Original Article

Vulnerabilities of the prison population in Ceará to sexually transmitted infections

Vulnerabilidades da população privada de liberdade no Ceará às infecções sexualmente transmissíveis

Vulnerabilidades de las personas privadas de la libertad a las infecciones de transmisión sexual en Ceará

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Abstract

Objective: To analyze the individual, social, and programmatic vulnerabilities and their associations with the history of Sexually Transmitted Infections (STIs) and/or HIV in the Prison Population in Ceará.

Methods: This cross-sectional study was performed in May-September 2022 in Ceará prison units (20,666 prisoners). Data were collected using a questionnaire with sociodemographic, prison, and health history information. The predictor variables were categorized according to the theoretical framework of vulnerabilities. The diagnosis of any STI/HIV during or after entry into the prison system was the outcome variable. For continuous variables, measures of position, dispersion, and normality analysis were calculated and for the association between vulnerability marker variables and STI history, binary logistic regression was performed.

Results: The prevalence of STIs was 445 (2.2%), and Syphilis and HIV were the most prevalent diseases. Most diagnoses (54.4%) were made on admission. The markers of greater vulnerability to STIs were as follows: be 30 years of age or older, have a psychiatric condition or previous chronic illness, low income, have been arrested for a drug crime, have relationships with other prisoners, work in the system, and prison time of up to one year. The markers of lowest vulnerability were the following: having a religion, previous formal employment, having a disability, being LGBTQIA+, receiving condoms in prison, reporting violence by police officers, receiving a visit from a partner, and having been transferred from one unit to another.

Conclusion: The prison population of Ceará presented individual, social, and programmatic vulnerabilities to STIs/HIV, which were active before and during imprisonment. The high admission prevalence reinforces the importance of understanding such vulnerabilities to promote health and life quality actions, considering the pre- and intra-prison context.

Resumo

Objetivo: Analisar as vulnerabilidades individuais, sociais e programáticas e suas associações com o histórico de Infecções Sexualmente Transmissíveis (IST) e/ou HIV na População Privada de Liberdade no Ceará.

Métodos: Estudo transversal realizado entre maio e setembro de 2022 nas unidades prisionais cearenses (20.666 prisioneiros). Os dados foram coletados por questionário com informações sociodemográficas, prisionais e histórico de saúde. As variáveis preditoras foram categorizadas conforme o referencial teórico de vulnerabilidades. A variável desfecho foi o diagnóstico de qualquer IST/HIV durante ou após o ingresso no sistema prisional. Para as variáveis contínuas, foram calculadas medidas de posição, dispersão e análise da normalidade e para a associação entre variáveis marcadoras de vulnerabilidade e histórico de IST, foi realizada regressão logística binária.

Resultados: A prevalência de IST foi de 445(2,2%), Sífilis e HIV foram as mais prevalentes. Grande parte dos diagnósticos (54,4%) foram admissionais. Os marcadores de maior vulnerabilidade às IST foram: ter 30 anos

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ou mais, condição psiquiátrica ou doença crônica prévia, baixa renda, prisão por crime de entorpecentes, relacionamento com outros internos, trabalhar no sistema e tempo de prisão até um ano. Os marcadores de menor vulnerabilidade foram: ter religião, trabalho formal prévio, apresentar deficiência, ser LGBTQIA+, receber preservativos na prisão, relato de violência por policiais, receber visita do companheiro e ter sido transferido de unidade.

Conclusão: A população privada de liberdade cearense apresentou vulnerabilidades individuais, sociais e programáticas às IST/HIV, atuantes antes e durante o aprisionamento. A alta prevalência admissional reforça a importância de compreender tais vulnerabilidades para promover ações de saúde e qualidade de vida, considerando o contexto pré e intraprisional.

Resumen

Objetivo: Analizar las vulnerabilidades individuales, sociales y programáticas y su relación con los antecedentes de infecciones de transmisión sexual (ITS) o VIH en las personas privadas de la libertad en el estado de Ceará.

