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Human immunodeficiency virus and female prostitutes, Sydney 1985

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SUMMARY One hundred and thirty two female prostitutes and 55 non-prostitutes who were tested for antibodies to human immunodeficiency virus (HIV) were surveyed by questionnaire at this centre. The two groups were well matched for age and were very similar in other respects, except for numbers of their sexual partners. Questions were asked about drug taking, sexual practices, general health, and episodes of sexually transmitted diseases (STDs).

None of the women in the survey was found to be seropositive, but both groups were found to be seriously at risk of HIV infection through using intravenous (IV) drugs, having unprotected sexual intercourse with men who used IV drugs, having unprotected sexual intercourse with bisexual men, or exposure to several STDs.

The published results of testing for antibodies to human immunodeficiency virus (HIV) in female prostitutes have shown considerable variation in the prevalence of infection in different populations.

A survey of prostitutes in seven geographical areas of the USA showed that the seroprevalence of HIV antibodies paralleled the incidence in other women living in the same areas, and ranged from 0% to 57%.[1] In Europe, prostitutes in London, Paris, and Nuremburg were antibody negative.[1,2] Other studies in Athens,[3] Pordenone (Italy), Zurich, and six West German cities, however, showed that 1% to 78% of the women tested were antibody positive.[1] The influence of sexual exposure alone was not known, however, as in studies that detected antibody positive women an appreciable proportion of the affected prostitutes were IV drug users. The only exception was the Athens study, which reported no IV drug usage among the 12 seropositive women in a cohort of 200 registered prostitutes. A very high prevalence of HIV antibodies was found in some prostitutes in Rwanda (88%)[4] and Kenya (66% of the lower socio-economic group),[5] which suggested that in those African countries prostitutes played an important part in the sexual transmission of the disease. In Asia the presence of HIV antibodies in prostitutes has been reported from India,[6] and the Philippines (BM Whyte, personal communication),[7] but a large survey in Thailand in 1985 detected antibodies in none of 2880 female prostitutes.[7]

We report here a study, undertaken in Sydney, of a group of women working as prostitutes and a comparison group of non-prostitute women. Both groups were drawn from patients attending this centre, which has the largest female STD clinic in New South Wales. Our aim was to assess the exposure to HIV, as assessed by serology, in a well defined cohort of prostitutes in Sydney and to elucidate the risk factors for infection.

Patients and methods

From January to September 1985 we enrolled in the study 132 female prostitutes and 55 women with no history of prostitution. The only criteria for enrolment were that the women were patients at this centre and had voluntarily been tested for HIV antibodies. Confidentiality was guaranteed by the use of a code, which was different from the clinic number routinely assigned to each patient at the STD Centre, and no names were used in the survey.

We collected information on a wide range of social and medical factors by a questionnaire, which was largely self administered unless language problems necessitated administration by an interviewer. Medical histories and personal details gained through the questionnaire were subsequently checked against clinic records and, when necessary, the information given was corrected or supplemented. Responses to the self-administered questions were validated by the subsequent use of an expanded version of the questionnaire in interviews.

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As far as possible, given the limitations of a busy clinic, every woman who sought an HIV antibody test was asked to take part in the survey. Both groups were recruited in the same way by counsellors and nurses when they received information about the procedures for HIV antibody testing. We distributed 302 questionnaires to consecutive patients, and 190 were handed back to the staff for analysis. Three prostitutes returned incomplete questionnaires and were excluded from the study. The remaining 132 prostitutes represented 34% of the total number (387) of female prostitutes who attended the centre and were tested for HIV antibodies in 1985. None was found to have positive results at that time.

Comparison with routine statistics collected by the centre indicated that both groups represented a reasonable cross section of the female clinic population in 1985, even though they were not necessarily representative of the female or the female prostitute population in the city as a whole. These women were among the first people in Australia to request HIV antibody testing, and therefore presumably indentified themselves as being particularly at risk.

LABORATORY ANALYSIS

We collected 10 ml of blood from each woman and sent it to the Centre for Immunology, St Vincent's Hospital, Darlinghurst. Serum was tested for antibodies to HIV by an enzyme linked immunosorbent assay (ELISA) (Electronucleonics, Columbia, Maryland, USA)[8] and confirmed by the H9 exclusionary ELISA and by immunofluorescence using a T cell line infected with HIV.[9,10]

Results

HIV ANTIBODY TEST RESULTS

All 132 prostitutes and 55 non-prostitutes were seronegative for antibodies to HIV.

AGE

Table 1 shows that the two groups were similar in their ages, the prostitutes having a slightly lower median age (27·5 years) than the non-prostitutes (28·25 years). Most women (69 (52%) prostitutes, 31 (56%) non-prostitutes) were aged 25 to 35.

