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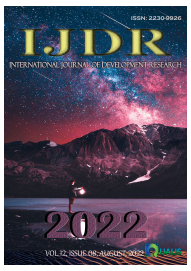

RESEARCH ARTICLE OPEN ACCESS

EPIDEMIOLOGICAL PROFILE AND PREVALENCE OF SYPHILIS IN PREGNANT WOMEN IN THE MUNICIPALITY OF MACAPÁ BETWEEN 2015 AND 2020

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ABSTRACT

Objective: to trace the epidemiological profile and prevalence of syphilis in pregnant women in Macapá between 2015 and 2020. **Method:** this is a descriptive, retrospective, cross-sectional study based on notifications of gestational syphilis from 2015 to 2020 in the city of Macapá, the capital of Amapá State. The data collection took place in an information system fed by the DCCI and in systems available in DATASUS. The descriptive analysis was performed through absolute and relative frequencies. The research complied with all applicable ethical aspects. **Results:** From 2015 to 2020, 908 cases were reported. The prevalence rate increased by 94.92% from 2015 to 2020. The detection rate increased from 8.38 in 2015 to 16.43 in 2020. The age group from 15 to 19 years corresponded to about 30% of the cases, and from 20 to 29 years to 49.67%. As for education, 27.20% of pregnant women did not complete elementary school. A total of 74.44% declared them selves brown. As for the gestational age, 47.91% were diagnosed in the third trimester. About 30% had primary syphilis, and 83.26% were treated with penicillin. **Conclusion:** there was a significant increase in notifications of gestational syphilis and detection rates in the municipality of Macapá.

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INTRODUCTION

Syphilis is a systemic and curable Sexually Transmitted Infection (STI) caused by the bacterium *Treponema pallidum*, which in pregnant women increases the risk of perinatal complications, such as premature birth, miscarriages, neonatal death, or transplacental transmission from the mother to the fetus. Transmission to the baby can occur during pregnancy, labor, delivery, or breastfeeding, if, at the time of breastfeeding, the lactating woman presents lesions in the breasts, among others (HILL et al., 2022). When contracted during pregnancy, syphilis is characterized as gestational syphilis and can be classified based on the time of infection (since the first contact with *Treponema pallidum*) as primary, secondary, tertiary, or latent.

Concerning its clinical manifestations, the disease can be classified into with or without skin lesions (TREVISAN et al., 2018). Syphilis infection has diagnostic and prevention measures that are easy to access and understand, as well as the low-cost treatment performed during prenatal care for the pregnant woman and her sexual partner within the scope of Primary Health Care (BRASIL, 2020; TREVISAN et al. al., 2018). In this sense, the first treponemal tests (commonly known as rapid tests) and non-treponemal tests (Venereal Disease Research Laboratory - VDRL) are recommended at the first prenatal visit, preferably in the 1st trimester of pregnancy and also at the beginning of the 3rd trimester, to make the diagnosis and treatment timely. However, despite the ease of diagnosis and cure of syphilis, its control and reduction of incidence rates prevail as a challenge

(BRASIL, 2020; RAMOS; BONI, 2018). Acc ording to the syphilis indicators available in the Notifiable Diseases Information System (SINAN in Portuguese), in 2018, Brazil had its highest number of cases of gestational syphilis, with 63,250 cases and a detection rate of 21.5 per thousand live births. Teenagers and young adults were the most affected public. In 2020, these numbers remained significantly high, with 61,441 cases and a rate of 21.6 per thousand live births. The increase in notifications can be explained, in part, by the expansion of prenatal diagnosis and the improvement of surveillance in the prevention of vertical transmission of STIs, but also by the low quality of prenatal care and treatment regimen for pregnant women and their sexual partners (BRASIL, 2022; RONCALLI et al., 2021). For Ramos and Boni (2018), high incident STIs are a public health problem. The importance of improvements in the organization of health services for testing patients for syphilis and providing adequate treatments is reinforced considering the impact caused by syphilis and its severe complications (RONCALLI et al., 2021). Furthermore, although the increase in cases of gestational syphilis is related to the improvement in diagnoses and surveillance, it is valid to consider other social and behavioral factors, which may be possible causes for this increase. Given the above, the present study aims to trace the epidemiological profile and prevalence of syphilis in pregnant women in Macapá between 2015 and 2020.

