Arch Public Health
1997, 55, 87-97

Tuberculosis, HIV, hepatitis B and risk behaviour in a Belgian prison

by

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Abstract

Prisons are ideal places for transmitting infectious diseases because of the environmental conditions, the high concentration of HIV infected individuals and the occurrence of risk behaviour. A voluntary medical examination accompanied by an interview was proposed to all new inmates of a Belgian prison and was performed by a team not connected to the prison. Prevalences of tuberculosis, HIV and hepatitis B infection as well as the occurrence of risky sexual behaviour and injecting drug use were studied. As was expected, the prevalences of tuberculosis (426/100 000), HIV (1.2%) and hepatitis B infection (4.4% hepatitis B surface antigen positive) were much higher in the population of inmates than among the general Belgian population. Self reported use of illegal drugs (42%) was even higher than was shown

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in previous studies in Belgian prisons. Active detection of TB cases in prisons, counseling about sexually transmitted diseases and a more adequate reaction to the drug problem of the prisoners are urgently needed. Independent teams, who guarantee the confidentiality of the inmates, may play an important role in assisting prison authorities to set up such programs.

Key-words

Belgium, prison, tuberculosis, HIV, hepatitis B, risk behaviour.

Introduction

Tuberculosis (TB), Human Immunodeficiency Virus/ Acquired Immunodefiency Syndrome (HIV/AIDS) and hepatitis B are potentially major public health issues in prison populations. Prisons provide a good environment for tuberculosis transmission from person to person because of crowding and poor ventilation (1). A review of TB cases among inmates in New York showed a spectacular increase of TB cases in parallel with the AIDS epidemic (2). There is furthermore a high number of HIV infected people incarcerated (3-6). In the U.S.A., AIDS became the leading cause of death among inmates. A survey of the European Council reports HIV seroprevalence in prisons for 17 countries in 1987 (7). The overall estimate was higher than 10%, whereas the rates for Belgian prisons were amongst the lowest, namely 1.3%.

A high frequency of injection of drugs, as well as of homosexual activity has been reported in correctional settings (8-13). The prevalence of risk behaviour decreases in prison, but the risks increase. Injecting drug users (IDU) are heavily represented in the prison population, since many of the criminal offences leading to incarceration are drug related (14). Among prisoners intravenous drug use has always been the most important risk factor for HIV infection (15, 16).

This paper describes a study of newly admitted inmates to the Antwerp prison during a twelve month period in 1993. The purpose of the study was to determine:

1) the prevalence of tuberculosis, HIV, hepatitis B and of risky behaviour (unprotected sex and injecting drug use among prisoners);
2) the feasibility to introduce preventive measures in prison;
3) the possibility of an independent team playing a role in prisons in the prevention of infectious diseases and drug use.

Methods

All new inmates of the Antwerp prison were offered a voluntary medical examination to detect tuberculosis, HIV infection and hepatitis B virus infection. The medical history included questions about risk behaviour (unprotected sex and drug use). The tests and interviews were performed by a team not connected to the prison. All participants received HIV pre-test counseling, had the right to know their results, and were offered post-test counseling. The possibility was also given to receive further counseling on medical problems or drug abuse. The prison setting made it impossible to offer these services and still have anonymous questionnaires. A tuberculin test, a chest X-ray and blood sample were taken after informed consent of the prisoner was obtained.

The HIV serology was done by ELISA, and all positive samples were tested by Western Blot. Hepatitis B surface antigen (HBsAg), hepatitis B surface antibody (HBsAb) and hepatitis B core antibody (HBcAb) were tested by classical enzyme immuno-assays. Positive samples were tested by microparticle enzyme immuno-essay (MEIA).

Tuberculin testing was performed by injecting five tuberculin units (TU) of purified protein derivatives (PPD) intradermally. Tuberculin tests resulting in an induration of 5 to 9 mm were considered positive for HIV positive persons, IV drug users, persons having had a recent contact with a pulmonary TB patient, and persons with a chest X-ray suggestive for TB sequelae. For all other prisoners an induration of more than 10 mm was considered positive. Interpretation of the chest X-rays was done by lung specialists, who also assured the follow-up of the tuberculosis patients.

