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ORIGINAL ARTICLE / *ARTIGO ORIGINAL*

Prevalence of Syphilis and associated factors in homeless people of Sao Paulo, Brazil, using a Rapid Test

Prevalência de Sífilis e fatores associados a população em situação de rua de São Paulo, Brasil, com utilização de Teste Rápido

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ABSTRACT: ***Introduction:*** Homeless people are a vulnerable group to sexually transmitted diseases (STD) with high prevalence of syphilis and hepatitis. ***Objectives:*** To estimate the prevalence of syphilis infection and its association with risky behaviors for STDs in a sample of homeless people, and to assess the feasibility of the use of rapid syphilis test (RST) in this population. ***Methods:*** Cross-sectional study, in a convenience sample of homeless people assisted in social support services of São Paulo, between 2006 and 2007. A structured questionnaire was applied and RST was performed. In addition, a blood sample for syphilis detection was also collected. The sensitivity and specificity of the RST was estimated using conventional laboratory diagnosis (VDRL + TPHA) as reference. ***Results:*** 1,405 volunteers were included in the study. The prevalence rate of syphilis was 7.0%, and was associated with homosexual practices (OR_{adj} 4.9; 95%CI 2.6 – 9.4), prior history of STD (OR_{adj} 2.6; 95%CI 1.7 – 4.0) and with self-referred non-white race (OR_{adj} 1.9; 95%CI 1.1 – 3.4). The sensitivity and specificity of the RST for syphilis were, respectively, 81.4 and 92.1%. ***Conclusion:*** The high prevalence of syphilis infection among homeless people shows the need for actions for its control and the utilization of RST that can be considered an efficient strategy due to its sensitivity and specificity. Public Health policymakers must strengthen actions for syphilis control, with screening tests for syphilis and early treatment, decreasing morbidity with the improvement of sexual and reproductive health of the population in general and especially the most vulnerable.

Keywords: Sexually transmitted diseases. Syphilis. Homeless. Sexual behavior. POC. Public health.

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RESUMO: ***Introdução:*** Pessoas em situação de rua constituem um grupo com alta vulnerabilidade às doenças sexualmente transmissíveis (DST), com altas prevalências de sífilis e hepatites. ***Objetivos:*** Descrever comportamentos, atitudes e práticas de risco para as DST, estimar a prevalência da sífilis, os fatores associados e avaliar a exequibilidade de uso do Teste Rápido (TR) para sífilis em pessoas em situação de rua. ***Metodologia:*** Estudo transversal em uma amostra não probabilística de pessoas em situação de rua assistidas em serviços de apoio social da cidade de São Paulo, entre 2006 e 2007. Foi aplicado questionário estruturado e realizado TR, além de coleta de sangue para detecção de sífilis. Estimou-se a sensibilidade e especificidade do TR utilizando como referência o diagnóstico laboratorial convencional (VDRL + TPHA). ***Resultados:*** Entre 1.405 voluntários, observou-se prevalência de sífilis de 7,0% que esteve associada à prática homossexual (OR_{aj} 4,9; IC95% 2,6 – 9,4), ao relato de história de DST (OR_{aj} 2,6; IC95% 1,7 – 4,0) e à raça/cor autorreferida não branca (OR_{aj} 1,9; IC95% 1,1 – 3,4). A sensibilidade e especificidade do TR para sífilis foram, respectivamente, de 81,4 e 92,1%. ***Conclusão:*** A alta prevalência de sífilis, em pessoas em situação de rua evidencia a necessidade de ações para o seu controle e o uso do TR, devido sua sensibilidade e especificidade, pode ser levado em consideração como uma estratégia eficaz. Políticas públicas de saúde devem priorizar ações para o controle da sífilis, com estratégias de rastreamento, diagnóstico e tratamento precoces, diminuindo a morbidade e com melhoria da saúde sexual e reprodutiva da população geral e em especial às mais vulneráveis.

Palavras chave: Doenças sexualmente transmissíveis. Sífilis. População em situação de rua. Comportamentos de risco. Teste rápido. Saúde pública.

