

Epidemiology of HIV Infection among Brothel-based Sex Workers in Kolkata, India

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ABSTRACT

A cross-sectional study was carried out during January-June 2004 to assess the status of HIV infection among brothel-based sex workers in Kolkata city, India. Six hundred and twenty-two sex workers, selected from six brothels, were included in the study to assess their HIV status, and 362 sex workers, a subset of the above population, were interviewed to study their risk behaviour and practices. Blood samples were collected from each sex worker for testing HIV by an unlinked anonymous method. The prevalence of HIV infection was 9.6%, but was much higher among younger sex workers aged 20 years or less (27.7%) compared to the older age group (8.4%). This difference was statistically significant, indicating an association of younger ages with HIV infection [$p=0.006$ and odds ratio (OR)=4.18; (95% confidence interval (CI) 1.2-13.8)]. HIV was not associated with duration of sex work, average number of clients entertained per day, condom use, practice of sex during menstruation, pre-coital examination of penis for visible ulcer/discharge, suffering from sexually transmitted infections, and entertaining clients outside the brothel. There was a big gap between the reported and the evaluated condom use by sex workers. The results suggest that there is a need to develop suitable HIV intervention strategies, considering the socioeconomic and cultural aspects of city sex workers, with a provision for continuous monitoring and evaluation.

Key words: HIV infections; Sexually transmitted infections; Sexually transmitted diseases; Disease transmission; Prostitution; Sex workers; Sex behaviour; Cross-sectional studies; India

INTRODUCTION

HIV-1 infection followed by AIDS spread worldwide during the 1980s (1,2). Initially, HIV occurred mainly among individuals, such as homosexuals and intravenous drug users, in many parts of America, whereas in parts of Africa, the infection has spread among general population mainly through heterosexual contacts (1-3).

India has had a sharp increase in the number of HIV infections, from a few thousands in the early 1990s to

an estimated 3.8-4.6 million children and adults living with HIV/AIDS in 2002 (4). With a population of over one billion, the epidemics of HIV in India will have a major impact on the overall spread of HIV in Asia and the Pacific and indeed worldwide. India has been experiencing the most serious public-health challenge posed by the HIV epidemic since its first detection in 1986 (5). In 2003, the country had an estimated 4.8 million HIV-infected cases (6). The prevalence data on HIV infection collected from various parts of the country indicate its spread from urban to rural areas and from high-risk to low-risk population (general population) (7). The activities of the National AIDS Control Programme, launched in 1992, were strengthened in 1999 in view of the increasing HIV/AIDS problem in the country. Despite this, sentinel surveillance data indicate that the number of HIV cases is increasing continuously throughout the

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country, with a major route of transmission being the heterosexual contacts (more than 80%) (7).

Kolkata, one of the four major metropolitan cities in India, situated in the eastern part of the country, has a number of brothels, where most sex workers operate as brothel-based full-time workers. In 2003, 20,000-25,000 sex workers (both brothel-based and floating) were estimated to be operated in the city (8). Sex workers, because of their occupation, act as reservoir for sexually transmitted infections (STIs) and play an important role in spreading infections in the community. The major route of HIV transmission in India is through heterosexual contact and a great extent of it is transmitted through sex workers, who often suffer from STIs facilitating HIV transmission further. So, it is extremely important to control STIs among sex workers as an important requirement for HIV/AIDS-control activities in general. Hence, this study was undertaken to understand the existing HIV status in them and other possible determinants.

MATERIALS AND METHODS

Study subjects

In total, 622 sex workers were selected from six different city brothels for this community-based cross-sectional study. The sample size was estimated to be 607 using the Stat calc programme of Epi Info version 6, where the prevalence of HIV among sex workers was considered to be 10%, the worst acceptable value of 8% from a sampling frame of 20,000. The subjects were contacted at each brothel during non-business hours with the help of peer outreach workers working with local community-based organizations. The brothels were selected at random. The peer outreach workers, who contacted the sex workers at each selected brothel, explained the purpose of the study in their homes located in different parts of the brothel. They recruited willing participants for the study. Care was taken to include sex workers from all locations of the brothel. Two experienced sociologists interviewed them, using a pre-tested semi-structured questionnaire, to assess their risk behaviour and practices. This was followed by the collection of blood samples for HIV testing. The entire procedure was performed by an unlinked anonymous method during January-June 2004.

