

EPIDEMIOLOGICAL PROFILE OF ACQUIRED SYPHILIS IN THE NORTHERN REGION OF BRAZIL FROM 2011 TO 2021

PERFIL EPIDEMIOLÓGICO DA SÍFILIS ADQUIRIDA NA REGIÃO NORTE DO BRASIL DE 2011 E 2021

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Abstract. Sexually transmitted infections are among society's most recurring public health dilemmas. Syphilis is an infectious, contagious disease exclusive to humans, transmitted through unprotected sexual contact. It is estimated that 11 million new cases of syphilis occur annually in adults aged 15 to 49 worldwide. The aim of this study was to identify the epidemiological profile of acquired syphilis in the states of the Northern region of Brazil between 2011 and 2021. This is an observational study with a quantitative, retrospective approach, using data from SINAN, available on DATASUS. Sociodemographic variables were analyzed: gender, age, race, level of education, and diagnosis criteria. It was found that between 2011 and 2021, 50,810 cases of acquired syphilis were reported in the states of the Northern region of Brazil. The state of Amazonas had the highest notification rate with 18,709 (36.82%) cases, followed by the state of Pará with 13,102 (25.79%) notifications and Tocantins with 6,728 (13.24%) notified cases. The year 2018 showed the highest incidence rate of the period, decreasing from 2019 onwards. Thus, the profile of acquired syphilis in the Northern region was: males, aged between 20 and 39, brown, with unknown schooling, and regarding the diagnostic criterion, laboratory diagnosis had the highest rate of notifications. This highlights the need to promote actions aimed at elucidating sexual health and offering effective measures to combat syphilis in the most affected population, as well as the need to re-evaluate the mandatory fields on the SINAN notification and investigation forms since they represent an essential source for determining health indicators.

Keywords: Syphilis; Communicable Diseases; Public Health.

Resumo. As infecções sexualmente transmissíveis estão entre os dilemas de saúde pública mais recorrentes da sociedade. A sífilis é uma doença infecto contagiosa, exclusiva do ser humano, transmitida por contato sexual desprotegido. Estima-se que, anualmente, 11 milhões de novos casos de sífilis ocorrem em adultos de idade entre 15 a 49 anos em todo o mundo. O objetivo da pesquisa foi identificar o perfil epidemiológico da sífilis adquirida nos estados da Região Norte do Brasil, entre os anos de 2011 e 2021. Trata-se de uma pesquisa de natureza observacional, com abordagem quantitativa, retrospectiva, com levantamento de dados do SINAN, disponíveis no DATASUS. Foram analisadas as variáveis sociodemográficas: sexo, idade, raça, nível de escolaridade e critério de diagnóstico. Verificou-se que entre 2011 e 2021, nos estados da Região Norte do Brasil, foram notificados 50.810 casos de sífilis adquirida. O estado do Amazonas apresentou a maior taxa de notificações com 18.709 (36,82%) casos, seguido pelo estado do Pará com 13.102 (25,79%) notificações e o Tocantins com 6.728 (13,24%) casos notificados. O ano de 2018 apresentou a maior taxa de incidência do período, diminuindo a partir de 2019. Assim, o perfil da sífilis adquirida na Região Norte foi: indivíduos do sexo masculino, com idade entre 20 e 39 anos, pardos, com escolaridade desconhecida, e em relação ao critério de diagnóstico o laboratorial apresentou a maior taxa de notificações. Dessa forma, evidencia-se a necessidade de promover ações com o objetivo de elucidar a saúde sexual e oferecer medidas efetivas no combate à sífilis na população mais acometida, bem como é indispensável uma reavaliação dos campos de preenchimento obrigatórios das fichas de notificação e investigação do SINAN, uma vez que representam uma fonte essencial para determinação dos indicadores de saúde

Palavras-Chave: Sífilis; Doenças transmissíveis; Saúde pública.

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INTRODUCTION

Nowadays, sexually transmitted infections are among society's most recurring public health dilemmas, with an estimated 376 million new cases per year, according to the World Health Organization in 2016. The causes of these infections are related to various pathological agents such as viruses, bacteria, or protozoa. These microorganisms establish a permanent presence in the host's bodily secretions, such as blood, sperm, and vaginal secretions¹.

