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EPIDEMIOLOGICAL PROFILE OF REPORTED CASES OF GESTATIONAL SYPHILIS IN THE STATE OF ACRE FROM 2012 TO 2021

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Abstract: Syphilis is a disease classified as a sexually transmitted infection and is caused by the spirochete bacterium Treponema pallidum. This disease represents a major public health problem in Brazil, since transmission of the etiological agent can occur vertically through the placenta in cases of gestational syphilis, triggering congenital syphilis. This situation highlights the need for adequate prenatal care, carried out early, with appropriate counseling, laboratory tests performed at the correct times, and effective treatment, in order to avoid negative outcomes for the mother-fetus binomial. This study aims to analyze gestational syphilis in the state of Acre from 2012 to 2021, with the intention of characterizing this pathology in its various notification nuances. Based on the results obtained in this study, it was noted that the state of Acre ranks third in the North region with the highest number of registered cases during the study period, a reality that reflects the limited coverage and low quality of prenatal care provided in the municipalities of Acre. The largest number of reported cases occurs in the health region called "Baixo Acre and Purus". Rio Branco, the capital of Acre, is among the three capitals with the highest rates of syphilis in pregnant women per live birth for the year 2021, highlighting the complex public health reality of the municipality. The diagnosis of the disease must be performed using treponemal tests associated with the patient's clinical condition and treatment monitored using non-treponemal tests. There was a predominance of gestational syphilis among young women during the period studied, as well as the perception of the low rate of formal education among them, both factors that highlight the need to expand public policies that aim to disseminate knowledge about the need for adequate prenatal care and the use of condoms during sexual intercourse to avoid contagion by the etiological agent,

thus preventing gestational syphilis.

Keywords: Pregnancy, Syphilis, Congenital Syphilis, Latent Syphilis, Prenatal.

INTRODUCTION

Syphilis is a disease classified as a sexually transmitted infection and is caused by the spirochete bacterium Treponema pallidum. This disease represents a major public health problem in Brazil, given its high prevalence and morbidity and mortality (ANDRADE et al., 2020; SONDA et al., 2013).

Treponema pallidum transmission can occur not only sexually, horizontally, but also vertically, that is, from mother to fetus via the placenta during pregnancy, triggering congenital syphilis (FERLA et al., 2022; MACÊDO et al., 2020). Such transmission to the fetus is independent of the mother's stage of infection (primary, secondary, latent and tertiary syphilis), however, it occurs more frequently in the classification into the primary and secondary stages of syphilis (MARQUES; MORAIS, 2020). Furthermore, transmission of syphilis to the fetus can also occur at the time of birth, although it occurs rarely (LIMA and SILVA et al., 2020).

Although syphilis has a widespread impact on public health in Brazil and around the world, its reporting is low, which masks the real epidemiological values of this disease. This situation highlights the need for adequate prenatal care (early, with appropriate counseling, laboratory tests performed at the correct times to obtain results in the necessary time and effective treatment), so that the clinical condition can be reported and properly treated, in order to avoid negative outcomes for the mother-fetus binomial, such as spontaneous abortion, fetal and neonatal deaths and the development of sequelae that represent high severity to the individual's health (MACÊDO et al., 2020).

The state of Acre is located in the Amazon region, which is characterized by one of the three highest infant mortality rates. In 2009, prenatal care coverage in the state was less than 90%. Furthermore, it must be taken into consideration, that the Amazon region has a small number of hospital beds and basic health units, when compared to other regions of the country, and this reality ends up being an important risk factor for gestational and perinatal complications (ARRUDA et al., 2020). As a result, despite being a preventable disease, the limited amount of financial and structural resources, whether human or hospital, will be a facilitating factor for an outcome in which gestational syphilis triggers congenital syphilis (BESSA et al., 2019).

The diagnosis of gestational syphilis can be performed using treponemal laboratory tests (which have high specificity), to identify antibodies against Treponema Pallidum. Clinical-therapeutic control can be performed using non-treponemal tests, comparing disease diagnosis titers with post-treatment titers, showing efficacy by verifying the decrease in the numerical value of such titers (BESSA et al., 2019; FIGUEIREDO et al., 2020; GASPAR et al., 2021).

