Analysis of monitored cases of acquired syphilis in Porto Alegre, Rio Grande do Sul

Análise de casos monitorados de sífilis adquirida em Porto Alegre, Rio Grande do Sul

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ABSTRACT

Introduction: Syphilis is a systemic and curable sexually transmitted infection, exclusive to humans. Brazil is experiencing an increasing incidence of syphilis in recent years. Porto Alegre has an incidence rate of acquired syphilis (AS) four times higher than the national one. **Objective:** To describe the epidemiological profile of monitored cases of AS, through rapid tests, in the city of Porto Alegre/Rio Grande do Sul in the first semester of 2018. **Methods:** The study has a cross-sectional, observational, epidemiological, and analytical design, and the study population was included in the Porto Alegre AS monitoring spreadsheet in the first semester of 2018, totaling 1,453 participants. We performed descriptive analyses with absolute and relative frequencies to develop the profile. The χ^2 test for bivariate analysis verified the association between sociodemographic variables and the adequate treatment outcome, with a 95% significance level. **Results:** The profile found had a predominance of males, white people, individuals aged 20 to 29, with incomplete elementary school, and not homeless. We identified an association in the bivariate analysis between the adequate treatment outcome and the variables schooling, gender, age, and homelessness. **Conclusion:** Actions that seek to structure and organize the processes related to AS monitoring are important, especially due to the association of sociodemographic variables that indicate social vulnerability with the adequate treatment outcome.

Keywords: syphilis; epidemiological monitoring; epidemiology; monitoring.

RESUMO

Introdução: A sífilis é uma Infecção Sexualmente Transmissível de caráter sistêmico, curável, e exclusiva do ser humano. O Brasil vive um período de crescimento dos casos de sífilis nos últimos anos. Porto Alegre possui um coeficiente de incidência de sífilis adquirida quatro vezes maior que o nacional. **Objetivo:** O objetivo deste estudo foi descrever o perfil epidemiológico dos casos monitorados para sífilis adquirida, por meio de testes rápidos, no município de Porto Alegre/RS, no primeiro semestre de 2018. **Métodos:** O delineamento é epidemiológico observacional analítico transversal, sendo todos os casos inseridos na planilha de monitoramento da SA de Porto Alegre no primeiro semestre de 2018, que totalizou 1.453 usuários. Análises descritivas foram realizadas com frequência absoluta e relativa para caracterizar o perfil. Foi utilizado o teste de χ^2 em análise bivariada para verificar a associação das variáveis sociodemográficas com o desfecho do tratamento adequado, com nível de significância de 95%. **Resultados:** O perfil encontrado foi predominância do sexo masculino, brancos, na faixa etária de 20 a 29, ensino fundamental incompleto e não estar em situação de rua. Houve associação na análise bivariada entre os desfechos do tratamento adequado e as variáveis escolaridade, sexo, faixa etária e situação de rua. **Conclusão:** Ações que buscam estruturar e organizar os processos relativos ao monitoramento da SA são importantes, especialmente por haver associação de variáveis sociodemográficas que indicam vulnerabilidade social com o desfecho de tratamento adequado da sífilis.

Palavras-chave: Sífilis; Vigilância Epidemiológica; Epidemiologia; Monitoramento.

INTRODUCTION

Brazil has been experiencing a growing incidence of syphilis in recent years. In 2016, 87,593 cases of acquired syphilis (AS) were reported. Stratified by regions, the Southern Region holds the second place, corresponding to 24.2% of the reported cases. In addition, the detection rate in Brazil in the aforementioned year was 42.5 cases of AS per 100,000 inhabitants. The South Region exceeded this rate with 72 cases per 100,000 inhabitants, while Rio Grande do Sul (RS) had the highest rate in the country (93.7 cases per 100,000 inhabitants)[1]. The capital of the state, Porto Alegre (POA), had a coefficient of AS incidence four times greater than the national one[2] and was the fifth capital with the highest detection rate according to data from the General Coordination of Health Surveillance (*Coordenadoria Geral de Vigilância em Saúde* – CGVS)[3].

Syphilis is a systemic and curable sexually transmitted infection (STI), exclusive to human beings, caused by the bacterium *Treponema pallidum*. Estimates indicate that 12 million new cases of syphilis occur annually in the world adult population[4]. The infection is transmitted by sexual contact, direct contact with open lesions, transfusion of contaminated blood, and transplacentally[5].

