HU Revista
Artigo Original

Evaluation of the epidemiological profile of acquired syphilis in Brazil (2013 to 2021): prevalence X challeges

Avaliação do perfil epidemiológico da sífilis adquirida no Brasil (2013 a 2021): prevalência X desafios

Antonio Carlos Vital Júnior[1,2]
Maria Clara Gomes de Almeida[1]
Pedro Lucas Travassos Ribeiro Fernandes[1]
Shênia Santos Monteiro[3]
Mikaelly Batista da Silva[3]
Jhonatta Alexandre Brito Dias[1]
Karla Monik Alves da Silva[1]
Matheus Augusto de Bittencourt Pasquali[2,2]

[1]Departamento de Ciências Farmacêuticas e Biomédicas, Centro Universitário Maurício de Nassau, Campina Grande, PB, Brasil.

[2]Programa de Pós-graduação em Bioquímica e Biologia Molecular, Departamento de Bioquímica, Centro de Biociências, Universidade Federal do Rio Grande do Norte, Natal, RN, Brasil.

[3]Centro de Tecnologia e Recursos Naturais, Universidade Federal de Campina Grande, Campina Grande, PB, Brasil.

✉ **Antonio Carlos Vital Júnior**

Av. Senador Salgado Filho, 3000, Lagoa Nova, Natal, Rio Grande do Norte
CEP: 59078-970
ac.vitaljunior@outlook.com

Submetido: 30/03/2024
Aceito: 03/06/2024

ABSTRACT

Introduction: Syphilis is a sexually transmitted bacterial infection caused by *Treponema pallidum* and is considered one of the most common public health problems in Brazil and worldwide. It affects around 12 million adults and more than 1 million newborns worldwide. **Objective:** To describe the epidemiological profile of acquired syphilis in Brazil from 2013 to 2021. **Material and Methods:** This is an exploratory, non-probabilistic and descriptive study. The data was collected from the SINAN database and then tabulated and treated using ANOVA analysis of variance. **Results:** It was found that between 2013 and 2021, there was a significant increase in the number of reported cases of acquired syphilis in Brazil, from 39,315 cases in 2013 to 152,915 cases in 2019. To this end, the average annual number of notified cases was higher than 6.9307±4.5571, with the Southeast region having the highest incidence of the disease (427,615 cases). **Conclusion:** Syphilis is a significant public health problem and requires more effective preventive measures to prevent and eliminate it.

Keywords: Treponema pallidum; Public Health; Bacterial Infection.

RESUMO

Introdução: A sífilis é uma infecção bacteriana sexualmente transmissível ocasionada pela *Treponema pallidum*, é considerada um dos problemas de saúde pública mais comuns no Brasil e no mundo. Atinge cerca de 12 milhões de adultos e mais de 1 milhão de recém-nascidos em todo o mundo. **Objetivo:** Descrever o perfil epidemiológico da sífilis adquirida no Brasil no período de 2013 a 2021. **Material e Métodos:** Trata-se de um estudo exploratório, não probabilístico e descritivo. Os dados foram coletados do banco de dados do SINAN e posteriormente tabulados e tratados pela análise de variância ANOVA. **Resultados:** Verificou-se que entre os anos de 2013 a 2021, houve um aumento significativo no número de casos notificados de sífilis adquirida no Brasil, passando de 39.315 casos em 2013 para 152.915 casos em 2019. Para tanto, o número médio anual de casos notificados foi superior a 6,9307±4,5571, sendo a região Sudeste a de maior incidência da doença (427.615 casos). **Conclusão:** A sífilis é um problema significativo de saúde pública e exige medidas preventivas mais eficazes para preveni-la e eliminá-la.

Palavras-chave: Treponema pallidum; Saúde pública; Infecção bacteriana.