MATERIALS AND METHODS

A descriptive, retrospective, cross-sectional study was carried out, based on notifications of gestational syphilis from 2015 to 2020, in the municipality of Macapá, the capital of the Amapá State, in northern Brazil. The data collection took place through secondary data from the information system "Basic indicators and data on syphilis in Brazilian municipalities", an information system fed by the Department of Chronic Conditions and Sexually Transmitted Infections (DCCI in Portuguese) of the Brazilian Ministry of Health. Data from the Information Systems on Mortality (SIM in Portuguese) and the Information Systems on Live Births (Sinasc in Portuguese), available on DATASUS, were also obtained to calculate prevalence rates. The following variables of the pregnant women were analyzed: number of cases and detection rate per year, age group, education, race or skin color, gestational age, clinical classification, and treatment regimen. The data were tabulated in Microsoft Excel 2010. The descriptive analysis was performed through absolute and relative frequencies. The prevalence of gestational syphilis was estimated by dividing the total number of notifications from 2015 to 2020 by the total number of pregnancies in the same period and multiplying it by 100. The number of pregnancies was obtained by adding the number of live births and stillbirths in the period, excluding abortions. The research complied with all ethical aspects established in Resolution No. 466/12 of the Brazilian National Health Council. The study, as part of a larger research, was approved by the Research Ethics Committee of the Federal University of Amapá under opinion No. 4,344,781 and CAAE No. 37153220.9.0000.0003. As the study used secondary data available in the public domain, and as no woman was identified, there is no need for informed consent.

RESULTS

Between 2015 and 2020, 908 cases of syphilis were reported in pregnant women in Macapá, the capital of Amapá State. During the period studied, there was an increasing behavior in the number of cases, with the highest rate in 2019, corresponding to 22.79% of the total cases in the period (Table 1).

Table 1. Cases of pregnant women with syphilis by year of diagnosis. Macapá, Amapá, Brazil, 2015-2020.

Variable	2015	2016	2017	2018	2019	2020
Number of detected cases of syphilis in pregnant women by year of diagnosis						
Cases	99	110	131	174	207	187

Source: data extracted from MS/SVS/Department of Chronic Conditions and Sexually Transmitted Infections.

Figure 1 shows the prevalence and detection rates of cases of gestational syphilis in Macapá, Amapá, in the analyzed period. The prevalence rate went from 0.83 in 2015 to 1.61 in 2020, an increase of 94.92%. It is noteworthy that 2019 had the highest prevalence rate (1.73) and the highest detection rate (17.51). The detection rate rose from 8.38 in 2015 to 16.43 in 2020.

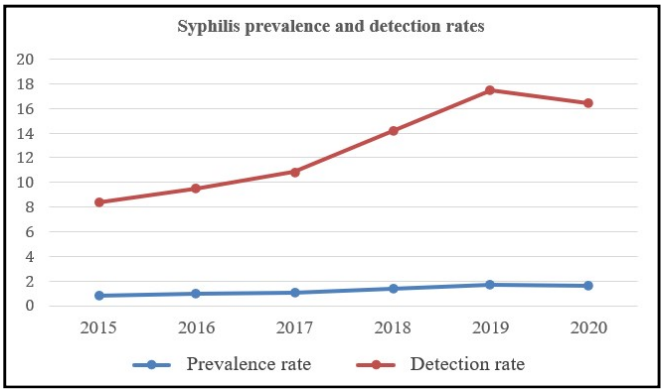

Figure 1. Distribution of syphilis prevalence and detection rates in pregnant women in Macapá, Amapá, Brazil, 2015-2020

Table 2 presents the cases of pregnant women with syphilis according to the sociodemographic characteristics (age, education, and color/race). As for the age group of pregnant women, in all the years analyzed, the most prevalent age group was from 20 to 29 years old, corresponding to 49.67% (n=451) of the total cases in the period. It is worth mentioning that the age group from 15 to 19 years old corresponded to about 30% (n=276) of the cases (syphilis in pregnant adolescents). As for education, 27.20% (n=247) of pregnant women did not complete elementary school. It is important to emphasize that about 25% (n=231) of the notifications had this data ignored. As for race/skin color, 74.44% (n=676) declared themselves brown. In table 3, regarding the gestational age at which they were diagnosed, 47.91% (n=435) were diagnosed in the 3rd trimester of pregnancy. As for the clinical classification, about 30% (n=266) were classified as having primary syphilis. However, it should be noted that 54.84% (n=498) of the notified forms had this information ignored. As for the treatment regimen, the system only presented data from 2017 to 2020 (n=699), of which 83.26% (n=582) of the pregnant women were treated with penicillin.