Métodos: Estudio transversal realizado entre mayo y septiembre de 2022 en las unidades penitenciarias de Ceará (20.666 presos). Los datos se recopilaron mediante un cuestionario con información sociodemográfica y penitenciaria y sobre los antecedentes de salud. Las variables predictivas se categorizaron según el marco teórico de vulnerabilidades. La variable de resultado fue el diagnóstico de cualquier ITS/VIH durante o después del ingreso al sistema penitenciario. Para las variables continuas, se calcularon medidas de posición, dispersión y análisis de normalidad, y para la asociación entre las variables marcadoras de vulnerabilidad y los antecedentes de ITS, se realizó una regresión logística binaria.

Resultados: La prevalencia de ITS fue de 445 (2,2 %), de las cuales la sífilis y el VIH fueron las más prevalentes. La mayor parte de los diagnósticos (54,4 %) se realizó en el momento del ingreso. Los marcadores de mayor vulnerabilidad a las ITS fueron: tener 30 años o más, padecer una enfermedad psiquiátrica o crónica previa, tener bajos ingresos, estar preso por delitos relacionados con estupefacientes, mantener relaciones con otros reclusos, trabajar en el sistema y llevar menos de un año en prisión. Los marcadores de menor vulnerabilidad fueron: tener religión, haber tenido un trabajo formal, presentar una discapacidad, ser LGBTQIA+, recibir preservativos en prisión, denunciar violencia por parte de la policía, recibir visitas de la pareja y haber sido trasladado de unidad.

Conclusión: Las personas privadas de la libertad de Ceará presentaron vulnerabilidades individuales, sociales y programáticas a las ITS/VIH, presentes antes y durante el encarcelamiento. La alta prevalencia al momento del ingreso refuerza la importancia de comprender estas vulnerabilidades para promover acciones de salud y calidad de vida, teniendo en cuenta el contexto pre e intrapenitenciario.

Introduction

The theory of health vulnerability understands that interdependent and inter-attenuating factors of individual and social magnitudes influence the determination of the health-disease relationship and the quality of life of individuals or social groups.[1] For Ayres, Paiva, and Buchala, vulnerability can be divided into three dimensions that are constantly changing over time: individual, social, and programmatic vulnerabilities.[2]

The individual dimension concerns the inherent characteristics of the subject, whether they were acquired at birth or in relation to the environment. The social dimension concerns the "social subject", which translates into the political, generational, and stigmatizing structures of the socio-environmental context in which it is inserted. The programmatic dimension concerns the governmental and institutional apparatuses used to reduce or increase the conditions of precariousness and vulnerability.[2]

In this context, some populations are often identified in the literature as being in a more vulnerable situation, with fewer resources for social protection and health access, which may predispose them to illness. The Prison Population (PP) is an example of these populations, as their living conditions before incarceration were often already impaired. After imprisonment, they may develop new health conditions or worsen existing ones, creating a cycle of declining health.[3,4]

Among the health vulnerabilities of PP, significant prevalence of Sexually Transmitted Infections (STIs) has been recorded in prisons in different regions of the world, mainly HIV, Syphilis, and viral hepatitis.[5,6] Thus, research seeks to understand the reasons for this vulnerability. Evidence points to reasons such as the precarious social and economic contexts of prisoners even before imprisonment, which may be alleviated by imprisonment.[6]

Despite the aforementioned lines of evidence, which have already highlighted some of the vulnerabilities of PP to STIs and HIV, the present investigation can expand knowledge on the topic by applying the theoretical framework of vulnerabilities in the individual, social, and programmatic dimensions to verify which are those most associated with STIs/HIV in all prison units in the State of Ceará. This approach broadens the contextual understanding of the health determinants in this group and

offers relevant support for planning more effective and equitable public actions and policies.

Furthermore, as there are still no national systems for public access to health surveillance of PP, knowledge about the vulnerabilities of this population to STIs/HIV is limited to specific observational studies, often carried out in a single prison unit and without in-depth analysis of the vulnerability markers associated with these health problems.