INTRODUCTION

Sexually transmitted infections are considered one of the most common public health problems in Brazil and worldwide.[1] Besides, acquired syphilis is the one that presents a high rate of transmissibility among individuals.[2] To this end, about 12 million adults and more than 1 million newborns worldwide are infected each year with this disease, being considered the disease that causes most mortality in developing countries.[1] Moreover, in the epidemiological bulletin produced by the Ministry of Health, in 2020, 115,371 cases of acquired syphilis were reported in Brazil.[3]

In Brazil, the notification of syphilis is compulsory and its etiological agent is a bacterium,[4] *Treponema pallidum*, with its morphology of a spirochete of the Order Spirochaetales.[5] Transmitted by skin/mucous contact through horizontal dissemination.[4]

In contact with the skin, transmission occurs by adherence to the surface of host cells due to fibronectin found at this site and by mucus, the action is given through penetration through wounds or solution of continuity, the process being facilitated by a hyaluronidase enzyme.[6] Thus, the bacterium multiplies slowly, remaining in an incubation period of three weeks or until 90 days, leading to an infiltration of polymorphonuclear cells, plasma cells, macrophages, and from then on it can reach the lymph nodes and bloodstream. In this period, the individual is already susceptible to transmitting the disease, even without the presentation of symptoms.[7]

In order, the disease is classified as: recent syphilis (less than 1 year of evolution), which includes primary, secondary and recent latent (asymptomatic) syphilis; late syphilis (more than 1 year) includes latent (asymptomatic), late syphilis and tertiary syphilis.[8]

In primary syphilis, hard chancre appears, an initially pink lesion that turns into a red ulcer, characterized by hardened and painless edges, followed by a regional ganglion reaction. In the secondary stage, after a period of latency, symmetrical lesions occur on the skin and internal organs, including reddish patches followed by papular lesions with discrete scales, commonly affecting the palms of the hands and soles of the feet. In the tertiary period, patients present destructive lesions called gummas, affecting the skin, mucous membranes and internal organs, which can form nodules, ulcerated nodular plaques or gummas, with a tendency to scarring and peripheral hyperpigmentation.[9]

With this, the clinical manifestations are observed according to the stage and time of infection. Therefore, the signs and symptoms are manifested through clinical, immunological and histopathological aspects in the distinct phases with latency periods with greater presence of vertical transmission, occurring in the primary and secondary phases of the disease.[8]

Given the rise in the number of cases reported over the years quality health care is crucial in primary care to plan control, prevention, and surveillance actions due to the increase in reported cases. This study aims to describe syphilis in Brazil from 2013 to 2021 and report notification challenges.

MATERIAL AND METHODS

Type of study

This is a descriptive, nonprobabilistic, retrospective, epidemiological study with a quanti-qualitative approach of public and secondary notification data of the cases of acquired syphilis in Brazil in the period from 2013 to 2021.

Data extraction

The main information on acquired syphilis is collected through the Notifiable Diseases Information System (SINAN), accessible through the TabNet Win32 3.0 program. This program is available for consultation on the website of the Unified Health System (UHS) Information Technology Department (DATASUS), maintained by the brazilian Ministry of Health (http://datasus.saude.gov.br/informacoes-de-saude/tabnet). The data is organized according to the following variables: "Cases of acquired syphilis notified in Brazil from 2013 to 2021", "Acquired syphilis in Brazil by Region", "Sex" and "Ethnicity/Race".

Statistical analysis

The data were plotted in tables, using the Microsoft Word® 2020 software, aiming the presentation and analysis, through graphs made by GraphPad Prism 6 software. The mean and variance was calculated by the ANOVA test, which allowed the verification of significant variations ($p < 0.05$) between the years and other data analyzed in the study.

RESULTS AND DISCUSSION

Between the years from 2013 to 2021, a total of 795,778 cases of acquired syphilis were reported in Brazil (Figure 1). Considering the data by year of diagnosis, an increasing increase in the number of cases was found from 2013 to 2018, the latter presenting the peak of cases (n= 158,966) and slightly decreased in 2019. In 2020, over a third fewer cases were reported than the previous year.

