Original article

Factors associated with HIV co-infection in cases of acquired syphilis reported in a Reference Center for Sexually Transmitted Diseases and AIDS in the municipality of São Paulo, Brazil, 2014*

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Abstract

Objective: to describe sociodemographic and behavioral characteristics and to identify factors associated with human immunodeficiency virus (HIV) co-infection in cases of acquired syphilis reported in a Reference Center for Sexually Transmitted Diseases (STD) and AIDS. **Methods**: cross-sectional study with secondary data from a Reference Center for STD and AIDS in the municipality of São Paulo, Brazil, in 2014; the Poisson regression was used to estimate prevalence ratios (PR) and 95% confidence intervals (95%CI). **Results**: 648 cases of acquired syphilis were reported, and 98% were male; 88% were men who have sex with men (MSM) and 57% had HIV co-infection; male sex (PR=1.95; 95%CI 1.05;3.61) and MSM (PR=1.87; 95%CI 1.38;2.53) were factors independently associated with HIV co-infection. **Conclusion**: there was a high prevalence of HIV co-infection in the service analyzed, disproportionately affecting MSM who were notified with acquired syphilis.

Keywords: Epidemiological Surveillance; Syphilis; Sexually Transmitted Diseases; HIV Infections; Cross-Sectional Studies.

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Introduction

Syphilis still constitutes a serious public health problem for its magnitude and transcendence, despite the existence of effective prevention and control measures.[1] The predominant form of this disease transmission is via sex.[2] Among the main consequences of untreated infection are the vertical transmission of Treponema pallidum – which causes the congenital syphilis – and the association with human immunodeficiency virus (HIV) infection.[1-3] HIV and syphilis co-infection has a synergistic effect, characterized by both the elevation of HIV transmissibility and the atypical evolution of treponemic infection.[2,4]

Actions for the prevention and control of syphilis are available and have a low cost: use of condom, early detection and proper treatment of infected people and their sexual partners.[2,3] It is important to highlight that these actions have an extremely favorable cost-effectiveness relation.[1]

> *HIV and syphilis co-infection has a synergistic effect, characterized by both the elevation of HIV transmissibility and the atypical evolution of treponemic infection.*

According to estimates from the World Health Organization (WHO), in 2012, approximately 18 million adults had syphilis worldwide, with 5.6 million new cases per year.[5] WHO has established syphilis as one of priorities for implementation of actions to prevent and control sexually transmitted infections (STI) from 2016 to 2021.[1] In order to achieve the goal defined by WHO to reduce 90% of the cases until 2030, several strategies have been proposed, among which we highlight the strengthening of surveillance activities in order to enable the monitoring and planning of the actions to be organized.[1]

In Brazil, congenital syphilis has been a notifiable disease since 1986. However, syphilis in pregnant women and acquired syphilis became notifiable diseases only in 2005 and 2010, respectively.[6]

From 2010 to June 2016, 227,663 cases of acquired syphilis in adults were reported in the country. São Paulo state accounted for 44% of this total, with 9,976 and 25,909 cases of acquired syphilis reported in 2011 and 2015, respectively.[7]

In the Brazilian context, the increase in the number of acquired syphilis cases may have occurred due to the reduction of underreporting cases; it can also be attributed to the influence of changes in the scenario of sexual practices and behaviors that could favor people's vulnerability to STI. According to a systematic review of the literature on the use of condoms in Brazil, studies indicate the stabilization or reduction in the frequency of male condom use, mainly since 2005.[8]

In the country, data available in the Information System for Notifiable Diseases (Sinan) referring to syphilis are about personal identification: sex, age, ethnicity/skin color, education level and place of residence. Data related to laboratory confirmation, disease phase, sexual behaviors, treatment prescription and presence of HIV co-infection are not yet available for all national territory.[6,7] Without the systematic collection of information related to the main exposures and the presence of HIV co-infection, it is not possible to carry out an adequate evaluation of the trends of this disease. In the United States (USA)[9] and Europe,[10] the epidemiological surveillance systems recommend the syphilis notification in adults with data regarding the disease phase, monitoring of main exposures, and HIV co-infection.

According to data available in Sinan,[7] it is not possible to know the prevalence of HIV/syphilis co-infection, since there is no co-infection data in the notification and investigation records of acquired syphilis or HIV/AIDS. To obtain this information, it would be necessary to establish relationships between databases referring to each of the diseases, using nominal data – which are not publicly available. Thus, we can justify the investigation of the prevalence of HIV/syphilis co-infection in a specialized care service, as well as the study of associated factors, in order to contribute to the proposal of prevention and control measures of these diseases at local level.

