

HIV Infection in Senegalese Prisons: Prevalence and Associated Factors

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Abstract

HIV/AIDS is a serious health problem among prisoners and constitutes a big challenge for prison administration services, public health services and governments. **Aims:** Determine the prevalence of HIV infection among prisoners and describe associated factors. **Population and Methods:** This was a descriptive and analytical cross-sectional study conducted from December 2015 to October 2016. A sample of 600 prisoners was randomly interviewed nationwide. They were selected directly from the sample frame from across the country and proportionally from all sites. Pre-established questionnaires providing information on the sociodemographic and biological characteristics of prisoners were used for the collection of data. Data entry and analysis were performed using EXCEL and SPSS 18 software. **Results:** The survey was based on a randomised sample of 600 prisoners, 593 of whom accepted blood extraction for the HIV testing. The series was mainly composed of males (89%). The median age was 33 years (18 - 69). The level of education among respondents was 60%. Regarding marital status, the proportion of married prisoners was 51.8%. Almost three-quarters (71.5%) were at their first imprisonment and 51.8% were on preventive detention. The reasons for imprisonment varied and were dominated by drug use (35.3%), while only 4.6% confessed that they continued using drugs while in prison. 97.8% of prisoners have had a sexual experience. Their median age was 19 years at their first sexual intercourse. 20.5% reported using a condom during their first intercourse. Multi partnership was estimated at 17.8%. The prevalence of HIV infection was high among prisoners (2%), the quadruple of the national rate. This preva-

lence was associated with female sex (4.5%) ($p = 0.012$) and housewives (12.5%) ($p = 0.002$). **Conclusion:** Prisoners are very vulnerable to HIV infection with a high prevalence compared to the national rate, hence the need for the enforcement of effective HIV prevention and care measures in prisons.

Keywords

HIV Infection, Prison, Associated Factors, Senegal

1. Introduction

In many countries, HIV/AIDS is a serious health problem among prisoners. As such, it is a serious challenge for prison administration services, public health services and governments [1]. The vulnerability of groups of prisoners is linked to detention conditions such as the lack of treatment against sexual transmissible infection (STIs), prohibited sexual relations but also the fact that the prisons are places of concentration of people considered as second rate citizens by society such as drug users, migrants and sex workers [2] [3].

Various studies show that the proportion of people infected with HIV in prisons is higher than in the general population [2] [3] [4]. In sub-Saharan Africa, the HIV prevalence was two to fifty times higher among prisoners than in the general population [2] [3] [4]. As evidence, higher prevalence was reported in Côte d'Ivoire (28%), Burkina Faso (11%) and Nigeria (9%) [5]. Jürgens and al reported high prevalence rates of 27% and 41.4% for Zambia and South Africa respectively [2].

In Senegal, the HIV epidemic is of the concentrated type with a high prevalence among key populations. In addition of these populations, the mostly exposed populations to HIV related risks, namely the most vulnerable ones, have been defined. They are composed of young people, prisoners, artisanal gold miners, people with disabilities, truckers, fishermen, soldiers and police [6]. Data on prisoners are scarce and mostly result from combined national surveillance surveys. These surveys have contributed to a better understanding of the evolution of the epidemic in Senegal and to the identification of related challenges and constraints [7]. Our study was conducted as part of the second combined national surveillance survey targeting prisoners. The objectives were to determine the prevalence of HIV infection in prison and to describe associated factors.

2. Population and Methods

This was a descriptive and analytical cross-sectional study conducted from December 2015 to October 2016. The inclusion criteria were 18 years of age and/or over, detained for more than 6 months and consenting to participate in the investigation. Non-inclusion was whether they have participated in the 2010 com-

bined surveillance survey or refused to participate.

A randomised sample was drawn directly from the survey database nationwide. A full list of prisons was used to provide reliable samples for the drawing of primary units from the sample. Secondary units were drawn at the time of collection based on of the lists of prisoners provided by the administrators of the prisons selected in the sample. A total of 15 sites out of 28 were selected in the sample for a total of 600 prisoners.