Non-residence in Belgium was defined as staying in Belgium for less than five years.

The data analysis was done using Chi-square tests.

The study protocol was approved by the Committee of medical ethics of the University of Antwerp (UIA).

Results

Demographic data

In the twelve month period, October 1992 - September 1993, 1 627 individuals of the Antwerp prison participated in the study. Sex was registered for 1 608 (99%) respondents: 1 567 (97%) were men, 40 (3%) women and 1 was a transsexual. The mean age was 29 years (range 15-71). The mean age of the Belgian inmates was higher than the one of the non-Belgian group (31 versus 28 years respectively). Eight hundred and twenty eight (51%) inmates were less than 28 years old. Nationality was known for 1 549 (95%) of the individuals, and 67 different nationalities were registered. Of the prisoners, 706 (46%) were Belgians, 473 (26%) were from other European countries, and 335 (22%) were from the African continent, of whom 259 (77%) were Moroccan nationals. Finally, 63 (4%) prisoners were from the American continent and 32 (2%) from the Asian continent. One fourth of the inmates was non-resident in Belgium, but half of the non-Belgian nationals was non-resident.

The studied population had a past of history of detention of 10 months on average. For 350 (24%) respondents these were short incarceration periods (less than 1 month). One hundred sixty seven (11%) inmates reported having been detained in foreign prisons.

Drug utilization

Thousand four hundred and thirteen (87%) respondents answered this part of the questionnaire.

Three hundred and twenty nine respondents (28%) reported a history of alcohol abuse, for which 224 (16%) had already been treated. There was a significant difference in alcohol abuse between Belgians and foreigners (36% versus 19% respectively, $p<0.001$).

Five hundred ninety eight prisoners (42%) reported use of illegal drugs (Table 1). The percentage of illegal drug use was lower among

the non-residents (28%), but this difference was only statistically significant in the age group above 25 years. In the age group up to 25 years, there was a statistical significant difference of drug use between Belgians and non-Belgians (67% versus 41% respectively, $p<0.001$). Of the people reporting drug use, 218 (36%) admitted having injected drugs at least once. This represents 15% of all respondents. Here also a significant higher percentage was found among the Belgian drug users, and this in both age-groups (47% versus 24%, $p=0.001$).

TABLE 1

Most important drug as mentioned by users of illegal substances (N = 598)

Mentioned substance	Belgians ($n=323$)		Non-Belgians ($n=275$)		Total	
	N	%	N	%	N	%
Cannabis	97	30	125	45.5	222	37.1
Heroin	88	27.2	80	29	168	28.1
Cocaine	52	16.2	44	16	96	16
Amphetamine	52	16.2	5	1.8	57	9.5
Speedball (heroin + cocaine)	21	6.3	15	5.4	36	6
XTC	10	3.1	3	1.1	13	2.2
Benzodiazepine/barbiturate	3	1	1	0.4	4	0.7
LSD	0		1	0.4	1	0.2
PCP	0		1	0.4	1	0.2

Sexual risk behaviour

Only 1 071 men (67% of all male respondents) answered the questions about sexual behaviour. Twenty two (2%) men reported homosexual relationships before incarceration. Before imprisonment, heterosexual men used condoms in 34% of contacts with occasional partners, and in 62% of contacts with prostitutes. The figures of condom use before imprisonment for homosexual men were 56% ($n=5$) with occasional partners and 18% ($n=2$) with prostitutes.

Seven persons (0.6%) reported having had sexual contact in prison. Three of them were men who also had homosexual contacts before incarceration, the other four only had heterosexual contacts before imprisonment. All seven had been incarcerated for a long period (mean of 75 months). No condoms were used for any of the sexual contacts in prison.

Only 17 women (43% of all female prisoners) answered these questions. One woman reported having had unprotected sex with a man while in prison.

