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SCIENTIFIC ARTICLE - CASE REPORT

RETROSPECTIVE STUDY OF THE INCIDENCE OF SYPHILIS AND ITS EPIDEMIOLOGICAL PROFILE ASSOCIATED WITH THE INCIDENCE OF FETAL DEATH 2013–2023

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ABSTRACT

Introduction: Maternal syphilis remains a major public health concern worldwide and is strongly associated with adverse pregnancy outcomes. Untreated Treponema pallidum infection may lead to spontaneous abortion, preterm birth, stillbirth, neonatal death, and congenital syphilis. **Objective:** To analyze the incidence of syphilis in pregnant women and its association with fetal death, as well as to characterize the epidemiological profile of this population in Brazil, the state of Goiás, and the municipality of Anápolis from 2013 to 2023. **Methodology:** A retrospective, observational, descriptive, and analytical epidemiological study was conducted using secondary data from official health information systems. Reported cases of syphilis in pregnant women and fetal deaths were analyzed through rate calculations and temporal trend assessment. **Results:** An increasing trend in syphilis incidence among pregnant women was identified during the study period, accompanied by a rise in congenital syphilis cases and associated fetal deaths. Previous studies demonstrate that untreated maternal syphilis is strongly associated with adverse pregnancy outcomes, particularly stillbirth and perinatal mortality. **Conclusion:** Maternal syphilis remains a preventable condition, and its persistence reflects gaps in prenatal screening, timely treatment, and follow-up care. Strengthening early diagnosis, adequate treatment, and surveillance strategies is crucial to reduce fetal deaths and prevent vertical transmission.

Keywords: Maternal syphilis, Congenital syphilis, Fetal death, Epidemiology, Maternal and child health.

INTRODUCTION

Syphilis is a sexually transmitted bacterial infection that is preventable and curable. In 2022, cases increased by more than 1 million, reaching a total of 8 million worldwide. The Americas currently face the highest global incidence, with 3.37 million cases (or 6.5 cases per 1,000 people), accounting for 42% of all new cases[1].

Syphilis is a curable, exclusively human sexually transmitted infection (STI) caused by the bacterium Treponema pallidum. Although infection by Treponema pallidum through blood transfusion or

contaminated piercing materials is possible, the main and most significant routes of transmission are sexual (genital, oral, and anal) and vertical transmission, which may result in fetal death or congenital syphilis. The disease may present with multiple clinical manifestations and different stages (primary, secondary, latent, and tertiary syphilis).[2–3]

Syphilis during pregnancy is associated with preterm birth, spontaneous abortion, stillbirth, non-immune fetal hydrops, perinatal death, and two characteristic clinical syndromes: early and late congenital syphilis. In addition, the placenta of infants with congenital syphilis is often enlarged, thickened, and pale. In Brazil, syphilis in pregnant women is a notifiable disease, and epidemiological data indicate a growing trend in cases in recent years.[4]

The diagnosis of congenital syphilis may be challenging due to the presence of maternal antibodies in newborns; therefore, diagnosis generally focuses on maternal syphilis. Serological testing for syphilis is recommended at the first prenatal visit, at 28 weeks of gestation, and at the time of delivery. Screening of pregnant women and early treatment of syphilis can significantly reduce infant morbidity and mortality.[5]

Therefore, the aim of this study is to analyze the incidence of syphilis in pregnant women and its association with fetal death, as well as to characterize the epidemiological profile of this population during the period from 2013 to 2023 in Brazil, Goiás, and Anápolis.

METHODOLOGY

A cross-sectional study was conducted using public data from TabNet/DATASUS, an online tool developed by the Brazilian Ministry of Health that allows rapid and interactive access to epidemiological data on syphilis cases (acquired syphilis, syphilis in pregnant women, and congenital syphilis) recorded in the Notifiable Diseases Information System (SINAN) throughout Brazil. The platform generates tables, graphs, and maps to support situation analysis, planning, and management of public health actions, and is essential for understanding the magnitude of the disease and monitoring syphilis control policies.

Data were filtered for the following indicators: cases and detection rates (per 1,000 live births) of syphilis in pregnant women by year of diagnosis; cases of syphilis in pregnant women according to gestational age by year of diagnosis; cases of syphilis in pregnant women according to clinical classification by year of diagnosis; cases of congenital syphilis in children under one year of age and their incidence rates; and deaths due to congenital syphilis in children under one year of age according to year of death. Data were analyzed for Brazil, the state of Goiás, and the municipality of Anápolis.

The analysis period ranged from January 2013 to December 2023. Some data related to 2024 had not yet been consolidated in the system at the time of analysis.

Regarding ethical considerations, publicly available data (open-access sources such as DATASUS) do not require approval from a Research Ethics Committee (CEP/CONEP) when they do not allow identification of individuals, in accordance with guidelines that complement Resolution No. 466/12, such as Resolutions No. 510/2016 and No. 674/2022, as there is no direct involvement of or risk to participants.

