

HIV and syphilis co-infection in northeast Brazil: a gender assessment

Coinfecção HIV e sífilis no Nordeste do Brasil: uma avaliação de gênero

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Abstract

Objective: this study aimed to determine the frequency and the clinical-epidemiological profile of the human immunodeficiency virus (HIV) and syphilis co-infection between genders in specialized care services in Northeast Brazil. **Methods:** an analytical cross-sectional study was conducted with secondary data from 171 individuals with HIV and syphilis co-infection. Data were collected in a reference center for acquired immunodeficiency syndrome (AIDS) in Northeast Brazil from 2015 to 2020. Welch's test compared the means of independent samples; the chi-square and Fisher's exact test assessed the association between categorical variables. The significance level was set at 5%. This study has ethical approval. **Results:** the HIV and syphilis co-infection frequency was 15.4%. Individuals with co-infection had a mean age of 34.2 (\pm 11.0) years and were predominantly men. The women sample started their sex life earlier, had a lower education level and per capita family income, used more illicit drugs, and were mostly heterosexual, married or in a stable union, and unemployed. Men had more anal sex. Moreover, most individuals had syphilis in the asymptomatic phase and HIV with undetectable viral load; CD4 T cells were greater than 350 cells/mm³. **Conclusion:** the high prevalence of HIV and syphilis co-infection in specialized care services, especially in men who have sex with men (MSM), highlights the need to improve counseling to reduce sexual risk behavior and improve prevention and care strategies to control these diseases.

Keywords: HIV; AIDS; syphilis; co-infection; sexually transmitted diseases.

Resumo

Objetivo: este estudo teve como objetivo determinar a frequência e o perfil clínico-epidemiológico da coinfeção pelo vírus da imunodeficiência humana (HIV) e sífilis em ambos os gêneros num serviço de atenção especializada no Nordeste do Brasil. **Métodos:** trata-se de um estudo transversal, analítico, com dados secundários de 171 pacientes com coinfeção por HIV e sífilis de um centro de referência para síndrome da imunodeficiência adquirida (SIDA) de 2015 a 2020. O teste de Welch foi utilizado para comparar as médias de amostras independentes; os testes qui-quadrado e exato de Fisher avaliaram a associação entre variáveis categóricas. O nível de significância adotado foi de 5%. Este estudo obteve aprovação ética. **Resultados:** a frequência da coinfeção por HIV e sífilis foi de 15,4%. Os indivíduos tinham idade média de 34,2 (\pm 11,0) anos e eram predominantemente homens. As mulheres iniciaram a vida sexual mais cedo, tinham menor escolaridade e renda familiar per capita, usavam mais drogas ilícitas e eram, em sua maioria, heterossexuais, casadas ou em união estável, e desempregadas. Os homens praticavam mais sexo anal. A maioria dos indivíduos apresentava sífilis na fase assintomática e HIV com carga viral indetectável, além de células T CD4 superiores a 350 células/mm³. **Conclusão:** a alta prevalência de coinfeção por HIV e sífilis em serviços de atenção especializada, principalmente em homens que fazem sexo com homens (HSH), evidencia a necessidade de aprimorar o aconselhamento a fim de reduzir comportamentos sexuais de risco e melhorar as estratégias de prevenção e cuidado para o controle dessas doenças.

Palavras-Chave: HIV; AIDS; sífilis; co-infecção; doenças sexualmente transmissíveis.

INTRODUCTION

Acquired immunodeficiency syndrome (AIDS) is a worldwide public health problem. Brazil has an estimated HIV prevalence HIV of 0.4% among adults, higher in vulnerable subgroups (e.g., men who have sex with men [MSM], women sex workers, drug users, and transgender women)¹.

Although antiretroviral therapy (ART) decreased the morbidity and mortality caused by opportunistic infections, the number of sexually transmitted diseases (STDs) increased in recent years, syphilis being one of the most prevalent². Each year, about six million new cases of syphilis are presented worldwide; Brazil reported about 115,371 cases of syphilis in 2020³.

Syphilis lesions facilitate the transmission of HIV⁴, and sexual

risk behaviors (e.g., less male condom use) could intensify the vulnerability to STDs⁵. These factors increase the HIV co-infection with the etiological agent of syphilis (*Treponema pallidum*)⁴.