Most people with syphilis tend not to be aware of the pathology, due to the absence of symptoms, depending on the stage of infection, which can enable transmission to their sexual partners. Thus, it is a silent disease getting worse over the years, reaching other stages, and, despite having effective diagnosis and treatment, which is free for the population, it remains a public health problem until today.

For case detection, the general population of Porto Alegre has access to free rapid tests (RT), without following the regionalization logic, that is, the user has the right to undergo the procedure in any Basic Health Unit (BHU) without the need for scheduling[6]. All pregnant women should have an RT in the first and third trimester of pregnancy, according to the low-risk prenatal care protocol[7].

The increasing identification and diagnosis with the advent of the RT stand out, since this tool is fundamental for investigation and

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necessary referrals, aiming at comprehensive, effective, and successful care[5]. However, there are gaps regarding the systematization of the follow-up required for the confirmation of diagnosis, treatment, outcome, and, consequently, the reduction in the *Treponema* transmission chain.

The Research Ethics Committee of the Municipal Health Department of Porto Alegre approved this study under protocol no. 2931412.

In order to transpose the test to address the high incidence problem, the Municipal Health Department (*Secretaria Municipal de Saúde* — SMS) began a monitoring process of rapid tests reactive for AS in BHUs of the Primary Care Network (*Rede de Atenção Primária* — RAP) and Specialized Care Services (*Serviços de Atenção Especializada* — SAE) of the city of Porto Alegre in the state of Rio Grande do Sul.

This article aims at analyzing this work and its initial results. Therefore, to evaluate the situation of the city and its regions, the analysis was also carried out by District Administrations (DAs), administrative structures, and regional managers, which are the agencies responsible for discussion and practice, where all health care strategies of the public health system are elaborated. DAs are distributed in eight health regions, with defined geographical boundaries and population to determine the services offered[8].

OBJECTIVE

To describe the epidemiological profile of monitored AS cases based on RTs in the city of Porto Alegre/Rio Grande do Sul in the first semester of 2018.

METHODS

This is an analytical cross-sectional epidemiological study. The study population comprised all cases entered in the Porto Alegre AS monitoring spreadsheet in the first semester of 2018, excluding pregnant women or those who became pregnant before the completion of the treatment, and users who refused any form of treatment.

The AS monitoring spreadsheet only has the cases of RT reactive for syphilis, deriving from the electronic form completed by health services with information regarding the tests in general, shared between care and management, generating tables for different DA services for each corresponding month.

Data from the AS monitoring spreadsheet corresponding to the first semester of 2018 were compiled and stored using Google Drive Sheets, and included the independent sociodemographic variables of the survey: the BHU that performed the test and its respective DA, gender, ethnicity, age, schooling, housing situation, and date of completion of the RT. We emphasize that sociodemographic factors were self-reported.

In the monitoring process, the evaluation of the pathology treatment consisted of consulting digital medical records from the electronic system of the public health system (*Sistema Único de Saúde eletrônico* — e-SUS), which is the registration tool used by the RAP. Thus, the follow-up of the cases was assessed and classified by treatment according to the clinical stage of the disease and current care protocol, the Clinical Protocol and Therapeutic Guidelines (*Protocolo Clínico e Diretrizes Terapêuticas* — PCDT) for Comprehensive Care for People with Sexually Transmitted Infections[5]. In addition, information concerning the presence of clinical manifestations and follow-up with non-treponemal infection test was added to support the categorization.

The outcome of the AS treatment was categorized as follows:

- Adequate: treatment registered with the appropriate dose of benzathine penicillin within the acceptable time frame (14-day interval tolerance between applications), which matches the clinical stage of AS; alternative treatments (doxycycline and ceftriaxone) associated with a non-treponemal test to observe bacterial load reduction and absence of treatment in case of prior notification of the disease, and non-reactive non-treponemal test or low titrations (≤1:4), according to the recorded clinical history;
- Inadequate: incorrect dose of benzathine penicillin, outside the tolerance range of administration, and with medicines not included in the current care protocols;
- Pending: when there is no record in the information systems about the complete treatment with benzathine penicillin according to the clinical stage of the pathology, or lack of current non-treponemal test results when necessary to confirm the disease, and in the absence of registration of follow-up non-treponemal test, when alternative treatments were performed.