Gestational syphilis must be treated early to prevent fetal damage. To this end, the pathogen can be eliminated by intramuscular injection of Benzathine Penicillin G. The recommended treatment regimen for recent syphilis: primary, secondary and recent latent syphilis (with up to one year of evolution) is a single dose of 2.4 million international units (1.2 million in each buttock). However, although in most situations only one application of penicillin is sufficient to eliminate syphilis, the number of applications may vary depending on the clinical situation of the pregnant woman, with late syphilis being: late latent syphilis (with more than one year of evolution) or latent with unknown duration and tertiary syphilis,

with 2.4 million IU, once/week (1.2 million in each buttock) for 3 weeks (BESSA et al., 2019; FIGUEIREDO et al., 2020; SIQUEIRA, 2021). Control must be performed by non-treponemal testing monthly in pregnant women (BRAZIL, 2022).

Therefore, this study aims to epidemiologically analyze gestational syphilis in the state of Acre in the period from 2012 to 2021, with the intention of characterizing this pathology in its various nuances of notification.

METHOD

This study refers to a qualitative and quantitative research, produced through the use of a government database, which can use "methods that involve numbers, percentages and statistics and those that involve the interpretation of phenomena (mixed methods)" (MARCONI; LAKATOS, 2017; PEREIRA et al., 2018). The bibliographic research was carried out using scientific articles and official documents published between 2013 and 2022, using the following descriptors (taken from DeCS – Health Sciences Descriptors) correlated: Pregnancy, Syphilis, Congenital Syphilis, Latent Syphilis, Prenatal. The main objective was to epidemiologically analyze the reported cases of gestational syphilis in the state of Acre between 2012 and 2021, aiming to characterize this pathology in its various nuances of notification. Furthermore, we sought to describe the epidemiological criteria present in the notifications of these cases, with the aim of presenting and justifying the results based on previously published scientific studies.

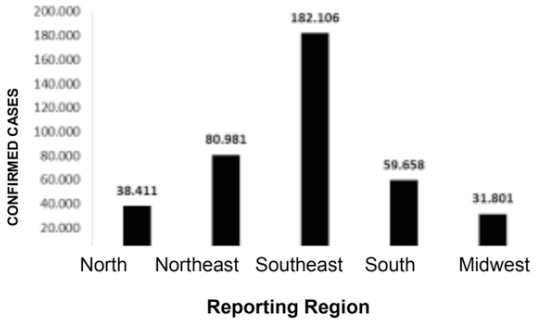
The research was conducted in the DATASUS database (http://datasus.saude.gov.br/). National data were collected according to the following steps: A) The link datasus.saude.gov.br was accessed, the arrow was slid with the mouse to the "Access to Information" tab, and then the "Health Information (TABNET)" tab was accessed, clicking on "Epidemiological and Morbidity" and then on "Notifiable Diseases and Injuries - 2007 onwards (SINAN)". On the page that opened, the option "Syphilis in Pregnant Women" was selected and then, in "Geographic Scope", the option "Acre". From this point on, the following steps were followed: 1) In the "Row" box, "Year of Diagnosis" was selected throughout the process; 2) In the "Content" box, "Confirmed cases" was selected throughout the process; 3) And in the "Column" box, the following items were selected: "Year of Diagnosis", "Health Region (CIR) of notification", "Municipality of residence", "Prenatal Municipality BR", "Trep Test", "Non-Trep Test", "Clinical classification" and "Age group". All data collected in the system cover the periods from 2012 to 2021. In the other available selection boxes, the standard options of the DATASUS system were maintained. Data were also collected on the number of cases of gestational syphilis in Brazil by region, from 2012 to 2021, and also data on the number of cases of gestational syphilis in the North region of Brazil by state, both in order to objectively compare the disparity between regions of Brazil and states in the North region, respectively.

The data was compiled using the Excel application, and the study was written using the Word application, both components of the Microsoft 365 Office package launched in 2011 and developed by Microsoft.