In 2020, Northeast Brazil was the third region with the most reported cases of syphilis, totaling 15,601 registers³. Although HIV and syphilis co-infection has a high prevalence and morbidity, the literature lacks knowledge about this condition in the region. Thus, our study aimed to determine the frequency and the clinical-epidemiological profile of HIV and syphilis co-infection between genders in specialized care services in Northeast Brazil.

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METHODS

This analytical cross-sectional and retrospective study initially included 1,111 individuals with HIV over 18 years old registered at the Instituto de Medicina Integral Professor Fernando Figueira (IMIP) from 2015 to 2020. Then, we identified and determined the frequency of individuals with HIV and syphilis co-infection by assessing acquired syphilis. The clinical and epidemiological characteristics were collected only from individuals with co-infection. Thus, individuals without syphilis were excluded, totaling 171 individuals for analysis.

Evaluated variables were divided into five topics: (a) sociodemographic (age, gender, skin color, origin, marital status, education level, occupation, and per capita family income), (b) behavioral (sexual orientation, age at first intercourse, anal sex, condom use, number of sexual partners in life, alcohol consumption, illicit drug use, and smoking), (c) clinical (history of STDs, previous history of syphilis, the form of discovery of syphilis, clinical stage of syphilis, presence of neurosyphilis, the form of discovery of HIV, time of HIV diagnosis, and clinical stage of HIV), (d) laboratory (venereal disease research laboratory test [VDRL], last viral load, and last CD4 count), and (e) therapy-related characteristics (adherence to syphilis treatment, partner treatment, serological control, cured syphilis, and adherence to ART).

Syphilis was defined by a reactive VDRL (with any titer) and positive fluorescent treponemal antibody absorption (FTA-ABS), even in an asymptomatic individual. History of syphilis was considered if the presence of treated and cured syphilis over one year after reinfection. Reduction in VDRL titers or negative test in two dilutions six months after the treatment determined cured syphilis.

The per capita family income was defined according to the World Bank and classified as above the poverty line (\geq US\$ 5.50/day), poverty (between US\$ 1.90/day and US\$ 5.50/day), or extreme poverty (\leq US\$1.90/day)⁶. The adherence of the individuals to syphilis treatment and ART considered the agreement of their behavior with the medications prescribed by health professionals, as registered in the medical records.

The data collected from medical records were inserted into a database. The researchers analyzed data using the STATA 12.1SE Software (StataCorp, College Station, Texas, USA). The values were presented as frequency distribution for nominal variables and measures of central tendency and dispersion for numerical variables. Kolmogorov-Smirnov test assessed the normality, and variables with normal distribution were presented as mean and standard deviation. Welch's test compared means of independent samples, and the chi-square and Fisher's exact test verified the association between categorical variables. The confidence interval was set at 95%. The study was approved by the research ethics committee of IMIP (registry no. 39890720.4.0000.5201 and opinion no. 4,420,607).

RESULTS

Overall, 1,111 individuals with HIV were registered at IMIP from 2015 to 2020, and 171 (15.4%) were diagnosed with HIV and syphilis co-infection. The mean age was 34.2 (\pm 11.0) years. Most individuals were men (57.9%); four women (5.5%) were transgender. Also, 47.8% of the individuals were married or had a stable union, and 82.2% were brown. Most individuals were from the metropolitan region of Recife (88%) and studied up to high school (79.3%). Although only 35.1% of the individuals were unemployed, 73.3% lived in poverty or extreme poverty (Table 1).

Table 1. Sociodemographic characteristics of individuals with HIV and syphilis co-infection

Variables	N (%)
Age (years) (mean \pm standard deviation) (total = 171)	
Men	99 (57.9)
Women	72 (42.1)
Skin color (total = 135)	
White	13 (9.6)
Brown	111 (82.2)
Black	10 (7.4)
Indigenous	1 (0.7)
Origin (total = 150)	
Metropolitan region of Recife	132 (88.0)
Inland regions	16 (10.7)
Other states	2 (1.3)
Marital status (total = 92)	
Single	46 (50.0)
Divorced	2 (2.2)
Married or in stable union	44 (47.8)
Education level (total = 145)	
Illiterate	2 (1.4)
Literate	1 (0.7)
Incomplete elementary school	41 (28.3)
Complete elementary school	26 (17.9)
High school	45 (31.0)
Incomplete higher education	6 (4.1)
Complete higher education	23 (15.9)
Post-graduation	1 (0.7)
Occupation (total = 154)	
Unemployed	54 (35.1)
Employee or self-employed	85 (55.2)
Retired	3 (1.9)
Student	12 (7.8)

