SHORT REPORT

Female sex workers incarcerated in New York City jails: prevalence of sexually transmitted infections and associated risk behaviors

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ABSTRACT

Objectives Sexually transmitted infections (STIs) are an important cause of morbidity among incarcerated women and female sex workers (FSW). Little is known about FSW incarcerated in New York City (NYC) jails. We reviewed jail health records to identify the STI and HIV prevalence among newly incarcerated FSW in NYC jails. We also examined the relationship of demographics and self-reported clinical and risk behaviour history with FSW status and compared FSW with non-FSW incarcerated women to identify FSW predictors and, guide NYC jail programme planning and policy.

Methods We retrospectively reviewed routinely collected jail health record data to identify the prevalence of chlamydia (Ct), gonorrhoea (Ng) and HIV infection among women newly incarcerated in NYC jails in 2009–2010 (study period) and studied the relationship of STIs, demographics and self-reported clinical and risk behaviour history with FSW status.

Results During the study period, 10 828 women were newly incarcerated in NYC jails. Of these, 10 115 (93%) women were tested for Ct and Ng; positivity was 6.2% (95% CI 5.7% to 6.7%) and 1.7% (95% CI 1.4% to 1.9%), respectively. Nine percent had HIV infection. Seven hundred (6.5%) were defined as FSW. FSW were more likely to have Ct (adjusted OR (AOR): 1.55; 95% CI 1.17 to 2.05; p<0.0001) but not Ng or HIV. FSW were more likely to have report age ≥20–24 years, reside in boroughs other than Manhattan, ≥6 prior incarcerations, ≥2 incarcerations during the study period, condom use with current sex partners, multiple sex partners and current drug use.

Conclusions Women incarcerated in NYC jails had high rates of Ct, Ng, and HIV infection. FSW were at higher risk for Ct than non-FSW incarcerated women. These findings are being used to design targeted interventions to identify FSW, provide clinical and preventive services in jail and coordinate care with community partners.

INTRODUCTION

Sexually transmitted infections (STI) are an important cause of morbidity among incarcerated women and female sex workers (FSW).1–3 Incarcerated women, particularly FSW are at increased risk for STI and often report risk behaviours including unprotected sex, sex for drugs or money or multiple sex partners.2 4 Inadequate health insurance coverage and access to needed clinical and social services are commonly reported.4 5 Incarceration, thus, provides a unique opportunity to screen high-risk women for STI. Correctional settings with comprehensive screening programmes identify high rates of human immunodeficiency virus (HIV), chlamydia (Ct) and gonorrhoea (Ng) infection among women.6 As such, STI and HIV testing, treatment and prevention efforts are public health priorities for correctional settings and public health agencies.

Little is known about STI and HIV infection among FSW incarcerated in New York City (NYC) jails. Identifying FSW in jail is difficult; women may not disclose sex work, and currently, jail clinicians do not specifically inquire about it. Prostitution criminal charge is often the only available, though insufficient, FSW marker; other means to identify FSW are needed. We retrospectively reviewed NYC jail health records of newly incarcerated FSW (identified by prostitution charges) with medical intake examinations during 2009–2010 to identify their STI and HIV positivity. We also examined the relationship of demographics and self-reported clinical and risk behaviour history with FSW status and compared FSW to non-FSW incarcerated women to identify FSW predictors and guide NYC jail programme planning and policy.

METHODS

NYC’s jail system is the second largest in the USA, annually receiving >80 000 new admissions, including >9 000 women. Facilities are operated by the Department of Correction (DOC); healthcare delivery is overseen by Department of Health and Mental Hygiene (DOHMH). Within 24 h of jail admission, newly incarcerated women receive a medical history and physical (intake) including routine voluntary rapid HIV testing and urine- or endocervical swab-based Ct and Ng screening. Median length of stay (LOS) is 7 days; ~25% of women are released ≤3 days after admission. Ct and Ng test results are available within 3 days, enabling treatment of >65% of STI-diagnosed women with appropriate antimicrobials prior to release. During testing, women are educated about DOHMH STI clinics where they may receive test results, treatment and partner notification assistance. HIV-infected women receive treatment if indicated and discharge planning.