There was a steady increase in the number of reported cases between 2013 and 2019, with a peak in 2018. However, the number of reported cases fell dramatically in 2020 and 2021, reversing the upward trend of previous years, respectively. This

fact is likely to be associated with the SARS-CoV-2 pandemic which led patients to not seek health services specifically for identification and consequently resulted in less identification of bacteria cases notification and knowledge of new cases.[11]

Comparing all the data reported in Figure 1, it was possible to see an average number of cases of n= 69,307±45,571. The results of the reported cases show that syphilis is still a public health issue in Brazil from 2013 to 2021. Thus, acquired syphilis is of compulsory notification in Brazil since the year 2010, according to Ordinance n° 2472 of August 31, 2010.[12] Therefore, the insertion of information is mandatory and essential for doctors and other health professionals or those responsible for these services, whether public or private.[13]

For this, is noted the need for the notification of cases in the DATASUS system for further construction of the database on a specific disease. Moreover, positive cases diagnosed recently or within 90 days, the carrier may still test negative. Thus, it is essential to intensify the actions of prevention, diagnosis and treatment of the disease, especially congenital syphilis, to reduce and minimize its incidence and complications.[14]

The notification of syphilis in Brazil has been a major challenge for the Brazilian health system.[15] There are several difficulties involved in the disease notification process, including lack of knowledge, infrastructure as well as the lack of adequate infrastructure to carry out the notifications effectively.[16]

Some of the main difficulties faced in the notification of syphilis in Brazil include: inadequate health professional training and awareness which are not adequately trained to identify the signs and symptoms of syphilis, and limited access to diagnostic tests. In addition, tests can produce false negative results, leading to underreporting of cases.[17] Untreated patients may go unreported due to lack of compliance.[18]

According to the estimates, the majority of cases occurred in the Southeast, followed by the South, Northeast, Midwest and, lastly, the North (Figure 2).

As observed in Figure 2, the notification of acquired syphilis was more prevalent in the Southeast region because it is the most populated in Brazil, when compared to the others. About this population difference, analyzing the IBGE website,[25] referring to the year 2021, about 89.6 million inhabitants lived in the Southeast, while the country had just over 213.2 thousand inhabitants.

When analyzing the cases identified by gender, a greater predominance of males was observed (Table 1). According to Castillo-Arcos et al[20], young men are more prone to risky behaviors than women due to cultural practices like polygamy, casual sex, commercial sex, and lack of parental supervision.

Data shows that underreporting of cases and high mortality from acquired and congenital syphilis continue to be a serious public health problem.[19] Francisco-Natanauan et al[21] The data suggests that factors such as race, gender and age are associated with different types of sexually transmitted diseases. In addition, approximately 46% to 60% of the sexual partners of individuals with syphilis may be carriers and be in the transmission phase of the disease, which further exacerbates the risk of spread, especially among vulnerable groups.[11]

The actions to prevent and control of syphilis should cover, in addition to the distribution of condoms, the early diagnosis and timely treatment of individuals and sexual partners.[22] Health professionals must notify