In addition to prior vulnerabilities, highlighting the challenges to prisoners' sexual health is necessary. There are records of Brazilian prison units facing challenges such as a lack of human and material resources, and prevention strategies (such as programs for condom distribution and regular testing, in addition to infrastructure and overcrowding in several prisons), which hinder health promotion.[7,8]

Based on what was exposed above, the present study sought to answer the following question: "What are the individual, social, and programmatic vulnerabilities associated with the history of STIs and/or HIV prisoners in the State of Ceará?". We started from the hypothesis that STIs/HIV can be influenced by prior or inherent vulnerabilities to the prison period. An analysis was then carried out on how prisoners' backgrounds and the dynamics of the prison environment could influence this outcome; its vision/view was to encourage measures to reduce vulnerabilities and promote the sexual health and quality of life of PP.

Therefore, the objective of the study was to analyze the individual, social, and programmatic vulnerabilities and their associations with the history of Sexually Transmitted Infections and/or HIV in the PP of Ceará.

Methods

This cross-sectional correlational study was guided by the STROBE checklist.[9] Data collection was carried out between May and September 2022 in all prison units and public prisons in the State of Ceará by a team of 50 field researchers (psychologists, sociologists, nurses, nursing students, and health professionals in the prison system).

This research is part of the project "Promotion of health and quality of life in the prison system of Ceará". It was funded by the Ceará Foundation for Support of Scientific and Technological Development (FUNCAP) to carry out the penitentiary census of Ceará and assess the health and quality of life of police officers and PP.

The study population comprised all PPs in Ceará (>22 thousand in 2022). All PPs from Ceará were included. Inmates who were receiving health care outside the units during data collection and those who had neurological conditions that prevented the interview (as per medical records) were excluded. The final sample consisted of 20,666 individuals (92.4% of all PPs in the state) using the criteria mentioned above.

Ceará has 32 prison units. Three of them are Women's Prison Units (UPF): Judge Auri Moura Costa (UPF), Sobral (UPF-Sobral), and Crato (UP-Crato). One of the prison units is intended for the LGBTQIA+ population (Sister Imelda Lima Pontes). However, the majority of Lesbian, Gay, Bisexual, and Transgender (PPLGBTs) Inmates are not directed to this unit, as this depends on screening, not just self-declaration of being LGBTQIA+.

For data collection, inmates were previously informed about the research being carried out by the units' health professionals. On the days of collection, the inmates were invited to participate in the research, and were then informed about the objectives, procedures, and confidentiality of the research. Those who agreed to participate were taken to the prison unit courts, where computers were distributed with adequate distance between the tables to ensure the privacy of participants. After reading and signing the Free and Informed Consent Form (FICF) by professionals identified with badges, the questionnaire was completed by the interviewers (mean: 30 min). Prisoners were interviewed without handcuffs when released by officers.

We emphasize that the interviewers participated in training (strategies for approaching participants and correctly filling out the data) to apply the questionnaires. Additionally, prison officers were present for the safety of the interviewers during the collection. However, the distance between police officers

and inmates was respected to avoid embarrassment and ensure confidentiality. The receptivity and acceptance of the research was almost unanimous, and no complications were recorded at any time.

The data collection instrument was adapted by the authors based on an existing instrument (used in the Penitentiary Census of Ceará in 2014). New questions focused on the health of PP were developed and others were adapted according to changes in the current Ceará prison system. The final version had 162 questions divided into sections on sociodemographic data, history of violence, prison history, and physical and mental health indicators.[10] The questions on STIs and/or HIV were included in the aforementioned "health indicators" section as an integral part of the Prison Census instrument.

We highlight that the limitation of this study refers to the fact that information on history of STIs and/or HIV was obtained through self-reporting by participants, which may be subject to recall bias or underreporting due to stigma, or low education level of the interviewees. We emphasize that access to inmates' health records was not predicted in the scope of the Ceará Penitentiary Census. To reduce potential misunderstandings during data collection, interviewers were trained to clarify any questions participants had, including providing a simple and accessible description of the different STIs mentioned in the questionnaire.