Routine jail electronic health record (EHR) data were extracted for newly incarcerated women having ≥1 medical intake from 1 January 2009 to 31 December 2010 (study period) and included demographics, self-reported HIV history, sexual

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Table 1  Factors associated with being a female sex worker among women incarcerated in New York City jails, 2009–2010

| Demographic/incarceration characteristics | Total | Female sex worker-Yes | Univariate logistic regression | Multivariate logistic regression |
|-------------------------------------------|-------|-----------------------|-------------------------------|-------------------------------|
|                                           | N     | N (Row %) | OR (95% CI) | OR (95% CI) |
| **TOTAL**                                | 10828 | 700 (6.5) |              |              |
| **Gender**                                |       |           |              |              |
| Male                                      | 9122  | 573 (6.3) |              |              |
| Female                                    | 706   | 47 (6.6)  | 0.80 (0.62 to 1.02) | 0.83 (0.63 to 1.10) |
| **Age, years**                            |       |           |              |              |
| 16–19                                     | 1070  | 69 (6.4)  | 0.96 (0.72 to 1.28) | 1.07 (0.77 to 1.49) |
| 20–24                                     | 1689  | 136 (8.1) | 1.22 (0.97 to 1.53) | 1.42 (1.09 to 1.85) |
| 25–34                                     | 2595  | 198 (7.6) | 1.15 (0.94 to 1.42) | 1.26 (1.00 to 1.58) |
| 35–44                                     | 2852  | 191 (6.7) | Reference     | Reference     |
| ≥55                                       | 2258  | 102 (4.5) | 0.66 (0.52 to 0.84) | 0.83 (0.64 to 1.08) |
| Unknown                                   | 10    | 0 (0.0)   | <0.01 (<0.01 to >999.99) | <0.01 (<0.01 to >999.99) |
| **Race/ethnicity**                        |       |           |              |              |
| NH Black                                  | 6406  | 414 (6.5) | Reference     | Reference     |
| Hispanic                                  | 2810  | 176 (6.3) | 0.97 (0.81 to 1.16) | 1.00 (0.82 to 1.23) |
| NH White                                  | 1239  | 85 (6.7)  | 1.07 (0.84 to 1.36) | 0.96 (0.73 to 1.27) |
| NH API/American Indian/Other              | 353   | 24 (6.8)  | 1.06 (0.69 to 1.62) | 1.68 (1.06 to 2.66) |
| Unknown                                   | 20    | 1 (0.1)   | 0.76 (0.10 to 5.71) | 0.26 (0.03 to 2.42) |
| **Borough of Residence**                 |       |           |              |              |
| Bronx                                     | 2336  | 144 (6.2) | 2.57 (1.81 to 3.64) | 2.73 (1.90 to 3.94) |
| Brooklyn                                  | 3415  | 232 (6.8) | 2.85 (2.04 to 3.98) | 2.47 (1.75 to 3.50) |
| Manhattan                                 | 1683  | 42 (2.5)  | Reference     | Reference     |
| Queens                                    | 1561  | 141 (9.0) | 3.88 (2.73 to 5.52) | 4.93 (3.41 to 7.14) |
| Staten Island                             | 446   | 27 (6.1)  | 2.52 (1.53 to 4.13) | 2.43 (1.44 to 4.11) |
| Other                                     | 1387  | 114 (8.2) | 3.50 (2.44 to 5.02) | 4.53 (3.03 to 6.76) |
| **Ever homeless during study period**     |       |           |              |              |
| Yes                                       | 791   | 94 (11.9) | 2.10 (1.67 to 2.64) | 0.70 (0.52 to 0.95) |
| No                                        | 10037 | 606 (6.0) | Reference     | Reference     |
| **Marital status**                        |       |           |              |              |
| Single, never married                     | 8616  | 600 (7.0) | Reference     | Reference     |
| Married/Cohabiting                        | 1617  | 72 (4.5)  | 0.62 (0.49 to 0.80) | 0.73 (0.56 to 0.95) |
| Divorced/Separated                        | 371   | 15 (4.0)  | 0.56 (0.33 to 0.95) | 0.72 (0.41 to 1.27) |