INTRODUCTION

Syphilis is a vertical, blood-related, systemic infectious disease with chronic evolution, transmitted through sexual contact, caused by *Treponema pallidum*, a pathogen that is exclusive to humans. Relevant factors in the transmission of syphilis may be related to social, biological, cultural and behavioral factors that influence the occurrence of the disease in the population. Given that syphilis has asymptomatic and latent phases, with a variety of signs and symptoms that can easily lead to diagnostic confusion with various other diseases, diagnosis through laboratory tests is of great importance, and sometimes the only way to identify it[1].

The World Health Organization (WHO) published, in 2010, an estimate of occurrence of 11 million new cases of syphilis per year worldwide, with 2.4 million in Latin America and the Caribbean[2]. In São Paulo, Basic Health Units are available to assist people affected by sexually transmitted diseases (STDs). However, people living on the street may have difficulties accessing these services, thus exacerbating the consequences of these diseases.

The census conducted by the Economic Research Institute Foundation (FIPE) in 2003 identified 10,394 non-domiciled residents in São Paulo, 40% of whom lived on the streets,

60% lived in shelters and 80.3% were male[3]. It is noteworthy that homeless people are a population group with high vulnerability to STDs, with high prevalence of syphilis and hepatitis[4,5]. In Brazil there are few studies that analyze this problem and identify the main relevant aspects to the structuring of public health policies aimed at this group[6,7].

This study was developed with the support of the São Paulo State STD/AIDS Program, and it aims to estimate the prevalence of syphilis infection and its association with knowledge and risk behaviors for STDs in a sample of homeless people and to assess the feasibility of using the Rapid Test (RT) for syphilis in the homeless population of the city of São Paulo.

METHODOLOGY

This is a cross sectional study with a non-probabilistic sample of the homeless population of São Paulo over 18 years old, assisted in social support services (such as shelters, hostels, homes and temporary charitable housings), from October 2006 to March 2007.

The approach to these people took place in the above locations, after lectures on syphilis that addressed the importance of diagnosis and serological tests, possibility of asymptomatic infection and risk factors for acquisition and transmission of syphilis, both sexual and vertical.

Individuals who agreed to participate in the study answered a structured questionnaire containing sociodemographic information (age, education, self-reported race/color), about sexual practices, drug use, degree of knowledge on STD prevention, STD history and participation in prevention activities. The questionnaire was administered by previously trained health professionals.

After the questionnaire, digital puncture was performed for blood collection and completion of the RST (VisiTect Syphilis - Omega Diagnostics, Alloa, Scotland). Also, 5 mL of blood by were collected by venipuncture for confirmatory serological and follow up tests, such as *Treponema pallidum* hemagglutination (TPHA) and Venereal Disease Research Laboratory (VDRL). The tests were performed at the laboratory in STD/AIDS Reference and Training Center.

The results of the Rapid Test were given to participants immediately after its completion, and initial treatment for syphilis was administered at the location of the interview for individuals with positive RT, according to the Guidelines for Control of Sexually Transmitted Diseases of the Brazilian Ministry of Health[8]. A subsequent referral for follow-up treatment at the Health Unit nearest to where the interview took place is given to the participant.

DATA ANALYSIS

In the first step, descriptive analyzes of demographic and behavioral characteristics and frequency of occurrence of syphilis in the study population was performed. In the

second step, we analyzed the factors associated with a positive result for syphilis, using the odds ratio (OR) as an effect measure, with confidence intervals of 95% (95%CI). The associated factors were analyzed using the logistic regression model, and all variables with a significance level of $p < 0.15$ were considered eligible for inclusion in the model. With each new variable included, the likelihood ratio test was used and, if the significance of the new model was greater than 0.05, the variable was excluded. The final model was constructed using sex as a control variable. To estimate the prevalence, individuals were considered as diagnosed with syphilis if they presented a VDRL with any title and a positive TPHA.

To analyze the feasibility of using the Rapid Test for syphilis screening in homeless people, we calculated the sensitivity and specificity of the RT. This was done by comparing the RT results with the diagnosis of syphilis, which was considered with a reagent VDRL test with any title and a reagent TPHA test.

The database of the study was built in the Epi-Info 6.04 software (Centers for Disease Control and Prevention, USA), and statistical analyzes were performed using the Statistical Package for Social Sciences (SPSS), version 13.