The objective of this study was to describe sociodemographic and behavioral characteristics and to identify factors associated with HIV co-infection in cases of acquired syphilis reported at a Reference Center for Sexually Transmitted Diseases (STD) and AIDS.

Methods

This is a cross-sectional study with secondary data from the Information System for Notifiable Diseases – Sinan.

The Reference Center for Sexually Transmissible Diseases (STD) and AIDS where the research was conducted is a specialized public assistance service that meets spontaneous and referenced demand from other state management services. This service is located in the southeast region of São Paulo city, state capital. It is organized into specialized outpatient clinics, which have different characteristics according to the populations assisted: an outpatient clinic for people living with HIV/AIDS (PLHA), predominantly with referenced demand; and an STD outpatient clinic, with a testing and counseling center (TCC), for diagnosis of HIV infection and STI, predominantly with spontaneous demand.

We included all cases of acquired syphilis diagnosed at the STD and AIDS Reference Center aged 18 years or older at the time of diagnosis, reported at Sinan in 2014.

We analyzed the following variables:

a) sociodemographic
- sex (male; female);
- age group (in years: up to 24, 25-34, 35-44 or 45 and over);
- education level (Elementary School, High School, complete or incomplete Higher Education); and
- ethnicity/skin color (white, black, Asian, brown or indigenous);

b) clinic
- acquired syphilis classification (primary, secondary or asymptomatic);

c) laboratory (results of treponemic and non-treponemic serology);

d) epidemiological background;

e) gender identity (transvestite, transsexual woman or transsexual man);

f) exposure categories (heterosexual, men who have sex with men [MSM], multiple sexual partners, use of non-injectable drugs, use of injectable drugs;

g) outpatient clinic type (STD/TCC; PLHA); and

h) HIV co-infection status (serological result of HIV infection: non-reagent or reagent).

The definition of acquired syphilis case adopted at the STD and AIDS Reference Center was the following: asymptomatic individual, with non-treponemic reactive serology with titration above 1/16 and reagent treponemic test; or individual with clinical evidence of primary or secondary syphilis (presence of hard cancer or lesions compatible with secondary syphilis), with non-treponemal serology reagent with any titration and reagent treponemic test. The case definition of HIV infection followed the laboratory flow chart defined by the Brazilian Ministry of Health.[11] All results of the serological and dark-field microscopy were obtained from laboratory reports performed at the same center.

We utilized data from Sinan and from syphilis investigation and notification forms. Sinan is a nationwide information system, managed by the Ministry of Health, and used for epidemiological surveillance in the country. Data entry in this system is under local responsibility; these data are extracted from specific investigation and notification forms on each disease or illness, and then consolidated and analyzed by municipal and state levels.[12] Sinan's data on acquired syphilis do not incorporate the clinical, laboratory and epidemiological preceding, neither the status in relation to HIV infection; only sociodemographic characteristics are recorded in the system. In order to complete the missing information, a complementary form was used in the service routine of the unit's epidemiological surveillance. Identification data were typed in Sinan; and the other data, in an Excel® spreadsheet.

All information regarding serology results for syphilis and HIV were confirmed with the laboratory source, to ensure the data reliability. We evaluated the duplicity of cases in Sinan database, withdrawing the identified cases. The possibly confounding variables were controlled through multivariate analysis.

All cases of acquired syphilis reported in 2014 were included.

In the analysis, the relative and absolute frequencies of the variables were calculated, as well as the prevalence of HIV co-infection and the respective prevalence ratios (PR) and 95% confidence intervals (95%CI). The Stata® statistical package (version 11.0) was used in the analyses. The Poisson regression model with robust variance estimation was used for multivariate analysis.[13] The multivariate model was organized with the inclusion of all analyzed variables that showed $p<0.20$ in the crude prevalence ratio, by the Wald test. We adopted the significance level of 5% for the maintenance of variables in the final model; the selection of the variables was performed using the stepwise backward technique. The variables that remained in the model were those that presented a

level of significance lower than 0.05 by the Wald test. We organized two intermediate models (model 1 and model 2) to test the potential confounding effect of the variable outpatient clinic type. In model 1, we tested the variables sex, age group, education level and sexual behavior; an exception was made for the outpatient clinic type, which was included in model 2; model 3 resulted from the inclusion of better adjusted variables.