The detection rate in the DA regions was calculated through the number of cases of RT reactive for AS in each DA, divided by the total number of tests performed in the respective administration, multiplied by one hundred. We performed descriptive analyses of all sociodemographic variables investigated with their absolute and relative frequency distributions to build the epidemiological profile.

The process of notification verification was carried out in partnership with the General Coordination of Health Surveillance (*Coordenadoria Geral de Vigilância Sanitária* — CGVS), through the Notifiable Diseases Information System (*Sistema de Informação de Agravos de Notificação* — SINAN), which was consulted to check whether the cases of AS meeting these criteria were included, that is, if the notification was made by the services according to the information notice no. 02-SEI/ 2017[9].

We adopted the chi-square test and linear trend p-value in ordinal categorical variables in a bivariate analysis to verify the association of sociodemographic variables with the treatment outcome, with a 95% significance level, using the statistical software SPSS (IBM SPSS Statistics 22). This analysis combined the treatments considered "Inadequate" and "Pending" to enable the investigation with two outcomes. We conducted a descriptive analysis with the Epi Info software (Epi Info™, CDC). Age groups were classified according to SINAN.

RESULTS

A total of 16,588 RTs for syphilis were performed in RAP and SAE in the city of Porto Alegre in the first semester of 2018, and 1,817 (11%) of them were reactive for syphilis. The analysis of the study population excluded 353 pregnant women, 7 who became pregnant during the treatment period, and 4 who refused any treatment, resulting in a total of 1,453 patients monitored for AS in the studied period.

According to **Table 1**, the distribution of the 1,453 cases of AS monitored during the study period was not homogeneous in the DA

territories, and the detection rate of syphilis by RT was higher in the Center region.

Table 2 presents the profile of the patients, showing a slight predominance of males (50.7%), and that 53.6% of the sample declared being white. Most participants belonged to the age group 20 to 29 years (34.1%), with a minimum age of 14 years and maximum of 86 years, and had incomplete elementary school (34.3%). The vast majority of the sample was not homeless (94.9%).

As demonstrated in **Table 3**, the East/Northeast DAs had the highest percentage of adequate treatment. Inadequate treatment was predominant in the Glória/Cruzeiro/Cristal DAs, and pending cases were more frequent in the Center DA, reaching 81.4%. The overall analysis of the city revealed that Porto Alegre has an adequate treatment percentage of 37.6%.

Table 4 shows an association in the bivariate analysis between treatment outcomes and the sociodemographic variables schooling, gender, age group, and homelessness, and a linear trend in the schooling and age group variables, that is, the higher the schooling and age, the higher the prevalence of adequate treatment. We found no association with the variable ethnicity.

Table 5 indicates that, although most AS cases are notified to SINAN (52.1%), the number and percentage of cases with no notification is high, even in the National List of Compulsory Notification, despite this communication being mandatory to health professionals.

The detection rate of RT for syphilis was 11% in Porto Alegre during the study period, higher than expected according to the incidence data presented by the Epidemiological Bulletins for the city, and higher than reported by the surveillance regarding syphilis in pregnant women, estimated in 4%[1,2].

The analysis per health region showed that the Center DA had a detection rate higher than the one in the city, reaching 14.5%. The administration and policies for prevention, care, and monitoring of syphilis in the city and its territory should take this fact into account. Concomitantly, this DA presented a large percentage (81.4%) of cases with pending treatment, which might be due to the testing of people from other cities who have access to the central region of Porto Alegre, or because this location has the highest concentration of homeless people[10].

The sociodemographic profile found in this study was similar to the analysis based on the compulsory notifications of AS from the Epidemiological Bulletin of Syphilis[1]. Most of them have incomplete elementary school, are white, male, and aged between 20 and 29 years. However, with respect to gender, this bulletin reveals a difference of 1.5 cases in males for each case in females, while in the present study, the proportion was practically equal between genders; nonetheless, the analysis showed statistical significance, with prevalence of females in cases with adequate treatment.

