VOLUNTARY ANONYMOUS LINKED STUDY OF THE PREVALENCE OF HIV INFECTION AND HEPATITIS C AMONG INMATES IN A CANADIAN FEDERAL PENITENTIARY FOR WOMEN

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Abstract • Résumé

Objective: To determine the seroprevalence of HIV infection and hepatitis C among inmates of a federal penitentiary for women.

Design: Voluntary, anonymous, linked, point-prevalence study involving testing of blood samples for antibodies to HIV and hepatitis C virus.

Participants: All inmates of the multilevel security federal Prison for Women, Kingston, Ont., who volunteered to participate in the study. Inmates at this long-stay facility are from across Canada.

Outcome measure: Seroprevalence rate among participants of antibodies to HIV and hepatitis C virus.

Results: Of the 130 inmates available for study 113 (86.9%) agreed to donate a blood sample. One woman (0.9%) was HIV positive; 45 (39.8%) were positive for hepatitis C antibody.

Conclusions: It is possible to obtain a high participation rate in a voluntary, anonymous, linked point-prevalence study in a long-stay penitentiary. The HIV seroprevalence rate of 0.9% is lower than that found in studies in provincial (short-stay) prisons. However, the high rate of antibodies to hepatitis C suggests a significant level of risk behaviour, most likely injection drug use, and suggests the potential for a rapid increase in the rate of HIV infection should the number of newly admitted HIV-positive inmates who use injection drugs rise.

Objectif : Déterminer la séroprévalence de l'infection à VIH et de l'hépatite C chez les détenues d'un pénitencier fédéral pour femmes.

Conception : Étude volontaire, anonyme, liée, de prévalence ponctuelle comportant l'analyse de spécimens de sang pour le dépistage d'anticorps du VIH et du virus de l'hépatite C.

Participantes : Toutes les détenues de la Prison pour femmes de Kingston (Ont.), établissement fédéral à sécurité multiniveau, qui se sont portées volontaires pour participer à l'étude. Les détenues de cet établissement de long séjour proviennent de toutes les régions du Canada.

Mesure des résultats : Taux de séroprévalence, chez les participantes, des anticorps du VIH et du virus de l'hépatite C.

Résultats : Sur les 130 détenues disponibles pour l'étude, 113 (86,9 %) ont consenti à donner un spécimen de sang. Une femme (0,9 %) était infectée par le VIH; 45 (39,8 %) étaient porteuses de l'anticorps de l'hépatite C.

Conclusions : Il est possible d'obtenir un taux de participation élevé à une étude volontaire, anonyme, liée, de prévalence ponctuelle dans un pénitencier de long séjour. Le taux de séroprévalence du VIH, qui est de 0,9 %, est inférieur à celui qu'on a trouvé dans le cadre d'études effectuées dans des prisons provinciales (court séjour). Le taux élevé d'anticorps de l'hépatite C indique toutefois un niveau important de comportement à risque, fort probablement de consommation de drogues injectées, et que le taux d'infection au VIH pourrait augmenter rapidement si le nombre de nouvelles détenues infectées par le VIH qui s'injectent des drogues augmente.

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The prevalence rate of HIV infection in prisons is higher than that in the general population and seems to represent a concentration of people at high risk of infection drawn most frequently from major urban centres.[1] The prevalence rate among people entering North American penitentiaries is thought to be about 10 times greater than the rate in the overall population.[2] Little is known about the spread of HIV infection in prisons, and although there was one report of a small outbreak in a Scottish prison,[3] there is as yet little direct evidence of significant spread within prisons.

In North American prisons HIV seroprevalence studies have shown that in general the rate among female inmates is about twice that among male inmates, with considerable regional variation in the United States[4] and fairly uniform rates in Canada (of around 1% among men and 1.2% to 3.3% among women).[5-7] Higher rates were reported previously from Quebec provincial prisons (3% among male volunteers[8] and 7% among female volunteers[9]), but these studies were conducted over a long period and no details were given as to the proportion of the total inmate population studied.

Most HIV seroprevalence studies in prisons have looked at testing, both voluntary and involuntary, at the time of entry and have been in short-stay institutions. All such studies involving female inmates in Canada have included women entering provincial prisons (where sentences of less than 2 years are served [short-stay institutions]).[5,7] There are no cross-sectional studies of an existing inmate population in a women's federal prison (long-stay institution), although one such study was reported involving male inmates.[6] Furthermore, many prison studies have been unlinked anonymous studies, which raises ethical questions.