Tuberculosis prevalence

Tuberculin tests were performed during six months, in which period 561 (62%) of the new inmates were tested. However, because of the high turnover of the prison population, the results could be read in only 397 persons (Table 2).

TABLE 2

Intradermal tuberculin testing: results (N = 561)

Nationality	N	No result obtained		Negative		Positive	
		N	%	N	%	N	%
Belgian	264	65	24.6	165	82.9	34	17.1
Moroccan	118	41	34.7	51	66.2	26	33.8
Turkey	19	8	42.1	5	45.5	6	54.5
Eastern Europe	34	11	32.4	10	43.5	13	56.5
Sub Saharan Africa	11	4	36.4	4	57.2	3	42.8
Other	115	35	30.4	49	61.2	31	38.8
Total	561	164	29.2	284	71.5	113	28.5

Twenty-three percent of the Belgian inmates aged 20 to 25 years had a positive tuberculin test, which is about 10 times the national average in the same age group (17). The index for non-Belgian persons was significantly higher than that of Belgians (39.9% vs 17.1%, $p<0.01$). For the age group above 25 years, no statistical difference could be found between resident Belgians and resident non-Belgians.

A chest X-ray was obtained from 1 328 (82%) inmates. An image suggestive for pulmonary TB was found in 12 (1.4%) cases, and 6 (0.7%) cases were diagnosed as active pulmonary TB. One of the 6 TB patients was a woman, and two were Belgians. The notification rate of active pulmonary TB in this group was 6/1 328 or 426/ 100 000.

HIV prevalence

Of the 1 448 inmates who were offered the test, 996 (69%) accepted to be tested. The most important reasons for refusing HIV-testing were fear of venopuncture and knowledge of a recent HIV test result. Twelve (1.2%) persons were found to be HIV positive. Six were injecting drug users, two were non-injecting drug users, and four were no drug using Central Africans.

Hepatitis B virus infection

A prevalence serosurvey was performed on a total of 888 prisoners. In 182 (20.5%) participants markers of hepatitis B virus were detected. Thirty nine participants (4.4%) were carriers of the hepatitis B surface antigen, and can thus be considered potentially infectious. HepBeAg detection was not performed because of the high costs of the tests. Amongst the Belgians and the resident non-Belgians there were significant more carriers of HepBsAg in the injecting drug users group ($p = 0.01$). The prevalence of HepB surface antigen among Belgian injecting drug users was 10.9%.

Discussion

Several reasons make it very difficult to obtain an exact participation rate for this study: many respondents left the prison to return only a couple of days later, others were not proposed to participate because they were only inside for some hours or during the weekend etc. A rough estimate would be that certainly more than 60 percent of those who were proposed to participate did in fact do so.

Not surprisingly, the prevalence rates of tuberculosis, HIV and hepatitis B were much higher in the population of inmates of the Antwerp prison than among the general population. Our study shows a notification rate of 426/100 000 cases of active pulmonary TB in the prison population. The incidence of TB in the Flemish community was estimated at 12/100 000 in 1993 (18).

This study showed that the implementation of tuberculin testing in prisons with a high turn-over is not cost-efficient. Firstly, tuberculin test results were often not obtained because inmates had left the prison before the result could be read. Secondly, the interpretation of the

results among the non-Belgian population was difficult since no reliable information of prior BCG vaccination could be obtained. Furthermore, a tuberculin test in an immune compromised person may equally be of little value because of anergy (19). Moreover, chemoprophylaxis proved nearly impossible to organise in prisoners which were rapidly released or transferred to other prisons. Chemoprophylaxis should however be considered in long-term detention centers where patient follow-up can be organized. Appropriate diagnostic measures (chest X-ray and sputum examination) should be made available for all persons who present with symptoms of TB.

Self reported use of alcohol and illegal substances was even higher than was shown in other studies in Belgian prisons (20). For the first time the existence of a large group of injecting drug users (15% of all respondents) in a Belgian prison is explicitly demonstrated. It is worth noting that more than two thirds of all Belgian prisoners under the age of 25 have a self-reported history of illegal substance abuse. The high proportion of non-Belgian, non-resident prisoners is also well known (21).