The study was approved by the Research Ethics Committee of the institution on April 28th, 2015 – CAAE: 43705715.2.0000.5375 –, in accordance with the Resolution of the National Health Council No. 466, dated December 12th, 2012. Only secondary data, registered by the local epidemiological surveillance system were used; thus, the signing of the Free and Informed Term of Consent was not necessary.

Results

A total of 648 cases of acquired syphilis were reported, with a predominance of males (97.8%), from 25 to 34 years old (40.3%), complete or incomplete higher education (47.5%) and self-declared white (59.9%) (Table 1); 56.9% were asymptomatic and 90.6% presented a non-treponemal test result higher than or equal to 1/32 dilution (Table 2). Among the characteristics of sexual behavior and other vulnerabilities, of the total reported cases, we observed: 8.2% transvestite/transsexual gender identity, 60.6% with multiple sexual partnerships in the prior year, 88.1% of MSM, 44.1% of non-injecting drug use and 1.5% of injecting drug use in the prior year (Table 2). The prevalence of HIV co-infection was of 56.5% (n=366) (Table 3).

Table 1 – Distribution of notified cases of acquired syphilis according to sociodemographic characteristics and outpatient clinic type, at STD and AIDS Reference Center, São Paulo, SP, 2014

Characteristics	STD/TCC[a]		PLHA[b]		Total	
	n	%	n	%	N	%
Sex						
Female	11	3.0	3	1.0	14	2.2
Male	351	97.0	283	99.0	634	97.8
Age group (in years)						
≤24	126	35.0	22	7.7	148	22.9
25-34	156	43.0	105	36.7	261	40.3
35-44	54	15.0	93	32..5	147	22.6
≥45	26	7.0	66	23.1	91	14.2
Education level						
Elementary School	55	15.2	27	9.4	82	12.7
High School	121	33.4	102	35.7	223	34.4
Complete or incomplete Higher education	161	44.5	147	51.4	308	47.5
Unknown	25	6.9	10	3.5	35	5.4
Ethnicity/self-reported skin color						
White	196	54.1	192	67.1	388	59.9
Black	38	10.6	26	9.1	64	9.9
Asian	4	1.1	7	2.5	11	1.7
Brown	88	24.3	53	18.5	141	21.8
Indigenous	3	0.8	4	1.4	7	1.0
Unknown	33	9.1	4	1.4	37	5.7
Total	362	100.0	286	100.0	648	100.0

a) STD/TCC: Sexually Transmitted Disease (assisted at specialized outpatient clinic)/Testing and Counseling Center.
b) PLHA: People Living with HIV/AIDS (assisted at specialized outpatient clinic).

Table 2 – Distribution of notified cases of acquired syphilis according to clinical-laboratory characteristics, epidemiological preceding and outpatient clinic type, at STD and AIDS Reference Center, São Paulo, SP, 2014

Characteristics	STD/TCC[a]		PLHA[b]		Total	
	n	%	n	%	N	%
Clinical Classification						
Primary	53	14.6	28	9.8	81	12.5
Secondary	115	31.8	80	28.0	195	30.1
Asymptomatic	194	53.6	175	61.2	369	56.9
Unknown	–	–	3	1.0	3	0.5
Result of non-treponemal serology						
Title <1/32	33	9.1	28	9.8	61	9.4
Title ≥1/32	329	90.9	258	90.2	587	90.6
Serology status for human immunodeficiency virus (HIV) [c]						
Non-reagent	279	77.1	2	0.7	281	43.5
Reagent	82	22.7	284	99.3	366	56.5
Gender identity						
Transvestite	25	6.9	8	2.8	33	5.1
Transsexual woman	12	3.3	6	2.1	18	2.8
Transsexual man	2	0.6	–	–	2	0.3
Not applicable	310	85.6	250	87.4	560	86.4
Unknown	13	3.6	22	7.7	35	5.4
Multiple sexual partners in the prior year						
Yes	257	71.0	136	47.6	393	60.6
No	75	20.7	61	21.3	136	21.0
Unknown	30	8.3	89	31.1	119	18.4
Exposure category						
Heterosexual	53	14.7	16	5.6	69	10.6
MSM[d]	306	84.5	265	92.7	571	88.1
Unknown	3	0.8	5	1.7	8	1.2
Use of injectable drugs in the prior year						
Yes	5	1.4	5	1.7	10	1.5
No	281	77.6	200	69.9	481	74.2
Unknown	76	21.0	81	4.0	157	24.3
Use of non-injectable drugs						
Yes	181	50.0	105	36.7	286	44.1
No	133	36.7	109	38.1	242	37.3
Unknown	48	13.3	72	25.2	120	6.0
Total	362	100.0	286	100.0	648	100.0

a) STD/TCC: Sexually Transmitted Disease (assisted at specialized outpatient clinic)/Testing and Counseling Center.
b) PLHA: People Living with HIV/AIDS (assisted at specialized outpatient clinic).
c) 1 (one) case with unknown information.
d) MSM: men who have sex with men.