The minimum age of 14 years in reactive tests for syphilis is worrying and reinforces the need for preventive actions against STIs among adolescents. The group in question belongs to a priority segment targeted by the Syphilis No project. This project is a partnership between the Ministry of Health and the Universidade Federal do Rio Grande do Norte that aims to expand the population's access to diagnosis and treatment in the basic health network. The initiative presents a wide range of strategies to disseminate information, achieve its purposes, and reach the priority populations (young people, pregnant women, sexually active population, and health professionals)[11].

Homeless people represented 5.1% of the cases of RT reactive for syphilis, showing the importance of care focused on social vulnerability. The study corroborates this issue due to the association of adequate treatment and not being homeless. Porto Alegre has 2,115 homeless adults, according to research conducted by the Universidade Federal do Rio Grande do Sul (UFRGS), representing 0.1% of the population of the city[10].

Table 1 – Number of reactive cases for acquired syphilis (n=1,453), tests performed (n=16,588), and detection rate according to District Health Administrations in Porto Alegre in the first semester of 2018.

District Administration	Reactive n	Tests n	Detection Rate
Center	285	1,908	14.9
Glória/Cruzeiro/Cristal	251	2,874	8.7
East/Northeast	155	1,919	8.1
North/Eixo Baltazar	126	1,998	6.3
Northwest/Humaitá/ Navegantes/Islands	112	1,694	6.6
Partenon/Lomba do Pinheiro	292	3,200	9.1
Restinga/Far South	113	1,365	8.3
South/South Center	119	1,630	7.3

Table 2 – Sociodemographic variables of individuals monitored for acquired syphilis (n=1,453) in the primary care network and specialized care services of Porto Alegre in the first semester of 2018.

Variable	N (%)
Schooling	
Illiterate	23 (1.6)
Incomplete elementary school	499 (34.3)
Complete elementary school	224 (15.4)
Incomplete high school	250 (17.2)
Complete high school	309 (21.3)
Incomplete higher education	70 (4.8)
Complete higher education	78 (5.4)
Ethnicity	
White	779 (53.6)
Black	404 (27.8)
Multiracial	239 (16.4)
Indigenous	12 (0.8)
Asian	8 (0.6)
Unknown	11 (0.8)
Gender	
Female	716 (49.3)
Male	737 (50.7)
Age group (years)	
10 to 14	7 (0.5)
15 to 19	173 (11.9)
20 to 29	496 (34.1)
30 to 39	316 (21.8)
40 to 49	197 (13.6)
50 to 59	150 (10.3)
60 to 69	89 (6.1)
70 or older	25 (1.7)
Mean (±standard deviation) (minimum; maximum)	34.6(±14.4) (14.86)
Homeless	
No	1,379 (94.9)
Yes	74 (5.1)

The bivariate analysis also evidences the association of vulnerability with the treatment outcome through the schooling variable, showing a linear relationship between better education and the greater frequency of adequate treatment. In Brazil, schooling is often used as a proximal income. This fact may indicate another aspect of vulnerability associated with treatment in this study. According to the information collected by the Institute of Applied Economic Research (*Instituto de Pesquisa Econômica Aplicada* — IPEA), the main factor of expansion in working income was the increase in schooling[12].

Table 5 – Distribution of cases meeting the criteria for mandatory notifications (n=432) among individuals monitored for acquired syphilis in the primary care network and specialized care services of Porto Alegre in the first semester of 2018.

Notified to SINAN	n (%)
Yes	225 (52.1)
No	207 (47.9)

SINAN: Notifiable Diseases Information System (*Sistema de Informação de Agravos de Notificação*).

Table 3 – Treatment outcome of monitored cases of acquired syphilis according to District Administrations in Porto Alegre in the first semester of 2018.