Some of the risk behaviours associated with HIV transmission, most notably injection drug use, are also linked to the transmission of hepatitis C. A seroprevalence study of hepatitis C in a federal prison in British Columbia showed an infection rate of 25.5% among the 23% of inmates who volunteered a blood sample;[10] this high rate suggests that there is a significant problem with hepatitis C in prisons.

We performed an anonymous, linked, point-prevalence study of the seroprevalence of HIV infection and hepatitis C in the federal Prison for Women, a multilevel security facility in Kingston, Ont. Part of the impetus to perform this study came from the inmates themselves, who were concerned that several of them had HIV infection and that injection equipment had been shared. Because of the inherent difficulties in conducting such a study in a prison, careful attention was paid in preparing the ground work, some details of which are given in this article. The women were aware of a similar study in the nearby Joyceville Penitentiary for men[6] and saw the present study as a way to undergo anonymous testing for HIV infection and hepatitis C, about which there was also concern.

Methods

At the time of the study, there were 133 inmates in the federal Prison for Women, Kingston, Ont., all serving sentences of more than 2 years. Table 1 shows their demographic characteristics and sentences.

As in a previous study,[6] a sample of blood was obtained from each prisoner who volunteered to participate. Self-adhesive labels were printed with two identical, randomly generated, nonsequential numbers, one on

Table 1: Demographic characteristics of inmates in the federal Prison for Women, Kingston, Ont., at the time of the study

Characteristic	No. (and %) of women *n = 133*
Age group, yr	
18–19	1 (0.8)
20–24	15 (11.3)
25–29	20 (15.0)
30–35	38 (28.6)
36–39	18 (13.5)
40–44	24 (18.0)
45–49	10 (7.5)
≥ 50	7 (5.3)
Length of sentence, yr	
< 5	64 (48.1)
5–10	34 (25.6)
10–20	10 (7.5)
> 20	1 (0.8)
Life (eligible for parole at 10 yr)	24 (18.0)
Place of residence	
Newfoundland	3 (2.3)
Prince Edward Island	1 (0.8)
Nova Scotia	12 (9.0)
New Brunswick	2 (1.5)
Quebec	12 (9.0)
Ontario	78 (58.6)
Manitoba	2 (1.5)
Saskatchewan	2 (1.5)
Alberta	9 (6.8)
British Columbia	1 (0.8)
Outside Canada	5 (3.8)
Unknown	6 (4.5)

each end. The tube was to be labelled with one half of the label, and the other half was given to the prisoner, who was told that her results, in a sealed envelope bearing the number on the outside, would be supplied to her only on presentation of the corresponding half of the numbered label. This process ensured that the prisoner would be the only one to know her test result.

Exploration of the study issues was carried out initially at meetings between the study team, an inmate committee and the Peer Health Counselling Group. Following this, inmates were informed of the study method and educated about HIV infection and hepatitis C. This was carried out in a number of ways: presentations by the study group and the Peer Health Counselling Group; a presentation on the prison's closed-circuit television of a film made by the Joyceville Penitentiary inmates of the study carried out in that prison; and the distribution of suitable written materials. During the consultations before the study, the inmates indicated that they would not participate if any data regarding risk behaviours were collected. Such risk behaviours as needle sharing are prohibited in prison, and the inmates felt that the collection of this type of information might result in repercussions. Because of concerns that those who volunteered for testing would be stigmatized by corrections staff, all inmates were invited to come to the areas where blood was being drawn and to enter a raffle regardless of whether they were prepared to give a sample. The inmates were informed that they had access to counselling by independent counsellors after testing regardless of the result of the test.

After the period of preparation the prison was closed for a day (June 30, 1994) to allow all interested inmates to participate in the study. A team consisting of two experienced venesectionists, a physician, a social worker and two workers from the Kingston AIDS Project collected the blood samples. Results were distributed about 4 weeks later.

Blood samples were sent to the Public Health Laboratory Kingston, Kingston, Ont., for testing. Screening for HIV antibodies was performed using the enzyme-linked immunoassay (ELISA) (DETECT-HIV; BioChem ImmunoSystemes Inc., Montreal); positive samples were retested, and if positive again the result was confirmed by an immunoblot test. Screening for hepatitis C antibodies was performed by the Central Public Health Laboratory, Toronto, using the Ortho 3.0 ELISA (Ortho Diagnostics, Markham, Ont.); samples with positive or intermediate results were further tested using the third-generation Organon Technika UBV HCV EIA (enzyme immunoassay) (Akzo, Scarborough, Ont.) or the Chiron RIBA HCV 3.0 assay (Ortho Diagnostics).

The study design was approved by the Ethics Review Committee of the Queen's University Faculty of Medicine.