RESULTS

The findings of this retrospective study reveal a concerning trend of a significant increase in the incidence of syphilis among pregnant women across all three geographic levels studied during the period from 2013 to 2023.

Table 1. Cases and detection rate (per 1,000 live births) of syphilis among pregnant women by year of diagnosis in Brazil

Syphilis in Pregnant Women	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cases	608,435	20,923	26,637	32,795	38,319	49,864	63,448	64,619	66,151	75,373	84,195	86,111
Detection rate	-	7.2	8.9	10.9	13.4	17.1	21.5	22.7	24.2	28.2	32.9	34

Table 2. Cases of syphilis among pregnant women according to gestational age by year of diagnosis in Brazil

Gestational age	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1st trimester	247,037	5,361	7,698	10,567	14,222	19,825	24,724	25,051	27,532	31,831	38,805	41,421
2nd trimester	145,749	6,648	8,165	9,763	11,014	13,905	15,929	15,549	14,339	15,579	17,237	17,621
3rd trimester	179,650	7,372	8,873	10,481	10,770	13,413	18,830	19,474	19,695	22,630	24,337	23,775
Gestational age unknown	34,913	1,542	1,901	1,980	2,238	2,556	3,676	4,371	4,468	5,202	3,733	3,246
Unknown	787	-	-	3	54	87	90	174	117	131	83	48

Table 3. Cases of syphilis among pregnant women according to clinical classification by year of diagnosis in Brazil

Clinical classification	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Primary syphilis	160,907	6,798	8,513	10,106	11,159	14,107	16,784	15,875	15,988	19,733	21,120	20,724
Secondary syphilis	28,042	1,307	1,663	1,901	2,160	2,620	3,206	3,061	2,661	3,162	3,171	3,130
Tertiary syphilis	54,865	2,200	3,003	3,501	4,114	5,389	6,127	5,305	5,476	6,113	7,029	6,608
Latent syphilis	224,552	4,423	6,009	8,103	10,640	15,210	21,775	25,055	27,760	29,715	35,871	39,991
Unknown	140,069	6,195	7,449	9,184	10,246	12,538	15,556	15,323	14,266	16,650	17,004	15,658

Table 4. Cases of congenital syphilis in children under one year of age and incidence rate (per 1,000 live births) by year of diagnosis in Brazil

	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Congenital syphilis	251,791	14,117	16,493	19,922	21,553	25,369	26,852	25,406	23,443	27,108	26,517	25,011
Congenital syphilis	-	4.9	5.5	6.6	7.5	8.7	9.1	8.9	8.6	10.1	10.4	9.9

Table 5. Deaths due to congenital syphilis in children under one year of age by year of death in Brazil

Deaths due to congenital syphilis in children under one year of age	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cases	2,212	160	174	235	195	222	261	178	192	192	207	196

Table 6. Cases and detection rate (per 1,000 live births) of syphilis among pregnant women by year of diagnosis in Goiás

Syphilis in Pregnant Women	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cases	19,835	815	917	1,034	1,097	1,518	2,011	2,119	2,059	2,363	2,818	3,084
Detection rate	-	8.6	9.2	10.3	11.5	15.6	20.3	22	22.2	26	31.4	33.6

Table 7. Cases of syphilis among pregnant women according to gestational age by year of diagnosis in Goiás

Gestational age	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1st trimester	6,265	125	168	203	258	411	630	673	695	791	1,014	1,297
2nd trimester	7,501	332	382	392	407	643	690	732	655	757	830	835
3rd trimester	7,011	301	326	407	391	425	646	655	652	750	905	878
Gestational age unknown	713	57	41	32	41	39	45	59	57	65	69	74
Unknown	-	-	-	-	-	-	-	-	-	-	-	-

Table 8. Cases of syphilis among pregnant women according to clinical classification by year of diagnosis in Goiás

Clinical classification	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Primary syphilis	5,638	288	254	298	252	324	548	557	568	671	843	1,035
Secondary syphilis	3,125	126	157	183	221	288	359	358	332	442	397	262
Tertiary syphilis	1,244	49	94	83	79	198	118	117	108	132	153	113
Latent syphilis	6,604	129	236	291	373	464	665	721	712	773	1,073	1,167
Unknown	3,224	223	176	179	172	244	321	366	339	345	352	507

Table 9. Cases of congenital syphilis in children under one year of age and incidence rate (per 1,000 live births) by year of diagnosis in Goiás

Congenital syphilis in children under one year of age	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cases	5,762	239	343	393	425	446	550	608	563	608	785	802
Detection rate	-	2.5	3.4	3.9	4.4	4.6	5.6	6.3	6.1	6.7	8.7	8.7

