

Unsafe injection practices among male injecting drug users in Chennai city, Tamil Nadu state, India associated with high HIV prevalence

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Abstract

The intertwined epidemics of HIV/AIDS and injecting drug use are among the most emerging public health problems in India. Injecting Drug Usage (IVDU) was found to be more prevalent among ex-prisoners who were attended by World Vision of India. The objective of this study was to determine the prevalence and correlates of HIV infection among a sub-sample of frequently incarcerated community-based injecting drug users (IVDU) in Chennai city, India. 180 injecting drug users were recruited and interviewed using a structured questionnaire regarding their socio-demographics and HIV risk characteristics. Data was analyzed using χ^2 and multiple logistic regression to estimate the odds ratios (OR) and 95% confidence intervals (CI). The prevalence of HIV infection was found to be 69.4% among male injecting drug users. In the multivariable analysis, a history of shared drug injection inside prison (OR, 2.45; 95% CI, 1.01-4.3), multiple incarcerations (OR, 4.15; 95%CI, 1.08-8.03), and tattooing (OR, 2.9; 95% CI, 1.80 -3.78) were associated with significantly higher prevalence of HIV infection. This study indicates that incarceration-related exposure and tattooing are the main correlates of HIV-1 infection for this population. Urgent and comprehensive HIV prevention programs and cost effective rehabilitation centers for injecting drug users in and out of prison are of prime importance to prevent further transmission of HIV infection.

Key Words:

HIV, injecting drug users (IVDUs), intravenous drug use (IvDU), incarceration or detention in prison

Introduction

Since the late 1980s, Asia has experienced the twin epidemics of injecting drug use (IVDU) and explosive rates of HIV/AIDS. Estimates suggest there are 13.2 million injecting drug users (IVDUs) worldwide and according to UNAIDS, Asia is likely to have the most injecting drug related HIV cases in the world (Aceijas et al., 2004). The primary precipitate for this epidemic is the boom in drug production in several Asian countries and drug-using populations that grow rapidly along drug trafficking routes, creating new drug markets and new HIV threats in host countries. The new 2006 estimates released recently by the National AIDS Control Organization (NACO), supported by UNAIDS and WHO, indicate that national adult HIV prevalence in India is approximately 0.36%, which corresponds to an estimated 2 million to 3.1 million people living with HIV in the country. However, the 2006 surveillance figures show an increase in HIV infection among several groups, such as people who inject drugs and men who have sex with men (Bull et al., 2002; Panda et al., 2005). The HIV positivity status among injecting drug users has been found to be significantly high in the cities of Chennai, Delhi, Mumbai and Chandigarh. In addition, the states of Orissa, Punjab, West Bengal, Uttar Pradesh and Kerala also show high prevalence among this group (UNODC and MSJE, 2004)

In India, the HIV infection crisis continues to deepen, as it becomes clearer that the epidemic is affecting all sectors of Indian society, with an increasing prevalence among the injecting drug

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users and prisoners. Drug abuse is alarmingly on the rise in India. Friedman from the CDC (Centers for Disease Control and Prevention) reports 66% (297/447) of the IVDU estimates were reported without technical information in Manipur, India. Although IVDU behavior was known to be more prevalent in northeast India, it is now on an all-time high in south India as well. Injecting drug users inject drugs into veins. Drug injecting is often a group activity among IVDUs. The common practice is to use the same syringe and needle for all the members of the group (World Health Organization, 2007). If one member of the group has the HIV infection, the infection would readily enter the other members. The chances of transmitting infection through the injecting route are much higher than the sexual route of transmission (Heimer et al., 1995). Thus, once HIV enters into the circuit of IVDU, the spread within the IVDU community is rapid. Intake of illicit drugs is strongly disapproved in India and in many other countries where drug abuse is a criminal act and punishable under law. Criminalization of illicit drug-use makes the IVDUs a hard to reach population. The Injecting Drug Users are often incarcerated as they get involved in criminal activities such as thefts, pickpocketing, chain snatching, burglary, and attempts to commit murder in pursuit of money to buy the injectable drugs. The relationship between drug abuse and incarceration has been well established in this study. The supply of drugs in the prison is related to the consistent demand from incarcerated addicts, which has not been brought to a halt despite the strict administration of the prison authorities.

The objective of this study is to highlight the inter-relationship of unsafe injection practices, frequency of incarceration and incidence of HIV infection among IVDU male population (Injecting Drug Users) in Chennai city, Tamil Nadu.