Results

Of the 133 inmates 130 were present on the day of the study; 3 were away on a day pass. In all, 113 (86.9%) volunteered to donate a blood sample. The study team was successful in obtaining a sample from all who volunteered.

One inmate was positive for HIV antibodies, for a prevalence rate of 0.9%. Forty-five were positive for hepatitis C antibodies, for a prevalence rate of 39.8%. Ten (8.8%) of the inmates tested did not collect their results.

Discussion

This is the first point-prevalence study in North America of voluntary, anonymous, linked HIV and hepatitis C antibody testing in an existing population of inmates in a long-stay penitentiary for women. Most studies so far have examined seroprevalence rates on entry to prison or in short-stay prisons.

Our study was unusual in that it was linked. Most studies previously performed in Canada and many in the United States have been anonymous and unlinked, and therefore the subjects contribute to the study with no benefits to themselves. Since positive results of HIV and hepatitis C antibody testing have serious health consequences for the subjects, their families and their associates, it is problematic to perform a study without giving the subjects a chance to access the information obtained. Anonymity was necessary because the inmates in our study would not have agreed to participate if the test results were made available to the authorities.

Studies involving inmates in long-stay institutions are difficult because a high level of trust has to be established between the researchers and the inmates.[1] Inmates are concerned about stigmatization if the seroprevalence rate is high and are reluctant to give data regarding risk behaviours because almost all risk behaviours constitute institutional offences. These issues are of somewhat less concern to inmates in short-stay institutions; nevertheless, participation rates for HIV antibody testing in such prisons in France and Scotland in which collection of data on risk behaviours was attempted were only 65% and 75% respectively.[11,12] We did not attempt to assess risk behaviours in our study population because the inmates were emphatic that they would not cooperate if we did so.

Our intensive education campaign and the reassurance of confidentiality resulted in a very high volunteer rate, a group of incarcerated women who received important information about their personal health and a very constructive health promotion experience. Thus, our study fully complied with the spirit and the letter of the World Health Organization's recommendations for research involving inmates.[13]

Volunteer bias has been recognized as a problem in nonincarcerated populations. In prison studies in which this was addressed directly with anonymous linked voluntary testing followed by mandatory testing, inmates in high-risk groups were overrepresented among the volunteers,[14,15] probably because anonymous linked studies offer an opportunity to undergo anonymous testing. The women in our study had manifested anxiety about their HIV and hepatitis C status, and we feel that most of the women at high risk took advantage of the opportunity for testing.

Previous studies in Ontario[6,7] and in other parts of Canada[5] have shown the HIV prevalence rate to be about 1% among male inmates and 1.2% to 3.3% among female inmates. Most studies in the United States have also shown a higher prevalence rate among female than among male inmates.[2] The low rate in the present study may have been because our sample was relatively small and because all of the HIV-positive inmates may not have participated. A third possibility is that the higher rates among women newly admitted to provincial institutions[5,7] reflect and magnify the prevalence of HIV seropositivity in the communities from which the women were drawn, probably by about 10-fold. Because the incidence rate of HIV infection is increasing among women[16] and it also appears to be on the rise among people who use injection drugs in Canada's larger cities, it is not surprising that the prevalence rate among newly admitted inmates is higher than the rate in the relatively static population of a long-stay penitentiary.

Results from Canadian studies[5,7,9] have indicated that injection drug use is the main risk factor among women inmates. The risk of acquiring a bloodborne infection through needle sharing depends on the prevalence of the infection in the needle-sharing community. Therefore, the low HIV prevalence rate in our study does not indicate a low prevalence of needle sharing; rather, it reflects a low risk of needle sharing with an infected individual. The hepatitis C prevalence rate of 40%, a cause for concern in its own right, indicates a population with significant risk behaviours, past or present. Because the prevalence rate of hepatitis C in the community, as determined from voluntary blood donations, is about 0.05%,[17] the rate we found in this long-stay penitentiary raises a serious concern that risk behaviours are current, a concern substantiated by our conversations with the women themselves. Thus, if the number of HIV-positive people who use injection drugs increases in the community, and subsequently in prisons, a rapid increase in the rate of HIV infection in prisons remains a threat.

Although the natural history of hepatitis C is still not completely understood most cases are thought to be bloodborne,[18] sexually transmitted infection being less common.[19] It is currently believed that most infected people will continue to carry the virus and that chronic hepatitis will develop in approximately 50%, its complications causing considerable morbidity and mortality.[20] It may take up to 3 months for hepatitis C antibodies to become detectable following infection. If there is significant spread occurring in the prison some of the women may be viremic but still have negative antibody test results; by testing for antibodies alone we may have underestimated the total number of cases of hepatitis C. Most of the women who had a positive test result should be regarded as having hepatitis C viremia. Thus, regardless of the implications for HIV spread, the high rate of hepatitis C is of serious concern, not only for the infected women in prison but also for those in the communities into which they will be released. As we had promised before the study, we offered nominal testing for hepatitis C to all the inmates, along with further testing of liver function, detection of hepatitis C viremia and treatment for those who were suitable. The nominal screening is currently being done.