Table 1 *Ages of 187 women tested for antibody to human immunodeficiency virus*

Age (years)	*No (%) of prostitutes (n=132)*	*No (%) of non-prostitutes (n=55)*
<20	11 (8)	3 (6)
20–24	30 (23)	9 (16)
25–29	44 (33)	20 (36)
30–34	25 (19)	11 (20)
35–39	15 (11)	7 (13)
40–44	2 (2)	2 (4)
45–49	2 (2)	3 (6)
>49	3 (2)	0

Table 2 *Drug use in 187 women tested for antibody to human immunodeficiency virus*

Drug use	*No (%) of prostitutes (n=132)*	*No (%) of non-prostitutes (n=55)*
Intravenous drugs ever	25 (19)	13 (24)
In previous six months:		
Heroin	14 (11)	7 (13)
Barbiturates	5 (4)	1 (2)
Tranquillisers	22 (17)	9 (16)
Antidepressants	7 (5)	3 (5)
Amphetamines	8 (6)	10 (18)
Amyl nitrite	6 (5)	1 (2)
Marihuana	52 (39)	24 (44)
Cocaine	18 (14)	6 (11)
None of the above	49 (37)	25 (46)
No information	10 (8)	1 (2)

DRUG USE

Table 2 shows that the two groups were also similar in their drug using behaviour, although the comparison here may be skewed by the fact that more prostitutes (10 (8%) *v* one (2%) non-prostitute) either did not answer the question about drug use or gave ambiguous answers that could not be coded.

Twenty five (19%) prostitutes and 13 (24%) non-prostitutes had used IV drugs at some time, and 14 (11%) prostitutes and seven (13%) non-prostitutes had used heroin in the previous six months. More prostitutes (18, 14%), than non-prostitutes (six, 11%) had used cocaine, but the pattern was reversed for marihuana, which had been used by 52 (39%) prostitutes, as opposed to 25 (44%) non-prostitutes. Small numbers of both groups had used barbiturates (five (4%) and one (2%) respectively) and amyl nitrite (six (5%) and one (2%) respectively). Substantially more non-prostitutes, however, used amphetamines (10 (18%) compared with eight (6%) prostitutes). Forty nine (37%) prostitutes and 25 (45%) non-prostitutes said that they had not used any of the named drugs during the preceding six months.

Table 3 *Number of sexual partners in preceding month of 187 women tested for antibody to human immunodeficiency virus*

No of sexual partners	*No (%) of prostitutes (n=132)*	*No (%) of non-prostitutes (n=55)*
0	0	10 (18)
1	11 (8)	25 (46)
2–5	8 (6)	13 (24)
6–20	19 (14)	0
21–50	16 (12)	0
51–100	13 (10)	0
>100	15 (11)	0
No information	61 (46)	3 (6)

Table 4 *Risk taking behaviour of sexual partners of 187 women tested for antibody to human immunodeficiency virus*

One or more partners in the following risk groups in previous five years	*No (%) of prostitutes (n=132)*	*No (%) of non-prostitutes (n=55)*
Bisexual man	45 (34)	22 (40)
(Not sure)	13 (10)	1 (2)
Homosexual man	14 (11)	1 (2)
(Not sure)	3 (2)	0
Male prostitute	17 (13)	4 (7)
(Not sure)	4 (3)	0
Intravenous drug user	38 (29)	18 (33)
(Not sure)	10 (8)	0

SEXUAL CONTACTS

Table 3 shows the number of sexual partners reported by the women in the month before completing the questionnaire. The ranges (medians) were 1 to 250 (24·5) for prostitutes and 0 to 4 (1·5) for non-prostitutes. Over a one year period the corresponding figures were: 1 to 3000 (median 175) for prostitutes and 1 to 13 (median 3·5) for non-prostitutes. Only 70 (53%) of prostitutes answered this question, however, which may have been for several reasons. Firstly, there are real difficulties in calculating the number of clients in any period, because of the changeable work conditions and irregular working days of most prostitutes. Secondly, many prostitutes are reluctant to give any information that might indicate how much they are earning. Thirdly, several prostitutes apparently misinterpreted the question as asking how many non-paying sexual partners—that is, lovers—they had. In the careful distinction prostitutes make between their working and their private lives, "partner" generally refers to lovers whereas paying sexual partners are almost always referred to as clients, and this word did not appear in the question. As an interesting exercise we tried discounting those prostitutes who claimed that they had fewer than 10 sexual partners in the last year (on the assumption that they had only counted their lovers). On this basis the median number of sexual contacts a year rose from 175 to 450. The corresponding figures a month rose from 24·5 to 40·25.

