



Prevalence and Related Factors of Needle-Sharing Behavior among Female Prisoners

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Background: The aim of this study was to investigate the prevalence of and factors related to needle-sharing behavior among intravenous heroin users in female prisons in Taiwan. **Methods:** Study participants (n=438) were recruited from 3 female prisons in 2002. Participants were told the goals and objectives of the study, and were then asked to indicate their willingness to participate by signing consent forms. A self-administered questionnaire included three parts: personal characteristics, knowledge of HIV/AIDS, and drug-related behaviors. **Results:** A large percentage of subjects had knowledge about modes of HIV transmission. Of 438 female heroin offenders, 40 reported that they had never injected heroin. Of 398 intravenous heroin users, 75.1% had shared needles, 54.8% had shared needles within the last month before incarceration, and 27.1% reported that they had shared a needle during their most recent heroin use. Participants who were of a younger age at the time of their first heroin use were much more likely to have shared needles. Marital status and being tested for HIV were significant predictors of sharing a needle during their most recent heroin use. **Conclusions:** There is a gap between knowledge of the risk of needle sharing and the needle-sharing behavior reported by study subjects. Hence, effective HIV prevention programs must identify strategies for reducing needle-sharing behavior among female intravenous heroin users.

Key words: AIDS knowledge, female offender, intravenous heroin use, needle sharing

INTRODUCTION

Human Immunodeficiency Virus (HIV) infection rates related to intravenous drug use (IDU) have increased dramatically within a relatively brief period in many countries¹. Sharing or use of contaminated needles is a more potent method of spreading HIV than sexual intercourse². IDUs are often linked together in tight networks and commonly share equipment. Hence, there has been a rapid spread of HIV infection in this population³. In Bangkok, HIV infection rates among IDUs increased from 2% to 40% in just over 2 years. In Mykolayev City, Ukraine, the rate of HIV infection among IDUs leapt dramatically in 1995, from 2% to 57%⁴.

In Taiwan, sexual contact has been the most common mode of HIV transmission. At the end of June 2004, 6,254 cases of HIV had been reported to the Center for Disease Control Taiwan⁵. Unprotected sexual contact accounted

for 82.6% of these cases, including homosexual, bisexual, and heterosexual intercourse. Within the past 3 years, however, the incidence of HIV infections from contaminated needles has increased dramatically. Heroin is the most frequently injected drug among IDUs in Taiwan. Although the percentage of all HIV infections related to IDU is currently 3.5%, the number of new cases has increased sharply within the past 3 years, from 10 cases (1.3%) in 2002, to 41 cases (4.8%) in 2003, to 90 cases (15.8%) in the first half of 2004.

The occurrence of HIV/AIDS in Taiwan is dramatically increasing in women. Women accounted for 6.5% of new cases in the first half of 2004⁵, in contrast to 4.1% in 2003. Female drug users are not the only at-risk minority group, but their risk behaviors merit special attention. Some studies indicate that female drug users engage in high-risk behaviors relating to HIV infection, including sharing needles, having unprotected sex, exchanging sex for drugs, and having sex with partners who also inject drugs⁶⁻¹⁰. Moreover, according to the Taiwan Directorate General of Budget Accounting and Statistics¹¹, illicit drug offenses account for the single largest number of crimes, and the number of female drug offenders grew by 33% between 1999 and 2002¹². Hence, HIV prevention programs might effectively prevent further increases in the infection rate by targeting the female drug-using population. This is the first

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study to focus on female heroin offenders with respect to needle sharing in Taiwan. This paper examines the prevalence of and factors related to the needle-sharing behavior among intravenous heroin users (IHUs) in female prisons.

MATERIALS AND METHODS

Participants

Taiwan has 3 female prisons. To recruit study subjects, a social worker from each prison was asked to identify illicit drug offenders with a history of heroin use. Research methods included reviewing criminal records on drug offenses and personal interviews. Other than heroin use, selection criteria included basic literacy, an age of at least 18 years, and no obvious psychiatric symptoms. All eligible women who were willing to participate in the study were asked to sign consent forms.