DISCUSSION

There was an increase of about 89% in the number of syphilis cases in pregnant women in the period from 2015 to 2020. The increase in notifications can be explained, in part, by the expansion of prenatal diagnosis and the improvement of surveillance in the prevention of vertical transmission of STIs, but also by the low quality of prenatal care and treatment regimen for pregnant women and their sexual partners (BRASIL, 2022; RONCALLI et al., 2021). The study by Costa et al. (2012) highlights among the weaknesses in prenatal care and prevention of syphilis the lack of adequate investigation of cases of syphilis in pregnant women, the absence of treatment for the pregnant woman's partner, and inadequate treatment of the pregnant woman herself. The study proposes strategies such as the training of the family health strategy teams on the subject, the promotion of health education by nurses and other health professionals focusing on the prevention of syphilis, towards early diagnosis and adequate notification, and the assessment of the knowledge of nurses who perform prenatal care on diagnosis and treatment. Corroborating the above, the study by Machado et al. (2018) points out that among the difficulties encountered in attracting the pregnant woman's partner to adhere to treatment, there are justifications related to the difficulty of following up and attending consultations due to working hours and lack of knowledge about the harm that can affect both the couple and the fetus. This reality is also true for pregnant women who lack knowledge about the disease and the importance of adequate treatment.

Table 2. Cases of syphilis in pregnant women according to sociodemographic characteristics per year of diagnosis. Macapá, Amapá, Brazil, 2015-2020

Variable	2015		2016		2017		2018		2019		2020	
	N	%	N	%	N	%	N	%	N	%	N	%
Age group												
10 to 14 years	1	1.0	4	3.6	1	0.8	3	1.7	-	-	3	1.6
15 to 19 years	24	24.2	27	24.5	44	33.6	53	30.5	66	31.9	62	33.2
20 to 29 years	55	55.6	47	42.7	66	50.4	91	52.3	101	48.8	91	48.7
30 to 39 years	13	13.1	28	25.5	17	13.0	26	14.9	31	15.0	29	15.5
40 years or older	6	6.1	4	3.6	3	2.3	1	0.6	9	4.3	2	1.1
Total	99	100	110	100	131	100	174	100	207	100	187	100
Education												
Illiterate	-	-	1	0.9	-	-	3	1.7	-	-	-	-
1st to incomplete 4th grade	6	6.1	6	5.5	7	5.3	5	2.9	8	3.9	3	1.6
Complete 4th grade	2	2.0	2	1.8	5	3.8	4	2.3	4	1.9	4	2.1
5th to incomplete 8th grade	21	21.2	25	22.7	43	32.8	31	17.8	41	19.8	26	13.9
Complete elementary education	5	5.1	3	2.7	8	6.1	8	4.6	27	13.0	14	7.5
Incomplete high school	17	17.2	23	20.9	19	14.5	34	19.5	32	15.5	33	17.6
Complete high school	14	14.1	15	13.6	26	19.8	31	17.8	35	16.9	33	17.6
Incomplete higher education	8	8.1	-	-	6	4.6	3	1.7	9	4.3	5	2.7
Complete higher education	2	2.0	2	1.8	5	3.8	6	3.4	4	1.9	3	1.6
Ignored	24	24.2	33	30.0	12	9.2	49	28.2	47	22.7	66	35.3
Total	99	100	110	100	131	100	174	100	207	100	187	100
Color/race												
White	9	9.1	6	5.5	15	11.5	25	14.4	17	8.2	16	8.6
Black	2	2.0	9	8.2	10	7.6	11	6.3	20	9.7	8	4.3
Yellow	-	-	-	-	1	0.8	2	1.1	3	1.4	1	0.5
Brown	77	77.8	80	72.7	101	77.1	124	71.3	140	67.6	154	82.4
Indigenous	-	-	1	0.9	-	-	-	-	-	-	-	-
Ignored	11	11.1	14	12.7	4	3.1	12	6.9	27	13.0	8	4.3
Total	99	100	110	100	131	100	174	100	207	100	187	100

Source: data extracted from MS/SVS/Department of Chronic Conditions and Sexually Transmitted Infections.