The predictor variables were divided by the authors based on the theoretical framework of vulnerabilities of Ayres, Paiva, and Buchala.[2] Thus, the following variables were categorized as individual vulnerabilities: age, sex, being LGBTQ+ (gender identity or sexual orientation), religion, previous marital status, race and/or ethnicity, parenthood, mental health conditions, chronic diseases, and disabilities. Prison time and STI diagnosis at the time of admission were the individual vulnerabilities of the prison period.

Within the scope of social vulnerabilities, the following items were listed: histories of previous arrest, family members incarcerated, arrest for drug crime, low family income before arrest, and previous housing situation. The use of legal and illegal drugs during prison time, a history of intimate visits in prison, and relationships with other prisoners in the prison environment were listed.

In addition, the programmatic vulnerabilities were as follows: education, formal employment history, transfer of prison units, number of people per cell, access to prison health service, participation in guidance on prevention of STI and/or HIV in prison, distribution of condoms in prison units, involvement in educational and work activities in jail, in addition to reports of violence in the prison system.

Finally, the diagnosis of any STI and/or HIV on admission or after admission to the prison system was the outcome variable. We emphasize that this variable was collected as a self-report during interviews. However, all diagnoses in Ceará are made with rapid admission tests in prison units (as a routine or through spontaneous demand consultations).

The data were tabulated and analyzed using the JAMOVI® (*v.* 2.4) statistical software for Windows®. For continuous variables, position, dispersion, and normality analysis measures were calculated. For the association between vulnerability marker variables and STI history, binary logistic regression was performed using the backward model (with Wald test). Thus, only the variables selected by the model remained in the final analyses presented. For analyses, a 95% confidence interval and a significant *p-value* <0.05 were used. Afterwards, the results were compiled into tables using the Microsoft Word program.

The research was approved by the Research Ethics Committee of the Federal University of Ceará (Opinion: 3.921.161; Certificate of Presentation of Ethical Appreciation: 29499120.8.0000.5054). The signed copies of the FICF were filed in the inmates' medical records (with guaranteed access if requested).

Results

Regarding the characterization of PP in the sample (n=20,666), cisgender (19,626; 94.9%), black skin (16,703; 80.8%), and heterosexual (20,005; 96.8%) men predominated. As for religion, most (16,108;

77.9%) were Christians, with a predominance of evangelicals (8,911; 43.1%). Regarding monthly family income, <1 minimum wage (5,831; 28.2%) was the most frequent. Regarding education, incomplete primary education (11,886; 57.5%) was highlighted. Finally, 29 years (IQR =12) was the median age, and four months (IQR=6) was the median length of imprisonment. The prevalence of each STI according to the time of diagnosis is presented in table 1.

Table 1. Prevalence of each sexually transmitted infection (STI) among the prison population of Ceará according to the time of diagnosis

STI	Diagnoses on admission n(%)	Diagnoses after arrest n(%)	Total by STI n(%)	Prevalence n=20666 (%)
Syphilis	153(63.2)	137(67.5)	290(65.1)	2.4
HIV	41(16.9)	26(12.8)	67(15)	0.3
Gonorrhea	17(7)	44(21.7)	61(13.7)	0.3
HPV	22(9.1)	2(1)	23(5.2)	0.1
Chlamydia	3(1,2)	19(9.4)	22(4.9)	0.1
Hepatitis B or C	4(1.7)	8(3,9)	12(2.7)	0.06
Herpes	10(4.1)	0(0)	10(2.2)	0.05
Total per moment	242(54.4)	203(45.6)	445(100)	2.2

Source: Prepared by the authors

The overall prevalence of STIs/HIV among the PP of Ceará was 445 (2.2%) cases (one case for every 46 people). In addition, the majority (242; 54.4%) of STIs/HIV diagnoses were made during prison admission examinations. Among infections, syphilis, HIV, and HPV were the most frequent at admission. In cases reported after the prison period, syphilis and HIV remain at the top, but are followed by gonorrhea (Table 1).

