

The vulnerability of Brazilian female prisoners to HIV infection

L. Strazza¹,
R.S. Azevedo²,
H.B. Carvalho³
and E. Massad⁴

¹Laboratório de Investigação Médica, LIM-01, Hospital das Clínicas, and Departamentos de ²Patologia, ³Medicina Preventiva and ⁴Medicina Legal, Faculdade de Medicina, Universidade de São Paulo, São Paulo, SP, Brasil

Abstract

The purpose of the present study was to determine the vulnerability of women in prison to HIV infection. The study was carried out from August to October 2000 in a São Paulo State Penitentiary, where 299 female prisoners were serving time. We interviewed and obtained a blood sample from 290 females who agreed to enter the study. Sera were tested for the presence of antibodies to HIV, hepatitis C virus (HCV) and syphilis and the odds ratio (OR) was calculated for variables related to HIV positivity on the basis of a questionnaire. The overall prevalence data were: 13.9% for HIV (37 of 267), 22.8% for syphilis (66 of 290), and 16.2% for HCV (47 of 290). Sexual partnership variables were significantly related to HIV infection. These included HIV-positive partners (OR = 7.36, P = 0.0001), casual partners (OR = 8.96, P = 0.009), injectable drug user partners (OR = 4.7, P = 0.0001), and history of sexually transmitted disease (OR = 2.07, P = 0.05). In addition, a relationship was detected between HIV infection and drug use (OR = 2.48, P = 0.04) and injectable drug use (OR = 4.2, P = 0.002). Even women with only one partner presented a significant OR for HIV infection (OR = 2.57, P = 0.009), reflecting their vulnerability due to their trust in their partner, who did not use a condom. Although the use of injectable substances is associated with HIV infection, our results point to sexual behavior as the most important component of HIV transmission in the female prisoner population.

Key words

- HIV
- HCV
- Syphilis
- Vulnerable populations
- Women
- Prisoners

Correspondence

L. Strazza
Disciplina de Informática Médica
LIM-01, HC, FM, USP
Av. Dr. Arnaldo, 455, 3º andar
01246-903 São Paulo, SP
Brasil
Fax: +55-11-3081-7717
E-mail: strazza@usp.br

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Introduction

In the 1980s, the woman/man ratio for new cases of HIV infection in São Paulo State, Brazil, was 1/27, with a progressive change to 1/3 by the mid-1990s (1,2). Recent data published by the Epidemiological Surveillance Center of DST and AIDS, in São Paulo State (3), showed that the cases notified in 2001 were 1113 for women and 2135

for men, corresponding to a continuation of the 1/2 trend for the woman/man ratio of new cases observed during the last 5 years.

Women are considered to be a population particularly vulnerable to infections, especially sexually transmitted diseases (STD) (4,5). The rapid increase in STD and acquired immunodeficiency syndrome (AIDS) is more noticeable among inmates of correctional facilities than among the general popu-

lation (6,7). Many behavioral studies have provided evidence for significant rates of risk behavior in correctional settings (5,8). The problem has been fueled by the rapidly increasing incidence of human immunodeficiency virus (HIV) infection and AIDS among prisoners in many countries (9). About 17% of AIDS cases notified in the US in 1996-1997 were for inmates of the penal system. About 8900 inmates of American prisons, in 1997, had AIDS and 35 to 47 thousand had HIV (4,10). Since the beginning of the 1990's, AIDS has been one of the major causes of death among women aged 25 to 49 years in Brazil (1,2). In addition, from 1996 to 1999 there was an increase from 3 to 22% of the prevalence of syphilis among women in the US penal system (11).

Some studies (4,12-19) carried out on female and male prisoners in American correctional prison systems and in penitentiaries in different countries have shown that serology for syphilis and hepatitis C virus (HCV) gave indirect information about the route of transmission of HIV infection.

Thus, the objective of the present study was to determine the risk factors for HIV infection among women prisoners before and during their time in a penitentiary by measuring the seroprevalence of the virus in a State Penal Institution in São Paulo, Brazil and by applying a questionnaire concerning habits and sexual behavior.