All volunteers who agreed to participate signed a free and informed consent form. The study was approved by the Research Ethics Committee of CRT-DST/AIDS, São Paulo (CEP no. 212/05).RESULTS

Of the total 2,110 homeless individuals invited to be part of the study, 1,405 (86.6%) of them agreed to participate. Among the 13.4% who did not participate, the most common reasons identified were: "did not wait to perform the test", "fear of blood collection", "did not have time", "would do the test for syphilis if other tests, such as for HIV, diabetes or hepatitis, were also done", "did not want to participate".

The sample consisted of 1,202 men (85.6%) and 203 women (14.4%), with a mean age of 40.9 years (41.4 for men and 38.0 for women), with extremes between 18 and 73 years. Most of the study population constituted of individuals who self-reported race/color black (68.4%). It was observed that almost three quarters of respondents (72.6%) had primary education (8 years of education) and 22.0% had secondary or superior education (Table 1).

The average age of first sexual intercourse was 15.3 years (15.2 for men and 16.1 for women). Most respondents (84.0%) reported being heterosexual, 84.5% of men and 80.7% women. Among men, 15.5% reported sexual activity with other men, where 3.9% were exclusively with men, and 11.6% with partners of both sexes. It was observed that 19.3% of women reported sexual activity with other women (Table 1).

Almost a quarter of respondents (24.1%) reported not having had sexual partners in the last 12 months. However, among those who reported being sexually active, the average number of sexual partners during this period was 5.4 (6.1 for men and 1.2 for women). A higher percentage of women (34.3%) reported having one regular partner, while a higher percentage of having only causal partners (56.3%) was found among men (Table 1).

Table 1. Sociodemographic, behavioral and clinical characteristics among homeless people according to sex, São Paulo, 2007.

Population characteristics	Sex		Total
	Female	Male	
	n (%)	n (%)	n (%)
Age group (years)			
18 to 29	62 (31.2)	207 (17.3)	269 (19.3)
30 to 39	51 (25.6)	341 (28.6)	392 (28.1)
40 to 49	43 (21.6)	328 (27.5)	371 (26.6)
50 or more	43 (21.6)	318 (26.6)	361 (25.9)
Total	199 (100.0)	1,194 (100.0)	1,393 (100.0)
Years of education			
0	19 (9.4)	57 (4.8)	76 (5.4)
1 to 8	145 (71.8)	868 (72.7)	1,013 (72.6)
Over 8	38 (18.8)	269 (22.5)	307 (22.0)
Total	202 (100.0)	1,194 (100.0)	1,396 (100.0)
Self-reported color/race			
White	51 (25.2)	25 (2.1)	391 (28.0)
Black or others	151 (74.8)	854 (71.5)	1,005 (72.0)
Total	202 (100.0)	1,194 (100.0)	1,396 (100.0)
Sexual orientation			
Homosexual	21 (10.7)	46 (3.9)	67 (4.9)
Bisexual	17 (8.6)	137 (11.6)	154 (11.2)
Heterosexual	159 (80.7)	999 (84.5)	1,158 (84.0)
Total	197 (100.0)	1,182 (100.0)	1,379 (100.0)
Type of partners in the previous 12 months			
Only regular partners	68 (34.3)	112 (9.4)	180 (13.0)
Only casual partners	38 (19.2)	668 (56.3)	706 (51.0)
Regular and casual partners	35 (17.7)	129 (10.9)	164 (11.8)
No partner	57 (28.8)	277 (23.4)	334 (24.1)
Total	198 (100.0)	1,186 (100.0)	1,384 (100.0)

Continue...

Table 1. Continuation.

