa System, BioMérieux Inc, Durham, NC, USA). Repeatedly reactive ELISA samples were confirmed using a Western blot test (OraSure HIV-1 Western Blot Kit, OraSure Technologies, Inc. Oregon, USA)¹⁹.

Ethical issues

The protocol used in this research was approved by the Ethics Committee in Medical Sciences Research in the Ministry of Health, the Ethics Committee in the National Center for Addiction Studies in Iran and by the Committee for Research on Human Subjects at Kyoto University in Japan. Separate informed consents were obtained for the interview and HIV testing, and no personal identifier was recorded on the questionnaires.

Statistical analysis

Statistical analysis was performed using SPSS for Windows[®] (version 12.01). Bivariate analyses were performed to determine associations between HIV status

Table 1. Characteristics of male injecting drug users recruited from treatment centers and community-based settings in Tehran between 2003 and 2004, divided by recruitment setting ($n=372$)

Characteristic	Phase I of HADI Project	Phase II of HADI Project
	Mean (SD) or Number (%)	Mean (SD) or Number (%)
Overall	165	207
Recruitment setting	Treatment-based	Community-based
Period of data collection	Oct. 2003 to May 2004	Oct. 2004
Mean age at interview (SD)	31.0 (7.8)	33.3 (8.1)
Mean age at first drug use (SD)	18.7 (4.4)	19.0 (4.3)
Mean age at first drug injection (SD)	26.0 (6.7)	25.4 (6.2)
Infected with HIV (%)	25 (15.2)	48 (23.2)
Ever incarcerated (%)	105 (63.6)	194 (94)
<i>Among incarcerated IDUs</i>		
Ever used drugs inside prison (%)	46 (43.8)	121 (62.4)
Ever injected a drug inside prison (%)	19 (18.1)	55 (28.4)
Ever injected a drug using a shared tool inside prison (%)	19 (18.1)	45 (23.2)

SD, standard deviation; IDUs, injecting drug users.

and self-reported characteristics, followed by logistic regression analyses. Variables were entered into a multivariate model if their association with HIV infection by bivariate analysis had a P value ≤ 0.10 or if they were considered epidemiologically important. A multivariate model was used to obtain adjusted odds ratio (OR) and 95% confidence interval (CI) for the associated factors with HIV infection.

Results

The main findings for injecting drug users with HIV test results are summarized in Table 1. Overall, information from 372 male IDUs (those who reported having ever injected an illicit drug in their lifetime) participated into these two surveys, 165 were recruited from treatment based settings during first phase of the study in 2003–4 and 207 community-based IDUs participated in the second phase conducted in 2004.

As shown in the Table 1, the mean age of male IDUs who were recruited from treatment centers was 31.0 [standard deviation (SD)=7.8] at the time of interview and they reportedly started drug injection on average at 26 (SD=6.7) years of age. For IDUs from community-based settings these figures were 33.3 (SD=8.1) and 25.4 (SD=6.2), respectively.

The majority of IDUs in both surveys reported that they were using heroin as the main injecting drug. Among treatment based IDUs, about 64% reported having been incarcerated and among those with a history of incarceration, 44% reported using drugs inside prison and 18% reported practicing drug injection inside prison. Notably, all of those with a history of

drug injection inside prison reported that at some point in time, they had shared drug injection tools (needle/syringe or hand-made device) there. The incarceration history was more evident among community-based IDUs and 94% of them reported having been incarcerated. Among those community-based IDUs with a history of incarceration, 62% reported using drugs at some time inside prison, 28% practiced drug injection inside prison and 23% reported using shared drug injection tools while inside prison.

Prevalence of HIV infection was 15.2% among IDUs who visited treatment centers but the infection rate was as high as 23.2% among community-based IDUs who were recruited from a drop-in center and its neighboring parks and streets.

Associated factors with HIV infection among IDUs recruited from treatment centers

There was no significant difference in HIV prevalence by age at first injection, by period of injection history, or by time elapsing from last injection. However, total length of lifetime incarcerations was found to be associated with higher prevalence of HIV infection in a dose-dependent manner as the odds ratio increased from 3.24 among IDUs who had experienced incarceration of less than 6 months to 8.38 in those who had been incarcerated for six months or more compared to those who never incarcerated. Those IDUs with a history of sharing injection equipment inside prison had a much higher HIV prevalence compared to those who had never had a shared drug injection tools (OR=10.00, 95% CI : 3.23–30.94), while HIV prevalence among IDUs with a history of sharing injection tools only

Table 2. Multivariable analysis on the association between HIV infection and risk characteristics of injecting drug users visiting public drug treatment centers in Tehran, Iran, 2003–4

Characteristics	Adjusted odds ratio	95% CI	P value
Jobless	2.7	0.9– 8.6	0.082
Injected using a shared needle/syringe but never inside prison ¹	2.4	0.8– 7.8	0.131
Injected using a shared tool inside prison ¹	12.4	2.9–52.0	0.001
Months of incarceration (continuous)	1.0	0.9– 1.0	0.233
Years of injecting (continuous)	1.1	0.9– 1.3	0.105

Variables shown in this model are controlled for age, ethnicity, level of education, and marital status.

¹Reference group consists of those never had a shared drug injection.

CI, confidence interval.

From Zamani *et al.* AIDS 19 : 709–716, 2005.