Table 3. Cases of syphilis in pregnant women by gestational age, clinical classification, and treatment regimen by year of diagnosis. Macapá, Amapá, Brazil, 2015-2020

Variable	2015		2016		2017		2018		2019		2020	
Gestational age	N	%	N	%	N	%	N	%	N	%	N	%
1st trimester	16	16.2	12	10.9	26	19.8	43	24.7	30	14.5	42	22.5
2nd trimester	22	22.2	32	29.1	25	19.1	40	23.0	43	20.8	44	23.5
3rd trimester	57	57.6	63	57.3	72	55.0	75	43.1	67	32.4	101	54.0
Unknown	4	4.0	3	2.7	8	6.1	16	9.2	67	32.4	-	-
Total	99	100	110	100	131	100	174	100	207	100	187	100
Clinical classification												
Primary syphilis	10	10.1	36	32.7	18	13.7	35	20.1	42	20.3	125	66.8
Secondary syphilis	4	4.0	8	7.3	6	4.6	6	3.4	5	2.4	11	5.9
Tertiary syphilis	4	4.0	8	7.3	7	5.3	6	3.4	7	3.4	7	3.7
Latent syphilis	16	16.2	5	4.5	9	6.9	6	3.4	11	5.3	18	9.6
Ignored	65	65.7	53	48.2	91	69.5	121	69.6	142	68.6	26	13.9
Total	99	100	110	100	131	100	174	100	207	100	187	100
Treatment schedule												
Penicillin	-	-	-	-	117	89.3	153	87.9	159	76.8	153	81.8
Other treatment schemes	-	-	-	-	-	-	1	0.6	6	2.9	2	1.1
None	-	-	-	-	6	4.6	15	8.6	11	5.3	23	12.3
Ignored	-	-	-	-	8	6.1	5	2.9	31	15.0	9	4.8
Total	-	-	-	-	131	100	174	100	207	100	187	100

Source: data extracted from MS/SVS/Department of Chronic Conditions and Sexually Transmitted Infections.

In addition, pregnant women in poverty have greater difficulties in accessing health services, financial needs, and difficulty moving from their place of residence to obtain healthcare, in addition to the lack of requests for serological tests by the health team. In that regard, it is observed that these challenges influence the significant increase in gestational syphilis rates. Madeira et al. (2013) relate the increase in the prevalence of syphilis in Brazil to regional and social inequalities in access to health services, combined with other failures. The authors state that women without prenatal care had the highest prevalence of syphilis during pregnancy. The results of the present study and those of the study by Ramos and Boni (2018) show an increase in the prevalence of gestational syphilis and an increasing trend in the country. The increase in the detection rate was also observed in the study by Silva et al. (2020). Regarding the detection rate of cases of gestational syphilis, the study by Cavalcante et al. (2021) points out that a significant increase was observed over the years, from 2015 to 2019.

However, a reduction is estimated for 2020, given that the COVID-19 pandemic hampered adequate prenatal care. Regarding the age group of pregnant women with syphilis, the predominance of cases in women aged 20 to 29 years was demonstrated, a result similar to those found by Andrade et al. (2019) and Couto et al. (2018) in which this age group represented, respectively, 53.5% and 53.9% of diagnosed cases. This finding may be related to the high engagement in sexual activities during this age range and the early onset of sexual intercourse (SOUSA, 2022; JESUS, 2019). The panorama evidenced by epidemiological research on gestational syphilis in this age group reveals the need to adopt new strategies for sex education aimed at this audience of young adults (COUTO et al., 2018). In addition, the number of occurrences of syphilis in pregnant adolescents aged 15 to 19 years stands out, with 24 cases reported in 2015 and 66 cases in 2019, representing a percentage increase of 63.64% in cases of syphilis. There was an annual increase in the number of cases registered in this group. The data show an unfavorable sexual and