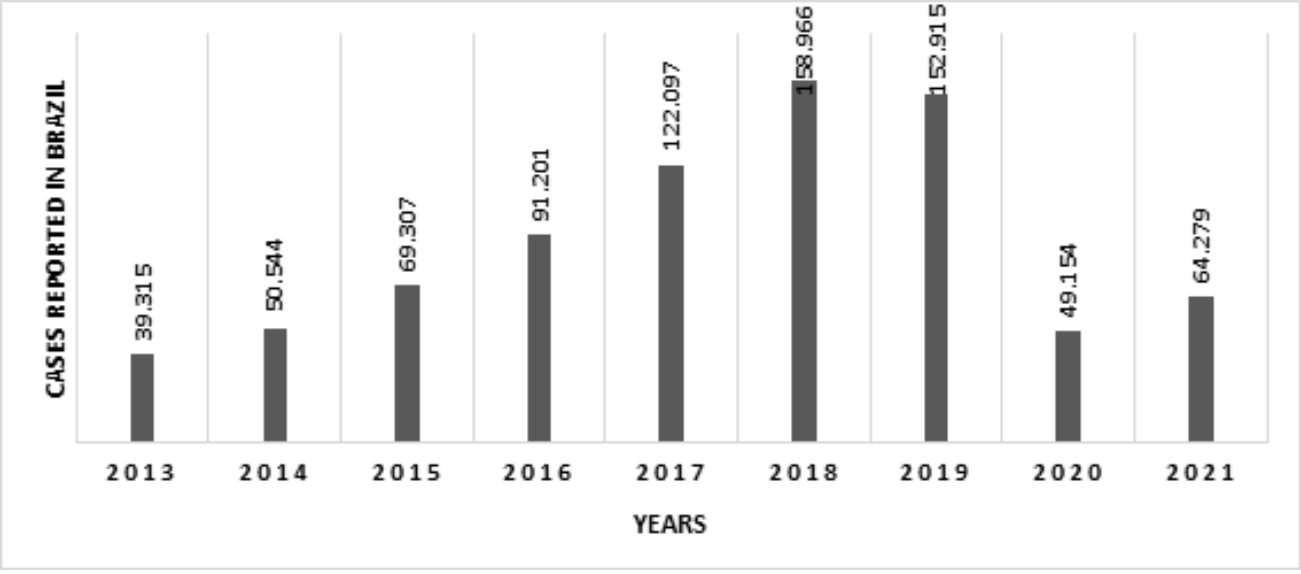

Figure 1: Cases of acquired syphilis reported in Brazil, by year of diagnosis in the period 2013-2021.

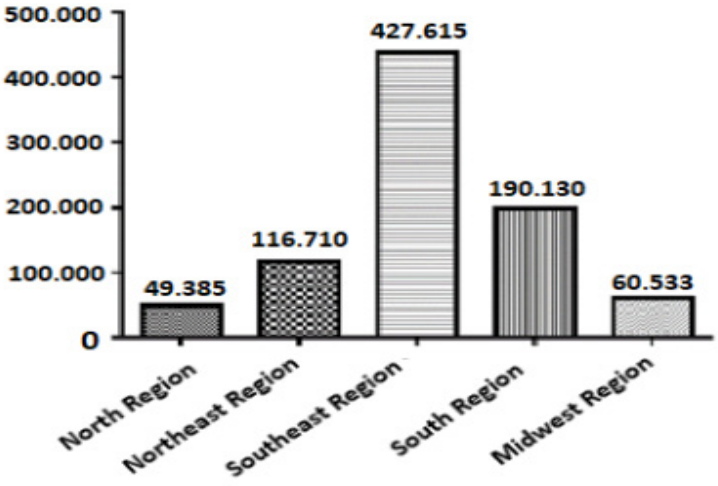

Figure 2: Incidence of acquired syphilis in Brazil by regions 2013-2021.

Table 1: Records of acquired syphilis notified in Brazil, annually, by gender in the period 2013-2021.[10]

Notification year	Notified cases	
	Male	Female
2013	23437	15868
2014	30457	20060
2015	41745	27534
2016	54083	37048
2017	71743	50285
2018	94715	64144
2019	91355	61399
2020	30753	18337
2021	40514	23665

cases to facilitate effective prevention and control policies, on that, it becomes possible to obtain accurate information about the occurrence of the disease and its geographical distribution. Notification can be performed by various methods: such as electronic forms, information systems, and compulsory notifications.

Syphilis can cause severe complications including neurological, cardiovascular, and bone problems, and it also causes congenital syphilis.[23] Therefore, through the information obtained, it can be seen that despite having a simple form of prevention and being easily treated, syphilis is a disease that can be considered emerging in the country[16-24]. Thus, the results presented indicate that acquired syphilis remains an important public health problem in Brazil, with increased prevalence in recent years, especially among young adults.