Variables	N (%)
Per capita family income (total = 90)	
Above the poverty line	24 (26.7)
Poverty or extreme poverty	66 (73.3)

Regarding behavioral characteristics, the mean age at first intercourse was 15.2 (\pm 2.2) years, and the mean number of sexual partners in life was 15.5 (\pm 28.7). Most individuals were heterosexuals (52.1%), practiced anal sex (73.3%), and never used condoms or used them occasionally (51.8%). Also, 52.4% of the individuals were smokers, 48.8% consumed alcohol, and 29.5% used illicit drugs (Table 2).

Table 2. Behavioral characteristics of individuals with HIV and syphilis co-infection

Variables	N (%)
Sexual orientation (total = 140)	
Yes	44 (73.3)
No	16 (26.7)
Condom use (total = 27)	
Always	13 (48.1)
Sometimes	11 (40.7)
Never	3 (11.1)
Illicit drug use (total = 95)	
Yes	28 (29.5)
No	67 (70.5)
Smoking (total = 82)	
Yes	43 (52.4)
No	39 (47.6)
Alcohol consumption (total = 80)	
Yes	39 (48.8)
No	41 (51.2)
Age at first intercourse (years) (mean \pm standard deviation) (total = 49)	15.2 \pm 2.2
Number of sexual partners in life (mean \pm standard deviation) (total = 47)	15,5 \pm 28,7

About 39% and 31% of individuals had a history of syphilis and other STDs, respectively. Hepatitis B [35.9%], genital herpes [28.2%], and condyloma acuminatum [20.5%] were the most frequent infections. Regarding the clinical stage of syphilis, 64.5% of the individuals were diagnosed in the asymptomatic phase, and 6.6% had neurosyphilis. Moreover, 72.5% of the individuals discovered the disease by routine HIV testing in follow-up, and 79.5% had VDRL titers $>$ 1/16. Also, 90% of individuals received prescribed treatment, 87.6% received serological control, 94% were cured, and 62.5% had partners treated (Table 3).

Table 3. Clinical, laboratory, and therapy-related characteristics of individuals with HIV and syphilis co-infection

Variables	N (%)
Other STDs (total = 124)	
Yes	39 (31.5)
No	85 (68.5)
STDs (total = 39)	
Hepatitis B	14 (35.9)
Gonorrhea	2 (5.1)
Trichomoniasis	1 (2.6)
HTLV ½	1 (2.6)
LGV	1 (2.6)
Previous history of syphilis (total = 87)	
Yes	34 (39.1)
No	53 (60.9)
Form of discovering syphilis (total = 98)	
Routine blood tests	71 (72.5)
Partner was diagnosed and reported	3 (3.1)
Clinical stage of syphilis (total = 93)	
Primary	11 (11.8)
Secondary	19 (20.4)
Asymptomatic	60 (64.5)
Tertiary	3 (3.2)
Presence of neurosyphilis (total = 76)	
Yes	5 (6.6)
No	71 (93.4)
VDRL titers (total = 171)	
$<$ 1/16	35 (20.5)
$>$ 1/16	136 (79.5)
Adherence to syphilis therapy (total = 72)	
Yes	67 (93.1)
No	5 (6.9)
Partner treatment for syphilis (total = 24)	
Yes	15 (62.5)
No	5 (6.9)
Serological control (total = 89)	
Yes	78 (87.6)
No	11 (12.4)
Cured (total = 67)	
Yes	63 (94.0)
No	
Form of discovering HIV (total = 95)	
Routine blood tests	65 (68.4)

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Showed symptoms and sought medical attention	19 (20.0)
Partner was diagnosed and reported	11 (11.6)
Clinical stage of HIV (total = 126)	
Asymptomatic	77 (61.1)
Symptomatic without AIDS-defining illness	32 (25.4)
Symptomatic with AIDS-defining illness	17 (13.5)
Last viral load (total = 131)	
Undetectable	84 (64.1)
Detectable	47 (35.9)
Last CD4 load (cells/mm³) (total = 132)	
≤350	34 (25.8)
> 350	98 (74.2)
Adherence to ART (total = 142)	
Yes	124 (87.3)
No	18 (12.7)

Legend: STD = sexually transmitted diseases; HTLV ½ = human T-lymphotropic virus 1/2; LGV = lymphogranuloma venereum; VDRL = venereal disease research laboratory; HIV = human immunodeficiency virus; ART = antiretroviral therapy; SD = standard deviation

The mean time of HIV diagnosis was 4 (± 3) years, and 68.4% of the individuals discovered the disease occasionally by routine blood tests (i.e., serology for STDs performed annually or by tests requested due to syphilis). Most of the individuals who adhered to ART (87.3%) were asymptomatic (66.1%) and presented the last undetectable viral load (64.1%) and the last CD4 load over 350 cells/ mm³ (74.2%) up to the date of evaluation (Table 3).