RESULTS

The graph 1, which aims to make a brief comparison between regions and show such data objectively, shows that the North region comprises 38,411 cases of the national sample (9.77% of the total), being the fourth region with the most confirmed cases of gestational syphilis. The other regions, in ascending order, are the Central-West (31,801 cases),

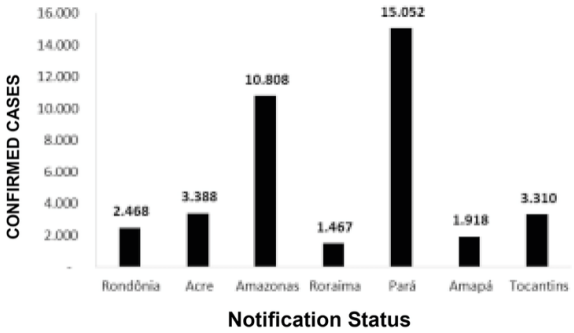
South (59,658 cases), Northeast (80,981 cases) and Southeast (182,106 cases). It is important to emphasize that the disparity in cases must consider the population estimate of each of the regions, which will be discussed later in this study.



Graph 1: Cases of gestational syphilis in Brazil by region, from 2012 to 2021.

Source: Ministry of Health/SVS – Notifiable Diseases Information System – Sinan Net, 2023.

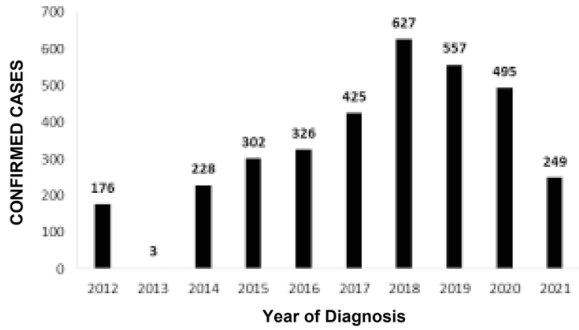
The graph 2 shows the cases of congenital syphilis reported in the North region according to the state. During this period, the state of Acre presented 3,388 cases (8.82% of the total cases in the region in question), placing it as the state with the 3rd highest number of cases in the North. In increasing order of number of cases, the following states appear: Roraima (1,467 cases), Amapá (1,918 cases), Rondônia (2,468 cases), Tocantins (3,310 cases), Amazonas (10,808 cases) and Pará (15,052 cases).



Graph 2. Cases of gestational syphilis in the North of Brazil, from 2012 to 2021.

Source: Ministry of Health/SVS – Notifiable Diseases Information System – Sinan Net, 2023.

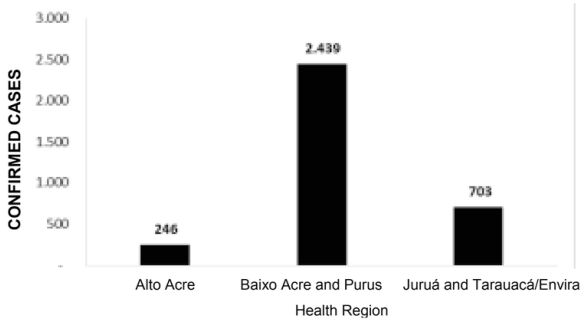
The Graph 3 shows the confirmed cases of gestational syphilis in the state of Acre, divided by the year of diagnosis. It can be seen that 2018 was the year with the highest number of cases recorded in the period (627 cases), representing 18.51% of the total. Evaluating the graph, it can be seen that there was a small number of cases recorded in SINAN (Information and Notifiable Diseases System) for the year 2013 in the state of Acre, which is probably explained by a failure to enter the records into the virtual platform or by the low level of reporting by state health entities, with no certainty about the cause in question, a fact that causes some harm to the epidemiological causal analysis explained later in this study.



Graph 3: Cases of gestational syphilis in the state of Acre, from 2012 to 2021.

Source: Ministry of Health/SVS – Notifiable Diseases Information System – Sinan Net, 2023.

The graph 4 shows the cases of gestational syphilis, from 2012 to 2021, in the state of Acre, according to the state health regions. It can be seen that the largest portion of cases was registered in the Baixo Acre and Purus region (2,439 cases, 71.99% of the total), followed by the Juruá and Tarauacá/Envira region (703 cases, 20.75% of the total) and, finally, the Alto Acre region (246 cases, 7.26% of the amount).