Data were collected based on the questionnaires validated by the National AIDS Control Program (CNLS). These data were collected and entered by a trained and tested personnel for a standardized understanding.

These questionnaires providing information on the socio-demographic characteristics (age, sex, marital status, level of education, profession, nationality, use of condoms, reason for incarceration, sexuality during the prison stay) and biological (retroviral serology results) of prisoners guided the collection of data. The retroviral serology was performed using immunoenzymatic techniques (ELISA) and confirmed by Western Blot at the reference Laboratory of Bacteriology and Virology of Aristide le Dantec Hospital. Data entry and analysis was done using EXCEL and SPSS 18 software. The proportions were compared by the χ^2 and the Fisher tests with a value of $p < 0.05$, considered to be significant.

3. Results

3.1. Epidemiological Aspects

A total of six hundred (600) prisoners were interviewed. 89% were male ($n = 534$) with a sex ratio M/F of 8.09. The median age of the series was 33 years with range of 18 and 69 years. The mostly represented age group was 30 - 34 years (20%), followed by 25 - 29 years (19%). 18% were between 35 and 39 years old, 9% were between 40 - 44 and 45 - 49 years old respectively, while those under 25 were 14% and 11% were over 50. Almost all were of Senegalese nationality (91.8%). Nationals from the sub-region were poorly represented. They were mainly nationals from Guinea (2%), Mali (2%), and Guinea Bissau (1.3%). 0.3% of the targeted population was from Gambia and 0.2% from Mauritania.

The proportion of other nationalities was 2.3% of the prisoners. More than half of the detainees were surveyed in the regions of Dakar, Thiès, Louga and Diourbel with 39.7%, 12.8%, 10% and 9% of the respondents respectively.

Over three-quarters of prisoners were poorly educated with 40% without school education and 31.7% had stopped at primary school level. 24% reached a secondary level, and 4.5% reached higher education level. Half of the targeted population was married, most of them under monogamy (41.2%). Singles represented 36.3% against 11.5% of divorced or widowed. The mostly represented profession was that of traders (20%) followed by workers (15%) and liberal profession (12%). Housewives represented 5% of the targeted population but this concerned 47% of female prisoners (**Table 1**).

Table 1. Epidemiological characteristics of prisoners.

Variables	Numbers (N = 600)	Percentage
Gender		
Male	534	89%
Female	66	11%
Age range (Years)		
<25	84	14%
25 - 29	114	19%
30 - 34	120	20 %
35 - 39	108	18%
40 - 44	54	09%
45 - 49	54	09%
>50	66	11%
Median Age Median (years) (Range)	33	(18 - 69)
Nationality		
Senegalese	551	91.8%
Guinean	12	02%
Malian	12	02%
Bissau Guinean	8	1.3%
Gambian	2	0.3%
Mauritanian	1	0.2%
Others	14	2.3%
School Education		
No school education	240	40%
Primary school level	190	31.7%
Secondary school level	144	24%
Higher education level	27	4.5%
Marital Status		
Unmarried	218	36.3%
Married on monogamous regime	247	41.2%
Married on polygamous regime	66	11%
Divorced/widowed	69	11.5%
Profession		
Traders	120	20%
Workers	90	15%
Drivers	48	8%
Housewives	30	5%
Liberal professions	72	12%

3.2. Characteristics Related to the Stay in Prison

The reasons for imprisonment were dominated by drugs-related issues (35.30%) or theft (13.5%). Imprisonment for murder was 10.7% of cases. The other rea-

sons for imprisonment were related to assault and battery (8%), infanticide (5%), frauds (5.8%) (Figure 1).