Material and Methods

The study was carried out in a Reference Prison, the Butantã Female Penitentiary, located on Rodovia Raposo Tavares, km 19.5, in Jardim Arpoador-Butantã, São Paulo city. The prison utilizes two systems: normal prison with capacity for 208 women and a minimum security section for 298 female prisoners.

From August to October 2000 we contacted 299 prisoners from the two systems, 290 of whom agreed to participate in the

study. All individuals recently admitted to the institution were included in the study during the two months we visited the penitentiary. They were included in order to provide evidence about the epidemiological background of this population, i.e., the extent and scope of HIV infection in the community from which the inmates originate, and, perhaps more importantly, to allow comparisons with previous studies. Participation in the study was voluntary and confidentiality was guaranteed.

Twenty-three of the 290 inmates refused to participate in anti-HIV screening. They said they were not interested in knowing their serological condition at that time, a reason also given to other investigators (20,21), but they agreed to be tested for syphilis and HCV. Thus, 267 inmates were submitted to the anti-HIV test and 290 were submitted to anti-syphilis and anti-HCV tests.

Since we did not know if the 290 prisoners were illiterate or not, they were interviewed face-to-face (22) using a questionnaire that covered their sex practices and those of their partners, use of illicit drugs, and knowledge of STDs and AIDS adapted from an injecting drug users study in Santos, Brazil (23).

Blood was collected by a nurse and the interviews were conducted by five psychologists previously trained by the psychologist in charge of the project. The results of the serological tests were delivered directly to the prisoners. The administrative staff of the prison did not have access to the replies to the individual questionnaires or to the results of the serological tests, but the latter were promptly reported to the medical staff responsible for the care of the female prisoners.

Laboratory tests

Serum samples were tested for antibodies against HIV types 1 and/or 2 (HIV-1 and HIV-2) using a commercial enzyme-linked

immunosorbent assay (Ortho HIV-1/HIV-2 Ab-Capture ELISA Test System, Ortho-Clinical Diagnostics Inc., East Bridgewater, NJ, USA). The presence of anti-HIV antibodies was confirmed in samples with a positive ELISA using a commercial immunoblotting assay (New Lav Blot I, Sanofi Diagnostics Pasteur S.A., Marnes la Coquette, France).

Seroprevalence for hepatitis C was determined by a commercially available enzyme-linked immunoassay (Murex anti-HCV version 4.0, Murex Biotech Limited, Abbott Diagnostics Division, Dartford, UK). Antibodies against *Treponema pallidum* were determined by a commercial enzyme immunoassay kit (ICE* Syphilis, Murex Biotech Limited, Abbott Diagnostics Division).

Cut-off values were determined according to manufacturer instructions for each batch, and results were recorded qualitatively as follows: if the absorbance of a serum sample was above the cut-off calculated for the batch, the subject was classified as seropositive (presence of antibodies against a given pathogen) and if the absorbance was equal to or below the cut-off, the subject was classified as seronegative.

Ethical aspects

The project was approved by CAPPesq/HCFMUSP (No. 771/99) on May 10, 2000 and the female prisoners who participated in the study signed an informed consent term. The confidentiality of all information was guaranteed and the results of the serological tests were given only to the interested prisoner by the researchers. The prisoners were instructed to contact the medical staff of the penitentiary assistance when appropriate.

Statistical analysis

The association between HIV, HCV and syphilis markers and questionnaire variables was tested by cross-tabulating the data in a bivariate analysis and by applying the χ^2 test

or Fisher's exact test and calculating the odds ratio (OR) and P value. Logistic regression was performed by analyzing HIV prevalence against independent variables and by employing stepwise backward analysis techniques. The EPI-INFO, version 6, and Stata 8.0 software was used.

Results

The prevalence estimates for HIV, hepatitis C and syphilis in this group of female prisoners are presented in Table 1. Only 17 of the 290 prisoners knew their serology status for HIV before this study was performed. All women known to be HIV-positive were under treatment at the Penitentiary during the time of their imprisonment. An interesting fact was that among the 37 HIV-positive prisoners, only 8 thought that they were not at risk for HIV infection.