| Widowed                                   | 158   | 6 (3.8)   | 0.53 (0.23 to 1.20) | 0.94 (0.40 to 2.25) |
| Unknown                                   | 66    | 7 (10.6)  | 1.59 (0.72 to 3.49) | 2.15 (0.84 to 5.52) |
| **Education**                             |       |           |              |              |
| <High school diploma/equivalent           | 4960  | 362 (7.3) | 1.00 (0.84 to 1.19) | 0.98 (0.81 to 1.18) |
| High school diploma/equivalent            | 2921  | 214 (7.3) | Reference     | Reference     |
| Some college                              | 1756  | 74 (4.2)  | 0.56 (0.42 to 0.73) | 0.70 (0.52 to 0.93) |
| ≥College degree                           | 483   | 12 (2.5)  | 0.32 (0.18 to 0.58) | 0.42 (0.23 to 0.79) |
| Unknown                                   | 708   | 38 (5.4)  | 0.72 (0.50 to 1.02) | 0.79 (0.47 to 1.33) |
| **Number of prior incarcerations (in last 3 years)** |       |           |              |              |
| 0                                         | 7866  | 427 (5.4) | Reference     | Reference     |
| 1                                         | 1268  | 62 (4.9)  | 0.90 (0.68 to 1.18) | 0.76 (0.57 to 1.01) |
| 2                                         | 628   | 51 (8.1)  | 1.54 (1.14 to 2.08) | 1.01 (0.73 to 1.41) |
| 3–5                                       | 713   | 73 (10.2) | 1.99 (1.53 to 2.58) | 1.05 (0.78 to 1.40) |
| ≥6                                        | 353   | 87 (24.6) | 5.70 (4.39 to 7.40) | 1.81 (1.32 to 2.47) |
| **Number of incarcerations during study period** |       |           |              |              |
| 1                                         | 7657  | 263 (3.4) | Reference     | Reference     |
| 2                                         | 1752  | 135 (7.7) | 2.35 (1.89 to 2.91) | 2.32 (1.84 to 2.93) |
| 3                                         | 652   | 101 (15.5) | 5.15 (4.03 to 6.59) | 4.86 (3.66 to 6.45) |
| ≥4                                        | 767   | 201 (26.2) | 9.98 (8.15 to 12.23) | 8.61 (6.59 to 11.25) |
| **Current drug use**                      |       |           |              |              |
| Yes                                       | 4411  | 403 (9.1) | 2.07 (1.77 to 2.42) | 1.24 (1.02 to 1.50) |
| No                                        | 6417  | 297 (4.6) | Reference     | Reference     |
| **Physical assault history**              |       |           |              |              |
| Yes                                       | 2501  | 179 (7.2) | 1.12 (0.93 to 1.33) | 0.88 (0.69 to 1.11) |
| No                                        | 7641  | 494 (6.5) | Reference     | Reference     |
| Unknown                                   | 686   | 27 (3.9)  | 0.59 (0.40 to 0.88) | 1.53 (0.84 to 2.78) |
risk behaviours, current drug use, lifetime physical assault/sexual abuse/intimate partner violence (IPV) history; current pregnancy; and jail Ct, Ng and HIV testing (table 1). Demographics (age, race/ethnicity, borough of residence, marital status, education) and sexual risk behaviours (current condom use, number of sex partners) were tabulated from the first incarceration during the study period. Remaining variables were computed across all incarcerations during the study period and counted as ‘yes’/positive if ever so in any incarceration. HIV positivity was determined using self-reported history, EHR documentation of infection and jail testing data. Ct and Ng positivity with exact binomial 95% CIs were calculated using jail testing results (no. of unique women testing positive/no. of unique women tested). Women with multiple positive tests were counted once as ‘positive’. DOC provided data on self-reported homelessness, LOS, prior NYC jail incarceration (≤3 years) and criminal charges. ‘Ever homeless’ status was assigned by report of homelessness at any incarceration. Cumulative LOS was calculated by summing all incarceration days. FSW were identified by ≥1 prostitution charges (New York Penal Law §110-230.00,110-240.37,230.00,240.37) among the top five charges occurring across all incarcerations.