reproductive health scenario, whether due to early pregnancy or the occurrence of gestational syphilis in this age group. Almeida (2022) cites the following preponderant factors for the occurrence of syphilis in pregnant adolescents: early onset of sexual intercourse, high vulnerability due to cognitive and emotional immaturity, and unplanned sexual initiation, a factor that corroborates unprotected sex. Added to this, adolescents suffer from a lack of information about early pregnancy and preventive actions against STIs, in addition to being a public that does not seek care in health services (PEDROSA et al., 2022). Regarding the educational level of pregnant women, most have a low education level. According to Miranda et al. (2020), this variable is related to deficits in the social and economic context, influencing the increase in syphilis cases and causing difficulty in adhering to the treatment. In addition, the authors mention that a higher level of schooling makes it possible to understand the factors that interfere with health and disease, in addition to dynamizing and facilitating adherence to health services and treatments. In the research by Marques et al. (2018), low education was listed as an aspect influencing the greater occurrence of syphilis in pregnant women. Given that knowledge about prevention actions and STIs is lacking or non-existent, these women and their fetuses are exposed to risks. Furthermore, in the study by Domingues et al. (2014) on gestational syphilis in Brazil, a 3.2 times higher prevalence was found in women with low education compared to those with a higher level of education. As for race/skin color, the large percentage (74.44%) of pregnant women self-declared brown is in agreement with the study by Fernandes et al. (2021), carried out in the Northeast of the country, in which the brown color (85.6%) predominated among pregnant women affected by gestational syphilis. Sousa et al. (2022) also found that young brown and black women with low education, low income, and poor housing structure were the most affected by syphilis during pregnancy. This fact can be explained by the social inequalities present in Brazil, emphasizing that this profile predominates in the North and Northeast regions, as well as by the country's regional specificities (CUNHA, 2015), allowing comparison based on the study by Jesus et al. (2019), carried out in the Southeast, in which white women (66.66%) were more affected by syphilis.

The predominance of syphilis in brown and black pregnant women reveals social vulnerability concerning race and confirms the disadvantage of brown and black women in obtaining adequate healthcare and prenatal care (FERNANDES et al., 2021). However, it is emphasized that gestational syphilis is not exclusive to vulnerable groups, corroborating the hypothesis that this population has difficult access to health services (SOUSA et al. 2022). Moroskoski et al. (2018) state that health professionals must consider Brazilians' racial diversity to meet the specificities of each region. Regarding the gestational age at diagnosis, the high percentage (47.91%) of pregnant women diagnosed in the 3rd trimester of pregnancy corroborates the research by Pereira et al. (2020), in which the prevalence of diagnosis in the 3rd trimester reached 62.95% of cases. Sousa et al. (2022) state that this fact is related to weaknesses and late initiation of prenatal care, highlighting the importance of early capture, active search for pregnant women and their partners, and quality prenatal care (PEREIRA et al. 2020). In addition, it emphasizes the need for greater effectiveness in welcoming and humanized care in primary health care networks. As for the clinical classification, primary syphilis is the most diagnosed. The data are in line with what was evidenced in the study by Pereira et al. (2021), in which the percentage of cases of primary syphilis in Brazil was 32% (n=73,360), the highest among the clinical forms excluding ignored data. Primary syphilis is characterized by hard chancre, exulceration or non-painful ulceration with raised edges. Primary syphilis is highly infectious and has a rich amount of treponemas. Currently, according to the Ministry of Health, primary syphilis is the most diagnosed form in Brazil, and its clinical diagnosis in pregnant women is very difficult due to the limited and short time of permanence of hard chancre and the absence of other symptoms. (SALOMÃO, 2017; CARDOSO et al., 2018). Concerning secondary syphilis, the clinical manifestations are usually lesions on the palmar and plantar surfaces, irregular alopecia, fever, malaise, anorexia, myalgias, and headache. These manifestations may occur from 4 to 10 weeks after the onset of a hard chancre (CUNNINGHAM et al., 2012). Concerning tertiary syphilis, it corresponded to the lowest number of notifications among the clinical forms of gestational syphilis diagnosed. This stage of syphilis can appear between 1 and 40 years after the onset of infection and presents signs and symptoms mainly cutaneous, in the bones, cardiovascular (aortic aneurysm), and neurological (dementia) lesions, which can lead to death, being the most severe form of the disease (SALOMÃO, 2017). Data were similar to those presented in Pereira et al.'s (2021) study, in which the percentages were 6% and 10%, respectively. According to Domingues et al. (2014), the constant percentage of secondary and tertiary syphilis cases is due to the advancement of treatment and diagnosis of STIs in recent years, with syphilis being one of the major screening diseases in primary care. Latent syphilis, also known as the asymptomatic phase, has as its main characteristic the disappearance of clinical manifestations after secondary syphilis, and its classification has two forms: recent and late, both from the time of infection, since the late form lasts more than a year after the infection, and the individual continues to transmit the disease (SALOMÃO, 2017). Latent syphilis had the third highest prevalence, behind only ignored cases and primary syphilis, respectively, with 2020 being the peak of cases of latent syphilis totaling 9.63% (n=18) of reported cases in the year. The data show the opposite of what was presented in the study by Moroskoski et al. (2018) carried out in the city of Curitiba-PR, where the percentage of latent syphilis was 68.7% (n=305). As for the treatment regimen, the data range from 2017 to 2020, and during this period, penicillin treatment was the most used therapy, reaching more than 80% of the total cases treated in the 4 years analyzed. Other treatment regimens were used in 1.3% (n=9) of the cases, while the number of cases where treatment was not performed reached 7.9% (n=55). The percentage data are similar to the study by Silva et al. (2020), in which penicillin treatment was prescribed and performed in 77.72% (n=192), other treatment regimens accounted for 5.67% (n=14), and those who did not undergo any treatment totaled 10.12% (n=25). According to Quirino, Oliveira, and Neto (2021), the treatment regimen with penicillin is the most adopted as its ability to cross the transplacental barrier allows for treating both the mother and the baby.