Methods

The survey was conducted in north Chennai city, in a relatively poor area where there is a high concentration of drug users, with a primary focus on users who visit the 'drop-in centers' (mini-clinics) of the World Vision of India. In June 2005, a consecutive sample of 200 injecting drug users was recruited at the drop-in center and at parks and streets in Chennai city of Tamil Nadu. Out of the 200 selected IVDU, only 80 ex-users were willing to participate in the study. The 80 ex-injecting drug users were key informants in bringing in the other

identified and unidentified IVDU in Chennai city until a suitable sample size of 180 subjects was reached. This sampling technique is termed as the Snowball sampling technique, which is most appropriate for the hard-to-reach populations (Schwartlander B et al., 2001). The research protocol was approved by the Ethical Committee of the institution.

The investigator explained the aspects of the study to the recruits in their native language of Tamil. Those willing to participate were asked to sign the 'Informed consent form.' Each respondent was interviewed using a structured questionnaire that aimed to capture socio-demographic characteristics, drug-use characteristics, history of IVDU, incarceration, and tattooing. The questionnaire was developed based on the findings of the pilot study. Participants were asked if they had ever used a shared needle or syringe for drug injection (receptive sharing of needle or syringe), were ever incarcerated in their lifetime, and if they ever used a shared injection device (needle, syringe, or handmade injection device) while incarcerated. All interviews were conducted verbally in the Tamil language, since the majority of the IVDU population was illiterate. Most were dropouts from school, abandoned and homeless.

Upon completion of the interview, the participants were recommended to undertake free serum HIV testing available at the drop-in center, to obtain a confirmative clinical diagnosis. Pre-test counseling and post-test counseling was provided for the subjects who consented to the HIV test. A phlebotomist tested the blood samples twice for HIV-1 with enzyme-linked immunosorbent assay, and repeatedly reactive enzyme-linked immunosorbent assay samples were confirmed using a Western blot test. Informed consent was obtained separately for the interview and the HIV test. No personal identifiers were recorded on the questionnaires.

Statistical analysis was performed using SPSS for Windows; Chi-squared or Fisher exact tests were performed to determine bivariate associations between HIV-1 status and the categorical variables. Variables were entered into a multivariable model if their association with HIV-1 infection by bivariate analyses had a p value ≤ 0.10 or if they were considered epidemiologically important. Multivariable logistic regression analysis was used to examine the associations of independent variables with the outcome, simultaneously adjusting for

potential confounders, and to estimate adjusted odds ratios (OR) and 95% confidence intervals (CI).

Results

Out of the 200 injecting drug users who were invited to participate in the study, 20 men refused to be tested for HIV. 180 IVDUs consented to participate in this study. All participants were tested for HIV. Two categories of injecting drug users were identified from the field data. They were classified as ‘current injectors’ (subjects who had injected illicit drugs in the last 6 months) and ‘ex-injectors’ (subjects who had recovered from injection drug addiction or had not used injectible drugs in the last one year). The subjects were also categorized based on their HIV seropositivity.

Socio-demographic Characteristics

The median age of male IVDU was 32.0 and 61.1% were recruited from the drop-in center, while 38.9% were recruited from neighboring parks and streets. 29.6% had never attended school, 65% IVDU had attended primary school, and only 5.6% of IVDU had reached high school. About 46% of the IVDUs were married, of which only 15.6% were living with their spouse (Table.1). At the time of interview, 75.6% were unemployed and forty percent (72/180) had no place other than parks, streets, or abandoned buildings to live.

Drug Use Characteristics and HIV prevalence

Cannabis (Ganja), Heroin and Buprenorphine are the commonly injected drugs in Chennai city. Ganja is widely available in India and is highly (71.1%) used by the IVDUs in this study. Heroin was reported to be used by 61.1% (110/180). Propoxyphene and Buprenorphine were used by 51% and 54% of the IVDU participants, respectively. About 8% of IVDUs reported that they started drug use via injecting. Drugs that were reported to be generally used by IVDUs were Cannabis, Heroin, Propoxyphene (Spasmo-proxyvon* -Dextro-propoxyphene plus Dicyclomine), Buprenorphine alone or in combination with other drugs; injectible opiates like Morphine, Pethidine and Pentazocine (Fortwin*), Diazepam (Calmpose*), Promethazine (Phenergan*), and Chlorpheniramine (Avil*). The most commonly reported mixture of drugs was the combination of Buprenorphine (Tidigesic), Avil and Phenergan. The IVDUs reported injecting these drugs directly into their blood stream. The chance of HIV infection

Table 1: Socio- demographic characteristics of male injecting drug users recruited from drop-in centers and its neighboring areas in Chennai city in 2006 (n =180)