There were differences among patients, according to the care provided at each of the two outpatient clinics located in the STD and AIDS Reference Center, especially regarding socio-demographic characteristics, sexual behavior and HIV seropositivity: higher frequency of cases over 35 years old (55.6%) in the PLHA outpatient clinic; higher frequency of heterosexuals (14.6%); and higher frequency of non-injectable drug use (50%) in the STD/TCC outpatient clinic. As expected, the prevalence of HIV co-infection was much higher in the PLHA outpatient clinic (99.3%), and this prevalence was of 22.7% (82) in the STD/TCC outpatient clinic (Table 3).

The highest prevalence ratios on HIV co-infection found in reported cases of acquired syphilis were the following: male sex, PR=2.68 (95%CI 1.30; 5.50); age of 45 years and over, PR=2.26 (95%CI 1.74; 2.92); education level of eight years or more of schooling, PR=1.52 (95%CI 1.09; 2.12); MSM, PR=2.52 (95%CI 1.77; 3.59); clinical classification of asymptomatic syphilis, PR=1.34 (CI95% 1.03; 1.72); and STD/CTA outpatient type, PR=0.23 (95%CI 0.19; 0.26) (Table 3).

In the multivariate analysis, there was a difference between the models: in model 1, there were associations related to age group and MSM exposure category. In models 2 and 3, the associated variables were sex, education level, MSM exposure category and outpatient clinic type. There was a confounding effect of the variables age group and outpatient clinic type. The inclusion of outpatient clinic type in model 2 made visible the confounding effect of age group, considering the reduction of more than 20% in the association measure, since the age group of PLHA outpatient clinic cases was higher than the STD/TCC outpatient clinic. In model 3, the variables independently associated to HIV infection were the following: male (PR=1.95; 95%CI 1.05;3.61); education level comprising eight or more of schooling (PR=0.96; 95%CI 0.93;0.99); MSM (PR=1.87; 95%CI 1.38;2.53); and outpatient clinic type (PR=0.24; 95%CI 0.19; 0.29) (Table 4).

Discussion

In the considered STD and AIDS Reference Center, the cases of acquired syphilis diagnosed and notified were predominantly of young men, with higher education level, self-declared white, with multiple sexual partners in the prior year, MSM, with preceding of non-injecting drug use, and with reagent serology to HIV.

Of the reported cases of acquired syphilis in the service in 2014, almost half were from 25 to 34 years old, a result that is similar to the most frequent age group among cases reported in the state of São Paulo in the same year.[6] In Brazil, according to data from cases of acquired syphilis reported in 2015, 33% refer to individuals in the age group from 20 to 29 years old.[7] In the USA, among the reported cases of syphilis in 2015, the highest incidence rate of primary and secondary syphilis in adults occurred in the age group from 25 to 29 years old (23.5 cases per 100,000 population).[9]

Results related to education level and skin color reflect, in part, the characteristics of the territory where the STD and AIDS Reference Center in question is located, in the southeastern region of São Paulo city. In 2010 this region presented a very low index of social vulnerability.[14]

The high frequency of MSM, multiple sexual partners and the use of non-injectable drugs were also reported by another study conducted in 2006, in a similar service located in the central region of the same municipality, where more than 50% of cases of syphilis were found in MSM,[15] pointing the need to intensify STI prevention actions in those more vulnerable groups.

In studies to estimate the prevalence of syphilis and HIV infection in MSM conducted in Brazil in 2008 and 2009, there was a high prevalence of syphilis in Bahia (8.8%)[16] and Minas Gerais (14%).[17] These results are well above the prevalence of syphilis in puerperal women with hospital delivery, corresponding to 1%,[18] indicating an increased risk in the MSM population. In the USA, among the 23,872 reported cases of primary and secondary syphilis in adults in 2015, 60% were of MSM.[9]

We should emphasize that the high prevalence of HIV co-infection among the cases of acquired syphilis in the service studied herein is due to the fact that many of them were being followed up at the PLHA outpatient clinic. In spite of the purpose of this outpatient clinic, the high frequency of co-infection that was found may represent possible failures in adherence to prevention measures and, potentially, occurrence of new exposures to the etiologic agent of syphilis.