We highlight that only 25 (5.6%) of the 445 cases of STIs/HIV were female: Syphilis (14), Hepatitis B (1), HIV (4), Gonorrhea (1), Herpes (1), HPV (1), and Chlamydia (3). Seven of these diagnoses were made during the prenatal period of these female prisoners [syphilis (4), HIV (2), and hepatitis B (1)]. In total, 65 women in the sample reported being or having been pregnant in the Ceará prison system.

In the associations between vulnerability markers and STI history at any time (from admission to current arrest), the factors associated with higher prevalence were as follows: age ≥30 years (OR=1.49), previous psychiatric disorder (OR=1.48) or chronic disease (OR=1.49), low-income family (OR=1.33), or imprisonment for drug crime (OR=1.69). Other types of crimes (against customs, against persons, and violence against women) were added to the initial regression model, but suppressed from the final backward regression model *(with Wald* test). Conversely, having a religion, having formally worked in the past, having a disability, and being LGBTQIA+ were protective factors for vulnerability to STIs (Table 2).

Table 2. Binary logistic regression between vulnerability markers and history of sexually transmitted infections among prison population

Vulnerability markers	Reference categories	p-values	OR	95% CI	
				Lower	Superior
Individual vulnerabilities					
Age	≥30 years (sample median)	0.004	1.49	1.13	1.97
Religion	With religion	0.022	0.66	0.46	0.94
Previous marital status	Married or in a stable relationship	0.102	0.79	0.59	1.05
Race and/or ethnicity	Non-white	0.978	1.00	0.72	1.4
Have children	Yes	0.72	0.94	0.7	1.27
Diagnosis of previous mental disorder	Yes	0.029	1.48	1.04	2.09
Chronic disease	Yes	0.01	1.49	1.10	2.02
Person with disabilities	Yes	0.003	0.48	0.29	0.78
Are you LGBTQ+?	Yes	<0.001	0.04	0.02	0.13
Social vulnerabilities					
Arrest of family member	Yes	0.792	0.96	0.75	1.25
Low family income	Yes	0.026	1.33	1.03	1.71
Arrested for drug crime	Yes	<0.001	1.69	1.31	2.18
I lived on the streets	Yes	0.185	1.82	0.74	4.48
Programmatic vulnerabilities					
Education	Complete elementary school	0.132	1.22	0.94	1.58
Formal work	Yes	<0.001	0.52	0.39	0.7

Source: Prepared by the authors

The last analysis (Table 3) aims to associate vulnerability situations, including programmatic experiences after the prison period, with the STI diagnosis reported during the prison period. The vulnerabilities associated with higher STI prevalence during the prison period were as follows: having received guidance on STIs/HIV (OR=1.89), involvement in an affective and/or sexual relationship with other inmates (OR=1.72), working in the prison (OR=1.49), and having been in jail for less than a year (OR=1.53).

Conversely, lower prevalence of STIs/HIV was related to the following variables: having been diagnosed with an STI upon admission to prison (OR=0.12), being in a cell with eight or fewer people (OR=0.54), receiving condoms in prison (OR=0.39), reporting violence by prison officers (OR=0.34), receiving visits from a partner before prison (OR=0.18), and having been transferred to another unit (OR=0.21).

Table 3. Binary logistic regression between vulnerability markers and STI history during prison time among prison population