Sample collection and processing

About 3 cc of venous blood was collected from each study subject for screening for HIV-1 and HIV-2 infections. The

blood samples were transported to the test site on the same day after being kept in the field for about two hours to allow them to clot. Sera were separated, stored at approximately 4 °C for 2-3 days, and then stored frozen. Screening of sera for HIV-1 and HIV-2 antibodies was done by one enzyme-linked immunosorbent assay, followed by another rapid test (Tri-dot test) as per the national AIDS control policy of the country (9).

The Institutional Ethical Committee approved the study. Verbal consent was obtained from each subject after explaining her the purpose of the study.

RESULTS

Blood samples from 622 sex workers were collected for screening for HIV-1 and HIV-2 infections, and 362 subjects, a subset of the above population, were interviewed to study their risk behaviour and practices. HIV was found in 60 samples, indicating a seroprevalence of 9.6%. Of these, 56 (93.3%) were positive for HIV-1, and only four were positive for HIV-2.

Of the 362 sex workers, 18 (5%) were aged 16-20 years, 182 (50%) were aged 21-30 years, and the remaining 162 (45%) were aged above 30 years.

The prevalence of HIV infection was higher among younger sex workers aged 16-20 years [27.7% (5 of 18)] compared to sex workers aged over 20 years [8.4% (29 of 344)]. This difference was statistically significant ($p=0.006$), and the odds ratio was 4.18.

The majority of the sex workers ($n=250$, 69%) were illiterate [people having no formal education and are not able to read and write], and 40 (11%) were minimally literate [able to just sign their names without any formal education in school]. No association was observed between HIV infection and literacy status. Forty-one percent ($n=147$) of the sex workers were married but separated from their husbands. Only 122 (34%) were maintaining relationship with their husbands. Forty-nine (13.5%) were unmarried, and 40 (11%) were widows. No statistical association was found between marital status and HIV infection.

In this study, 193 (53.3%) of the subjects had been in this occupation for more than five years, and 81 (22.4%) had been involved in sex work for between two and five years. The rest ($n=88$) had been involved in sex work for less than two years. No statistical association was observed between HIV status and duration of sex work.

The average number of clients entertained by the sex workers each day might influence their HIV status. Sixty-six percent (n=239) of the sex workers entertained 3-4 clients per day, and 23% (n=84) of them entertained 1-2 client(s) daily. Only 11% (n=39) entertained five or more clients per day. Although the rates of HIV infection were higher among sex workers having 3-4 or more clients compared to those having 1-2 client(s) per day, but this difference was not statistically significant.

The consistent use of condoms is perhaps the single most important determining factor in controlling STIs in sex workers. In this study, all the sex workers initially stated that their clients routinely used condoms. Closer interactions and repeated cross-examinations revealed that many sex workers allowed their clients to have sex without a condom. Forty-four percent (n=159) of the 362 sex workers did not use condoms with their most recent three clients consistently. The prevalence of HIV was similar among both consistent and inconsistent condom users.

Another determining factor could be the place of sexual contact. Some sex workers met their clients in hotels or other outside places on demand for a higher income. In this study, 84 (23.2%) of the 362 sex workers entertained their clients outside the brothels. The rates of HIV infection were similar in both the groups.

Anal sex is associated with a higher risk of HIV transmission compared to peno-vaginal sex (10,11). In this study, 7 (2%) of the 362 sex workers reported anal sexual contact. Sex practices during menstruation are also associated with a higher transmission of HIV (10,11). In this study, about 91 (25%) of the 362 sex workers continued their profession during menstruation. One hundred eighty-one (50%) sex workers had examined the penis of their clients for visible ulcer or discharge before engaging in sex work. HIV infection was almost absent among sex workers who did pre-coital examination compared to those who did not.