Characteristics	n (%)
Recruitment site	
Drop-in center	110 (61.1)
Park/street	70 (38.9)
Age at interview (years)	
<30	51 (28.3)
30-39	109 (60.6)
≥40	20 (11.1)
Education	
Uneducated	53 (29.4)
Primary school or less	117 (65)
High school or more	10 (5.6)
Marital status	
Never married	97 (53.9)
Married (not living with spouse)	55 (30.6)
Married (living with spouse)	28 (15.6)
Place of residence	
Residential place (family/friends)	55 (30.6)
Park/street/abandoned building	72 (40)
Rehabilitation units	20 (11.1)
Group living	33 (18.3)
Job situation	
Employed	44 (24.4)
Unemployed	136 (75.6)

through the injecting route is much higher than sexual route of HIV transmission. The drug use pattern of the IVDUs in this study coincided with the findings of the Rapid Assessment Survey of drug abuse in India .

Results in Table 2 show that of the 45.6% (82/180) of the IVDUs who had reported having injected illicit drugs within the last six months (current IVDUs) 75.6% were infected with HIV; the HIV positivity rate of the 54.4% (98/180) of the IVDUs who were termed ex-IVDUs (last time of taking injectible drugs was more than 6 months to one year) was 64.3% (OR,0.114;95%CI, 0.02-0.53).

History of incarceration

As high as 98% of male IVDUs had a history of incarceration in their lifetime, with over 85% having

Table 2
Risk Characteristics Of Male Injecting Drug Users in Chennai City, Tamil Nadu State, India

Characteristics	N (%)	HIV-1 POSITIVE		Odd Ratio# (95% CI)	Chi square value	p value
		N	%			
Overall	180	125	69		-	-
Time from last drug injection (months) <6	82 (45.6)	62	75.6	1.0	2.698	NS
>6	98(54.4)	63	64.3	0.114 (0.024-0.53)		
Length of continual injecting (years) <6	60(33.3)	23	38	1.0	149.878	p ≤ 0.01
>6	120(66.7)	102	85	-		
Frequency of daily injecting during addiction Once a day	36 (20)	15	41.6	1.33(0.15-1.69)	74.255	p ≤ 0.01
Twice a day or more	144 (80)	110	76.4			
Incarceration /history of arrests Yes	178(98.9)	125	70.2	-	4.597	p ≤ 0.05 4.3513†
No	2(1.1)	0	0			
Frequency /no. of times incarcerated <2	34(19.1)	8	23.5	1.0	48.397	p ≤ 0.01
2-5	99(55.6)	75	75.6	3.9(1.4-4.1)		
>5	45(25.3)	42	93.3	5.1(1.5-15.1)		
Total length of incarceration (years) <2	30(16.9)	7	23.3	1.0	42.295	p ≤ 0.01
2-5	96(53.9)	71	74	2.4(1.6-4.1)		
>5	52(29.2)	47	90.4	4.4(1.9-5.0)		
Ever injected a drug inside prison Yes	26(14.6)	24	92.3	2.1(1.2-3.3)	9.789	p ≤ 0.01
No	152(85.4)	100	65.8	1.0		
Shared needle while injecting drugs in prison Yes	26(14.6)	24	92.3	2.8(1.0-4.51)	7.101	p ≤ 0.01
No	152(85.4)	101	66.4	1.0		
Shared needle while injecting drugs outside prison Yes	180(100)	125	69.4	-	6.934	p ≤ 0.01
No	0	0				
No. of needle sharing IVDU partners <2	5 (2.8)	1	20	-	71.738	p ≤ 0.01
2-5	24(13.3)	10	41.6			
>5	151(83.9)	114	82.1			
Ever Tattooed No	7(3.9)	2	28.6	1.0	5.734	p ≤ 0.05
Yes (never inside prison)	92(51.1)	50	54.3	1.8(0.8-2.5)		
Yes (inside prison)	81(45)	73	90.1	3.2(1.8-4.1)		
Tattoo artist used same needle for tattooing all clients: Yes	174(96.7)	123	70.7	-	5.734	p ≤ 0.05
No	6 (3.3)	2	33.3			
No. of clients tattooed along with you <2	8(4.6)	-	-	-	34.225	p ≤ 0.01
2-5	137(78.7)	94	68.6			
>5	29(16.7)	29	100			
Ever had sex with another man : Yes	16	3	18.5	0.49(0.4-1.4)	0.5453 ^{NS}	NS
No	164	42	25	1.0		

*p values based on χ^2 test of proportions unless otherwise specified: $p \leq 0.01$ –** Highly significant: $p > 0.05$ - ^{NS} Not Significant; †z-test –Two-tailed Fisher exact test.