Vulnerability markers	Reference categories	p-values	OR	95% CI	
				Lower	Higher
Individual vulnerabilities					
Prison time	≤1 year	0.022	1.53	1.06	2.21
STI diagnosis on admission	Yes	<0.001	0.12	0.05	0.27
Social vulnerabilities					
Use of legal substances in prison	Yes	0.473	1.58	0.45	5.47
Use of illicit substances in prison	Yes	0.089	2.09	0.89	4.88
Affective and/or sexual relationship with other inmates	Yes	0.012	1.72	1.12	2.63
Receives visits from a previous partner	Yes	<0.001	0.18	0.07	0.47
Programmatic vulnerabilities					
Access to prison health service	Satisfactory	0.608	0.9	0.6	1.34
Received guidance on STIs/HIV	It received	<0.001	1.89	1.29	2.75
Receives condoms in prison	Yes	<0.041	0.398	0.164	0.964
Report of violence by prison officers	Yes	<0.001	0.34	0.23	0.51
Report of violence by other inmates	Yes	0.064	1.92	0.96	3.81
Number of people per cell	≤ 8	<0.001	0.54	0.38	0.75
Studies in prison	Yes	0.165	1.28	0.9	1.84
Transferred from unit	Yes	<0.001	0.21	0.14	0.33

STIs: Sexually Transmitted Infections. Source: Prepared by the authors

Discussion

A predominance of black, young, and low-educated men was noted in the sociodemographic profile, highlighting the prior vulnerability of these people. The profile of the PP in Ceará is similar to that of the population in other Brazilian and international studies. The overrepresentation of young and black men with low levels of education in the Ceará and Brazilian prison populations cannot be understood in isolation or only statistically. It can be interpreted in light of the theory of vulnerabilities as a direct reflection of a historical process of exclusion and inequality, which dates back to the period of slavery in Brazil and whose structural/social effects remain[2,11]. In this sense, skin color, youth, and low education are not causes of vulnerability in isolation. They are indicators of a social and political pattern that produces and reproduces inequalities, exposing certain groups to greater risks and fewer opportunities for protection.[11-13]

Regarding the prevalence of STIs, our results are close to those found in a systematic review, with similar prevalences for HIV, hepatitis B, C and syphilis, except for Chlamydia, gonorrhea, and Herpes, with values lower than the lowest found in the review.[6]

When comparing this sample with another Brazilian sample (research conducted in prisons in Salvador, BA, and the Northeast region), a prevalence of 9.4% of STIs was evidenced (sample: >6,000 prisoners), with a similar predominance of syphilis and HIV, although with higher prevalences than those of the Ceará sample.[14]

Regarding markers of greater vulnerability to STIs in the PP of this study, inmates aged ≥30 years presented a higher prevalence. On this topic, several studies highlight the significant STI prevalence in older age groups, including in prisons.[15,16]

In addition, an association between mental health conditions and STI history has been found. In this sense, some studies have shown a greater vulnerability to STIs (mainly HIV and Syphilis) in prisoners with some mental health diagnosis.[17,18] Additionally, one cohort found that treating psychiatric conditions may decrease the risk of STIs.[18] These observations were confirmed by the present findings.

Previous chronic diseases were another relevant factor as a factor of greater vulnerability to STIs. However, the literature is not unanimous on this subject. A study conducted in the United Kingdom showed difficulty in maintaining an active sex life and achieving satisfactory sexual performance in people with chronic conditions.[19] When analyzing this finding, differences in behavior between the prison and free public contexts were perceived, representing a particular case in the analysis of vulnerabilities and potentialities.

In addition, being from a low-income family was one of the vulnerabilities to STIs. We know that family income is an important social determinant of health. Additionally, an unfavorable economic situation may facilitate risky sexual behaviors as a means of subsistence or psychological escape.[20] In this context, a Brazilian study also showed that a monthly income lower than the minimum wage indicates greater vulnerability to STIs/HIV.[21] This complements the relationship between prior formal work and income, which has a lower prevalence of STIs, consolidating access to work as a potential to promote sexual health.

Furthermore, imprisonment for drug crime is among the vulnerability factors. Although drug trafficking is not directly related to sexual vulnerability, pointing out a correlation between the use of psychoactive substances and ineffective prevention of infections is valid, as their use reduces inhibitions and increases impulsivity, facilitating engagement in unprotected sexual behaviors.[7]

The discussions above reflect the intersection between the individual, social, and programmatic dimensions that contribute to increased vulnerability to STIs in PP. Vulnerability is not a static state or a personal attribute, but a dynamic phenomenon, produced and reproduced by structural conditions, power relations, and processes of social exclusion.[2] Thus, markers identified as older age, presence of chronic diseases, and diagnoses of mental disorder represent conditions that may affect the autonomy and individual capacity to carry out care and prevention practices in sexual health, which may be further reduced in the prison context and its programmatic conditions.