DISCUSSION

The findings of the present study showed that the prevalence of HIV among the brothel-based sex workers in Kolkata city was 9.6% (9% for HIV-1 and 0.6% for HIV-2 infection). Age of sex workers could be a determining factor as observed in this study. The prevalence of HIV was much higher (27.7%) among younger sex workers aged 20 years or less compared to the sex workers of

the older age group (8.4%). The odds ratio was 4.18 (95% CI 1.2-13.8), which indicates that odds of exposure of younger sex workers acquiring HIV were four times higher compared to the older age group. Similar observation was reported in Nepal where country surveillance data showed that most HIV-affected victims were young female sex workers compared to older ones (12). The reason could be either due to professional immaturity of younger sex workers who might have joined the profession recently, leading to more incidences of unprotected sex with their clients, or due to a higher rate of injury of the cervico-vaginal epithelium due to relatively immature genital tract anatomy of teen-age sex workers. Both might lead to higher HIV transmission, and this needs to be studied further in-depth. Whatever may be the reason, an HIV intervention programme needs to be targeted with greater emphasis towards younger sex workers.

Another important observation was the gap between the reported and the evaluated use of condom. Outreach workers of many city NGOs educate their sex workers about prevention of HIV through sexual transmission and role of condom in HIV prevention. But this does not seem to help an HIV intervention programme even to a moderate extent particularly in this set up, as this study revealed that only 202 (56%) of the 362 sex workers used condoms consistently with their most recent three clients, and 44% did not. But the HIV status, which was almost the same in both the groups, did not support their claim of consistent condom use. It is strongly felt that, under the existing socioeconomic condition of sex workers of Kolkata, it is not possible to ensure high and consistent condom use unless clients are motivated towards consistent use. Despite being aware that sex without a condom might lead to HIV infection, many sex workers were forced to have sex without a condom to avoid losing their income. This is because most clients, who visit city brothels, are uneducated, often come for sex under the influence of alcohol and do not believe in enjoying sex without a condom. They are least bothered about protected sex and transmission of STIs and HIV. Because of poverty and high professional competition, sex workers often indulge in sex without a condom. Acquiring HIV and its avoidance are considered to be a lesser priority to earning money for their daily livelihood by them. They cannot afford to lose their clients by insisting on condom use. Training sex workers about client-negotiating skills do not appear to play a significant role in the prevention of HIV, particularly in this set up.

HIV-2 was detected in only four of the 622 sex workers. HIV-2 was also previously detected in injecting drug users (IDUs) of Manipur (13), one of the northeastern states of India, which experienced a massive HIV epidemic in 1990 (14,15). The existence of HIV-2 among sex workers in Kolkata city probably indicates their sexual exposure to multinational clients. The possibility of HIV-2 transmission from IDUs is less as the sexual urge of most IDUs is poor due to their drug-taking behaviour (16). On the other hand, the seaport near Kolkata city facilitates the crew of international ships to mix with local sex workers. This could be the possible route of transmission of HIV among local sex workers, particularly HIV-2.

In this study, HIV was not associated with the duration of sex work, number of clients entertained per day, pre-coital examination of penis of clients for visible ulcers or discharge, entertaining clients outside the brothel, and suffering from STIs within the last one year. Anal sex was rare in the study community, and only 2% of the 362 sex workers had anal sex with their clients. Sex during menstruation could lead to the higher spread of HIV compared to sex during the non-menstruating period. In this study, 91 (25%) sex workers continued their profession during menstruation. This could be alarming, particularly where the use of condoms is either poor or questionable and must be considered carefully while strengthening the HIV intervention programme targeted towards sex workers.

The factors responsible for young sex workers being more vulnerable to HIV need to be studied further in-depth, and a suitable behavioural intervention with a provision of continuous monitoring and evaluation is required to contain the problem. Promotion of condom use along with improving negotiating skills of sex workers while dealing with clients does not appear to be successful in controlling HIV, particularly in this set up, as already discussed. So, there is a need for finding some alternative methods for controlling HIV, which is totally independent of clients (such as vaginal microbicides), after establishing their efficacy and effectiveness in controlling HIV.