A total of 438 women out of 449 eligible heroin offenders completed the survey in 2002. Eleven women were excluded from the study: 6 had no interest in the study, 2 were illiterate, and 3 did not finish the survey. The study consisted of 158, 142, and 138 women from prisons in the northern, middle, and southern areas of Taiwan, respectively.

Questionnaire

The survey was conducted by a self-administered questionnaire completed in the prisons. The contents of the questionnaire included personal characteristics, the participant’s knowledge of HIV/AIDS, and drug-related behaviors. Personal characteristics included information about age, duration of education, age at the first use of heroin, concern about contracting HIV/AIDS, marital status, number of children, and history of testing for HIV. Concern about contracting HIV/AIDS was rated on a 7-point Likert scale, from not being concerned at all to always being concerned. Knowledge about HIV/AIDS included 3 questions regarding the mode of HIV transmission: needle sharing, unprotected sexual behavior, and mother-to-child transmission. Four dichotomous questions were designed to collect information about needle-sharing behavior: 1) “Have you ever injected heroin before?”; 2) “Have you ever shared a needle?”; 3) “Did you share needles with others in the last month before you were put in jail?”; and 4) “Did you share a needle the last time you injected

Table 1 Background characteristics and HIV/AIDS knowledge of the study participants according to area of recruitment

| Variables | Total N=438 | Northern n=158 | Middle n=142 | Southern n=138 | p |
|---|----------------|-------------------|-----------------|-------------------|-----|
| | | Mean (SD) | Mean (SD) | | |
| Age (years) | 27.90 (6.29) | 28.63 (5.94) | 27.91 (6.96) | 27.07 (5.87) | .10 |
| Age at the first heroin injection | 19.64 (6.18) | 19.36 (5.81) | 20.45 (6.57) | 19.13 (6.15) | .16 |
| Education years | 9.32 (2.05) | 9.60 (2.30) | 9.19 (1.89) | 9.13 (1.86) | .10 |
| Score of concerning about contracting AIDS | 4.74 (2.31) | 4.82 (2.49) | 4.45 (2.34) | 4.93 (2.06) | .19 |
| | | n (percent) | n (percent) | | |
| Marital status | | | | | .16 |
| Single | 204 (46.6) | 66 (41.8) | 76 (53.5) | 62 (45.0) | |
| Married | 112 (25.6) | 41 (25.9) | 37 (26.1) | 34 (24.6) | |
| Separated/Divorced/Widowed | 122 (27.9) | 51 (32.3) | 29 (20.4) | 42 (30.4) | |
| Having children | 268 (61.2) | 103 (65.2) | 86 (60.6) | 79 (57.2) | .41 |
| Ever having HIV test | 85 (19.5) | 41 (26.3) | 26 (18.4) | 18 (13.0) | .02 |
| AIDS Knowledge: | | | | | |
| People can get AIDS through unsafe sexual contact | 425 (96.1) | 153 (96.8) | 135 (95.1) | 130 (96.3) | .91 |
| People can get AIDS through the shared use of injection equipment | 418 (97.5) | 154 (97.9) | 139 (97.9) | 132 (97.1) | .73 |
| A baby can get AIDS from the labor of a HIV positive mother | 424 (97.0) | 155 (98.1) | 138 (97.2) | 131 (95.6) | .45 |
| Intravenous drug use, ever | 398 (90.9) | 144 (91.1) | 126 (88.7) | 128 (92.8) | .50 |

heroin?”

Analysis

SPSS statistical software was used in data analyses. Analysis of variance and chi-square tests were used to test for differences in continuous and categorical variables, respectively. Logistic regression was used to define factors related to needle-sharing behavior.