At the social and programmatic levels, low family income and a history of unemployment before incarceration indicate structural vulnerabilities that precede imprisonment and reflect trajectories marked by poverty, exclusion, and marginalization. The association between arrest for drug trafficking and STIs can also be understood in light of social inequality, exposure to crime, use of psychoactive substances, and unprotected sexual practices. They show how the social dimension expands and legitimizes individual vulnerabilities, creating a scenario where opportunities for protection become even scarcer.[1] Thus, the markers of greater vulnerability to STIs identified in this study are not isolated aspects, but interdependent expressions of a system that articulates social inequalities, individual weaknesses, and institutional omissions that reinforce the cycle of vulnerability.

Regarding factors that reduce vulnerability, religiosity was highlighted. Research has also shown that being religious and attending religious meetings were protective behaviors against STIs.[22] Also in this context, a scoping review investigated the relationship between religion and practices to prevent STI/HIV. About 48% of studies indicated greater protection against STIs/HIV among religious people.[23]

In addition, having some disability was also protective, which can be explained by the difficulty in searching for sexual partners.[24] To better understand this data, the experience of people with disabilities in the prison system can be even more challenging, as environmental vulnerabilities combined with disability hinder adequate health monitoring in prison, reducing the quality of life of these individuals.[25]

The prevalence of STIs was significantly higher in the cisgender and heterosexual populations when compared to the LGBT+ population. In this sense, a study highlighted that some individuals did not see themselves as vulnerable to HIV because they were not LGBT+. This confirms that heterosexual men have a historical difficulty seeing themselves as susceptible to STIs. This reflection of hegemonic masculinity patterns agrees with their perception of immunity.[26,27]

Considering the programmatic vulnerabilities inherent to prison time, a systematic review showed that PP had higher rates of STIs due to unsafe sexual behaviors, overcrowded prisons, and poor living conditions.[6]

First, having affective or sexual relationships with other inmates was a factor in greater vulnerability to STIs. In this regard, a study described that sexual relations between prisoners were common to maintain an active sex life in prison, and were often correlated with unprotected sexual behavior and exchange of favors.[26] This reinforces the importance of offering guidance on safe sexual behavior and testing to sexual partners in prisons.[7]

Although in this study a higher prevalence of STIs was observed among participants who reported having received some guidance on STIs/HIV, this finding does not necessarily indicate that educational actions are ineffective. On the contrary, we hypothesize that the guidelines contributed to an increase in risk perception, recognition of signs and symptoms, and active seeking of healthcare, thereby favoring diagnosis and, consequently, the reporting of STIs. In contexts such as prisons, where there are various barriers to care and information, sexual health education remains a fundamental strategy for reducing the incidence of STI/HIV, especially when it is combined with regular access to testing services, early diagnosis, and appropriate treatment.[7] Those imprisoned for less than a year had a higher prevalence of STIs. This finding is different, as a study showed that long periods of stay in prison environments, with difficulty in accessing health services, can increase the development and worsening of health conditions.[28] We emphasize that this relationship reflects the prior vulnerability of PP, as many of them received the diagnosis or the first care for previous STIs, upon admission to the prison environment.

Working in the prison system was listed as a factor of greater vulnerability. Such a correlation has not been described before in the literature. However, according to researchers, prisoners who work have some privileges, such as movement without handcuffs in some areas and better relationships with other prisoners and police officers, which favors the creation of sexual bonds with other inmates.