Graph 4: Cases of gestational syphilis in the state of Acre by health regions, from 2012 to 2021.
Source: Ministry of Health/SVS – Notifiable Diseases Information System – Sinan Net, 2023.

The table 1 shows the cases of gestational syphilis in Acre, from 2012 to 2021, according to the municipality of residence of the pregnant woman. It is noted that the vast majority of cases were registered in the state capital, Rio Branco, with a total of 1,880 cases, a number that represents more than half of the total cases in the state during the period studied (approximately 55.5%). It must be taken into consideration, however, that Rio Branco is the most populous municipality in the state and, therefore, a higher number of records is expected.

Municipality of Residence	Cases	Municipality of Residence	Cases
RIO BRANCO	1.880	PLACIDO DE CASTRO	49
TARAUACA	275	BUJARI	46
CRUZEIRO DO SUL	226	MANCIO LIMA	43
SENADOR GUIOMARD	118	SANTA ROSA DO PURUS	32
FEIJO	102	ASSIS BRASIL	31
PORTO ACRE	98	MANOEL URBANO	29
BRASILEIA	90	RODRIGUES ALVES	29
SENA MADUREIRA	90	ACRELANDIA	26
XAPURI	73	MARECHAL THAUMATURGO	20
CAPIXABA	57	JORDAO	14
EPITACIOLANDIA	52	PORTO WALTER	8
Total	**3.388**		

Table 1: Cases of gestational syphilis in the state of Acre by municipality of residence, from 2012 to 2021.
Source: Ministry of Health/SVS – Notifiable Diseases Information System – Sinan Net, 2023.

The table 2 shows the cases of gestational syphilis in Acre, from 2012 to 2021, according to the municipality in which the pregnant woman's prenatal care was carried out. The capital, Rio Branco, has the highest number of cases recorded during the period (1,926 cases, approximately 60% of the total prenatal care carried out in Acre).

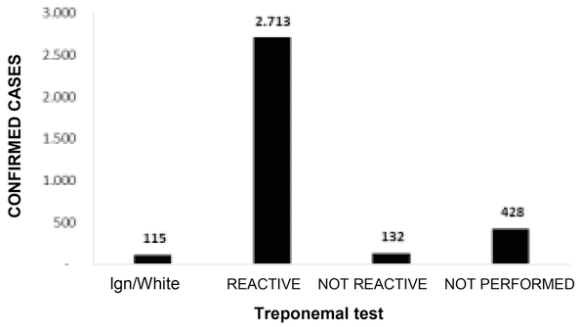
It is clear that the lowest number of cases occurred in the municipality of Pauini, with only 1 case reported. There is a considerable discrepancy between the total number of confirmed cases of congenital syphilis reported in the state of Acre and the total number of cases of gestational syphilis observed during prenatal care. This fact may be related to the fact that none of the pregnant women in the sample of this study received prenatal care, in addition to the possibility of receiving prenatal care outside the state of Acre.

Municipality of Prenatal	Cases	Municipality of Prenatal	Cases
RIO BRANCO	1.926	PLACIDO DE CASTRO	35
TARAUACA	261	MANCIO LIMA	34
CRUZEIRO DO SUL	229	SANTA ROSA DO PURUS	30
FEIJO	99	ASSIS BRASIL	24
SENADOR GUIOMARD	88	MANOEL URBANO	23
BRASILEIA	84	ACRELANDIA	20
PORTO ACRE	66	MARECHAL THAUMATURGO	14
XAPURI	61	RODRIGUES ALVES	11
SENA MADUREIRA	53	JORDAO	10
BUJARI	40	PORTO WALTER	6
EPITACIOLANDIA	39	BOCA DO ACRE	3
CAPIXABA	37	PAUINI	1
Total	**3.194**		

Table 2: Cases of gestational syphilis in the state of Acre by municipality of prenatal care, from 2012 to 2021.
Source: Ministry of Health/SVS – Notifiable Diseases Information System – Sinan Net, 2023.