The age of the female prisoners included in the sample ranged from 18 to 65 years (mean \pm SD: 31.0 \pm 9; median: 29 years); 40% (116 of 290) had been arrested before, 53% (147 of 279) were single, 58% (94 of 162) had children, 41.4% (91 of 220) were taking the pill for birth control, 56% (156 of 279) were white, 52.7% (147 of 279) had completed primary school, 40.1% (112 of 279) had completed high school, 6.5% (18 of 279) were illiterate, and 0.7% (2 of 279) had higher education (2 lawyers).

The population was highly heterogenous, with very distinct patterns of crimes committed. The most common crime was burglary/robbery (50.3% were imprisoned based on

Table 1. Seroprevalence of HIV, HCV and syphilis among female prisoners at the Butantã Women's Penitentiary, São Paulo, Brazil, in 2000.

	HIV	HCV	Syphilis
Number of prisoners	267	290	290
Seropositive	37	47	66
Prevalence	0.139	0.162	0.230
95% CI	0.097-0.180	0.119-0.205	0.179-0.276

Table 2. Frequency of female prisoners who maintain sexual intercourse out of and in the Butantã Women's Penitentiary, according to gender of the partners.

Partner gender	Out (%)	In (%)
Female	13 (4.7)	59 (24.0)
Male	228 (82.3)	28 (11.4)

Sixty-three percent of the prisoners had no sexual activity in the penitentiary.

Table 3. Drug use profile among female prisoners and their partners, as reported by the female prisoners, in the Butantã Women's Penitentiary, São Paulo, Brazil.

Drug	Prisoners (%)	Partners (%)
Marijuana	163 (61)	143 (52)
Cocaine	130 (47)	105 (38)
Crack-cocaine	119 (43)	88 (32)
Inhalants	108 (39)	14 (5)
LSD	19 (7)	9 (3)
Amphetamine	18 (7)	11 (4)
Hashish	7 (2)	0 (0)

Table 4. Injectable drug use (IDU) profile among prisoners in the Butantã Women's Penitentiary, São Paulo, Brazil.

Question	Answer	
	Yes	No
Use of injectable drugs	9% (24)	91% (239)
Syringe sharing	44% (11)	56% (14)
Sex with injecting drug user	15% (41)	91% (216)

Table 5. History of past and present sexually transmitted diseases (STD) reported by the prisoners in the Butantã Women's Penitentiary, Sao Paulo, Brazil, and their knowledge of their partners having STD.

Disease	% Prisoners (N = 61)	% Partners (N = 24)
Syphilis	11.50 (7)	25.0 (6)
Gonorrhea	6.55 (4)	12.5 (3)
Yellow discharge	8.20 (5)	8.5 (2)
Condyloma	1.65 (1)	4.2 (1)
Other genital lesions treated	1.65 (1)	8.5 (2)
Itching	8.00 (4)	8.5 (2)
Treated for unknown STD	13.11 (8)	33.3 (8)
Not answered	1.63 (31)	-

articles 157 and 155 of the Brazilian Penal Code), followed by drug use and dealing (28.9%, articles 12 and 14). The replies to questions about sex and drugs can be considered to be of doubtful veracity because it is very difficult to talk about these subjects with persons who are prisoners.

Table 2 shows the sex habits of the women interviewed when they were out of the penitentiary and when they were imprisoned. It is interesting to point out that there were occasional reports of homosexuality, given the absence of male partners during imprisonment.

Concerning drug abuse, the female prisoners stated that they use more illicit drugs than their partners, as shown in Table 3. The injecting drug use (IDU) profile of this group is shown in Table 4. IDU was much less frequent among these prisoners than among their partners (9 and 15%, respectively). However, when the prisoner reported having an IDU partner, her risk of HIV and HCV infection was higher, with an OR of 4.72 and 8.16, respectively ($P < 0.0001$).