Furthermore, challenges in early diagnosis, treatment and prevention include lack of access to tests/treatment, antimicrobial resistance and low patient adherence.

CONCLUSION

Analysis of the epidemiological profile of syphilis in Brazil from 2013 to 2021 shows a significant prevalence of the disease. The years 2017 to 2019 were the years with the highest incidence, mainly in the southeast of the country. This increase can be attributed, in part, to advances in diagnostic and reporting capacity, expanded access to diagnostic tests and growing awareness of the value of syphilis prevention and treatment.

However, despite these advances, syphilis remains a major public health problem in Brazil. With an annual average of approximately 69,307±45,571 cases reported during the period analyzed, it is clear that there are comprehensive and effective methods needed to deal with this disease.

Addressing these challenges requires a combination of preventive measures, education and access to health services, aimed not only at reducing the prevalence of syphilis, but also at improving the quality of life and health of the Brazilian population.

REFERENCES

1. Domingues CSB, Duarte G, Passos MRL, Sztajnbok DCN, Menezes MLB. Protocolo brasileiro para infecções sexualmente transmissíveis 2020: sífilis congênita e criança exposta à sífilis. Epidemiol Serv Saúde. 2021; 30(spe1):e2020597. doi: 10.1590/S1679-4974202100005.esp1

2. Newman L, Rowley J, Vander Hoorn S, Wijesooriya NS, Unemo M, Low N et al. Global estimates of the prevalence and incidence of four curable sexually transmitted infections in 2012 based on systematic review and global reporting. PLoS One. 2015; 10(12):e0143304.

3. Ministério da Saúde (BR). Campanha nacional de combate à sífilis adquirida e congênita em 2021 [Internet]. Ministério da Saúde; 2021 [cited 2022 sep 28]. Available at: https://antigo.aids.gov.br/pt-br/campanha/campanha-sifilis-2021.

4. Ministério da Justiça e Segurança Pública (BR). Portaria MJSP n° 264, de 30 de dezembro de 2022. Dispõe sobre o emprego da Força Nacional de Segurança Pública no interior do Palácio da Justiça, bloco T, Edifício Sede e Anexos I e II, em Brasília – DF. Diário Oficial da União [Internet]. 2023 jan. 2 [cited 2022 sep 28]; 1(1):52. Available at: https://dspace.mj.gov.br/bitstream/1/8588/1/PRT_GM_2022_264.pdf.

5. Matos KR, Simões LG, Souza RB, Campos Filho PC. Perfil histórico epidemiológico da sífilis adquirida no Brasil na última década (2011 a 2020). Conj. 2022; 22(6):644-62. doi: 10.53660/CONJ-1093-R05

6. Chen J, Huang J, Liu Z, Xie Y. Treponema pallidum outer membrane proteins: current status and prospects. 2022; 80(1). doi: 10.1093/femspd/ftac023

7. Ministério da Saúde (BR). Protocolo clínico e diretrizes terapêuticas para atenção integral às pessoas com infecções sexualmente transmissíveis (IST) [Internet]. Brasília: Ministério da Saúde; 2022 [cited 2022 Oct 22]. Available at: https://www.gov.br/aids/pt-br/central-de-conteudo/pcdts/2022/ist/pcdt-ist-2022_isbn-1.pdf/view.

8. Escobar ND, Gilo NF, Bedran SC, Prieb A, Sousa MTB, Chiacchio A. Perfil epidemiológico de sífilis adquirida nas regiões do Brasil no período de 2010 a 2019. Revista Amazônia: Science & Health. 2020; 8(2):51-63. doi: 10.18606/2318-1419/amazonia.sci.health.v8n2p51-63

9. Avelleira JCR, Bottino G. Syphilis: diagnosis, treatment and control. An Bras Dermatol. 2006; 81(2):111-26.

10. Ministério da Saúde (BR). Departamento de Informação e Informática do Sistema Único de Saúde. TabNet [Internet]. Ministério da Saúde; 2022 [cited 2022 oct 23]. Available at: https://datasus.saude.gov.br/informacoes-de-saude-tabnet/

11. Workowski KA. Centers for disease control and prevention sexually transmitted diseases treatment guidelines. Clin Infect Dis. 2015; 61(suppl 8):S759-62.