The first identification of syphilis occurred around the 15th century in Europe in 1546^{2,3}. The physician and poet Fracastoro assumed that syphilis was a sexually contagious disease, which occurred through small seeds, calling them "seminaria contagionum"⁴.

Syphilis is an infectious disease exclusive to humans. It is characterized by periods of latency when there are no signs and symptoms of the disease and activity when there are specific aspects to each stage of the disease, which are divided into primary, secondary, and tertiary syphilis⁵. The primary activity is characterized by the appearance of a red, raised sore, which is a pink papule that evolves to a more intense red, with hard edges, covered in serous material. The secondary activity is evidenced by spots and lesions on the body, located mostly on the palms of the hands and feet; they manifest themselves in large quantities and symmetrically and may be erythematous macules. In the tertiary stage, there is a predominance of severe and disabling skin, bone, cardiovascular and neurological lesions⁶.

It is currently estimated that 11 million new cases of acquired syphilis occur every year in adults aged between 15 and 49 worldwide⁷. According to data from the Sistema de Informação de Agravos de Notificação - SINAN (Brazilian Notifiable Diseases Information System), there has been an increase in reported cases of acquired syphilis, from 59.1 cases per 100,000 inhabitants in 2017 to 75.8 cases per 100,000 inhabitants in 2018.5 Syphilis infection occurs mainly through unprotected sexual intercourse, but this is not the only way it can be transmitted. In pregnant women, the infection occurs congenitally and is transmitted via the placenta.⁸ However, once the immune system has been evaded, the infection begins rapidly, with an increase in the number of pathogens and spirochetes entering through the lymphatic and blood circulation.⁹

Its causative agent is the bacterium *Treponema pallidum*, which belongs to the phylum Spirochaetes, the family Spirochaetaceae, and the genus *Treponema*. It has the shape of a spirochete, containing around 10 to 15 spirals and is around 8 micrometers long.⁴ It is considered to be an extremely virulent bacterium, due to its ability to evade the immune system of its hosts. This evasion process is what allows the pathogen to excel and protect itself against the host's immune system, and also due to the clinical manifestations observed in syphilis.¹⁰ Nowadays, the pathogenesis of this disease is still a dilemma, as its identification in relation to isolation is difficult.⁸

The need for more elaborate and complete data on this subject, as well as the profile of people affected by syphilis and its repercussions on the course of the disease, especially when there is no treatment or inadequate adherence to it, leads to severe complications. Still on a regional level, in the Northern region of Brazil, acquired syphilis is a common reality in health services, but the lack of studies and an information database is one of the main obstacles to establishing a target population.

The aim of this study was to describe the epidemiological profile and incidence of reported syphilis cases in the Northern region of Brazil between 2011 and 2021.

MATERIAL AND METHODS

This is an observational, descriptive study with a quantitative and retrospective approach, as the analysis was carried out using data provided by DATASUS, between 2011 and 2021, based on the sociodemographic variables provided by SINAN of positive cases for acquired syphilis in the Northern Region of Brazil. This region is made up of the states of Amapá, Acre, Amazonas, Pará, Roraima, and Tocantins. It is the largest region in terms of geographical size compared to the four other regions¹¹. According to the Brazilian Institute of Geography and Statistics (IBGE)¹¹, it had around 18.6 million inhabitants in 2020 and had a Human Development Index of 0.683.