	Adequate n (%)	Inadequate n (%)	Pending (%)	Total n (100%)
District Administration				
Center	52 (18.2)	1 (0.4)	232 (81.4)	285
Glória/Cruzeiro/Cristal	112 (44.6)	7 (2.8)	132 (52.6)	251
East/Northeast	72 (46.5)	3 (1.9)	80 (51.6)	155
North/Eixo Baltazar	56 (44.4)	0 (0)	70 (55.6)	126
Northwest/Humaitá/Navegantes/Islands	41 (36.6)	1 (0.9)	70 (62.5)	112
Partenon/Lomba do Pinheiro	115 (39.4)	1 (0.3)	176 (60.3)	292
Restinga/Far South	47 (41.6)	4 (3.5)	62 (54.9)	113
South/South Center	51 (42.9)	5 (4.2)	63 (52.9)	119
Total of Porto Alegre	546 (37.6)	22 (1.5)	885 (60.9)	1,453

Table 4 – Prevalence of adequate (n=546) and inadequate/pending (n=907) treatments for acquired syphilis according to sociodemographic variables of monitored cases in Porto Alegre in the first semester of 2018.

Variable	Adequate n (%)	Inadequate/Pending n (%)	P*
Schooling			
Illiterate	9 (1.6)	14 (1.5)	
Incomplete elementary school	201 (36.8)	298 (32.9)	
Complete elementary school	84 (15.4)	140 (15.5)	
Incomplete high school	99 (18.1)	151 (16.6)	0.001
Complete high school	123 (22.5)	186 (20.5)	
Incomplete higher education	15 (2.8)	55 (6.1)	
Complete higher education	15 (2.8)	63 (6.9)	
Ethnicity			
White	265 (48.5)	514 (56.6)	
Black	170 (31.2)	234 (25.8)	
Multiracial	99 (18.1)	140 (15.4)	0.098
Indigenous	5 (0.9)	7 (0.8)	
Asian	3 (0.6)	5 (0.6)	
Unknown	4 (0.7)	7 (0.8)	
Gender			
Female	295 (54)	421 (46.4)	0.005
Male	251 (46)	486 (53.6)	
Age group (years)			
10 to 14	3 (0.5)	4 (0.4)	
15 to 19	79 (14.5)	94 (10.4)	
20 to 29	185 (33.9)	311 (34.3)	
30 to 39	85 (15.6)	231 (25.5)	<0.001
40 to 49	70 (12.8)	127 (14)	
50 to 59	59 (10.8)	91 (10)	
60 to 69	51 (9.3)	38 (4.2)	
70 or older	14 (2.6)	11 (1.2)	
Homeless			
No	533 (97.6)	846 (93.3)	<0.001
Yes	13 (2.4)	61 (6.7)	

*P for heterogeneity of proportions (dichotomous variable) and linear trend (ordinal variable).

The 2010 IBGE census[13] revealed that Porto Alegre has a black population of 10.2%, multiracial of 10%, and indigenous of 0.23%. These same population segments presented respectively 27.8, 16.4, and 0.8% of RT reactive for AS. This information shows an increased risk of a reactive result for this pathology, again reinforcing the need for attention to social vulnerability in the follow-up of syphilis cases. However, this study found no association between the variable ethnicity and the adequate treatment outcome.

We emphasize that, although the incidence of syphilis is high in Porto Alegre, as published in epidemiological bulletins, cases are still underreported, and in the studied period — one semester — , 47.9% of cases had not been notified despite meeting the notification criteria for AS.

CONCLUSION

This study identified a higher than expected RT detection for syphilis, which corroborates data from epidemiological bulletins showing an elevated incidence of AS in Porto Alegre. In addition, some DAs of the city had higher detection rates, despite the presence or absence of adequate treatment in the regions. This information enables a situation diagnosis of the city and can support management actions and public policies, while Brazil focuses on the Syphilis No program.

The development of actions to structure and organize the processes for AS monitoring becomes indispensable, especially due to the evidence of an association between sociodemographic variables that indicate social vulnerability and the adequate treatment outcome. We underline that the diagnosis and treatment of people with STIs and their sexual partners break the transmission chain, preventing possible complications. This is the only way we can fight a disease that has no vaccine but can be treated and cured.

Based on this study, we propose to continue monitoring the cases to expand and improve information about syphilis aggravation and management. We also suggest adding other variables related to income, sexual orientation, and gender identity to this analysis information, which would enable other preventive strategies.

Participation of each author

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Lisiane Morelia Weide Acosta – Advisor.
Fabiana Ferreira dos Santos – Co-advisor.
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Conflict of interests

The authors declare no conflict of interests.

Approval by the Human Research Ethics Committee

The Research Ethics Committee of the Municipal Health Department of Porto Alegre approved this study under protocol no. 2931412.

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