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Risk of prevalent HIV infection associated with incarceration among injecting drug users in Bangkok, Thailand: case-control study

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Abstract

Objectives To identify risks for HIV infection related to incarceration among injecting drug users in Bangkok, Thailand.

Design Case-control study of sexual and parenteral exposures occurring before, during, and after the most recent incarceration.

Setting Metropolitan Bangkok.

Participants Non-prison based injecting drug users formerly incarcerated for at least six months in the previous five years, with documented HIV serostatus since their most recent release; 175 HIV positive cases and 172 HIV negative controls from methadone clinics.

Main outcome measure Injection of heroin and methamphetamine, sharing of needles, sexual behaviour, and tattooing before, during, and after incarceration.

Results In the month before detention cases were more likely than controls to have injected methamphetamine and to have borrowed needles. More cases than controls reported using drugs (60% v 45%; $P=0.005$) and sharing needles (50% v 31%; $P<0.01$) in the holding cell before incarceration. Independent risk factors for prevalent HIV infection included injection of methamphetamine before detention (adjusted odds ratio 3.3, 95% confidence interval 1.01 to 10.7), sharing needles in the holding cell (1.9, 1.2 to 3.0), being tattooed while in prison (2.1, 1.3 to 3.4), and borrowing needles after release (2.5, 1.3 to 4.4).

Conclusions Injecting drug users in Bangkok are at significantly increased risk of HIV infection through sharing needles with multiple partners while in holding cells before incarceration. The time spent in holding cells is an important opportunity to provide risk reduction counselling and intervention to reduce the incidence of HIV.

Introduction

An estimated one million people in Thailand are infected with HIV, and the prevalence is highest among

injecting drug users (30-40%).¹ Incarceration has been associated with prevalent and incident HIV infection among injecting drug users,²⁻⁸ but little insight exists as to the timing of transmission (before arrest, while being held at a police station before trial, or during or after incarceration).

We investigated two hypotheses: that the risk of HIV infection is increased before incarceration because of high intensity risk behaviour; and that the risk of HIV infection is increased during the three to eight day holding period, which is likely to coincide with acute opiate withdrawal and increased risk behaviour. To investigate these hypotheses and define more fully the incarceration related risk of HIV infection we examined risk factors occurring before arrest, during the holding period, during incarceration, and immediately after release.

Methods

Participants

From August 2000 to January 2001 we recruited male injecting drug users who had been incarcerated for at least six months during the previous five years from 17 methadone clinics in Bangkok. These clinics serve most injecting drug users who seek treatment. We defined a case as an HIV positive injecting drug user with a medical record documenting a negative HIV test within the five years before the most recent incarceration and HIV positive serostatus since the most recent release. Controls were HIV negative injecting drug users with current documentation. We recruited and interviewed 175 cases and 172 controls.

During structured interviews, we asked participants about demographic characteristics and about injecting and sexual risk behaviours before, during, and immediately after incarceration.

Statistical analysis

We described summary statistics and did bivariate analyses of associations with HIV status for demographic variables, injection drug use, and sexual risk variables. We used multiple logistic regression analysis to identify independent predictors of prevalent HIV infection. We considered variables for inclusion in

multifactorial models if we found them to be significant in bivariate analyses or considered them to be potential confounders. See bmj.com for more details. We used the final multifactorial model to obtain estimates of adjusted population attributable fraction.

Results

The 175 cases and 172 controls had a median age of 29 (interquartile range 25-36) years; all were Thai citizens; 84% resided in Bangkok; and 48% were unemployed. The demographic characteristics of cases and controls were similar (see bmj.com). Cases had a higher median number of years of injected drug use than controls (9.2 (7-13) *v* 8.0 (6-13), $P < 0.05$) and more months in drug treatment (84 *v* 67 months, $P < 0.01$). We found no differences in length of latest prison stay, frequency of incarceration, or time since the most recent release from prison.

Injection risk

Before detention—More cases than controls reported having injected methamphetamine (9% (15) *v* 2% (4), $P < 0.01$) and having injected combinations of heroin and methamphetamine (15% (27) *v* 8% (14), $P < 0.05$) during the month before arrest. Cases were also more likely to recall having borrowed needles during that period (46% (81) *v* 28% (28), $P < 0.01$).

While in the holding cell—More cases than controls reported having used drugs in the holding cell (60% (105) *v* 45% (77), $P < 0.01$) and having injected heroin (51% (89) *v* 36% (62), $P < 0.05$). No differences existed between cases and controls in the number of times they used drugs while in the holding cell (3 (1-5) *v* 2 (1-3), $P = 0.58$). More cases than controls had shared needles in the holding cell (50% (87) *v* 31% (54), $P < 0.01$); among men who shared needles, cases reported sharing with a higher median number of people (5 (4-8) *v* 4 (2-7), $P < 0.05$). Cases and controls did not differ with respect to where they obtained drugs while in the police holding cells (34% (61) from other prisoners; 30% (54) smuggled in from outside).

While in prison—Cases and controls reported similar heroin and methamphetamine injection practices while in prison. Cases were more likely than controls to report using non-injection sedatives (6% (11) *v* 1% (2), $P < 0.05$) and to recall injecting drugs with other people (33% *v* 22%, $P < 0.05$). Among men who injected, however, no differences existed in the median number of injecting partners (8 (5-10) *v* 5 (3-10), $P = 0.45$).

After release—A higher proportion of cases than controls reported injecting sedatives (11% (20) *v* 5% (9), $P < 0.05$) but not other drugs in the 30 day period after release from prison. A higher proportion of cases reported borrowing needles (31% (54) *v* 13% (23), $P < 0.05$), but no differences existed in the median number of times they did this or the number of people they borrowed needles from.