Data were tabulated; χ²-statistics were used to identify factors associated with FSW status. Unadjusted ORs and 95% CIs were calculated for all variables in table 1. Variables significant in bivariate analysis (p<0.10) were analysed using multivariate logistic regression to determine predictors of FSW status; adjusted ORs (AORs) and 95% CIs were calculated. Variables ‘unknown’ values were retained to maximise statistical power because some variables had >500 unknown observations. Analyses were conducted using SAS V.9.2 (SAS Institute Inc., Cary, North Carolina, USA).

This study was deemed research-exempt by the NYC DOHMH Institutional Review Board.

**RESULTS**

During the study period, there were 19 677 admissions to NYC jails among 12 078 unique women. Of 12 078 women, 10 828 (89.7%) received medical intake; the remainder were released from jail prior to intake. Median age was 35 (range: 28-82 Parvez F, et al. Sex Transm Infect 2013;89:280–284. doi:10.1136/sextrans-2012-050977

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**Table 1 Continued**

| Total N | Female sex worker-Yes N (Row %) | Univariate logistic regression OR (95% CI) | Multivariate logistic regression OR (95% CI) |
|---------|---------------------------------|------------------------------------------|------------------------------------------|
| Sexual abuse history | | | |
| Yes | 1890 | 159 (8.4) | 1.38 (1.14 to 1.66) | 1.00 (0.79 to 1.28) |
| No | 8309 | 520 (6.4) | Reference | Reference |
| Unknown | 629 | 21 (3.3) | 0.52 (0.33 to 0.81) | 1.02 (0.49 to 2.11) |
| Intimate partner violence history | | | |
| Yes | 1558 | 140 (9.0) | 1.48 (1.22 to 1.80) | 1.01 (0.79 to 1.29) |
| No | 8585 | 536 (6.2) | Reference | Reference |
| Unknown | 685 | 24 (3.5) | 0.55 (0.36 to 0.83) | 1.23 (0.73 to 2.07) |
| Condom use with current sex partner(s)* | | | |
| Yes | 3330 | 349 (10.5) | 2.36 (2.01 to 2.77) | 1.76 (1.47 to 2.10) |
| No | 6453 | 305 (4.7) | Reference | Reference |
| Unknown | 1045 | 46 (4.4) | 0.93 (0.68 to 1.28) | 1.00 (0.64 to 1.54) |
| Number of current sex partners* | | | |
| 0 | 2112 | 75 (3.6) | Reference | Reference |
| 1 | 6833 | 425 (6.2) | 1.80 (1.40 to 2.31) | 1.53 (1.17 to 2.00) |
| 2–3 | 703 | 91 (12.9) | 4.04 (2.94 to 5.56) | 2.56 (1.80 to 3.63) |
| 4+ | 284 | 70 (24.6) | 8.88 (6.23 to 12.67) | 4.57 (3.05 to 6.89) |
| Unknown | 896 | 39 (4.3) | 1.24 (0.83 to 1.84) | 1.69 (1.01 to 2.83) |
| Pregnant during study period | | | |
| Yes | 639 | 66 (10.3) | 1.71 (1.31 to 2.24) | 1.00 (0.74 to 1.35) |
| No | 9963 | 628 (6.3) | Reference | Reference |
| Unknown | 226 | 6 (2.7) | 0.41 (0.18 to 0.92) | 0.91 (0.38 to 2.18) |
| Clinical status | | | |
| Ever Chlamydia-positive | | | |
| Yes | 623 | 85 (13.6) | 2.34 (1.84 to 2.99) | 1.55 (1.17 to 2.05) |
| No | 9492 | 600 (6.3) | Reference | Reference |
| Not tested | 713 | 15 (2.1) | 0.32 (0.19 to 0.54) | N/A† |
| Ever Gonorrhoea-positive | | | |
| Yes | 167 | 30 (18.0) | 3.11 (2.08 to 4.65) | 1.46 (0.92 to 2.33) |
| No | 9948 | 655 (6.6) | Reference | Reference |
| Not tested | 713 | 15 (2.1) | 0.31 (0.18 to 0.51) | 0.41 (0.22 to 0.78) |
| HIV status | | | |
| Positive | 975 | 76 (7.8) | 1.03 (0.80 to 1.33) | 0.95 (0.71 to 1.27) |
| Negative | 6585 | 499 (7.6) | Reference | Reference |
| Unknown | 3268 | 125 (3.8) | 0.49 (0.40 to 0.59) | 0.94 (0.76 to 1.18) |