12. Ministério da Saúde (BR). Boletim epidemiológico sífilis. 2016; 47(35).

13. Silva LBB, Rezende FAVS, Pinto JMC (org.). Informações e registros em saúde e seus usos no SUS. Rio de Janeiro: Editora Fiocruz; 2020.

14. Domingues CSB, Duarte G, Passos MRL, Sztajnbok DCN, Menezes MLB. Protocolo brasileiro para infecções sexualmente transmissíveis 2020: sífilis congênita e criança exposta à sífilis. Epidemiol Serv Saúde. 2021; 30(spe1):e2020597. doi: 10.1590/S1679-4974202100005.esp1

15. Figueiredo DCMM, Figueiredo AM, Souza TKB, Tavares G, Vianna RPT. Relação entre oferta de diagnóstico e tratamento da sífilis na atenção básica sobre a incidência de sífilis gestacional e congênita. Cad Saúde Pública. 2020; 36(3):e00074519. doi: 10.1590/0102-311X00074519

16. Barcelos MRB, Lima EFA, Bof SMS, Silva MBO, Filippon J, Figueiredo KC, Vargas TB, Barroso JAM, Souza MP, Primo CC. Tackling syphilis in Vitória (ES) 2016-2019: a qualitative assessment for public management. RSD. 2022; 11(11):e399111133646.

17. Petrúcia A, Souza CRO, Cantalice ASC. Desafios para o controle da sífilis congênita no Brasil. Rev Cereus. 2022; 14(2):196-11. doi: 10.18605/2175-7275/cereus.v14n2p196-211

18. Forrestel AK, Kovarik CL, Katz KA. Sexually acquired syphilis: part 1: historical aspects, microbiology, epidemiology, and clinical manifestations. Journal of the American Academy of Dermatology. 2019.

19. Easterlin MC, Ramanathan R, Beritto T. Maternal-to-fetal transmission of syphilis and congenital syphilis. NeoReviews. 2021; 22(9):e585-99.

20. Castillo-Arcos LC, Alvarez-Aguirre A, Bañuelos-Barrera Y, Valle-Solís MO, Valdez-Montero C, Kantún-Marín MAJ. Age, gender and resilience in sexual risk behavior of STI among adolescents in Southern Mexico. Enf Global. 2017; 45(1):178-86.

21. Francisco-Natanauan P, Leatherman-Arkus N, Pantell RH. Chlamydia and gonorrhea prevalence and treatment in detained youths: strategies for improvement. Journal of Adolescent Health. 2021; 68(1):65-70.

22. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Departamento de Vigilância, Prevenção e Controle das IST, do HIV/ AIDS e Hepatites Virais. Como prevenir a transmissão vertical do HIV e da sífilis no seu município [Internet]. Ministério da Saúde; 2019 [cited 2022 oct 22]. Available at: https://bvsms.saude.gov.br/bvs/publicacoes/protocolo_clinico_hiv_sifi-

lis_hepatites.

23. Ott MA, Santelli J. Sexually transmitted infections, public health, and ethics. In: Mastroianni AC, Kahn JP, Kass NE (ed.). The Oxford handbook of public health ethics. New York: Oxford University Press; 2019. p. 378.

24. Comissão Nacional de Incorporação de Tecnologias no SUS (BR). Relatório de recomendação: penicilina benzatina para prevenção da sífilis congênita durante a gravidez. Brasília: Conitec; 2015.

25. Instituto Brasileiro de Geografia e Estatística (BR). Estimativas de população enviadas ao TCU [Internet]. IBGE; [2022] [cited 2022 Nov 09]. Available at: https://www.ibge.gov.br/estatisticas/sociais/populacao/9103-estimativas-de-populacao.html?=&t=resultados.