The mostly used drug was hashish/Indian hemp. 0.5% of inmates were familiar with heroin injection. During their prison stay, 4.6% of prisoners recognized that they continued using drugs, which was supplied with the complicity of co-detainees in 50% of the cases, and with prison guards in 26% of the cases. 24% of the prisoners preferred to keep the secret when it comes to the drug supply chain in prison. More than three-quarters (71.5%) of the study population were at their first detention and 18.7% at their second detention. Half of the respondents were in preventive detention. The median length of detention was 20 months with range of 7 and 236 months. 26% stayed longer than 24 months, 17% between 19 and 24 months and 5% between 6 and 12 months. More than half of the respondents (55%) said that they momentarily left prison for the following reasons: respond to court (68%), perform professional duties (14%), do shopping (11%) or perform city cleaning duties (7%) (Table 2).

3.3. Sexuality and Risk Practices

Almost all the prisoners were sexually active. The median age at first intercourse was 19 years old (12 - 30). 98.5% claimed to know the usefulness of condom but only 20% claimed to have used it during the first sexual intercourse. Multi sexual partnership was found in 17.8% of cases. During their prison stay, only one prisoner recognized having sex with another male prisoner.

3.4. Prevalence of HIV Infection

Of the 600 detainees, 593 (527 men and 66 women) agreed to have their blood sample taken, thus a refusal rate of 1%. Retroviral serology was positive with a prevalence of 2%, 1.7% in men (9/527) and 4.5% in women (3/66).

The prevalence was higher among prisoners under 35 years old (2.5%), female

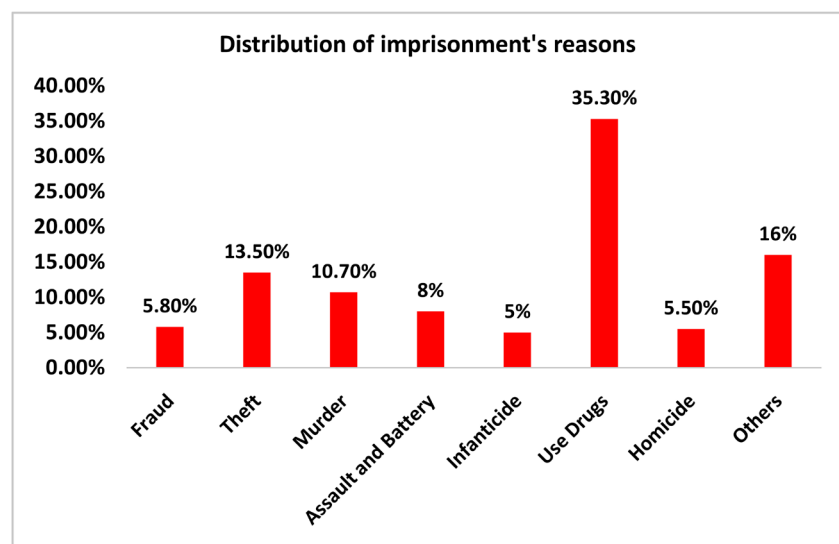


Figure 1. Distribution of imprisonment's reasons.

Table 2. Characteristics to the stay in prison.

Variables	Numbers (N = 600)	Percentage
Preventive Detention		
Yes	311	51.8%
No	289	48.2%
Number of Detention		
1	429	71.5%
2	112	18.7%
3	33	5.5 %
4	16	2.7%
5 and more	10	1.6%
Average Duration in Detention (month, range)	20	(7 - 236)
Mobility		
Yes	330	55%
No	270	45%
Reason for Momentarily Left Prison (n = 330)		
Court	225	68%
Professional activities	46	14%
Shopping	36	11%
City cleaning	23	7%

Table 3. Factors associated with HIV infection.

Variables	Number	HIV Positives	Percentage	P Value
Age < 35 YEARS	318	8	2.5%	0.34
Female	66	3	4.5%	0.012
No School Education	240	6	2.5%	0.45
Divorced	60	6	8.5%	0.44
Housewives	30	4	12.5%	0.002
Fraud	35	2	6.5%	0.11

prisoners (4.5%), illiterates (2.5%). It was also higher among female prisoners having worked as household workers before their imprisonment (12.5%). Among divorced prisoners, the rate was (8.5%) and (6,5%) among those imprisoned for fraud. However, a statistically significant difference was only found in the female sex ($p = 0.012$) and housewives ($p = 0.002$) (**Table 3**).