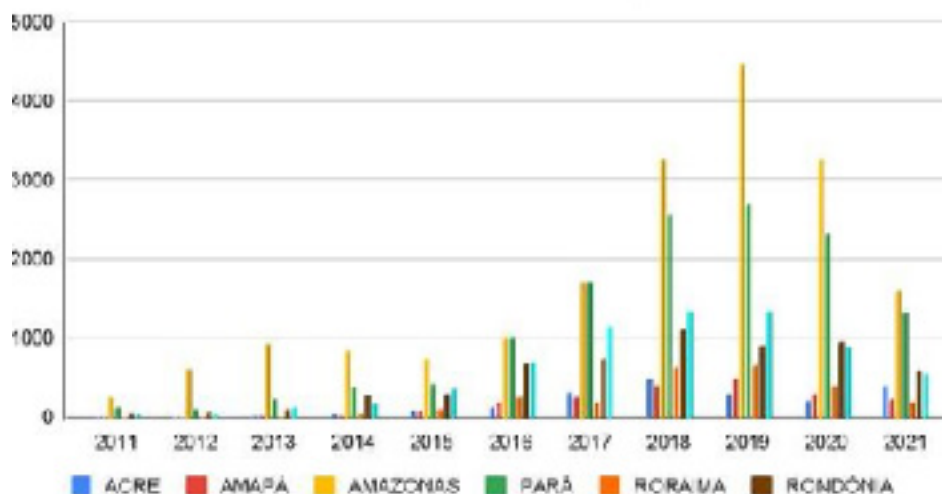
The variables collected were: gender, age group, race, level of education, and diagnosis criteria. The data was extracted from DATASUS, from January to March 2023 and tabulated in the Microsoft Excel 2019 software by year of notification. A univariate analysis was carried out using the frequency of each variable. BioStat 5.3 was used as a tool for statistical quantification, and the Chi-square test was conducted, adopting statistical significance at a value of $p < 0.05$. Then, the results were plotted into the Microsoft Excel 2019 software to generate graphs and tables. The Incidence Coefficient (IC) of acquired syphilis per 100,000 inhabitants was also calculated for each state in the Northern region by dividing the number of reported cases by the total estimated population residing in the region during the period under study and then multiplying the quotient by 100,000 during the period evaluated. This study was not submitted for approval to the Ethics Committee for Research with Human Beings (CEP), as it used secondary data in the public domain.

RESULTS

Between 2011 and 2021, a total of 50,810 cases of acquired syphilis were notified on SINAN in the Northern Region of Brazil.

As shown in Graph 1, between 2011 and 2019, there was a significant increase in acquired syphilis notification rates, and it was also observed that the number of cases in Para between 2018 and 2019 remained stable.

Graph 1: Representation of acquired syphilis cases notified on SINAN in the Northern Region of Brazil between 2011 and 2021.



Source: authors.

Table 1 shows that among all the states that make up the Northern Region of Brazil, Amazonas ranked first in notifications of acquired syphilis, with 18,709 (36.82%), indicating the highest proportions during the study period. The state of Para came second in terms of the notification rate per year with 13,102 (25.79%) notifications. However, it is important to note that in 2016, Para had only ten fewer cases notified than Amazonas. Still, in 2017, it overtook the state of Amazonas with eight more notifications, demonstrating an alternation between the two largest Brazilian states. The state of Tocantins, which took third place in the total number of acquired syphilis detection rates with 6,728 (13.24%), noted that from 2011 to 2015, cases remained low compared to the states of Acre, Amapá, Roraima, and Rondonia. Yet, from 2016 onwards, there was a rise in the number of notifications,

making it quite significant. However, in all states, there was a decrease in the number of notifications between 2020 and 2021.

Table 1: Data on the observed absolute frequencies of acquired syphilis cases in Northern Brazil between 2011 and 2021.