Population characteristics	Sex		Total
	Female	Male	
	n (%)	n (%)	n (%)
Condom use in all occurrences of intercourse			
No	153 (77.3)	698 (59.1)	851 (61.7)
Yes	45 (22.7)	483 (40.9)	528 (38.3)
Total	198 (100.0)	1,181 (100.0)	1,379 (100.0)
Reports having had any STDs			
No	149 (74.1)	683 (58.1)	832 (60.4)
Yes	52 (25.9)	493 (41.9)	545 (39.6)
Total	201 (100.0)	1,176 (100.0)	1,377 (100.0)
Correct information on sexual transmission and prevention through condom use			
No	81 (39.9)	425 (35.4)	506 (36.0)
Yes	122 (60.1)	777 (64.6)	899 (64.0)
Total	203 (100.0)	1,202 (100.0)	1,405 (100.0)
Frequent drug use (except for tobacco, alcohol and sleeping pills)			
No	169 (83.3)	876 (72.9)	1,045 (74.4)
Yes	34 (16.7)	326 (27.1)	360 (25.6)
Total	203 (100.0)	1,202 (100.0)	1,405 (100.0)
Participation in educational activities (groups, counseling, lectures)			
No	91 (44.8)	535 (44.5)	626 (44.6)
Yes	112 (55.2)	667 (55.5)	779 (55.4)
Total	203 (100.0)	1,202 (100.0)	1,405 (100.0)
Reports having received free condoms?			
No	87 (48.9)	474 (43.2)	561 (44.0)
Yes	91 (51.1)	624 (56.8)	715 (56.0)
Total	178 (100.0)	1,098 (100.0)	1,276 (100.0)
Has ever been discriminated?			
No	86 (42.6)	542 (45.2)	628 (44.9)
Yes	116 (57.4)	656 (54.8)	772 (55.1)
Total	202 (100.0)	1,198 (100.0)	1,400 (100.0)

STD: Sexually transmitted diseases.

Using condom in some occurrences of intercourse was reported by 70.9% of subjects, 50.5% among women and 74.3% among men. Among those who claimed to use condoms (70.9%), 38.3% reported to use it in all occurrences of intercourse (Table 1), and 32.6% reported to use it only in some occurrences. Only 56.0% of the population mentioned having received free condoms (data not shown in table).

STD history was reported by 39.6% of respondents, ranging from 25.9% for women and 41.9% for men (Table 1). In the last 12 months, there was a higher frequency of testing rates for syphilis among women compared to men - 20.1 and 13.6%, respectively (data not shown in table). Among subjects who were able to inform the results of the test performed (85.1%), the percentage of positivity was 10.5% (9.1% in women and 10.8% in men) (data not shown in table). The public health system was responsible for servicing 73.5% of these individuals, and 14.6% of the population pointed to have been tested at Counseling and Testing Centers (CTA). Pregnancy was the main reason for the test among women (42.1% for prenatal care and 5.3% for hospitalization for childbirth), followed by curiosity (21.1%), whereas the main reasons for men were curiosity (28.5%) and "finding oneself at risk" (9.8%).

Correct information on the transmission of syphilis through sexual intercourse and prevention with condom use were observed in 64.0% of homeless individuals (Table 1).

Drug use during life, excluding tobacco, was reported by 55.7% of the population, and 25.6% reported frequent use (Table 1). The most reported drug was marijuana (50.8%), followed by inhaled cocaine (34.2%), crack/cocaine paste (25.0%), and 5.6% of drug users reported using intravenous cocaine.

More than half of respondents (55.4%) claimed participation in counseling and educational group activities. Discrimination due to homelessness was reported by 55.1% of this population (Table 1).

Among the 1,389 individuals who underwent the RT, 181 (13.0%) were positive for syphilis.

A total of 97 subjects had a positive diagnosis for syphilis, being tested with VDRL and TPHA, with a prevalence of 7.0%. According to the exposure category, the prevalence was 12.1% among men who have sex with men and 9.5% among women who have sex with women (data not shown in table).

The highest prevalence of syphilis was associated with homosexuals, male and female, 24.2% (OR_{adj} 4.9; 95%CI 2.6 – 9.4), with a reported history of any previous STDs, 10.6% (OR_{adj} 2.6; 95%CI 1.7 – 4.0) and belonging to the self-reported race/color non-white, 8.0% (OR_{adj} 1.9; 95%CI 1.1 – 3.4) (Table 2). Other sociodemographic characteristics, type of sexual partners (regular or casual), condom use, and drug use, were not associated with a higher prevalence of syphilis.

Using the VDRL and TPHA tests as a reference for syphilis diagnosis, it was observed that, among individuals with a positive RT, 79 (43.7%) were true positives. Among the negatives, the proportions of true and false negatives were 98.5 and 1.5%, respectively. Thus, the sensitivity of the RT to diagnose syphilis in the homeless population was 81.4%, with a specificity of 91.9% (Table 3).