The mean age (men 36.9 vs. women 31.3, $p = 0.001$) and mean age at first intercourse (men 16.6 vs. women 14.7, $p = 0.007$) were significantly different between genders. Moreover, no difference was found between sex considering the mean number of sexual partners in life and the time of HIV diagnosis (men 11.6 vs. women 17.5, $p = 0.372$; and men 3.8 vs. women 4.1, $p = 0.544$, respectively) (Table 4).

Table 4. Comparison of means of numerical variables in the sample, according to gender, of individuals with HIV and syphilis co-infection

Variable	Men		Women		P*
	N	Mean ± SD	N	Mean ± SD	
Age (years)	98	36.9 ± 13.2	71	31.3 ± 9.1	0.001
Age at first intercourse	13	16.6 ± 2.0	36	14.7 ± 2.0	0.007
Number of sexual partners in life	16	11.6 ± 8.2	31	17.5 ± 34.9	0.372
Time of HIV ¹ diagnosis (years)	81	3.8 ± 2.6	67	4.1 ± 3.4	0.544

Legend: HIV = human immunodeficiency virus; SD = standard deviation.
* Welch's test compared the means of two independent samples.

In addition, differences between sexes were presented in marital status ($p < 0.001$), education level ($p < 0.001$), occupation ($p < 0.001$), per capita family income ($p = 0.032$), sexual orientation ($p < 0.001$), anal sex practice ($p = 0.001$), and illicit drug use ($p = 0.026$). No difference was found in alcohol consumption and smoking. Compared to men, women were younger, started their sex life earlier, had a lower education level and per capita family income, used more illicit drugs, had less anal sex, were mostly married or in a stable union, and were unemployed (Table 5).

Table 5. Association of categorical variables and gender of individuals with HIV and syphilis co-infection

Variable	Sex		p-value
	Men N (%)	Women N (%)	
Marital status			< 0.001
Married or in stable union	12 (26.1)	32 (69.6)	
Others	34 (73.9)	14 (30.4)	
Education level			< 0.001*
Up to high school	57 (66.3)	58 (98.3)	
Higher education or post-graduation	29 (33.7)	1 (1.7)	
Occupation			< 0.001
Workers	66 (73.3)	19 (29.7)	
Non-workers	24 (26.7)	45 (70.3)	
Per capita family income			0.032
Above the poverty line	20 (33.9)	4 (12.9)	
Poverty or extreme poverty	39 (66.1)	27 (87.1)	
Sexual orientation			< 0.001
Heterosexual	22 (26.2)	51 (91.1)	
Homo/bisexual	62 (73.8)	5 (8.9)	
Anal sex practice			0.001*
Yes	39 (84.8)	5 (35.7)	
No	7 (15.2)	9 (64.3)	
Illicit drug use			0.026
Yes	11 (20.4)	17 (41.5)	
No	43 (79.6)	24 (58.5)	
Smoking			0.754
Yes	25 (51.0)	18 (54.5)	
No	24 (49.0)	15 (45.5)	
Alcohol consumption			0.870
Yes	25 (48.1)	14 (50.0)	
No	27 (51.9)	14 (50.0)	

* Fisher's exact test. P values without "*" were obtained by Pearson's chi-square test

DISCUSSION

In this study, the frequency of HIV and syphilis co-infection was 15.4%. Studies in Brazil obtained varied results (2,7%⁷ to

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56,6%⁵) according to the social, cultural, and economic aspects of each region. Although other studies showed a co-infection frequency higher than the present study⁵, the percentage found in this study is significant and may be due to a lack of awareness about sexual risk behaviors.

HIV and syphilis co-infection was mainly prevalent in men, with a mean age of 36.9 years, single, and homosexual or bisexual; these results corroborated several studies^{5,8}. The mean age of women with co-infection was lower (31.3 years) than men, possibly due to HIV diagnosis during pregnancy. After this diagnosis, women were referred and followed up in IMIP (reference in high-risk pregnancies).