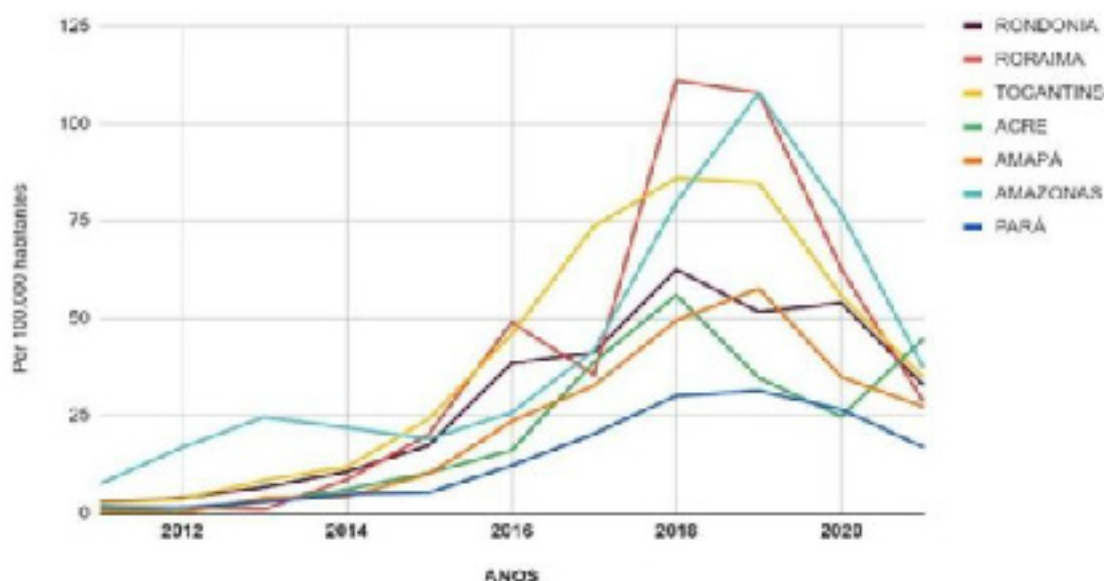
	ACRE	AMAPA	AMAZONAS	PARA	RONDONIA	RORAIMA	TOCANTINS
2011	7	2	265	133	45	6	36
2012	3	1	610	117	62	7	52
2013	23	29	936	231	116	6	127
2014	48	31	849	393	187	43	179
2015	84	78	755	436	310	103	368
2016	132	184	1.029	1.019	688	252	705
2017	322	261	1.698	1.706	744	186	1.142
2018	487	411	3.258	2.564	1100	640	1.339
2019	306	488	4.473	2.701	919	653	1.333
2020	222	301	3.246	2.310	960	396	890
2021	407	239	1.590	1.492	595	186	558
Total	2.041	2.025	18.709	13.102	5.726	2.478	6,729
Total of cases: 50.810 cases							

By stratifying the data by state, with regard to the Northern Region of Brazil, it was possible to see that the predominance of notified cases of acquired syphilis, according to the gender variable, occurs in males, with 59.83% (30,399) of notifications. At the same time, 40.14% (20,393) of cases were notified between 2011 and 2021 among females. Regarding the age groups, the figures showed that young adults between 20 and 39 predominated, with 57.31% (29,119) of notifications in the Northern Region in the years under study. Regarding race, the number of cases among self-declared brown individuals stands out, with around 71.03% (36,094) of the cases notified between 2011 and 2021. Regarding the level of education, it was possible to observe that the filling in of this field on the notification form is a criterion that showed the highest frequency in the ignored/blank field with 29.81% (14,724) of the notifications; however, when checking the proper filling in, it was noted that the level of education corresponded to complete high school at 22.46% (11,093). The diagnosis criteria in the Northern Region of Brazil were primarily laboratory-based, accounting for 57.97% (29,693) of notified cases. However, it is important to note that the clinical-epidemiological criterion also accounts for a significant proportion of notifications, with around 325 (15.92%) cases.

Graph 2 shows the incidence of acquired syphilis in all seven states in the Northern region of Brazil between 2011 and 2021. It shows that in 2018, the number of notifications reached the peak of its growth, as the incidence rate was 30.11 in Para, 49.54 in Amapa, 56.02 in Acre, 62.58 in Rondonia, 79.84 in Amazonas, 86 in Tocantins and 111 in Roraima, per 100,000 inhabitants.

However, in subsequent years, starting in 2019, there was a decrease in notifications. In 2020, the incidence rate was 26.57 in Para, 34.92 in Amapa, 24.81 in Acre, 54.01 in Rondonia, 77.14 in Amazonas, 55.9 in Tocantins and 62.73 in Roraima, per 100,000 inhabitants. In addition, in 2021, the decrease in notifications expanded, with an incidence of 32.77 in Rondonia, 28 in Roraima, 34.7 in Tocantins, 44.87 in Acre, 27.23 in Amapa, 37.23 in Amazonas and 16.99 in Para, per 100,000 inhabitants.

Graph 2: Data on the incidence of acquired syphilis in the states of the Northern Region of Brazil between 2011 and 2021.