Table 2. Multivariate analysis of factors associated with syphilis infection in homeless people, São Paulo, 2007.

Population characteristics	Results for syphilis		Total	p-value	OR (95%CI)	OR_{adj} (95%CI)
	Positive	Negative				
	n (%)	n (%)	n (%)			
Sex						
Female	18 (9.1)	179 (90.9)	197 (100.0)	0.200	1.42 (0.83 – 2.42)	1.42 (0.80 – 2.52)
Male	79 (6.6)	1,115 (93.4)	1,194 (100.0)			
Total	97 (7.0)	1,294 (93.0)	1,391 (100.0)			
Age group (years)						
18 to 29	13 (4.9)	254 (95.1)	267 (100.0)			
30 to 39	30 (7.8)	356 (92.2)	386 (100.0)	0.145	1.65 (0.84 – 3.22)	
40 to 49	22 (6.0)	345 (94.0)	367 (100.0)	0.541	1.25 (0.62 – 2.52)	
50 or more	30 (8.4)	329 (91.6)	359 (100.0)	0.092	1.78 (0.91 – 3.49)	
Total	95 (6.9)	1,284 (93.1)	1,379 (100.0)			
Years of education						
0	6 (8.0)	69 (92.0)	75 (100.0)	0.581	1.31 (0.50 – 3.40)	
1 to 8	71 (7.1)	931 (92.9)	1,002 (100.0)	0.605	1.15 (0.68 – 1.94)	
Over 8	19 (6.2)	286 (93.8)	305 (100.0)			
Total	96 (6.9)	1286 (93.1)	1382 (100.0)	1.186		
Self-reported color/race						
White	17 (4.4)	371 (95.6)	388 (100.0)			
Black or others	80 (8.0)	914 (92.0)	994 (100.0)	0.018	1.91 (1.12 – 3.27)	1.94 (1.12 – 3.36)
Total	97 (7.0)	1,285 (93.0)	1,382 (100.0)			
Sexual orientation						
Homossexual	16 (24.2)	50 (75.8)	66 (100.0)	0.000	4.77 (2.59 – 8.80)	4.95 (2.61 – 9.37)
Bissexual	8 (5.2)	146 (94.8)	154 (100.0)	0.598	0.82 (0.39 – 1.73)	0.70 (0.33 – 1.49)
Heterossexual	72 (6.3)	1,074 (93.7)	1,146 (100.0)			
Total	96 (7.0)	1,270 (93.0)	1,366 (100.0)			
Type of partners in the previous 12 months						
Only regular partners	10 (5.6)	168 (94.4)	178 (100.0)			
Only casual partners	50 (7.1)	651 (92.9)	701 (100.0)	0.475	1.29 (0.64 – 2.60)	
Regular and casual partners	13 (8.0)	149 (92.0)	162 (100.0)	0.380	1.47 (0.62 – 3.44)	
No partner	24 (7.3)	306 (92.7)	330 (100.0)	0.478	1.32 (0.62 – 2.82)	
Total	97 (7.1)	1,274 (92.9)	1,371 (100.0)			

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Table 2. Continuation.