Table 4 shows that a surprisingly high proportion (over one third) of both groups recorded that they had had bisexual partners during the previous five years. A further 13 (10%) prostitutes said they suspected that some of their partners were bisexual, but could not be sure. Many (38 (29%) prostitutes, 18 (33%) non-prostitutes) also recorded partners at risk from IV drug usage and from being male prostitutes (17 (13%) prostitutes, four (7%) non-prostitutes).

SEXUALLY TRANSMITTED DISEASES (STDs)

Table 5 shows the number of women affected, and the numbers of episodes of STDs that they had experienced during the previous five years. Analysis using Student's *t* test shows that this cohort of prostitutes had significantly more episodes of gonorrhoea, chlamydial infection, and pelvic inflammatory disease (PID) than the non-prostitute cohort ($p < 0.05$). They also reported more genital warts and abnormal Papanicolaou smears, but these differences were not significant.

In addition to the conditions shown in the table, seven women (six prostitutes and one non-prostitute) had contracted molluscum contagiosum, one prostitute had been infested with *Entamoeba histolytica*,

Table 5 *Sexually transmitted diseases (STDs) of 132 prostitutes and 55 non-prostitutes in previous five years*

STD	*Group*	*No (%) who had following No of episodes: 1*	*2*	*3*	*4*	*5+*	*Total*
Gonorrhoea	Prostitutes	36 (28)	23 (17)	9 (7)	6 (5)	2 (2)	76 (58)
	Non-prostitutes	6 (11)	1 (2)	0	0	0	7 (13)
Chlamydial infection	Prostitutes	37 (28)	11 (8)	7 (5)	1 (1)	5 (4)	61 (46)
	Non-prostitutes	10 (18)	2 (4)	0	0	0	12 (22)
Pelvic inflammatory disease	Prostitutes	19 (14)	6 (5)	1 (1)	1 (1)	2 (2)	29 (22)
	Non-prostitutes	4 (7)	1 (2)	0	0	0	5 (9)
Syphilis	Prostitutes	3 (2)	0	0	0	0	3 (2)
	Non-prostitutes	1 (2)	0	0	0	0	1 (2)
Hepatitis A	Prostitutes	4 (3)	0	0	0	0	4 (3)
	Non-prostitutes	1 (2)	0	0	0	0	1 (2)
Hepatitis B	Prostitutes	8 (6)	0	0	0	0	8 (6)
	Non-prostitutes	4 (7)	1 (2)	0	0	0	5 (9)
Herpes	Prostitutes	31 (24)	8 (6)	8 (6)	3 (2)	17 (13)	67 (51)
	Non-prostitutes	11 (20)	0	3 (6)	2 (4)	5 (9)	21 (38)
Trichomoniasis	Prostitutes	36 (27)	10 (8)	5 (4)	4 (3)	13 (10)	68 (52)
	Non-prostitutes	13 (24)	1 (2)	1 (2)	1 (2)	1 (2)	17 (31)
Thrush	Prostitutes	41 (31)	16 (12)	12 (9)	2 (2)	13 (10)	84 (64)
	Non-prostitutes	17 (31)	4 (7)	1 (2)	1 (2)	3 (6)	26 (47)
Genital or anal warts	Prostitutes	25 (19)	4 (3)	4 (3)	0	0	33 (25)
	Non-prostitutes	9 (16)	0	0	0	0	9 (16)
Abnormal Papanicolaou smear	Prostitutes	17 (13)	4 (3)	0	0	0	21 (16)
	Non-prostitutes	4 (7)	1 (2)	0	0	0	5 (9)

Table 6 *Use of condoms by sexual partners of 187 women tested for antibody to human immunodeficiency virus*

% Partners using condoms	No (%) of prostitutes (n=132)	No (%) of non-prostitutes (n=55)
0	16 (12)	42 (76)
1–10	40 (30)	5 (9)
11–20	9 (7)	1 (2)
21–40	15 (11)	1 (2)
41–60	13 (10)	2 (4)
61–80	5 (4)	0
81–99	11 (8)	0
100	14 (11)	3 (6)
No information	9 (7)	1 (2)

two prostitutes had been diagnosed as having chronic PID, and one non-prostitute had been treated for cancer of the cervix. Of the eight episodes of hepatitis B in prostitutes, four occurred in IV drug users and four in non-IV drug users. One non-IV drug user was a confirmed carrier of hepatitis B virus, and one IV drug user claimed to have had hepatitis B twice and hepatitis A once in the previous five years, though this could not be substantiated from her clinic records.