Contrarily to men, most women were heterosexual and married or in a stable union. This difference between genders is difficult to evaluate because it requires comprehensive sociological analysis. Likewise, we could not determine whether these women were infected by their spouses, extramarital relationships, or before the current relationship.

The socioeconomic profile showed more social vulnerability among women than men: most were unemployed, had up to eight years of schooling, and lived in poverty or extreme poverty. The high vulnerability of women of reproductive age leads to increased vertical transmission of syphilis and HIV and infant mortality⁹ since education level and per capita family income are related to access to information and search for health services¹⁰.

The women population had four transgender women, who usually have a higher prevalence of HIV and syphilis than the general population. A meta-analysis study estimated that HIV prevalence in transgender women was 19.1%, almost 50 times higher than in adults of reproductive age. This disproportionality may be explained by risk behaviors (e.g., unprotected anal sex and illicit drug use) and transgender discrimination and stigma, which hinder access to labor resources and prevention services.¹¹

Most individuals were brown (82.2%). However, this result varied among the studies conducted in the country^{5,12}, reflecting regional characteristics from where each study was developed.

This study observed that 73.8% of individuals with HIV and syphilis co-infection were MSM, corroborating the literature that indicated MSM has a higher risk of this co-infection⁵. Although no definitive explanation was found for the high frequency, some hypotheses were proposed. First, the progressive decrease in CD4 T cells in individuals with HIV impairs immunity against pathogens¹³. Second, the availability of ART and antiretroviral pre-exposure prophylaxis may encourage sexual risk behavior, also known as risk compensation, increasing the incidence of syphilis¹⁴.

The availability of ART and PrEP may reduce the fear of HIV infection, resulting in more frequent sexual activity, more sexual partners, and less condom use. This hypothesis is supported by

the boost in STDs after the ART era. Men with HIV may also have other risk behaviors, such as *serosorting*, i.e., choosing sexual partners previously infected with HIV and strategically choosing the sex position with serodiscordant partners; the individual with HIV assumes the receptive role during anal sex to avoid the insertive role which is more likely to transmit the virus¹⁴.

Regarding behavioral characteristics, over half of individuals (51.8%) never used condoms or used them occasionally. A systematic review found a stabilization or reduction in male condom use in Brazil since 2005¹⁵. In addition, individuals with HIV have high morbidity from alcohol consumption, illicit drug use, and smoking¹⁶. In this study, 52.4% of individuals were smokers, similar to a meta-analysis in which 54% of individuals with HIV were smokers. This value is almost 2.5 times higher than the general population¹⁶.

Furthermore, almost half of individuals (48.8%) consumed alcohol. However, the consumption could not be measured since this information was not included in the medical records. Smoking and mild to moderate alcohol consumption were 2.5 times higher (50% to 60%) in individuals with HIV or AIDS than in the general population (20% to 25%)¹⁷. According to the literature, smoking and alcohol negatively impact HIV care¹⁶ since they may reduce adherence to ART and hinder viral suppression¹⁸.

A meta-analysis observed associations between alcohol consumption and sexual risk behaviors. Individuals who frequently consumed alcohol intended more to engage in unprotected sex than individuals in the control group¹⁹. This study observed no association in men and women between HIV and syphilis co-infection and alcohol consumption or smoking; the former is more observed in women²⁰ and the latter in men²¹ in studies developed in Brazil.

Almost a third of individuals (29.5%) used non-injecting illicit drugs. Classically, HIV among drug users is transmitted by sharing needles. Nonetheless, like alcohol consumption, the use of illicit non-injecting drugs stimulates sexual risk behavior and the exchange of sex for drugs, favoring the transmission of STDs²². Contrary to another study²¹, our study observed that the use of these substances was more frequent among women. Possible explanations include the social vulnerability seen among women and the referral of pregnant women who use illicit drugs to IMIP.

The mean age of the first sexual intercourse was 15.2 years. One study reported an inverse association between age at first intercourse and sexual risk behavior²³. In addition, the mean number of sexual partners in this study was 15.5. The multiplicity of sexual partners is a risk factor for STDs and their complications (e.g., infertility, ectopic pregnancy, and pelvic inflammatory disease)²³.

HIV and syphilis co-infection was established for years because of the common transmission route and their biological synergy.