*Reported at first incarceration during study period.
†OR not generated as parameter set to 0 in model (equal to linear combination of other parameters).
NH, non-Hispanic, API, Asian/Pacific Islander.
remained associated with FSW status, as did age 20 level interest. In multivariate analysis, Ct (AOR: 1.55; 95% CI (p=0.96), which was retained in multivariate analysis for study- table 1 in bivariate analysis (p<0.05) except race/ethnicity Ct, Ng or HIV infection; 114 (1.1%) had two, and 4 (0.04%) identi
women were HIV-tested in jail; 27 (0.4%) tested positive. 723 women, 478 (66.1%) were treated with antimicrobials prior to jail release. Fourteen percent (103/723) of all Ct and Ng were among FSW; of these, 76% (78/103) were treated in jail. Of 10 828 women, 975 (9.0%) had HIV infection; the 6612(61.1%) women were de

DISCUSSION
This is the first study to examine STI prevalence among FSW in NYC jails. We found many women had Ct, particularly FSW, consistent with published reports.6–9 FSW were more likely to be age 20–24 years, the age often at highest Ct risk.3, 7 While the association between FSW and increased STI rates is not new, the high Ct prevalence detected among FSW in our study merits further attention. Nearly 25% of STI-positive FSW were released from jail prior to treatment, increasing risk of STI sequelae and transmission.4 Prevention interventions including peer outreach services, HIV counselling and testing, harm reduction education, and STI testing and management are associated with declines in HIV and STI prevalence among FSW.6 In NYC jails, our study findings are being used to design similar targeted interventions to identify FSW, provide clinical and preventive services in jail, and coordinate care with community partners. Interventions will be designed to address not only the medical, but also mental health and social services needs of this medically vulnerable population.4 5 8

Key messages

► Sexually transmitted infections (STI) are an important cause of morbidity among correctional populations in the USA.

► Incarcerated women, particularly female sex workers (FSW), are at high risk for STI and report sexual behaviours such as unprotected sex, sex for drugs or money or multiple sex partners.

► FSWs incarcerated in New York City (NYC) jails were at higher risk for chlamydia STI than non-FSW incarcerated women.

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Contributors FP, MK, HA and HV designed the study. FP, MK, HA and RL collected and analysed the data. All authors contributed to writing and revising the manuscript.

Disclaimers The findings and conclusions in this paper are those of the authors and do not necessarily represent the views of the Centers for Disease Control and Prevention.

Competing interests None.

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