Other risks

Cases and controls did not differ with respect to reported sexual behaviour during any of the prison related time periods. Cases were significantly more likely than controls to be tattooed during incarceration

(59% (104) *v* 42% (73), $P < 0.05$), but the number of tattoos did not differ (2 (1-4.5) *v* 3 (2-5), $P = 0.16$), and nor did the proportion of cases and controls who reported sharing tattooing needles (85% (89) *v* 75% (55); $P = 0.12$).

Independent risk factors for prevalent HIV infection

Variables independently associated with prevalent HIV infection (table) included exposures both in and out of prison: use of methamphetamine during the month before detention, sharing needles in the holding cell before incarceration, borrowing needles in the month after release from prison, and being tattooed while in prison. The population attributable fraction (table) for being tattooed while in prison was the highest (17.1%), reflecting the high prevalence of the risk factor (52%). Injecting methamphetamine before incarceration had the lowest population attributable fraction (2.5%), whereas sharing needles in the holding cell and after release from prison, which were more prevalent, had higher population attributable fraction estimates (11.1% and 8.6%).

Discussion

Risk factors for HIV infection

We found that prevalent HIV infection was associated with risky injecting both before and after prison: injection of methamphetamine before detention, sharing of needles while in a holding cell before incarceration, and borrowing needles during the period after release from prison. Injected drug use was highly prevalent in holding cells. Being tattooed was the only factor during incarceration that was associated with prevalent HIV infection.

Use of methamphetamine is increasing rapidly throughout Thailand,⁹ and it may become a more predominant hazard for HIV infection, as in other parts of the world.^{10 11} Use of methamphetamine may also be a marker for the most risky injecting behaviours. Our results did not support the hypothesis that the period before incarceration is characterised by high intensity drug use or “bingeing.”¹²

Sharing needles while in the police holding cell was an independent risk factor for prevalent HIV infection. To our knowledge, our study is the first to pinpoint excess risk during the holding period before incarceration. This confirms our hypothesis that high risk exposures in the holding cell are probably attempts to alleviate the severe symptoms of drug withdrawal.¹³ A possible confounding factor is that prisoners in holding cells in Bangkok may have more opportunity

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Independent associations with HIV-1 infection (multifactorial analysis) and associated population attributable fractions among 347 male injecting drug users in Bangkok, Thailand

Characteristic	Adjusted odds ratio (95% CI)	Adjusted population attributable fraction (95% CI)
Years of injecting (per year)	1.0 (0.99 to 1.1)	0.104 (−0.09 to 0.26)
Used methamphetamine one month before incarceration (injected <i>v</i> no use or not an intravenous drug user)	3.3 (1.01 to 10.7)	0.025 (0.004 to 0.05)
Shared needles in holding cell (yes <i>v</i> no)	1.9 (1.2 to 3.0)	0.111 (0.02 to 0.19)
Tattooed in prison (yes <i>v</i> no)	2.1 (1.3 to 3.4)	0.171 (0.06 to 0.27)
Borrowed needles one month after incarceration (yes <i>v</i> no)	2.5 (1.3 to 4.4)	0.086 (0.03 to 0.14)

to inject owing to lower security at this stage of their remand.

We found no differences in drug use by cases and controls during time in prison. Being tattooed, although common, was associated with being HIV positive. We hypothesise that tattooing in prison occurs in unhygienic conditions. Whereas tattooing is not generally recognised as a risk factor for HIV, the possibility remains.¹⁴ Alternatively, it may be an indicator of another unmeasured exposure.

Attributable fractions estimate the potential for preventive interventions by linking information about the prevalence of the exposure with an associated measure of excess risk. Although injecting methamphetamine presents a significant risk for HIV infection, the higher prevalence of sharing needles and tattooing result in larger population attributable fraction estimates.

Limitations and strengths of the study

Limitations of the study include possible recall bias and an underestimation of the risk associations as a result of underreporting of sensitive behaviours. Also, cases could have selectively recalled exposures related to their infection status and may have differentially reported risk, resulting in overestimation of excess risk. Lastly, we have no accurate way of ascertaining exactly when seroconversion occurred.

The design of this study aimed to ensure that cases and controls came from the same reference population over a corresponding time period. Another strength was the high quality of the Bangkok Metropolitan Administration medical records used to ascertain HIV status relative to incarceration. Participants in this study were comparable to other populations of injecting drug users studied in Bangkok.¹⁵

Targeting HIV prevention

Prevention activities, including clean needles, condoms, and methadone maintenance, are rare in prisons.¹⁶ Counselling and drug detoxification should also be targeted to injecting drug users in holding cells. Barriers to prison based HIV interventions can be overcome by developing prevention partnerships between public health and law enforcement.¹⁷ As injecting drug users tend to serve short prison terms owing to the petty nature of their crimes,¹³ most will soon return to society. Both the prisoners and people in close contact with them after their release will benefit from targeted comprehensive efforts to prevent HIV infection.

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What is already known on this topic

The incidence of HIV in Thailand is highest among injecting drug users in Bangkok

Incarceration is a risk factor for incident HIV infection among Thai injecting drug users

What this study adds

Injecting drug users are at increased risk of HIV infection from sharing needles with multiple partners while in police holding cells before incarceration

Other risk factors include injecting methamphetamine before imprisonment, being tattooed while imprisoned, and sharing needles after release

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Endpiece

The art of surgery

Surgery is derived from the Latin *chirurgia* meaning "hard work." The surgeon does more than just working with his or her hands, however, as alluded to by St Francis of Assisi:

He who works with his hands is a labourer.

He who works with his hands and his head is a craftsman.

He who works with his hands and his head and his heart is an artist.

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