4. Discussion

Our study involved a randomised sample of 600 prisoners, selected nationwide. An obvious male predominance was found in our series (89%) with a sex ratio

M/F at 8.1. This observation supports the results described in several studies, especially those carried out in the sub-region where the predominance of male population was respectively 95% in Burkina Faso [8] and 75% in Côte d'Ivoire [9]. The median age of our study was 33 years, which testifies that the prison population is mainly composed of the youth. This was also described by Dembele in Mali [10] and by Ouedraogo in Burkina Faso [11].

Almost two-thirds (60%) of prisoners were educated in our series, which is relatively close to the enrollment rate found in a study carried out in the sub-region [12]. Higher education rates were found in prisons in developed countries [13]. The notion of first imprisonment described in several studies in the sub-region [9] [14] was also found in our series with a median imprisonment duration of 20 months. However, due to the slowness of judicial procedures in resource-limited countries, half of our series was in preventive detention, like what was described in Mali [10]. More than half of respondents said that they were temporarily released from prison, which confirms the fact that prisoners do not live in a vacuum. Therefore, they can be a vector for HIV transmission inside and outside prisons [5] [13]. Thus, adequate control of HIV infection in prisons must be considered a public health priority, not only for prisoners, but also for the entire community.

The main reasons for imprisonment within our study population were dominated by drug-related issues but with a lower proportion in comparison to those described in Northern countries [4]. In addition, drug injection was not documented in our series, unlike in the sub-region [9] and elsewhere [15] [16]. This non-documentation may be explained by the fact that the use of drugs is prohibited in our countries and severely repressed by law. That is why a group of prisoners claiming to use drugs prefer to keep the secret when it comes to the drug supply chain.

Though nearly all our target was sexually active and claimed to know the usefulness of condom, its use remained low. The low use of this means of protection was documented in several African studies [9] [11] and testifies the vulnerability of this target with regards to HIV infection. On the other hand, slightly higher rates are observed in Quebec [17] in terms of condom use.

Sexuality, more precisely homosexuality, is a common practice during imprisonment. Yet it was poorly reported in our series [1] [3] [18] [19] [20]. This under-estimation can be explained by the denial of homosexuality due to repressive laws condemning such sexual practice but also by the socio-cultural environment which does not approve homosexuality. However, this risk, even if small, suggests the need to make condom available in Senegalese prisons for a better control of HIV infection in prison.

The prevalence in our series was 2%, four times the national average, which further demonstrates the vulnerability of this target everywhere else in the world with various origins [1] [3] [11] [15] [21].

The found prevalence is higher than the one described in Burkina Faso [12]

but much lower than the one in Mali [10] and Nigeria [2]. We also notice an increase in this prevalence compared to the one revealed by the last national combined surveillance survey, which was 1.5% [7].

This growing dynamic of HIV prevalence in prisons had undoubtedly motivated the National HIV/AIDS control Program (CNLS) to reconsider the target prisoners by classifying them in the Key populations group after men who have sex with men, sex workers and injecting drug users [6]. This therefore suggests the need to develop awareness-raising actions on HIV among this population but also the necessity to coordinate the management of HIV-positive prisoners care. This is supported by the fact that prisons are suitable sites for HIV testing and treatment, since prisoners are confined in a restricted space and easily accessible for diagnosis, treatment, and health education.

Prevalence was associated with female sex and the profession of housewives.

This finding corroborates the feminization of HIV due to several factors including biological, economic, and socio-cultural vulnerability of women [6] [22]. The use of drugs and homosexuality have been described in several studies [3] [23] [24]. This association was not found in our study and can be explained by the prison environment where prisoners are very apprehensive to these kinds of practices considered as criminal offenses in our country.

Our study faced some limitations due to information bias due to the fact that a portion of information collected as homosexuality and use of drugs is under-notified. Another limitation is the tiny sample size of female prisoners, which may pose the problem of generalization. However, despite these limitations, we believe that the results of our study have provided an important overview of the prevalence of HIV in Senegalese prisons and have helped to inform programmatic decisions regarding the targeted detainees.