The lower prevalence of STIs among inmates who reported violence by prison officers was another relevant finding. In a complementary qualitative study, prisoners expressed that psychological and physical oppression by officers restricted them in several ways, including sexual behavior.[26] We emphasize that violence must be repudiated, but the power of police control could be channeled into sexual education for PP.

Furthermore, police coercion may be influenced by other factors. A study with Portuguese prison officers revealed that most of them acted to prevent any sexual contact between prisoners. The study reminds us that police repression of sexual behavior is sometimes based on preventing sexual violence among inmates.[29]

In this regard, both the study cited above and a study conducted with prisoners in Finland highlighted that sexual behavior in prison can be mediated by various coercive factors [such as protection from other inmates, from violence or sexual harassment (called "survival sex" and/or "protective sex") or as a bargaining chip for drugs and other favors] even if "consensual". This points to the complexity of police action in relation to the sexual behavior of inmates.[29,30] However, we once again emphasize our rejection of police violence in prisons and the importance of training these professionals. They must deal humanely, better understand the sexuality patterns of inmates, and better identify sexual coercion between prisoners. In addition, they must respect the individuality of PP and channel actions to prevent sexual coercion and STIs/HIV among inmates.

Furthermore, receiving a visit from a partner before the prison period conferred a lower vulnerability to STIs. In this context, a study with Cuban prisoners showed that receiving intimate visits reduced the number of diagnoses of HIV and syphilis.[31] Moreover, maintaining affectionate relationships increases social support and satisfaction, reducing engagement in sexual activities with various partners.[32]

As for the protective factors related to a lower vulnerability to STIs, we can mention receiving condoms. Distributing condoms and promoting a healthy environment in prison units are crucial preventive strategies to reduce infections.[32] The use of condoms is certainly the most recommended strategy to reduce the vulnerability of PP to STIs. The results of the present study reinforce its importance. Thus, prison health teams must ensure their satisfactory distribution to PP.[7]

In short, the identification of markers associated with reduced vulnerability to STIs in PP shows that some individual and social aspects can act as protective elements, although the prison environment represents a structurally adverse condition. In the adopted framework, we understand that vulnerability does not refer only to direct exposure to risk, but also to the capacity for coping and protection that

subjects develop based on their social, affective, and institutional contexts. Thus, certain conditions or links can strengthen autonomy, critical consciousness, and self-efficacy in the face of vulnerabilities, although limited, partially balancing the effects of previously identified structural inequalities and institutional failures.[2]

In addition, the findings of reduced vulnerability with programmatic actions reinforce the need for actions based on the promotion of health and human rights that recognize the complexity of sexual dynamics in prison and effectively articulate the principles of integrality, equity, and dignity in the care of PP. Therefore, understanding these nuances is essential to break with deterministic views and guide actions that promote not only the control of STIs but also care with dignity.

As limitations of the study, we highlight the cross-sectional design that cannot precisely define the causal relationships regarding the history of STIs. Furthermore, information on STI diagnoses was obtained through participant self-reporting and is thus subject to recall bias. Moreover, information addressed sensitive issues about individual behaviors, which could cause response bias. We recommend carrying out longitudinal studies assessing the vulnerability of PP in the long term, with monitoring of sexual practices and casualties.

Conclusion

The prison population in Ceará is vulnerable to sexually transmitted infections and/or HIV, where syphilis and HIV were the most common infections. More than half of these cases were infections diagnosed on prison admission. Various vulnerability markers are associated with a history of sexually transmitted infections and/or HIV. Prison populations often already had vulnerabilities before imprisonment. Some vulnerabilities that existed before entering the penal system were enhanced or added to new vulnerabilities that are typical of the prison period, impacting the Brazilian penitentiary system. A better understanding of vulnerability markers is needed to direct prison health professionals, prison officers, and all system staff to provide a better quality of life for the prison population.

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Collaborations

Teles DO, Oliveira RA, Ribeiro SG, Soares PRAL, Menezes PR, and Pinheiro AKB contributed to the project design, analysis and interpretation of the data, writing of the manuscript, relevant critical review of the intellectual content, and approval of the final version to be published.

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