Our results confirm the findings from other studies that hepatitis B infection is strongly associated with injecting drug use (22-24). Because of the high turnover of prisoners, screening and vaccination of those susceptible might result in many incomplete vaccination series being given and thus reveal not to be cost-effective. However, immunization may be targeted at long-term prisoners.

The prevalence of HIV infection in this Belgian prison is rather low compared to other prisons in Europe and the U.S.A. However, the risk of transmission exists in this prison. Homosexual contact is not frequently reported in this Belgian prison, and occurred only in persons being incarcerated since a long period. None of them had used condoms in prison. Unsafe sex might possibly be more frequent in long-terms prisons. Homosexual behaviour by the otherwise heterosexual group may provide a source of secondary infection of later heterosexual contact in the community. Condoms and lubricant were offered during the counseling sessions but were hardly ever accepted. This might be explained either by the fact that open homosexuality is not really accepted by most of the prison population, or otherwise by the fact that this prison does not offer enough privacy for the occurrence of this behaviour.

Questions about injecting drug use in prison were not asked in this survey since an earlier feasibility study showed that this kind of

questions yielded unreliable information (25). However, based on the results from other studies, as well as on the information obtained from prison staff, showing that even in settings with very close supervision inmates manage to acquire needles and share them with many of their colleagues, it can be assumed that drug injection also occurs in Belgian prisons.

Prisoners are different from the general population in many ways, and represent a group of people who are at risk for many aspects. Although most of the prisoners are young, there is a high frequency of medical complaints, largely associated with drug abuse (26). Any medical care program in the prisons must be geared to deal with the recognition and treatment of these problems, as well as with the prevention of them. The study also revealed the high demand of prisoners to receive moral support and counseling, as well as medical assistance in the withdrawal phase (personal observation of the intervention team). This need could not always be fulfilled by the prison services. There was, for instance, no help available for newly admitted prisoners who experienced acute opiate withdrawal, unless they were already enrolled in methadone programs prior to their arrest. This situation creates a lucrative market for illegal substances within the prison.

The confidentiality offered by the center was highly appreciated by the inmates. It became clear that an independent counseling team could play a very positive role in prison settings. Indeed, services belonging to the prison system are often mistrusted by the prisoners, especially by the drug users, as shown by studies from other countries (27). Such an agency would also be in a better position to ensure continuity of treatment once the prisoner is released.

The health problems in prison are of utmost importance from a public health point of view. In the U.S.A., there have been several tuberculosis outbreaks, including multi-drug resistant tuberculosis, caused by the concentration of HIV infected individuals in prisons and poor tuberculosis control measures (28). Prisons are often the first and only medical contact for this particular high-risk group. Failure to implement all necessary recommendations on treatment and prevention will result in further avoidable spread of infections to the partners and individuals in the general population secondarily infected through these partners.

Conclusions

This study shows, as has been demonstrated in other countries and as was suspected by the involved authorities, that users of alcohol and illegal substances make up a large part of the prison population. As a result prisons threaten to become a health hazard for the inmates but secondary also for the general population. The imprisonment of hundreds of injecting drug users, among which several are HIV-positive, with hardly any medical support or access to methadone and without any counseling or harm reduction program in place could result in outbreaks of hepatitis B, hepatitis C and HIV infection. The results of the questions on sexual behaviour outside the prison walls show the potential hazard for secondary transmission to the population.

The high rate of TB should also be considered as a serious public health hazard. Although the majority of the active cases could not be directly linked to drug use, the fact remains that susceptible individuals (injecting drug users) are held together with active cases of TB in a poorly ventilated environment. The findings of these study therefore warrant a more generalized system of active detection of TB throughout the prison system.

Finally this study shows the poor reaction of the prison authorities to the drug problem in general. We showed that an independent team that offers counseling and support was welcomed and trusted by the inmates. Further research on the organisation, tasks and financing of such teams would be useful.

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