About one-quarter of acquired syphilis cases treated at the STD/TCC outpatient clinic presented HIV co-infection. This high frequency, much higher than that estimated for the Brazilian population, is also due to the service characteristics. We should point out the

Table 3 – Co-infection prevalence with human immunodeficiency virus (HIV) in notified cases of acquired syphilis, prevalence ratio and 95% confidence intervals, according to selected characteristics, at STD and AIDS Reference Center. São Paulo-SP, 2014

Characteristics	Infection by HIV (n)[a]	Total (n)	Infection percentage by HIV (%)	Prevalence ratio	95%CI[b]
Sex					
Female	3	14	21.4	1.00	
Male	363	633	57.3	2.68	1.30;5.50
Age group (in years)					
≤24	49	148	33.1	1.00	–
25-34	142	261	54.4	1.64	1.27;2.12
35-44	107	147	72.8	2.19	1.71;2.82
≥45	68	91	74.7	2.26	1.74;2.92
Ethnicity/ self-referenced skin color[c]					
White	239	388	61.6	1.00	–
Black	34	64	53.1	0.86	0.67;1.10
Asian	11	11	100	1.62	1.50;1.75
Brown	73	141	51.8	0.84	0.70;1.00
Indigenous	5	7	71.4	1.16	0.72;1.86
Education level (in years of schooling)[d]					
0-7	22	56	39.3	1.00	–
≥8	333	556	59.9	1.52	1.09;2.12
Men who have sex with men (MSM)[e]					
No	13	55	23.6	1.00	–
Yes	349	585	59.7	2.52	1.77;3.59
Multiple sex partners in the prior year[f]					
No	75	136	55.1	1.00	–
Yes	188	392	48.0	0.87	0.72;1.04
Use of non-injectable drugs in the prior year[g]					
No	136	242	56.2	1.00	–
Yes	148	285	51.9	0.92	0.78;1.08
Clinical classification[h]					
Primary	36	80	45.0	1.00	–
Secondary	105	195	53.8	1.19	0.90;1.57
Asymptomatic	222	369	60.2	1.34	1.03;1.72
Outpatient clinic type					
PLHA[i]	284	286	99.3	1.00	–
STD/TCC[j]	82	361	22.7	0.23	0.9; 0.26
Total	366	647	56.6	–	–

Cases with unknown information were excluded from this analysis: (a) a case with unknown information; (c) 36 cases with unknown information; (d) 35 cases with unknown information; (e) 7 cases with unknown information; (f) 119 cases with unknown information; (g) 120 cases with unknown information; and (h) 3 cases with unknown information.
b) 95%CI: 95% confidence interval.
i) PLHA: People living with HIV/AIDS (assisted at specialized outpatient clinic).
j) STD/TCC: Sexually Transmitted Disease (assisted at specialized outpatient clinic)/Testing and Counseling Center.

Table 4 – Multivariate models: co-infection prevalence with human immunodeficiency virus (HIV) in notified cases of acquired syphilis, prevalence ratio and 95% confidence intervals, at STD and AIDS Reference Center, São Paulo-SP, 2014

Characteristics	Model 1[a]			Model 2[b]		Model 3[c]	
	Crude prevalence ratio	Adjusted prevalence ratio	95%CI[d]	Adjusted prevalence ratio	95%CI[d]	Adjusted prevalence ratio	95%CI[d]
Sex							
Female	1.00	1.00	–	1.00	–	1.00	–
Male	2.68	2.52	0.95;6.59	1.96	1.07;3.59	1.95	1.05;3.61
Age group (in years)							
≤24	1.00	1.00	–	1.00	–		
25-34	1.64	1.66	1.29;2.13	1.08	0.88;1.33		
35-44	2.19	2.34	1.84;2.98	1,11	0.91;1.35		
≥45	2.26	2.37	1.84;3.05	1,04	0.86;1.26		
Education level (in years of schooling)							
0-7	1.00	1.00	–	1.00	–	1.00	–
≥8	1.52	0.95	0.91;1.00	0.96	0.93;0.99	0.96	0.93;0.99
Men who have sex with men (MSM)							
No	1.00	1.00	–	1.00	–	1.00	–
Yes	2.52	2.95	1.84;4.71	1.88	1.39;2.57	1.87	1.38;2.53
Outpatient clinic type							
PLHA[e]	1.00	–	–	1.00	–	1.00	–
STD/TCC[f]	0.23	–	–	0.24	0.20;0.30	0.24	0.19;0.29