Seven (5%) prostitutes and six (11%) non-prostitutes had contracted no STD in the previous five years, and we had no information for three (2%) prostitutes.

USE OF CONDOMS

Table 6 shows the numbers of women whose sexual partners used condoms and for what percentage of sexual encounters. The numbers who used condoms regularly were very low in both groups. Condoms were not used at all by the partners of 42 (76%) non-prostitutes, and the partners of 65 (49%) prostitutes used condoms in fewer than 20% of encounters. Only the partners of 14 (11%) prostitutes used condoms all the time.

Discussion

This study was performed when HIV antibody testing had just become available in New South Wales, and there was a high level of publicly expressed concern about the possibility of the rapid spread of the acquired immune deficiency syndrome (AIDS) to heterosexual men and women via prostitution. None of the total of 387 prostitutes who were tested in the Sydney STD Centre during 1985, however, was seropositive. Nevertheless the cohort of 132 prostitutes and 55 non-prostitutes who completed our questionnaire clearly could have been exposed to the virus in several ways.

The risk factors most commonly associated with the spread of the virus in the West are some homosexual and bisexual practices and the sharing of syringes and needles in the use of IV drugs. In 1985, before the widespread introduction of improved blood testing procedures, recipients of blood and blood products were also at risk. Concomitant STDs have also been directly associated with HIV antibody positivity in African heterosexual women[11] and in European homosexual men.[12 13]

A high proportion of the women in our study were at risk of infection because of the behaviour of their sexual partners. Many women in each group reported sexual contacts with partners who were bisexual, used IV drugs, or were male prostitutes. Heterosexual transmission of HIV from men in high risk groups has been well documented[14–16] and there is epidemiological evidence of female to male sexual transmission.[17] In Africa the evidence suggests that AIDS is spread predominantly through heterosexual activity.[18 19]

In addition to having high risk partners, several women in the study put themselves directly at risk through their own behaviour; 19% of prostitutes and 24% of non-prostitutes gave histories of IV drug use. HIV antibodies have been reported in IV drug users in Sydney,[20] and IV drug use has been found to be associated with HIV infection in female prostitutes and in non-prostitute women.[1 21] Apart from intravenous drugs many women swallowed or inhaled large quantities of other drugs. Tranquillisers, marihuana, heroin, and cocaine were each used by 10% or more of both groups. The figures on drug usage indicate that a large number of women in this survey led unhealthy and stressful lives that may well have lowered their resistance to infection.

STD histories showed that a similar range of diseases was experienced by both groups of women. The higher incidence of some STDs in prostitutes is probably attributable to the very high numbers of sexual partners that they encounter. In other studies specific STDs have been associated with seroconversion or the progression of HIV infection, or both. They include gonorrhoea,[4 5 12 18] syphilis,[13 22] and hepatitis.[12 13 22] A study in 1986 described a significant association between a lifetime number of episodes of STDs and seroconversion.[12] It also showed that a history of an acute infection with STD during the year before examination was associated with the development of HIV antibody, or the progression of HIV infection.

The risk of the sexual transmission of HIV and the spread of other STDs may be considerably reduced by the widespread use of condoms.[23 24] In this study, however, condom usage by women in both groups was low. Only 14 (11%) prostitutes and three (5%) non-prostitutes used condoms for every sexual encounter. Conversely, 65 (49%) prostitutes and 48 (87%) non-prostitutes used condoms in only one in five encounters, or fewer. Given the previously described large numbers of partners engaging in "risky" behaviour,

this level of unprotected sexual activity adds greatly to the potential for spread of HIV infection.

The absence of any HIV antibody positivity in this cohort of risk taking women might be explained by the small number of antibody positive people in the heterosexual population in Australia at that time,[21] and the fact that the women tested were self selected patients attending the STD Centre. The prostitutes were not fully representative of the Sydney prostitute population as a whole, and in particular did not include women who worked predominantly on the street, from single rooms, or in small brothels in the inner city. Most of them were parlour prostitutes who underwent regular health checks.

Notwithstanding the absence of any detectable level of HIV infection in female prostitutes in Sydney in 1985, we conclude that the virus could spread rapidly within the prostitution industry and back into the wider community through sexual contacts and IV drug use. There is therefore an urgent need to enhance current control measures including: the preventive education of the women themselves, their sexual partners, clients and the managers of prostitution premises; the continued provision of condoms and of safer sex information; and initiatives to reduce the practice of intravenous needle sharing by prostitutes who use drugs. It is also essential to continue to monitor the health of prostitutes during this early stage of the heterosexual spread of HIV infection in Australia.

A larger, long term, prospective study of HIV seroprevalance in prostitutes, based on this work, is in progress.

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