Odd Ratio(OR) and 95% Confidence Interval(CI) was calculated for specific risk factors to be subjected for multivariate analysis to identify association with HIV infection

experienced 2 or more prior incarcerations (multiple incarcerations). Of those who were ever incarcerated, the median number and length of lifetime incarcerations were six and eight months, respectively.

The results of Fisher exact test and students 't' test indicated a significantly higher prevalence of HIV infection among IVDUs with incarceration records when compared to those who did not have any record of incarceration (70.2 % vs. 0%; $z=4.3513$, $p \leq 0.05$). Subjects who had been incarcerated more than two times (75.6%) to more than five times (93.3%) were associated with significantly higher prevalence of HIV infection as compared to 23.5% of HIV positivity rate among subjects who were imprisoned for less than two times. The length of the incarceration period was highly associated with HIV prevalence ($\chi^2= 42.295$; $p \text{ value} \leq 0.01$). The HIV prevalence was highest (above 90%) for subjects who had been incarcerated more than five times (OR, 5.1; 95% CI, 1.5- 15.1).

Among those with a history of incarceration, 14.6% had reported having ever injected a drug inside prison. 73.1% of them were found to be HIV positive ($\chi^2= 9.789$; $p \text{ value} \leq 0.01$; OR, 2.1; 95% CI, 1.2-3.3). Of the 14.6% IVDUs who reported sharing injection devices (needles, syringes, or handmade injection devices) at some time during their incarceration period, 96.2% tested positive for HIV infection ($\chi^2= 7.101$; $p \text{ value} \leq 0.01$; OR, 2.8 ; 95% CI, 1.0-4.51), compared to 69.4% of the subjects who had shared needles outside prison.

Tattooing

Tattooing was another factor associated with HIV-infection. About 96% of the IVDUs recruited for the study had tattoos on their hands, legs and chest. Up to 45% of ever-incarcerated IVDUs reported being tattooed inside prison, and of them 90% tested positive for HIV ($\chi^2= 5.734$; $p \text{ value} \leq 0.05$; OR, 3.2; 95% CI, 1.8-5.1); out of 51% of the IVDUs who reported being tattooed outside of the prisons 54.3% were HIV sero-positive (OR, 1.8; 95% CI, 0.8-2.5).

The subjects reported being tattooed on the streets of Chennai city. Observation of some of these street-based tattoo artists indicated the re-use of needle on their clients. The tattoo artists used contaminated sharps and unsafe injection practices. Battery-operated and manual tattooing was carried out using rusted sharps, reused needles and a dye bottle that contained residues of bloodstains of the

previous client. One of the IVDUs reported being the fifth person in the line to receive his tattoo. It was observed that the needle was not immersed in any kind of disinfectant. In an adjusted analysis (Table 3), having a tattoo indicated a significant association with HIV-infection ($\chi^2=5.734$, $p \leq 0.05$; OR, 2.9; 95% CI, 1.80 -3.78), which suggests that HIV probably is being transmitted via this route. If this is the case, then IVDUs with tattoos are at a higher risk for HIV infection.

Multivariable Analysis

The variables related to the history of shared drug injection inside prisons, multiple incarcerations (>2 times) and tattooing were selected as the main incarceration-related exposures to be included in the multivariable model. In the multivariable analysis, controlling for basic socio-demographic characteristics, it was shown that HIV-1 infection remained associated with a history of shared drug injection inside prisons (adjusted OR, 2.45; 95% CI, 1.01-4.3); multiple incarcerations (adjusted OR, 4.15; 95%CI, 1.08-8.03); and been tattooed in a prison (OR, 2.9; 95% CI, 1.80 -3.78) (Table 3).

No significant relationship was observed between the HIV positive status and MSM (men having sex with men) behavior of IVDUs in prison. The results could reflect underreporting of same-gender sexual practices inside prison, or other confounding factors inside prison, such as violence, which would also be contributing factors for transmission of HIV infection in prisons.

Discussion

This study investigated the prevalence of HIV infection and its correlates among community-based IVDU in Chennai city. Out of the 180 subjects screened for HIV, 125 subjects were confirmed HIV positive (69.4%). Findings show that the HIV prevalence detected in Chennai city was at a record high and that it was potentially correlated with a history of shared drug injection inside prison, multiple incarcerations and tattooing.