5. Conclusion

The prevalence of HIV infection in prisons is high in Senegal, four times the national average. This suggests the need to enforce preventive actions to manage HIV infection in prisons. Moreover, additional studies would be necessary for a better understanding of factors associated with the vulnerability of prisoners to HIV in Senegal.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

- [1] Office des Nations Unies Contre la Drogue et le Crime (ONUDD) (2008) Le VIH/ Sida: Prévention, soins, traitement et soutien en milieu pénitentiaire. 56 p.
- [2] Jurgens, R., Nowak, M. and Day, M. (2011) HIV and Incarceration: Prisons and Detention. *Journal of the International AIDS Society*, **14**, 26. <https://doi.org/10.1186/1758-2652-14-26>

- [3] Golrokhi, R., Farhoudi, B., Taj, L., Pahlaviani, F.G., Mazaheri-Tehrani, E., Cossarizza, A., et al. (2018) HIV Prevalence and Correlations in Prisons in Different Regions of the World: A Review Article. *The Open AIDS Journal*, **12**, 81-92. <https://doi.org/10.2174/1874613601812010081>
- [4] Dolan, K., Kite, B., Black, E., Aceijas, C. and Stimson, G.V. (2007) HIV in Prison in Low-Income and Middle-Income Countries. *The Lancet Infectious Diseases*, **7**, 32-41. [https://doi.org/10.1016/S1473-3099\(06\)70685-5](https://doi.org/10.1016/S1473-3099(06)70685-5)
- [5] United Nations Programme on HIV/AIDS (UNAIDS) (2007) HIV and Prisons in Sub-Saharan Africa: Opportunities for Action. 45 p.
- [6] Conseil National de Lutte Contre le Sida au Senegal. Plan Stratégique de Lutte contre le SIDA 2018-2022. 85 p.
- [7] Conseil National de Lutte Contre le Sida au Senegal. Rapport de situation sur la riposte nationale à l'épidémie du VIH/SIDA Senegal: 2015-2016. 87 p.
- [8] Diendere, E.A., Tieno, H., Bognounou, R., Ouedraogo, D.D., Simpre, J., Ouedraogo-Traore, R., et al. (2011) Prevalence and Risk Factors Associated with Infection by Human Immunodeficiency Virus, Hepatitis B Virus, Syphilis and Bacillary Pulmonary Tuberculosis in Prisons in Burkina Faso. *Med Trop (Mars)*, **71**, 464-467.
- [9] Sable, P.S., Konan, E., Ake-Tano, O., Tetchi, O., Ekou, F.K., Kpebo, D., Yapi, A. and Dagnan, N.S. (2016) Comportements à risque et séroprévalence du VIH chez les nouveaux détenus de la maison d'arrêt et de correction d'Abidjan. *8th Conférence Internationale Francophone VIH/Hépatites: AFRA VIH: Poster PV25*.
- [10] Dembele, I.N., Traore, Y., Camara, A.Y., Maiga, I. and Dembele-Keita, B. (2016) Etude de la séroprévalence de l'infection à VIH et des facteurs de risque associés chez les détenus de la Maison Centrale d'arrêt de Bamako au Mali en 2015. *8th Conférence Internationale Francophone VIH/Hépatites: AFRA VIH: Poster PV33*.
- [11] Ouedraogo, O., Garanet, F., Sawadogo, S., Mesenge, C. and Guiard Schmid, J.B. (2015) La vulnérabilité des détenus hommes face au VIH/SIDA à Ouagadougou (Burkina Faso). *Santé Publique*, **27**, 749-756. <https://doi.org/10.3917/spub.155.0749>
- [12] Ouedraogo, O., Guiard Schmid, J.B., Ouedraogo, T.M., Mesenge, C. and Rapp, C. (2013) Pratiques à risque et accès à la prévention du VIH dans une prison pour hommes au Burkina Faso. *Médecine et Santé Tropicales*, **23**, 236-237. <https://doi.org/10.1684/mst.2013.0208>
- [13] Stasi, C., Silvestri, C., Fanti, E., Di Fiandra, T. and Voller, F. (2016) Prevalence and Features of Chronic Viral Hepatitis and HIV Coinfection in Italian Prisons. *European Journal of Internal Medicine*, **34**, 21-22. <https://doi.org/10.1016/j.ejim.2016.04.020>
- [14] Nanema, D., Goumbri, P. and Ouedraogo, A. (2016) Prévalence du VIH à la maison d'arrêt et de correction de Ouagadougou, Burkina Faso 2014. *8th Conférence Internationale Francophone VIH/Hépatites: AFRA VIH, Poster PV14*.
- [15] Ba, K., Keita, M., Fall-Malick, F.Z., Mint Beibakar, M., Diallo, M. and Lo, B.B. (2015) Enquête comportementale et sérologique sur le VIH/sida chez les détenus à Nouakchott (Mauritanie). *Bulletin de la Société de Pathologie Exotique*, **108**, 208-212. <https://doi.org/10.1007/s13149-015-0426-5>
- [16] Lukasiewicz, M., Falissard, B., Michel, L., Neveu, X., Reynaud, M. and Gasquet, I. (2007) Prevalence and Factors Associated with Alcohol and Drug-Related Disorders in Prison: A French National Study. *Substance Abuse Treatment, Prevention, and Policy*, **2**, 1. <https://doi.org/10.1186/1747-597X-2-1>
- [17] Poulin, C., Alary, M., Lambert, G., Godin, G., Landry, S., Gagnon, H., Demers, E., Morarescu, E., Rochefort, J. and Claessens, C. (2007) Prevalence of HIV and Hepa-