RESULTS

Demographic characteristics and HIV/AIDS knowledge of the study participants are summarized in Table 1. The mean age of participants was about 28 years, and the average duration of education was 9.32 years. The mean score for concern about contracting HIV/AIDS was 4.74, suggesting that participants were aware of their increased chances of HIV infection. More than 46% of participants were single, 25.6% were married, and 27.9% were separated, divorced, or widowed. A majority had at least 1 child, and 19.5% had undergone HIV testing. Overall, more than 96% of participants had knowledge of the 3 modes of HIV transmission. Forty participants reported that they had not injected heroin in their lifetime.

A significant difference was identified between women living in different areas of Taiwan and the likelihood of HIV testing. Specifically, participants residing in the northern areas of Taiwan were much more likely to have been

Table 2 Rate of needle-sharing behavior among intravenous heroin users of the study sample

| Variables | Total N=398 | Northern n=144 | Middle n=126 | Southern n=128 | P |
|---|----------------|-------------------|-----------------|-------------------|-----|
| Ever shared needles | 299 (75.1) | 111 (77.1) | 89 (70.6) | 99 (77.3) | .37 |
| Shared needles in the last month before in jail | 218 (54.8) | 82 (56.9) | 64 (51.2) | 71 (55.5) | .63 |
| Shared a needle during the most recent heroin injection | 108 (27.1) | 44 (30.8) | 25 (20.0) | 39 (30.7) | .08 |

tested for HIV compared with those living in the middle and southern parts of the country.

Table 2 indicates the rate of needle sharing behavior. Of 398 IHUs, 75.1% had shared a needle, 54.8% had shared a needle within the last month before incarceration, and 27.1% had shared a needle during their most recent heroin use. Rates of needle sharing were high and no significant difference was found between prisons.

The results from regression analyses on needle sharing and all other study factors, including background variables and HIV/AIDS knowledge, are shown in Table 3. Age at the first use of heroin was significantly associated with having shared a needle. Individuals who were 1 year older at the time of their first heroin use were 7% less likely to have shared a needle. Marital status and having been tested for HIV were significant predictors of sharing a needle during the most recent heroin use. Specifically, female IHUs who had undergone HIV testing were 99% more likely to have shared a needle. Compared to divorced, separated and widowed IHUs, married participants were 51% less likely to have shared a needle during their most recent heroin use. No significant association was found for age, education, concern with contracting HIV/AIDS, having children or the three knowledge items about HIV transmission.

DISCUSSION

This is the first study to examine the prevalence of and factors associated with needle sharing among female IHUs in Taiwan. About 91% of participants reported that they had injected heroin. Among 398 IHUs, 75.1% had shared needles over their lifetime, 54.8% had shared needles within the last month before incarceration, and 27.1% had shared needles in their most recent use of heroin. According to an anonymous survey of IDUs in England and Wales¹³, 23% of women had shared a needle or syringe in the month before interview. The reported rate of needle sharing in Ho Chi Minh City, Vietnam within the past 6 months before interview was 19%¹⁴. Compared to the

Table 3 Factors related to needle sharing using logistic regression analysis among 398 female intravenous heroin users