Regarding limitation of the study, selection of subjects at random from some brothels could not be carried out strictly, and purposive samples were taken from there instead. This is because houses in those brothels were arranged haphazardly, and the number of sex workers in each house varied in relation to the time of the day,

festival season, local crime, harvesting season, and some other factors. Moreover, there was a large number of sex workers who stayed in the brothel during the day-time only and left for home in the evening. Despite the limitation, this study appears to be fairly representative of sex workers in finding HIV prevalence among city sex workers as evidenced from several other small-unpublished studies of similar nature carried out at different brothels in Kolkata city during the contemporary period.

The results suggest that there is a need to develop suitable HIV intervention strategies, considering the socioeconomic and cultural aspects of city sex workers, with a provision for continuous monitoring and evaluation.

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REFERENCES

1. Quinn TC, Mann JM, Curran JW, Piot P. AIDS in Africa: an epidemiologic paradigm. *Science* 1986; 234:955-63.
2. Piot P, Plummer FA, Mhalu FS, Lamboray JL, Chin J, Mann JM. AIDS: an international perspective. *Science* 1988;239:573-9.
3. Mhalu F, Bredberg-Raden U, Mbena E, Pallangyo K, Kiango J, Mbise R *et al.* Prevalence of HIV infection in healthy subjects and groups of patients in Tanzania. *AIDS* 1987;1:217-21.
4. Kumar S. HIV cases rising sharply in India. *BMJ* 2003;327:245.
5. Malviya AN, Chaudhury K, Singh Y, Tripathy S. AIDS—facts, problems, solutions. Delhi: R Taneja, 1990:9.

6. NACO Press Release on the eve of India's first National Convention on HIV/AIDS, held in New Delhi, on 3 July 2003 (www.newscientist.com/news/news/, accessed on 25 June 2004).
7. Report of National AIDS Control Organisation. New Delhi: Ministry of Health, Government of India, 2001. (www.nacoindia.org, accessed on 5 August 2004).
8. Mapping population groups vulnerable to HIV/AIDS in West Bengal. New Delhi: Taylor Nelson Sorfes Mode, 2003:1-10.
9. Saha MK, Chakrabarti S, Panda S, Naik TN, Manna B, Chatterjee A *et al.* Prevalence of HCV & HBV infection amongst HIV seropositive intravenous drug users & their non-injecting wives in Manipur, India. *Indian J Med Res* 2000;111:37-9.
10. Centers for Diseases Control and Prevention. National Centre for HIV, STD & TB Prevention. HIV and its transmission. (www.cdc.gov/pubs/facts/transmission.htm, accessed on 3 February 2005).
11. Johnson L, Budlender D. HIV risk factors: a review of demographic, socio-economic, biomedical & behavioural determinants of HIV (www.commerce.uct.ac.za/care/Monographs/mono08.pdf, accessed on 3 February 2005).
12. Suvedi BK, Baker J, Thapa S. HIV/AIDS in Nepal: an update. *J Nepal Med Assoc* 1994;32:204-13.
13. Singh NB, Panda S, Naik TN, Agarwal A, Singh HL, Singh YI *et al.* HIV-2 strikes injecting drug users (IDUs) in India. *J Infect* 1995;31:49-50.
14. Naik TN, Sarkar S, Singh HL, Bhunia SC, Singh YL, Singh PK, Pal SC. Intravenous drug users—a new high-risk group for HIV infection in India. *AIDS* 1991;5:117-8.
15. Sarkar S, Das N, Panda S, Naik TN, Sarkar K, Singh BC *et al.* Rapid spread of HIV among injecting drug users in north-eastern states of India. *Bull Narc* 1993;45:91-105.
16. Sarkar S, Mookerjee P, Roy A, Naik TN, Singh JK, Sharma AR *et al.* Descriptive epidemiology of intravenous heroin users—a new risk group for transmission of HIV in India. *J Infect* 1991;23:201-7.