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Syphilis lesions increase HIV transmission, and individuals with HIV or AIDS who acquire syphilis have accentuated a decline in CD4+ T cells and raised viral concentration in plasma. Furthermore, HIV immunosuppression changes some clinical aspects of syphilis, such as a greater number and infectivity of lesions and a shorter incubation period⁴. Studies observed that HIV increases five times the risk of reinfection by syphilis²⁴, while individuals with a history of syphilis have a 3.5-fold higher risk of reinfection²⁵. The present study showed that 39.1% of the individuals had a recurrence of syphilis, a percentage higher than in other studies⁸.

Several factors explain the syphilis reinfection in individuals with HIV: (a) the high prevalence of syphilis in individuals with HIV may increase the risk of reinfection due to sexual risk behavior and repeated exposure to partners with syphilis; (b) immunosuppression caused by HIV may limit the defense against *Treponema pallidum*; (c) individuals with HIV who receive ART are more likely to be tested for other STDs (including syphilis), increasing the chance of detecting reinfection earlier²⁴. In this study, although most individuals did the prescribed treatment and the serological control, and the disease was cured, only 62.5% of the partners were treated, which may explain the reinfection in already treated individuals.

About a third of the individuals (31.5%) had HIV co-infection with another STD. The most prevalent STDs were hepatitis B (35.9%), genital herpes (28.2%), and condyloma acuminatum (20.5%). These percentages were higher than those found in the literature^{26,27}. Viral infections remain important morbidity factors in individuals with HIV and may contribute to immune activation and HIV transmission by genital lesions¹³.

Similar to another study conducted in Brazil⁵, about 72.5% of individuals discovered syphilis by blood tests performed regularly during HIV follow-up, and 64.5% were in the asymptomatic phase. The lack of data in the medical records hindered the classification of the asymptomatic phase as early or late. However, VDRL titers were high ($\geq 1/16$), indicating a recent onset; VDRL titers are usually lower in the later stages of syphilis²⁸.

Possibly, most syphilis cases were diagnosed in the asymptomatic phase due to poor access to health services, lack of suspicion of diagnosis by health professionals in emergency services, or lack of search for medical help by the individual because of mild initial symptoms or symptoms that did not cause discomfort.

Five individuals (6.6%) had neurosyphilis, a frequency within the mean reported in individuals with HIV (0.6% to 16%)²⁹.

As for HIV infection, the mean time of diagnosis was four years, with most individuals (68.4%) discovering the virus in the asymptomatic phase during screening tests for other STDs after the diagnosis of syphilis or regular annual STD testing. STD testing is extremely important, especially in populations with sexual risk behavior or a previous STD, since the early diagnosis allows actions to interrupt the chain of transmission³⁰. Individuals with HIV or AIDS who acquire syphilis may have a decline in CD4+ T cells and increased viral concentration in plasma¹³. In our study, most individuals showed the last undetectable viral load (64.1%) and CD4 load over 350 cells/mm³ (74.2%) until the evaluation date. This finding is possibly due to the prompt initiation of ART and the regular follow-up, allowing early diagnosis and treatment of syphilis. However, changes in CD4 and viral load values after syphilis in individuals with HIV were not registered in the medical records.

The retrospective and observational nature of this study brings intrinsic limitations, hampering the collection of secondary data. The main limitations were the absence of clinical and laboratory information and inaccurate or incomplete data in the medical records. This study was one of the few conducted in Northeast Brazil analyzing the frequency and clinical-epidemiological profile of HIV and syphilis co-infection. This data may improve treatment by recognizing atypical forms of evolution of each infection, improving prognosis.

In conclusion, this study showed a high frequency of HIV and syphilis co-infection, especially in young, single, and homosexual or bisexual men; most had about ten years of schooling and were employed. Most women were married or in stable unions and more socially vulnerable with low education levels, per capita family income, high unemployment, and high illicit drug use. Most individuals discovered syphilis in the asymptomatic phase, and more than a third were reinfected. Regarding HIV, most individuals were asymptomatic with undetectable viral load, CD4 load over 350 cells/mm³, and high adherence to ART.

Since syphilis increases the chance of acquiring HIV and HIV immunosuppression increases the infectivity of syphilis lesions, early diagnosis and treatment of co-infection are essential to reduce morbidity and mortality. The results obtained from this study may improve prevention and control actions for these diseases in specialized care services.

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