The graph 5 shows the cases of gestational syphilis in Acre, from 2012 to 2021, according to treponemal tests. It is noted that in 2,713 (80.08%) of the cases the results were reactive,

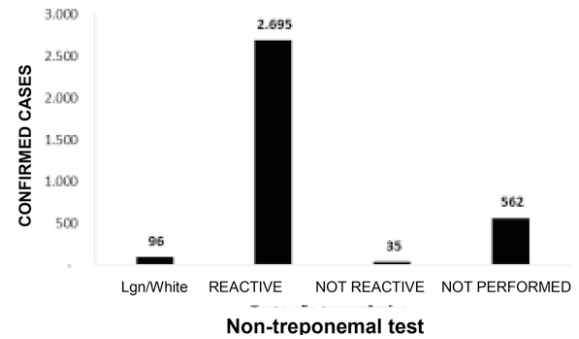
being non-reactive in 132 (3.9%) cases. The treponemal test was not performed in 428 (12.63%) pregnant women in the present sample. In 115 (3.39%) notification forms the information was not filled in (left blank).



Graph 5: Cases of gestational syphilis in the state of Acre by treponemal tests, from 2012 to 2021.

Source: Ministry of Health/SVS – Notifiable Diseases Information System – Sinan Net, 2023.

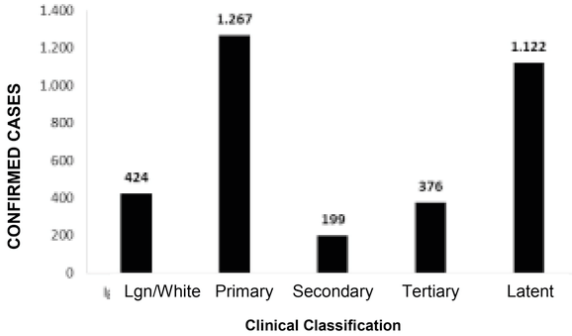
The graph 6 shows the cases of gestational syphilis in Acre, from 2012 to 2021, using non-treponemal tests. The predominant result was reactive, with 2,695 (79.55%) of the notifications, with 35 (1.03%) records with a non-reactive result. The non-treponemal test was not performed on 562 (16.59%) pregnant women in the sample. Information on whether the test was performed was left blank (not filled in) in 96 cases, representing 2.83% of the total.



Graph 6: Cases of gestational syphilis in the state of Acre by non-treponemal tests, from 2012 to 2021.

Source: Ministry of Health/SVS – Notifiable Diseases Information System – Sinan Net, 2023.

The graph 7 shows the cases of gestational syphilis in Acre, from 2012 to 2021, according to the clinical classification of the disease at the time of notification. It is noted that the majority of cases, 1,267 (37.4%), correspond to the classification of primary syphilis, the others being: secondary with 199 cases (5.87%), tertiary with 376 cases (11.1%) and latent syphilis in 1,122 cases (33.12%). Completion of such information during notifications was ignored in 424 (12.51%) pregnant women in the sample.



Graph 7: Cases of gestational syphilis in the state of Acre by clinical classification, from 2012 to 2021.

Source: Ministry of Health/SVS – Notifiable Diseases Information System – Sinan Net, 2023.

The graph 8 shows the cases of gestational syphilis in Acre, from 2012 to 2021, considering the age group of the pregnant woman. There was a predominance of pregnant women aged between 20 and 39 years, representing 63.43% (2,149 records) of the total. Furthermore, 1,109 were between 15 and 19 years old (32.73%), followed by 72 aged 10 to 14 years old (2.13%) and 58 pregnant women aged 40 to 59 years old (1.71%).

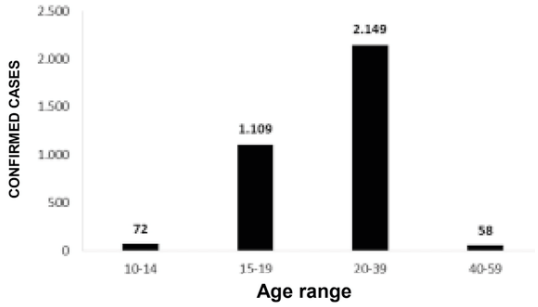


Table 8: Cases of gestational syphilis in the state of Acre by age group, from 2012 to 2021.

Source: Ministry of Health/SVS – Notifiable Diseases Information System – Sinan Net, 2023.