| Variables | Needle Sharing | | Ever | | In last mo. | | Most recent use | |
|---|----------------|------------|--------------|------------|--------------|------------|-----------------|------------|
| | β (SE) | Odds Ratio | β (SE) | Odds Ratio | β (SE) | Odds Ratio | β (SE) | Odds Ratio |
| Mean age in years | .03(.03) | 1.03 | -.02(.03) | 0.99 | -.02(.03) | 0.98 | -.02(.03) | 0.97 |
| Age at the first heroin use | -.07(.03) | 0.93* | -.03(.03) | 0.97 | -.03(.03) | 0.97 | -.03(.03) | 0.97 |
| Education in years | -.04(.06) | 0.96 | .00(.05) | 1.00 | -.02(.06) | 0.98 | -.02(.06) | 0.98 |
| Concern with contracting AIDS | .09(.08) | 1.09 | .10(.07) | 1.10 | .11(.08) | 1.12 | .11(.08) | 1.12 |
| Marital status | | | | | | | | |
| Single | .32(.35) | 1.38 | -.33(.31) | 0.72 | -.67(.36) | 0.51 | -.67(.36) | 0.51 |
| Married | .40(.33) | 1.49 | -.07(.29) | 0.93 | -.71(.34) | 0.49* | -.71(.34) | 0.49* |
| Separated/Divorced/Widowed | (referent) | (referent) | (referent) | (referent) | (referent) | (referent) | (referent) | (referent) |
| Having children | .06(.32) | 1.07 | .43(.27) | 1.53 | .52(.31) | 1.69 | .52(.31) | 1.69 |
| Ever had HIV testing | -.35(.32) | 0.71 | -.14(.26) | 0.87 | .69(.33) | 1.99* | .69(.33) | 1.99* |
| People can get AIDS through unsafe sexual contact | -.54(.60) | 0.58 | .16(.57) | 1.17 | 1.05(.57) | 2.86 | 1.05(.57) | 2.86 |
| People can get AIDS through the shared use of injecting equipment | .67(1.12) | 1.95 | 1.53(1.10) | 4.60 | .52(.81) | 1.69 | .52(.81) | 1.69 |
| A baby can get AIDS from the labor of a HIV positive mother | 1.31(1.08) | 3.71 | .38(.66) | 1.46 | .69(.65) | 2.00 | .69(.65) | 2.00 |

Note: *P<.05.

prevalence rates reported in previous studies^{13,14}, the rates identified in this study were much higher, suggesting that addressing needle-sharing behavior is a priority issue in mitigating the spread of HIV in Taiwan.

The finding that age at the first use of heroin is significantly associated with ever sharing a needle is consistent with previous studies^{15,16}. These previous studies found that long-term IDUs who injected at an earlier age had a greater likelihood of having shared equipment at their first episode of intravenous drug use. Intervention programs for HIV should adapt their counseling strategies to accommodate for this developmental difference in age at initial heroin use.

No significant relationship was identified between age, duration of education, concern with contracting HIV/AIDS, having children, and knowledge of modes of transmission in relation to needle-sharing behavior among female IHUs. Needle sharers in this study did not deny the risk of their behavior, and some reported that they worried about getting HIV/AIDS. The lack of a significant relationship between knowledge of modes of HIV transmission and needle sharing indicates that having this knowledge may not necessarily result in action. Knowledge, attitudes, and behaviors within the study sample were not consistent.

It was somewhat surprising that having a test for HIV correlated with needle sharing during an individual's most recent heroin use, but not with earlier sharing behavior. A possible explanation for this may be that through personal risk assessment and counseling HIV testing reduces the

frequency of high-risk behavior that leads to HIV transmission. This finding is consistent with a previous study¹⁷, in which HIV testing effectively reduced HIV risk. The association between needle sharing and taking an HIV test in this study was not strong. This could be due to the relatively small proportion of participants who had undergone HIV testing, and that HIV/AIDS education programs had not addressed the susceptibility of this particular population.

A number of limitations in this study must be considered. The results were based on self-reports that may have been affected by social desirability or denial of recent high-risk behavior. Our study found evidence that female heroin offenders have high levels of knowledge of modes of HIV transmission. Perhaps they are aware that they are not supposed to share needles and thus gave the answers they believed would minimize the interviewer's disapproval, especially when they were interviewed by a social worker who they would have to face in the prison every day. Additionally, respondents were not merely street heroin users, they were arrested by police officers for drug offenses. Some heroin users may not have been arrested or incarcerated because of skills they have in avoiding arrest or penalties. Hence, the present findings can be generalized to female heroin offenders, but not to all female heroin users, especially those who have not been incarcerated in Taiwan.

Another limitation is the design of the assessment tool. Due to the limited time and resources available for the research, only topics directly associated with needle sharing were assessed in this study. In future studies, social networking, unprotected sex, and the meanings of sharing needles with partners versus non-partners may need to be taken into account so that the methods for preventing HIV through needle sharing, and HIV prevention in general, can be more effectively designed.