Source: authors.

DISCUSSION

Acquired syphilis is a sexually transmitted infection of great importance for public health since the number of notifications nationwide has increased in recent decades, especially with regard to prevention policies. The findings of this study, focusing on the Northern Region of Brazil, show the growing number of cases between 2011 and 2019, with greater attention to 2019 since it had the highest rate of reported cases, data that corroborates the mapping carried out by the Health Surveillance Secretariat in 2022¹², indicating that acquired syphilis in Brazilian territory showed an increase in detection rates.

According to data made available by the Health Ministry¹² by 2021, the Brazilian regions had different notification rates. The Southeastern region, where the highest concentration of notified cases occurs, had a rate of 51.0%, followed by the Southern region, which had a rate of 22.1%. The Northeastern region had 14.0% of cases, the Midwestern had a total of 6.9%, while the Northern region had a rate of 6.0% of acquired syphilis rates over the years studied. This projection can be explained by the number of notifications in each region¹³.

On the other hand, these figures showed a sharp drop in cases from 2020 to 2021. This decrease is attributed to the impact experienced during the pandemic period caused by the SARS-CoV-2 infection, and in 2020, there was a marked scenario of underreporting, which may have impacted the epidemiological data.¹⁴ Still in this context, underreporting in Brazil is a recurring aspect of public health. However, the deficits and inequalities in health become evident in the Northern region since access to health services and the absence of policies that incorporate the importance of notifications of diseases and infections of a compulsory nature by health professionals is evidenced to a greater extent due to the lack of health measures¹⁵.

One of the determining factors in the epidemiology of syphilis is the poor distribution of resources and coverage plans best offered in the Federative Units (UF), which leads to a lack of supply and availability of basic resources in health care services, also demonstrating the evident shortage of professionals, instruments,

and supplies, with incalculable repercussions, and consequently difficulties and inefficiencies in the responses to diseases that have the possibility of being prevented or minimized through health education actions¹⁶.

Looking at each variable in isolation and relating it to each state, it is possible to see that there are similar patterns that contribute to the growth of acquired syphilis. With regard to gender, it was possible to observe that in all the states of the Northern Region, acquired syphilis predominantly affects males since, between 2011 and 2021, a total of 30,399 (59.83%) cases were reported in males, while in females this figure was 20,393 (40.14%). This trend aligns with the results of a study¹⁷, which showed that of the 34,253 cases reported in the Northern Region, 20,945 of the reported cases between 2018 and 2021 occurred mainly in males. Still, in this perspective, it can be seen that in 2015, men had the highest prevalence (60.2%) of acquired syphilis¹⁸.

Risky behaviors, through sexual relations without the use of condoms, as well as perpetuating the cycle of infection by not recognizing the symptoms, directly influence the constancy of relations with multiple partners, contributing to the increase in cases in the Northern Region of Brazil¹⁹. Another important aspect that corroborates this scenario is that, historically, male sexuality has had repercussions in the field of health, so the increase in STI rates, especially acquired syphilis, demonstrates the difficulties in promoting preventive actions.²⁰ Therefore, men become a group more susceptible to acquiring diseases compared to women, and the lower adherence to programs that enable care compared to men's health is one of the reasons why access to these spaces is difficult, demonstrating the invisibility of men's health²¹.

According to some authors, this is due to the significant increase in relationships between men who have sex with men (MSM) and the continued risky behavior in their sexual relations²². In a study of male patients who tested positive for acquired syphilis, one of the implications of this phenomenon would be pre-exposure prophylaxis, or PrEP used as a means of reducing the risk of HIV infection; however, this method does not rule out the possibility of other STIs. In this study, more than half of the participants reported not wearing condoms with their partners and the use of PrEP as an alternative against HIV infection²³.

With regard to the age group of patients who tested positive for acquired syphilis, it was found that in the states of the Northern Region of Brazil, the predominance of notifications occurred in patients between 20 and 39, with 29,119 (57.31%). According to the results found²⁴, the profile most affected by acquired syphilis is young adults between 20 and 39, and it pointed out that one of the reasons for this was related to the early onset of sexual life and risky behavior through unprotected sex. A study carried out in the state of Para found that the lack of an approach to safe sex and sexuality among young people makes detection rates for STIs even more alarming.²⁵ More sexual health policies must be implemented from a young age, as it is clear that through these measures, individuals can recognize their individuality and their role as social actors to minimize the risks of spreading infections, as well as have information about symptoms, contagion, diagnosis, and treatment²⁶.