Table 3. Multivariable analysis on the association between HIV infection and risk characteristics of injecting drug users recruited from a drop-in center and its neighboring area in Tehran, Iran, 2004

Characteristics	Adjusted odds ratio	95% CI	P value
Injected using a shared tool in prison	2.3	1.0–5.2	0.050
History of multiple incarcerations	3.1	1.1–8.9	0.038
Engaged in sex with another man	0.5	0.1–2.1	0.349
Tattooed inside prison	1.4	0.7–2.9	0.396

Variables shown in this table are controlled for age, levels of education, marital status, job status and number of years of drug injection.

CI, confidence interval.

From Zamani S, *et al.* J Acquir Immune Defic Syndr 42 : 342–346, 2006.

outside prison was not significantly higher than those who had never shared ($P=0.099$) (Not shown in the table)¹⁴.

In the multivariate analysis conducted on the data for male IDUs controlling for basic demographics, a history of sharing injection equipment inside prison remained the major factor associated with HIV infection (adjusted OR 12.37, 95% CI 2.94–51.97) (Table 2)¹⁴.

Factors associated with HIV infection among community-based IDUs recruited from a drop-in center and its neighboring area

Among community-based IDUs, the prevalence of HIV infection was associated with the number of incarcerations and with the total length of incarcerations in a dose-dependent manner. Those who reported having injected a drug inside prison using a shared injection tool had a significantly higher prevalence of HIV compared to those who did not (36% v 20%, $P < 0.05$)¹⁵.

In the multivariable analysis controlling for basic socio-demographics, it was shown that HIV infection was associated with a history of sharing drug injection

tools inside prison (adjusted OR, 2.3 ; 95% CI, 1.0–5.2) and of having had multiple incarcerations (adjusted OR, 3.1 ; 95% CI, 1.1–8.9) (Table 3)¹⁵.

Discussion

Despite the increasing number of HIV/AIDS cases in Middle Eastern countries, there have been few epidemiological studies providing evidence relating to the prevalence of HIV infection and characteristics of at-risk populations in this region²⁰. Through these studies, we investigated HIV prevalence and risk characteristics of IDUs recruited from drug treatment centers and those from a community-based drop-in center and its neighboring parks and streets in Tehran, Iran. Both studies showed that HIV infection was already prevalent among both groups at alarming levels and the infection was strongly associated with a history of sharing drug injection tools while inside prison.

The increased risk of HIV infection among incarcerated drug users is not confined to Iran and has been reported in several other countries. Similar findings have been reported in Thailand, where drug in-

jecting inside prison was shown to be a potent correlate of HIV infection among incarcerated drug users²¹). In Berlin, IDUs were recruited from different settings and data on risk behavior were obtained along with serological markers including that for HIV infection. In this study, it was found that a history of syringe sharing in prison was potentially associated with HBV, HCV and HIV infection²²). In 1993, Taylor *et al.* conducted an investigation in response to an HIV outbreak in Glenochil Prison in Scotland that indicated some of HIV transmissions definitely occurred within that prison²³). The authors, who were examining one of the first outbreaks of HIV infection occurring within a prison, concluded that restricted access to injecting equipment resulted in random sharing and placed injectors at high risk of becoming infected with HIV²³).

The association between HIV infection and a history of shared drug tools inside prison in Iran is also supported by our qualitative data which showed that while drugs can be found in some prisons, they are much more expensive than those purchased outside prison in Iran. Having obtained an expensive drug inside prison, the most cost effective way of drug use is by injection. On the other hand, lack of sterile needles/syringes inside prisons may lead IDUs to share hand-assembled injecting tools with a large number of partners²⁴). This intense sharing practice with hand-assembled injection tools that can be hard to disinfected can put incarcerated IDUs at a great risk of HIV infection as well as other blood-borne infections such as HBV and HCV²⁵).

Our findings strongly suggest that the Iranian government should be compelled to undertake HIV preventive interventions for incarcerated drug users, given the high prevalence of HIV infection among those IDUs who reported sharing drug injection tools inside prison. Cumulative evidence from other countries and that of national studies in Iran showed a greater risk of HIV infection for incarcerated drug users needs urgent and comprehensive attention^{14,15}). In January 2005, in response to increasing concern over HIV transmission among IDUs and prisoners, the head of the Iranian judiciary issued an executive order to judges in all courts of justice in favor of further provision of sterile injection equipment and MMT for IDUs and incarcerated people²⁶). Authorities in the judiciary system and its sub-division Prison Organization have, in fact, adopted harm reduction policies and practices for drug using inmates in Iran. As a result, the Iran Prison Organization has started comprehensive HIV prevention interventions for drug using inmates in many provinces in Iran including epidemiological surveillance, educational programs, research activities, and prevention programs. One of the key elements of prevention programs inside prisons in Iran is to reduce HIV-related

harm through MMT⁸). While the Iran Prison Organization is intensively scaling up its prevention interventions for drug using inmates, it is very important that these interventions become available in all prisons in Iran and that they become more coordinated with and integrated into existing public health interventions for drug users and ex-prisoners in the community outside of prisons.

These two studies had some limitations. Firstly, our participants are unlikely to be representative of the general drug using population as they were recruited from three treatment centers and from a drop-in center and its neighboring area in Tehran. We mainly relied on self-reported risk behaviors which could be biased as a result of recall ability, or social desirability^{27,28}) given the social context where many of the HIV risk behaviors are highly stigmatized.

Conclusions

Our findings show that HIV prevalence has reached high proportions among community-based IDUs in Tehran with incarceration-related exposures revealed to be the main correlates of the infection. Urgent and comprehensive harm reduction programs for drug users in prison as well as those in the community are needed if the epidemic among IDUs in Iran is to be controlled.

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