DISCUSSION

Gestational syphilis, together with congenital syphilis, has a high number of annual notifications in Brazil. However, it is known that its registration still does not match the reality of the country, since a large portion of cases are lost due to intense underreporting (MACÊDO et al., 2020). This reality can be explained by the reduced quality of prenatal care provided in the country, as well as the unpreparedness and lack of interest of health professionals in the diagnosis and in the notifications and feeding of the national database - factors that hinder the correct assessment of the epidemiological reality of the country and, therefore, hinder the creation of adequate strategies to mitigate this public health problem in Brazil (LAFETÁ et al., 2016).

During the period under study, the North region ranks fourth in the number of confirmed cases of gestational syphilis in the country. This parameter is compatible with its position in terms of population, since, according to the 2022 census by the Brazilian Institute of Geography and Statistics (IBGE), the North region is also the fourth most populous region (with approximately 17.5 million inhabitants), ahead only of the Central-West region (with approximately 16.5 million inhabitants).

Among the states in the Northern region, Acre ranks third with the highest number of cases registered in the period under study. Besides, according to the 2022 IBGE census, Acre is the 5th most populous state in the Northern region (with approximately 830,000 inhabitants), a factor that shows a certain numerical disparity, since its position in number of cases exceeds its position in population numbers among the states in the Northern region. Based on the results obtained, it is noted that gestational syphilis represents a serious problem for public health in the state of Acre (CAVALCANTE et al., 2021). This reality may be related to the limited coverage and low quality of prenatal care provided in the municipalities of Acre, as in the study by Arruda (2020, p. 6), in which, when evaluating the municipality of Assis, located southwest of the capital Rio Branco, of the 361 mothers who were included in the study and who received prenatal care, only 183 had a prenatal care for analysis, a factor that denotes deficiency and carelessness in recording the pregnant woman's information and consequently increasing the possibility of diagnostic and therapeutic damage, as well as in the continuity of prenatal care for pregnant women.

When numerically analyzing the confirmed cases of gestational syphilis in the state of Acre during the study period (2012 to 2021), the small number of cases for the year 2013 is noted (with only 3 records of gestational syphilis in the SINAN in the state of Acre for that year). Although there is no defined justification in the available literature for this finding, it is possible to infer that there was a significant failure in the registration in the notification forms and in the entry of data into the system and, also, in the scope of the prenatal care offered, given that, according to Guimarães (2020, p. 400), there were 47 records of cases of congenital syphilis in the

year 2013 according to data collected from SINAN itself, which implies at least 44 other cases of gestational syphilis that were not reported.

Among the reported cases of gestational syphilis in Acre during the study period, the largest number occurred in the health region called "Baixo Acre and Purus". The state health regions are part of the SUS (Unified Health System) strategy to improve the implementation and effectiveness of public health throughout the country. In Acre, three regions were subdivided to operationalize such implementation, each of which is managed by a CIR (Regional Intermanagerial Commission), namely: "Baixo Acre and Purus" (composed of the capital, Rio Branco, and ten other municipalities, comprising approximately 45% of the state population), "Alto Acre" (composed of 4 municipalities) and "Juruá, Taraucá/Envira (composed of 7 municipalities) (TESTON et al., 2019). The population size of the "Baixo Acre and Purus" region is the largest of the three health regions and is also the one with the highest number of notifications of gestational syphilis, demonstrating epidemiological coherence.

It is also noted that most notifications of gestational syphilis occur in pregnant women living in the capital Rio Branco. Extrapolating the explanatory majority of cases due to the larger population contingent (IBGE, 2022), the capital of the state of Acre is among the three capitals with the highest rates of syphilis in pregnant women per live birth for the year 2021 (with approximately 64 cases of gestational syphilis per 1,000 live births). The other capitals in question are Rio de Janeiro (with approximately 75 pregnant women with syphilis per 1,000 live births) and Porto Alegre (close to 69 cases of gestational syphilis per 1,000 live births); (BRAZIL, 2022).

When analyzing the number of gestational syphilis records in Acre according to the municipality where prenatal care was provided, it is noted that, once again, the capital Rio Branco has the highest number of records, a result compatible with its largest state population (IBGE, 2022). However, the 4 records of prenatal care for pregnant women in the sample in municipalities in the state of Amazonas are noteworthy, namely the cities of Boca do Acre (3 prenatal records) and Pauini (1 record).