Population characteristics	Results for syphilis		Total	p-value	OR (95%CI)	OR_{adj} (95%CI)
	Positive	Negative				
	n (%)	n (%)	n (%)			
Condom use in all occurrences of intercourse						
No	59 (7.0)	782 (93.0)	841 (100.0)			
Yes	37 (7.0)	488 (93.0)	525 (100.0)	0.982	1.00 (0.66 – 1.54)	
Total	96 (7.0)	1,270 (93.0)	1,366 (100.0)			
Reports having had any STDs						
No	40 (4.8)	787 (95.2)	827 (100.0)			
Yes	57 (10.6)	479 (89.4)	536 (100.0)	0.000	2.34 (1.54 – 3.56)	2.58 (1.66 – 4.01)
Total	97 (7.1)	1,266 (92.9)	1,363 (100.0)			
Correct information on sexual transmission and prevention through condom use						
No	32 (6.4)	469 (93.6)	501 (100.0)	0.520	1.20 (0.75 – 1.79)	
Yes	65 (7.3)	825 (92.7)	890 (100.0)			
Total	97 (7.0)	1,294 (93.0)	1,391 (100.0)			
Frequent drug use (except for tobacco, alcohol and sleeping pills)						
No	70 (6.8)	964 (93.2)	1,034 (100.0)			
Yes	27 (7.6)	330 (92.4)	357 (100.0)	0.612	1.13 (0.71 – 1.79)	
Total	97 (7.0)	1,294 (93.0)	1,391 (100.0)			
Participation in educational activities (groups, counseling, lectures)						
No	43 (6.9)	576 (93.1)	619 (100.0)			
Yes	54 (7.0)	718 (93.0)	772 (100.0)	0.972	1.01 (0.67 – 1.53)	
Total	97 (7.0)	1.294 (93.0)	1.391 (100.0)			
Reports having received free condoms?						
No	38 (6.9)	515 (93.1)	553 (100.0)			
Yes	54 (7.6)	656 (92.4)	710 (100.0)	0.619	1.12 (0.73 – 1.72)	
Total	92 (7.3)	1.171 (92.7)	1.263 (100.0)			
Has ever been discriminated?						
No	40 (6.4)	584 (93.6)	624 (100.0)			
Yes	55 (7.2)	708 (92.8)	763 (100.0)	0.558	1.13 (0.74 – 1.73)	
Total	95 (6.8)	1.292 (93.2)	1.387 (100.0)			

DISCUSSION

In Brazil, there are few studies available that examined the prevalence of syphilis in homeless people. This study aimed to describe the epidemiology and risk behaviors of people living on the streets, as well as the frequency of syphilis in São Paulo, having found a high prevalence of syphilis (7.0%) in the study population.

Despite having appropriate diagnostic methods and a simple treatment, syphilis remains an important public health problem, also for the people living on the streets, maybe because of the difficulty these individuals have in seeking health services and fear of discrimination[6,7], as the high percentage found in this study shows (55.1%).

The RST have been reported by WHO, nearly a decade ago, as a tool for rapid diagnosis with early treatment, to be used in specific situations where there is difficulty in geographic access to services or laboratory supplies[9].

A study by the STD / AIDS Reference and Training Center in São Paulo[4], in 2000, showed that among 259 homeless individuals interviewed, only 37.5% agreed to be submitted to the RST. Of these, 22.6% were positive, showing low acceptability of participation and high prevalence. It is possible that the greater acceptance in the current study comes from the high proportion of individuals inserted in educational activities, which has not been investigated in previous researches, and that the lower prevalence found in this study comes from most specific diagnostic criterion with the use of VDRL and TPHA in addition to the RT. Another possible factor for the low acceptance and high prevalence in that study may have been due to the small sample size at that time. The prevalence of syphilis in this study only with the RT was 13.0%.

Another study conducted in 2003 with a homeless population in São Paulo, where the VDRL was used for screening and TPHA was used for confirmation, has also found a high prevalence of syphilis, 5.7%, which approximates the rate found in this study[5].

Table 3. Sensitivity, specificity, positive and negative predictive values of the Rapid Syphilis Test *versus* (TPHA + VDRL, VDRL e TPHA).

Serology	Result	Rapid Test		Sensitivity	Specificity	Positive predictive value	Negative predictive value
		Positive	Negative				
TPHA and VDRL	Positive	79	18	81.4	91.9	42.9	98.5
	Negative	105	1,189				
VDRL	Positive	79	21	79	91.9	42.9	98.3
	Negative	105	1,186				
TPHA	Positive	79	21	57.7	98	88	90.1
	Negative	105	1,186				

TPHA: *Treponema pallidum* hemagglutination; VDRL: Venereal Diseases Research Laboratory.

The high rate of syphilis found in our study is in agreement with some international studies that showed a prevalence rate of syphilis in the homeless population of 9.2% in San Francisco[10], 12.0 and 14.0% in New York city[11,12].

A population-based study conducted in pregnant women in Brazil[13], as a proxy for the general population, showed a prevalence of syphilis of 1.6%, which shows a higher vulnerability of homeless people to this condition.