Despite the potential biases, the present findings provide some insight into the spread of HIV among female IHUs in Taiwan and have implications for prevention of the further spread of HIV. Needle-sharing rates are sufficiently high to produce an outbreak of HIV, which is consistent with the recent trend of HIV cases associated with drug use in Taiwan. Intervention programs need to involve not only female IHUs, but also male IDUs, including special efforts to convince them to use clean needles and syringes. Additionally, a shift in public health policy is needed to create an environment that provides access to sterile needles and syringes and that supports behavioral change.

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REFERENCES

1. World Health Organization. Report on the global HIV/AIDS epidemic. WHO 2000 [on-line]. Available: <http://www.unaids.org>.
2. UNAIDS. Preventing the transmission of HIV among drug abusers: a position paper of the United Nations System. Annex to the Report of 8th Session of ACC Subcommittee on Drug Control 2000:Author.
3. Stimson GV, Des Jarlais DC, Ball A. Drug injecting and HIV prevention. London: UCL Press, 1998.
4. World Health Organization. Report on the global HIV/AIDS epidemic. WHO 1998 [on-line]. Available: http://www.unaids.org/epidemic_update/
5. Center for Disease Control Taiwan. National statistics on HIV/AIDS. CDCT 2004 [on-line]. Available: <http://www.cdc.gov.tw>
6. Freeman RC, Rodriguez GM, French JF. A comparison of male and female intravenous drug users' risk behaviours for HIV infection. *Am J Drug Alcohol Abuse* 1994;20:129-157.
7. Weissman G, Melchioe L, Huba G. Women living with drug abuse and HIV disease: drug abuse treatment access and secondary prevention issues. *J Psychoactive Drugs* 1995;27:401-410.
8. Lee SH. Initiation and maintenance of HIV risk reduction: a prospective study among injection drug users. Doctoral dissertation, University of Pennsylvania, 1999.
9. Loxley W, Bevan J, Carruthers S. Sex, gender, drugs and risk: the Australian study of HIV and injecting drug use. *Int J Drug Policy* 1998;9:255-262.
10. Rhodes T, Millson M, Bueno R, Myers T, Hunter GM, Stimson GV. Differences in sexual behaviour and condom use among cocaine and opioid injectors in Santos, Toronto and London. *Int J Drug Policy* 1998; 9:449-460.
11. Directorate General of Budget Accounting and Statistics. Statistics of offenders in prisons between 1999 to 2002 in Taiwan. Executive Yuan: Taiwan,

- 2003a.
12. Directorate General of Budget Accounting and Statistics. Statistics of female offenders between 1999 to 2002 in Taiwan. Executive Yuan: Taiwan, 2003b.
 13. Durante AJ, Hart GJ, Brady AR, Maddex PB, Noone A. The health of the Nation target on syringe sharing: a role for routine surveillance in assessing progress and interventions. *Addiction* 1995;90:1389-1396.
 14. Hien NT, Giang LT, Binh PN, Deville W, van Ameijden EJ, Wolfers I. Risk factors of HIV infection and needle sharing among injecting drug users in Ho Chi Minh City, Vietnam. *J Subst Abuse* 2001;13:45-58.
 15. Chitwood DD, Sanchez J, Comerford M, Page JB, McBride DC, Kitner KR. First injection and current risk factors for HIV among new and long-term injection drug users. *AIDS Care* 2000;12:313-320.
 16. Des Jarlais DC, Freeman SR, Perlis T, Chapman TF, Sotheran JL, Paone D, Monterroso E, Neaigus A. Risk behavior and HIV infection among new drug injectors in the era of AIDS in New York City. *J Acquir Immune Defic Syndr Hum Retrovirol* 1999;20:67-72.
 17. Colon HM, Roble RR, Marrero CA, Reyes JC, Sahai H. Behavioral effects of receiving HIV test results among injecting drug users in Puerto Rico. *AIDS* 1996;10:1163-1168.