We cannot extrapolate our findings to all Canadian federal penitentiaries; indeed, the study in British Columbia prisons showed a considerably lower rate of hepatitis C than ours, albeit in a smaller sample of male inmates.[10] However, those results and ours indicate an urgency for dealing with the spread of bloodborne diseases in prisons. The recent report by the Expert Committee on AIDS in Prisons (ECAP report), commissioned by Correctional Service Canada,[5] provided some clear recommendations of how to prevent HIV transmission in prisons, equally applicable for preventing other bloodborne diseases such as hepatitis C. In the long term further studies of the natural history and modes of spread of hepatitis C are required, but for now a window of opportunity exists to prevent a rapid increase in the spread of disease, such as has occurred in US prisons, where HIV infection is now endemic. Full implementation of the ECAP recommendations is urgently required.

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In June 1995 we performed a voluntary linked study of the seroprevalence rate of hepatitis C antibodies among the inmates at the Joyceville Penitentiary for men.[21] Of the 592 inmates 408 (68.9%) volunteered to donate a blood sample; 114 (27.9%) had positive test results.

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Sept. 26–28, 1996: Canadian Mental Health Association 1996 National Conference

Hamilton, Ont.

1996 National Conference, Canadian Mental Health Association, Ontario Division, 2301–180 Dundas St. W, Toronto ON M5G 1Z8; tel 416 977-5580, ext. 16; fax 416 977-2264

Oct. 11–13, 1996: 4th World Biomedical Conference of the Hellenic Diaspora

Nicosia, Cyprus

Pancyprian Medical Association, PO Box 1348, Nicosia, Cyprus; tel 011 357 2 367-401, fax 011 357 2 367-016

Dec. 8–11, 1996: 2nd National Canadian Conference on Immunization

Toronto

Mr. Chuck Schouwerwou, conference and committee coordinator, Childhood Immunization Division, Laboratory Centre for Disease Control, PL # 0603E1, Tunney's Pasture, Ottawa ON K1A 0L2; fax 613 998-6413

Apr. 14–16, 1997: Community and Hospital Infection Control Association (Canada) National Education Conference

Quebec

Mrs. Gerry Hansen, conference planner, PO Box 46125, RPO Westdale, Winnipeg MB R3R 3S3; tel 204 897-5990, fax 204 895-9595

Du 27 juill. au 1er août 1997 : 16e Congrès international de nutrition (sous les auspices de l'Union internationale des sciences de la nutrition)

Montréal

Secrétariat du congrès, IUNS '97, Conseil national de recherches Canada, Édifice M-19, ch. Montréal, Ottawa ON K1A 0R6; tél 613 993-7271, fax 613 993-7250

July 27–Aug. 1, 1997: 16th International Congress of Nutrition (under the auspices of the International Union of Nutritional Sciences)

Montreal

Congress Secretariat, IUNS '97, National Research Council Canada, Building M-19, Montreal Rd., Ottawa ON K1A 0R6; tel 613 993-7271, fax 613 993-7250

Du 13 au 16 oct. 1997 : 9e Conférence internationale sur les maladies respiratoires professionnelles (parrainée par le Bureau international du travail et organisée par le Comité national d'organisation en collaboration avec le ministère du Travail du Japon et l'Association de la santé et de la sécurité au travail du Japon)

Kyoto (Japon)

9e Conférence internationale sur les maladies respiratoires professionnelles, Secrétariat, Association de la santé et de la sécurité au travail du Japon, 5-35-1, Shiba, Minato-ku, Tokyo 108, Japon; tél 011 81 3 3452-6841, fax 011 81 3 3453-8034

Oct. 13–16, 1997: 9th International Conference on Occupational Respiratory Diseases (sponsored by the International Labour Office and organized by the Japanese National Organizing Committee in collaboration with the Ministry of Labour of Japan and the Japan Industrial Safety and Health Association)

Kyoto, Japan

9th International Conference on Occupational Respiratory Diseases, Secretariat, c/o Japan Industrial Safety and Health Association, 5-35-1, Shiba, Minato-ku, Tokyo 108, Japan; tel 011 81 3 3452-6841, fax 011 81 3 3453-8034