In our study, one in four men who have sex with men (MSM), and one in 10 individuals with a history of STD were diagnosed with syphilis. This high prevalence is similar to the highest rates observed by other authors with populations labeled as "most vulnerable" to STDs, such as studies with women inmates in São Paulo (5.7%)[14], adolescents in a correctional system in Espírito Santo (7.8%)[15], sex workers of the city of Pelotas (7.5% and 6.1% among women and 11.6% among men)[16], people seen in an STD clinic in Manaus (7.5%)[17] multicenter study involving 10 Brazilian cities, with sex workers (16.4%)[18].

A positive aspect found in our study was that a significant portion of the group (53.7%) is inserted in educational activities. This situation can be an opportunity to broaden the actions directed to this population and to raise the relatively low proportion of individuals who received condoms (56.0%), which could contribute to a possible increase in protected sexual practice.

An important aspect, from the point of view of public health, is the high proportion of individuals who reported frequent use of drugs (25.6%), including a significant proportion who mentioned intravenous use. Considering the negative impact of this fact on the health of homeless individuals, it would be desirable to conduct actions to reduce the harm caused by these drugs, associated with prevention interventions and comprehensive health care for this population.

It is noteworthy that, in this study, treatment was performed only in individuals with a positive result in the RT, which caused therapy being applied in uninfected individuals (7.3%). However, it should be considered that this treatment presents a low risk to health and a reduced cost to the health system. However, the immediate and timely treatment of infected individuals favors breaking the chain of transmission and reduces morbidity.

Syphilis is a marker of unprotected sex, and it can increase the transmission of HIV, as demonstrated by Flemming & Wasserheit[19]. This fact was observed in a study with a homeless population in San Francisco, in which having had a diagnosis of syphilis was a significant predictor for HIV infection, with more than thrice the risk[10].

One aspect which enhances the feasibility of using the RST among homeless individuals was the rates of agreement to participate in the research and undergo the disease's diagnosis. In this respect, it could be noted that a small portion of the population did not undergo the test based on their own decision ("fear of blood collection", "did not want to participate", "lack of time referred").

In addition, all individuals with a positive RT result agreed to start treatment right away, and, through the guidance of the multidisciplinary team, they were referred to health units to complete the treatment and for monitoring of the cure process. Similar

data to that found by Grimley et al.[20] (91.5%), in shelters in two cities in Alabama (USA), showing that when there is facilitation of access to treatment, there may be greater adherence to it.

Mabey et al.[21] and Cisneros et al.[22] analyzed the feasibility of using the RST in specific populations and showed slightly higher rates of sensitivity and specificity than those found in this study. This may be due to the testing process being carried out in the institutions that house homeless people, where the research was conducted. In the cited studies, tests were performed in laboratories, which has better performance conditions compared to field applications. In this study's population, it was difficult to obtain optimal conditions for the collection of material (hyperkeratosis of fingertips and impregnation with environmental waste). These aspects can and should be minimized by improving the existing framework for interventions and the training of health professionals to work in the field.

Another limitation that may have occurred would be the inaccuracy of information on condom use, age of first sexual intercourse and number of sexual partners, given a possible a memory bias or attempt to give socially acceptable responses to a questionnaire.

Given that this population has a high vulnerability to STDs and low participation in health services for prevention, the occurrence of reinfection is plausible, and a treponemal test, rapid or conventional, is not able to differentiate between active infection and serological scars, leaving it to health professionals to evaluate the cost effectiveness of the strategy.

The sensitivity and specificity values of the RT in this study can be considered as a strategy for screening of syphilis in populations with difficulty of access.

CONCLUSION

The results presented in this study show that homeless individuals may be receptive to testing for syphilis and treatment of positive cases. The collected data can enhance knowledge on health of a population that is relatively invisible to health services, i.e., a population that has no access to health services. The latter, in turn, do not develop continuous extramural activities to reach these populations.

Screening policies that do not include populations that are asymptomatic and/or characterized by difficulty of access, such as the homeless populations, among others, may result in loss of opportunity for significant reduction of infection.

Therefore, there is hope that the findings presented in this study may boost public health actions with the elaboration of both preventive and care strategies, aimed at controlling these hazards in order to minimize morbidity in this population and support new studies that deepen knowledge in the area.

It is up to public health policy leaderships to reinforce actions for the control of syphilis, with screening strategies, early diagnosis and treatment, avoiding complications, reducing

morbidity and improving sexual and reproductive health of the general population, especially those most vulnerable.

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