In order to diagnose gestational syphilis, laboratory tests must be performed. Initially, and preferably, the first-line test for this purpose is the rapid treponemal test, since this test is capable of quickly detecting (in up to 30 minutes) antibodies in pregnant women that arise in response to infection by Treponema pallidum. Another advantage of performing the rapid treponemal test is that it does not require complex equipment to be performed; all it requires is a trained person, which further increases its usefulness in health services, given that it places less of a burden on public health funds (BESSA et al., 2019; GASPAR et al., 2021). Thus, it is justified that the percentage of diagnoses performed through treponemal tests in Acre during the study period is comprehensive (over 80%).

In addition to treponemal tests, non-treponemal tests can also be performed, which are capable of detecting IgM and IgG anticardiolipin antibodies and, due to the possibility of false-positive results (since other pathologies such as malaria, chronic hepatitis, lupus and others, such as leprosy, can generate reactive non-treponemal tests), are most commonly used to carry out clinical-laboratory investigation of active syphilitic disease, as well as to monitor therapeutic results by comparing titers at the time the diagnosis of gestational syphilis is made with titers after treatment has been instituted and performed. The non-treponemal test for this case is the VDRL (Venereal Disease Laboratory

Study) (BESSA et al., 2019; FIGUEIREDO et al., 2020; GASPAR et al., 2021).

Syphilis must be diagnosed as early as possible, especially during pregnancy and due to the high possibility of vertical transmission of the disease (mother-fetus via transplacental transmission). Syphilis can be diagnosed in four stages (primary, secondary, latent and tertiary). For each of these stages, diagnosis may be easier depending on the method (GASPAR et al., 2021).

In primary syphilis (the stage with the highest rate of diagnoses in the state of Acre during the study period), specific symptoms can be seen even before seroconversion, i.e., they are more easily seen through clinical findings, especially the hard chancre. In secondary syphilis, almost all reactive results are observed in serological tests for syphilitic infection, given the high titers already detectable in non-treponemal tests. During the latency period, so called due to the absence of symptoms, non-treponemal tests lose the value of their titers, however, treponemal tests continue to show reactive results for the infection. Care must be taken to ensure that the disease does not progress from latency to the tertiary stage, since there may be multiple organ and system involvement (GASPAR et al., 2021; SIQUEIRA, 2021). The vertical transmission rate of syphilis is higher in the clinical stage of primary syphilis (it can vary from 70 to 100% transmissibility), therefore, there is great importance in diagnosing the disease while it is still in its primary stage (MARQUES; MORAIS, 2020).

The predominance of cases of gestational syphilis among women aged 20 to 39 (63.43% of records) in the present sample is seen repeatedly in other studies, such as that by Macêdo et al (2017, p. 11), in which there was a predominance of cases in women with an average age of 23 years, and in the study by Ferla et al (2022, p. 3), with a predominance among the age group of 20 to 29 years, and in their study, it is highlighted that in more than a third of cases, pregnant women have only between 1 and 3 years of formal schooling, factors that highlight the importance of disseminating knowledge about the severity of gestational syphilis, in order to increase the demand for health services for adequate prenatal care and treatment and, consequently, reduce the incidence of this disease and its complications.

CONCLUSION

By observing the aspects analyzed, it is understood that the state of Acre ranks third with the highest number of registered cases in the North region during the period under study, with 2018 being the year with the highest number of registered cases. Considering the reported cases of gestational syphilis in Acre during the period under study, it is noted that the largest number occurs in the health region called "Baixo Acre and Purus", with the population in this region being the largest of the three health regions and the one with the highest number of notifications of gestational syphilis, denoting epidemiological coherence.

Rio Branco, the capital of Acre, concentrates the majority of cases, representing more than half of the total number of registered cases. In addition, it is among the three capitals with the highest rates of syphilis in pregnant women per live birth for the year 2021 and, therefore, it can be concluded that, although it is not one of the most populous capitals in the country, it is one of those with the most problems related to gestational syphilis.

Regarding clinical classification, most notifications occurred in the primary phase of the disease. Finally, it is important to highlight that there was a predominance of gestational syphilis among young women in the period studied, as well as the perception of the low rate of formal education among them.

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