a) Model 1: it was included variables sex, age, education level and MSM – adjusted.
b) Model 2: it was included variables sex, age group, education level, outpatient clinic and MSM – adjusted.
c) Model 3: it was included variables sex, education level and MSM – adjusted.
d) 95%CI: 95% confidence interval.
e) PLHA: People Living with HIV/AIDS (assisted at specialized outpatient clinic).
f) STD/TCC: Sexually Transmitted Disease (assisted at specialized outpatient clinic)/Testing and Counseling Center.

fact of being a TCC, where recently exposed people are looking for the service for testing. In a study about personal characteristics and factors associated with HIV seropositivity in TCC service users, for the period from 2000 to 2007, 7.5% of HIV infection was found, and an HIV prevalence of 11.6% among those who had syphilis.[19]

The variables independently associated with HIV co-infection in cases of acquired syphilis were males and MSM. Associations found among male sex, MSM and HIV co-infection, independently of outpatient clinic type, corroborate the results of other studies that showed an increased risk of HIV co-infection in MSM. A study carried out in 2013 with 391 MSM in Rio de Janeiro revealed a prevalence of HIV and syphilis co-infection of 10.8%.[20] Another study, carried out from 2008 to 2009 in Salvador, with 383 MSM, found 44 of them with syphilis diagnosed, and 22.7% with HIV co-infection.[16] Surveillance data in England from 2009 to 2013 showed that the chance of MSM with HIV infection to be affected by syphilis was four times higher than in other exposure category.[21] In the USA, in 2015, 50% of notified cases of primary and secondary syphilis involving MSM presented HIV co-infection.[9]

The present study has some limitations. Data quality could be compromised due to incompleteness and inconsistency – quite present when secondary data are utilized. To reduce possible losses, the information was checked with those from other sources. In order to minimize underreporting of cases, all service users who presented reagent results to serological tests for syphilis were investigated and notified.

Results of this research point the need to strengthen the offer of HIV prevention and control actions on

MSM category for those that seek health care during the diagnosis of syphilis. Several prevention strategies available should be offered in accordance with the exposures and vulnerabilities of the population, in an articulated way. Among these strategies, we highlight the behavioral (condom distribution), educational (counseling) and biomedical (antiretroviral therapy pre-exposure [PrEP] and post-exposure [PEP] to HIV.[21-25]

Brazilian policy to tackle HIV and AIDS adopts the combined prevention strategy, because it understands that different prevention strategies can offer the choice opportunity of the prevention tool considered more appropriate.[26]

In this service studied in 2014, MSM notified with acquired syphilis were disproportionately affected by HIV co-infection. The possibility of offering combined prevention actions, as recommended by the Brazilian policy to tackle HIV and AIDS for specialized care services to STI and AIDS, would enable the vulnerability reduction of this population.

In the recommendations of the 'Clinical Protocol and Therapeutic Guidelines for Pre-Exposure Prophylaxis (PrEP) of Risk to HIV Infection'[26] the indication of PrEP is mentioned as one of the components of combined prevention actions. The presence of recurrent STI in MSM constitutes one of the criteria for offering this prevention strategy in Brazil[26] and in the USA.[27] Therefore, we recommend to be one of the criteria for choosing PrEP[26] the presence of bacterial sexually infections in MSM, as well as in other populations at increased risk.

In conclusion, the analysis of HIV co-infection prevalence in patients with acquired syphilis and its associated factors can contribute to the formulation of prevention measures on HIV infection in populations that attend specialized services of STI and AIDS. Future studies should deepen the knowledge of different profiles on the co-infection between HIV and syphilis in other scenarios of assistance to STI and AIDS.

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Authors' contributions

Luppi CG, Gomes SEC, Ueno AM and Santos AMK contributed in the conception and design of the study, data analysis and interpretation, writing of the first version and revision of the manuscript. Silva RJC, Tayra A and Takahashi RF contributed in the design, data analysis and interpretation and critical review of the manuscript. All authors have approved the final version to be published and are responsible for all aspects of the study, ensuring its accuracy and integrity.

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