Another group that stands out regarding the number of notifications during the study period is the growing number of cases among adolescents aged 15 to 19, with 5,684 (11.19%). This phenomenon is identified because they belong to a group that is more susceptible to STIs.²⁷ This unsafe behavior may be linked, firstly, to the lack of information about contamination of sexually transmitted infections, such as forgetfulness and reduced pleasure in sexual intercourse. The use of licit and illicit drugs can contribute to a greater increase in cases of acquired syphilis since the effect of these drugs on the body reduces reasoning and the feeling of vulnerability.⁵

Of the results found concerning the race variable, the predominance of cases occurred in brown people, with 36,094 (71.04%) in the Northern Region. According to data from the National Household Sample Survey (PNAD), in 2022, the population living in Brazil identified themselves about their race/color, mostly as brown with 45.3%, white with 42.8%, and black with 10.6%. On the other hand, in the Northern region, this rate rises to 70% of self-declared brown people. This information validates the results of this research since it shows a general panorama of the Brazilian scenario. This factor can be better explained by the fact that most of the population in the Northern region of Brazil belongs to this ethnic group. Still, there is no evidence in the literature to suggest that this population has a predisposing factor to syphilis.²⁸ It is also worth noting that the social construction of Brazil is marked by ethnic mixtures, which contributes to the identification of the different peoples¹⁷.

With regard to the education level of individuals infected with this pathology, in the Northern region of Brazil, the prevalence of notifications was mainly in the "unknown and blank" variable, with 18,228 cases (35.87%). However, when the forms were filled in, there was a predominance of individuals with completed secondary education, with 11,093 (21.83%). The notifications that have schooling as a variable are not properly filled out since, in the Northern region, it is predominant to have this field left as "blank or ignored," obtaining a percentage of 32% compared to the total number of cases between 2011 and 2020. This dilemma is detrimental to a proper analysis.²⁶ This data is in line with the results observed in this study since it shows the same perspective, as well as compared to the national level, since there is a predominance of "ignored and blank" cases similar to the data from the Northern Region¹².

About notifications on the criteria for diagnosing acquired syphilis, the prevalence in the seven states observed during the study was highest for the laboratory variable, with 29,693 (58.44%). All this data is extremely important, as it corroborates the conclusion that the most reliable tool for an assertive diagnosis of acquired syphilis is the laboratory, which is in line with a study that shows the predominance of laboratory diagnoses in all regions of Brazil, with an overwhelming difference of 551.577 cases (65.32%) compared to the clinical epidemiological 65,394 (7.74%); totaling, in the Northern region, 26,332 (57.72%) laboratory diagnoses in its studies between 2011 and 2020²⁹.

Regarding the incidence of acquired syphilis in the Northern Region of Brazil, it was observed that cases had decreased between 2019 and 2020. This trend follows the results found by the Health Surveillance Secretariat (SVS) of the Health Ministry (MS) (2021), showing that throughout Brazil, the detection rates of acquired syphilis went from 74.2 to 54.5 cases per 100,000 inhabitants. In the Northern Region, there was a drop from 58.4 to 44.1 cases per 100,000 inhabitants³⁰. One of the conditions attributed to such a decrease was the COVID-19 pandemic, reflecting the low number of notifications during this period.³¹ The demand for syphilis tests at health centers and the quality of the results are of great significance to the epidemiological picture throughout Brazil³².

CONCLUSION

Based on the findings of this research, it can be seen that the clinical, epidemiological profile of the population most affected by acquired syphilis in the Northern Region of Brazil between 2011 and 2021 was: adult men between 20 and 39 years old, brown, with complete secondary education, when this information was available, and diagnosed by laboratory.

It is essential to re-evaluate the mandatory fields on the SINAN notification and investigation forms, since they are an essential source for determining health indicators.

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