- titis C Virus Infections among Inmates of Quebec Provincial Prisons. *CMAJ*, **177**, 252-256. <https://doi.org/10.1503/cmaj.060760>
- [18] Odujinrin, M.T. and Adebajo, S.B. (2001) Social Characteristics, HIV/AIDS Knowledge, Preventive Practices and Risk Factors Elicitation among Prisoners in Lagos, Nigeria. *West African Journal of Medicine*, **20**, 191-198.
- [19] Rotily, M., Weilandt, C., Bird, S.M., Käll, K., Van Haastrecht, H.J., Iandolo, E. and Rousseau, S. (2001) Surveillance of HIV Infection and Related Risk Behavior in European Prisons. A Multicentre Pilot Study. *European Journal of Public Health*, **11**, 243-250. <https://doi.org/10.1093/eurpub/11.3.243>
- [20] Office des Nations Unies Contre la Drogue et le Crime. Onusida. (2007) Le VIH en Prisons: Possibilités d'intervention en Afrique subsaharienne. Genève, 29 p.
- [21] Akbari, M., Akbari, M., Naghibzadeh-Tahami, A., Joulaei, H., Nasiriyani, M., Heshampour, M. and Bagheri-Lankarani, K. (2016) Prevalence of HIV/AIDS among Iranian Prisoners: A Review Article. *Addiction and Health*, **8**, 195-206.
- [22] United Nations Programme on HIV/AIDS (UNAIDS) (2010) Agenda for Accelerated Country Action for Women, Girls, Gender Equality and HIV. Opérationnel Plan for the UNAIDS Action Framework. Genève, 34 p.
- [23] Muhammad, D.K., Ahmad, W., Razia, F., Aashifa, Y. and Shoaib, A. (2018) Prevalence and Associated Risk Factors of HIV in Prisons in Balochistan, Pakistan: A Cross-Sectional Study. *F1000Research*, **7**, 1821. <https://doi.org/10.12688/f1000research.16994.1>
- [24] El Maerawi, I. and Carvalho, H.B. (2015) Prevalence and Risk Factors Associated with HIV Infection, Hepatitis and Syphilis in a State Prison of São Paulo. *International Journal of STD & AIDS*, **26**, 120-127. <https://doi.org/10.1177/0956462414531242>