Regarding the data presented, an alarming fact is the high amount of ignored data in almost all variables studied. The following percentages of unknown information were found: education: 25%, color/race: 8.37%, gestational age: 10.79%, clinical classification: 54.84%, and treatment regimen: 7.58%. The above finding hinders the interpretation of data. As a result, the sociodemographic profile of pregnant women becomes imprecise, making it difficult to formulate public policies aimed at the correct target audience (ANDRADE*et al*., 2019). According to Andrade et al. (2019), this high percentage of ignored data is due to the lack of knowledge or attention on the part of professionals when filling out the notification and diagnosis forms. This alarming factor indicates a failure in the prenatal care of these pregnant women, which interferes with the correct diagnosis and the prescription of adequate and timely treatment. The problem is also caused by the lack of implementation of diagnosis and notification protocols by the Brazilian Ministry of Health, affecting how information about the disease is presented to pregnant women (BARBOSA et al., 2017).

CONCLUSION

Based on the results of the study, there was a significant increase in notifications of gestational syphilis and detection rates in the municipality of Macapá, capital of the Amapá State, in the northern region of Brazil, due both to the improvement in the supply of testing but mainly to the existence of weaknesses in prenatal care and the follow-up of women and sexual partners for the diagnosis and treatment of syphilis. The profile of these pregnant women shows a vulnerability pattern since a significant percentage of the women were young, had a low level of education, were mixed race, and were diagnosed with syphilis only in the last trimester of pregnancy. These results demonstrate the need for improvements in professional conduct, new strategies to approach sexual partners, and sexual

education actions to raise awareness of the population about the severity of gestational syphilis and its forms of prevention, which are easily accessible and free. Regarding the notifications of gestational syphilis, it was possible to observe the need for greater attention on the part of health professionals in filling out the notification forms since the percentage of ignored data in almost all the analyzed variables was alarming. The study makes it possible to reflect on weaknesses in professional conduct, with questions about the ignored data reflecting the lack of knowledge about syphilis or lack of attention. Given this, continuing education on STIs is important, as well as strategies to raise awareness about the consequences of registration failures on maternal and fetal health systems, as they prevent a real diagnosis of syphilis in the municipality.

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