The association between HIV infection and a history of shared drug injection inside prison has been reported in other countries and was found in our earlier study among IVDU who visited treatment centers in Chennai city. This association is also supported by our qualitative data that showed that although drugs are available in some prisons, they are much more expensive than those purchased outside of prison in Chennai city. Having obtained

Table 3

Multivariable analysis on the association between HIV-1 infection and risk characteristics of injecting drug users recruited from a drop-in center and its neighboring area in Chennai city in 2006.

<i>Characteristics</i>	<i>Adjusted OR</i>	<i>95% CI</i>	<i>P</i>
Ever injected using a shared device in prison	2.45	1.01- 4.3	0.007
History of multiple incarcerations (≥ 2 times)	4.15	1.08- 8.03	0.000
Ever had sex with another man	0.49	0.40- 1.83	0.370
Ever tattooed inside prison	2.90	1.80 -3.78	0.016

an expensive drug inside prison where drug use is apparently prohibited, the most cost-effective and concealing way for drug users to consume their drugs is by injecting. Meanwhile, an extreme shortage of needles and syringes inside prisons has lead incarcerated IVDU to share needles/syringes or handmade injection devices with a large number of partners, which, as shown in this study, puts them at great risk of HIV infection.

The prevalence of tattooing behavior was also found to be 96% among the recruited IVDU. All the injecting drug users (100%; 180/180 IVDUs) in this study reported that they were not aware of ‘HIV transmission via tattooing’ during their initial visit to the street side tattoo parlor. The results in Table 2 show an HIV positivity rate of 71% (123 tattooed IVDUs were out of the total 173 IVDUs who had tattoos) with significantly higher incidence (90%) among subjects who reported tattooing in prison. The IVDUs reported using crude means such as razor blades or broken syringes to tattoo themselves or their friends. This was an alarming finding, and the consequence of the lack of awareness on issues related to health, hygiene and especially HIV/AIDS with regard to IVDU prisoners.

The ex-prisoners reported that the prevalence of peer pressure in the prison and imposition of MSM behavior (Men having sex with men) adds to the likelihood of increased incidence of HIV among incarcerated IVDUs. Thus, when the court of justice penalizes an IVDU for criminal activities, adequate measures must be executed to check the ‘needle-sharing behavior’ of the IVDUs, which generally persists even behind bars as per the findings of this study. The urgent need for health care provision in prisons is underscored by this study, which points out the startling fact that 98.8 % (178/180) of the frequently incarcerated IVDU tested positive for HIV in Chennai city. The need for safe injection practices followed in tattoo parlors

and street corners in Chennai city as part of the harm reduction program for injecting drug users is mandatory.

The present study established evidence of same-gender sexual practice among drug users in Chennai, with 18.5% of IVDUs having reported a history of having sex with another man in their lifetime. Although this practice did not show any additional risk for HIV infection, health authorities in Chennai city should be encouraged to address same-gender sexual practices of IVDU and to start identifying appropriate sexual risk reduction strategies.

This study had some limitations. The design of this study was cross-sectional, which precludes us from determining the exact temporal relationship between risk behaviors and HIV infection. The findings of this study are representative of the south Indian IVDU population. The socio-demographic characteristics of the IVDU participants in this study, such as age, gender composition, ethnicity, and employment rate were comparable with those of IVDUs who participated in a similar study carried out by Zamani et al., 2004 in Tehran. However, the proportion of homeless IVDU was high among the IVDUs (approximately 50%) in the present study which could be inclusive of the 18.3% who reported living with IVDU partners (‘group living’) but complained that they had to vacate and remain homeless if they could not pay for the house-rent or drugs. Results reveal that 60% of the homeless IVDU indicated clinical symptoms of depression and inclination to be ‘victimizers’ (expressed a purposive inclination to infect others with HIV either by sharing injections or having sexual encounters).

The self-reported risk behaviors that could be biased as a result of recall ability or social desirability, given the social context where many of the HIV risk behaviors are highly stigmatized. The

results reveal a startling high number in the prevalence of HIV infection among the IVDU in Chennai (69.4%) when compared to a similar study conducted in Tehran, Iran where the prevalence of HIV-1 infection was 23.2% (48 of 207) among male injecting drug users (Zamani et al., 2004).

Conclusion:

Results show that HIV prevalence has reached significantly higher proportions (69.4% vs. 30% in 2005 as per findings of Panda et al., 2005). It is critical to extend an extremely structured and effective rehabilitation programs to the marginalized IVDU population, with special reference to IVDUs living in prisons and in the community of Chennai city, India. India must come up with effective HIV awareness programs highlighting 'blood-exposures to HIV' such as tattooing which was a significant risk factor among the injecting drug users in this study.

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