Twenty-two percent of the female prisoners (61 of 276) were aware of having had at least one STD, with syphilis being the most frequent (11.5%, 7 of 61). Among these women, 8.7% (24 of 276) knew their partners had an STD, and again syphilis was in first place, with a frequency of 25% (6 of 24 male partners). Complete data are shown in Table 5.

The OR for HIV infection was calculated by crossing each questionnaire variable with HIV serostatus (bivariate analysis), and the statistically significant results are shown in Table 6. It can be seen that variables related to sexual partnership had significantly higher P values for OR. HIV infection was associated with HCV infection (OR = 3.48; $\chi^2 = 10.8$, $P = 0.001$), but no association was found between HIV and syphilis.

Logistic analysis was applied to the variables shown in Table 6, plus HCV serostatus and age. In the final model all variables were

removed except for the IDU partner, with a statistically significant OR = 20.7 (2.6-163.8) (P = 0.04).

We also performed another logistic analysis including the same independent variables except HCV serostatus, which was entered as a dependent variable. Again, in the final model all variables were removed except the IDU partner, with a higher and even more significant OR = 36 (3.34-388.2) (P = 0.003).

Discussion

The prevalence of HIV was 13.85% among female prisoners, a value higher than that reported by Azevedo in 1999 (15) for disadvantaged young women aged 12 to 18 years arrested in São Paulo (10.3%). The present value was lower than that reported by Ferreira (13) in a study of female prisoners of the São Paulo State Penitentiary conducted from 1994 to 1995, which was 20.6%, but was similar to that reported by Lopes et al. (4) for the same penitentiary in a study conducted from 1997 to 1998 (14.5%).

The present study provides some quantitative information about the likely route of HIV transmission among these female prisoners. As shown by the OR, by bivariate analysis and by logistic regression, sexual partnership seems to be the most important risk of acquiring HIV.

These data are in contrast with those reported by Massad et al. (16) for male prisoners, which showed that self-injection of illicit drugs was the main route of HIV transmission. Gender, that can reflect different social habits and risk behaviors, seems to play a role in HIV transmission, and therefore different approaches should be used for men and women.

According to Dixon (24), confinement is considered to be a unique moment in the

Table 6. Statistically significant risk behaviors for HIV infection after calculation of the odds ratio (OR) for each questionnaire variable related to HIV seropositivity.

Behavior	n	N	%HIV+ (x)	OR	95% CI	χ^2	P
Partner was IDU	35	236	38 (12)	4.7	1.87-11.89	15.1	0.0001
Partner was HIV+	14	248	20 (7)	7.36	2.1-25.9	15.8	0.0001
Fixed partner	68	255	44 (16)	2.57	1.16-5.68	6.8	0.009
Casual partners	13	59	63 (5)	8.96	1.42-62.81	-	0.009
Prisoner is IDU	21	242	22 (8)	4.2	1.42-12.2	9.8	0.002
Prisoner uses drugs	187	267	84 (31)	2.48	0.93-7.02	3.98	0.04
Previous STD	60	255	36 (13)	2.07	0.9-4.7	3.69	0.05

IDU = injectable drug user; STD = sexually transmitted diseases. Fisher's exact test.

lifetime of female prisoners, when they can take care of their body and health and learn about prevention. However, it is an accepted fact that confinement increases the risk of the acquisition of STDs, including HIV infection (5,25-30).

Wolfe et al. (31) and Perez-Molina et al. (32) pointed out the spread of HIV to this floating population, bringing their diseases with them from one prison to another when they are transferred.

The prevalence of HIV (13.85%) observed in the present study also reflects the virtual absence of prevention programs directed toward the prison population. In addition, even though female prisoners have been regularly tested for HIV during the last decade, only a small fraction (less than 5%) knew about their HIV serostatus at the time of the present study.

Our data confirm the increase of HIV infection among women, mainly by sexual transmission, as demonstrated by the strong correlation of HIV seroprevalence and sexual vulnerability with their partners, in addition to high syphilis seroprevalence. The present results also emphasize the need for educational and adequate prevention programs directed at the female and male prison population in order to reduce the vulnerability of women to HIV/AIDS and STDs.

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