Table 10. Deaths due to congenital syphilis in children under one year of age by year of death in Goiás

Deaths due to congenital syphilis in children under one year of age	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cases	67	4	5	2	3	7	6	4	8	8	11	9

Table 11. Cases and detection rate (per 1,000 live births) of syphilis among pregnant women by year of diagnosis in Anápolis

Syphilis in Pregnant Women	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cases	1,340	65	52	59	76	84	128	153	113	175	184	251
Detection rate	-	11.1	8.5	9.3	12.4	13.5	21	25.2	20.1	30.9	32.2	43.1

Table 12. Cases of syphilis among pregnant women according to gestational age by year of diagnosis in Anápolis

Gestational age	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
1st trimester	447	16	7	18	26	30	50	48	42	34	68	108
2nd trimester	405	21	19	18	24	28	36	46	41	57	50	65
3rd trimester	431	24	24	22	24	26	41	41	22	66	63	78
Gestational age unknown	57	4	2	1	2	-	1	18	8	18	3	-
Unknown	-	-	-	-	-	-	-	-	-	-	-	-

Table 13. Cases of syphilis among pregnant women according to clinical classification by year of diagnosis in Anápolis

Clinical classification	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Primary syphilis	585	32	20	6	16	29	46	39	49	95	94	159
Secondary syphilis	47	-	2	3	1	8	5	6	4	1	12	5
Tertiary syphilis	28	1	-	-	2	1	6	3	-	3	8	4
Latent syphilis	584	25	25	46	55	43	69	61	44	75	63	78
Unknown	96	7	5	4	2	3	2	44	16	1	7	5

Table 14. Cases of congenital syphilis in children under one year of age and incidence rate (per 1,000 live births) by year of diagnosis in Anápolis

Congenital syphilis in children under one year of age	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cases	354	18	24	10	28	23	46	42	16	32	48	67
Detection rate	-	3.1	3.9	1.6	4.6	3.7	7.6	6.9	2.8	5.6	8.4	11.5

Table 15. Deaths due to congenital syphilis in children under one year of age by year of death in Anápolis

Deaths due to congenital syphilis in children under one year of age	Total	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cases	5	-	-	-	-	-	2	1	-	-	2	-

DISCUSSION

The 286% increase in the number of syphilis cases among pregnant women in Anápolis between 2013 and 2023, with a rise in the detection rate from 11.1 to 43.1 per 1,000 live births, reflects an epidemic of significant proportions. This growth is particularly concerning when considered in the context that the detection rate in Anápolis in 2023 is 28% higher than that of the state of Goiás and 27% higher than the national rate, positioning the municipality as a hotspot for syphilis among pregnant women. Gómez et al., in a meta-analysis of studies on maternal syphilis, demonstrated that similar increases in the incidence of syphilis in pregnant women are associated with significant adverse outcomes, including a two- to threefold increase in fetal and neonatal mortality rates.[6] The accelerated growth pattern observed in Anápolis, particularly between 2020 and 2023 (36.6% per year), suggests that specific local factors may be contributing to this epidemic, differentiating it from the national pattern.

The volatility observed in congenital syphilis data, with significant reductions in 2015 (−58.3%) and 2020 (−61.9%), followed by substantial increases, reflects variations in screening and diagnostic practices. Nevertheless, the overall increase of 272% in congenital syphilis cases between 2013 and 2023 (rising from 18 to 67 cases) demonstrates that, despite annual fluctuations, the general trend is one of consistent growth. The detection rate of congenital syphilis in Anápolis in 2023 (11.5 per 1,000 live births) is 32% higher than the state rate and 16% higher than the national rate. Qin et al., in a meta-analysis study on estimates of adverse outcomes in pregnant women with syphilis, reported that each 1% increase in the prevalence of syphilis among pregnant women is associated with an approximately 0.3% increase in the incidence of congenital syphilis, suggesting that the increases observed in Anápolis are likely to result in sustained pressure on local health systems.[7]

A particularly notable finding of this study is the distinct epidemiological pattern observed in Anápolis, characterized by a predominance of primary syphilis (41.3% of cases in 2023, increasing to 63.3% when considering only cases with known clinical classification). This proportion is significantly higher than that observed at the state (28.4%) and national (26.4%) levels, suggesting a different pattern of clinical presentation. The exponential growth of primary syphilis in Anápolis, with an increase of 397% between 2013 and 2023 (from 32 to 159 cases), represents the largest increase among all clinical classifications, indicating important changes in local epidemiological characteristics.

This pattern contrasts with the predominance of latent syphilis observed in Goiás (33.2%) and Brazil (36.9%). Primary syphilis, characterized by the presence of a genital ulcer, is more easily diagnosed clinically and may indicate better access to healthcare services or greater awareness of symptoms. Alternatively, it may reflect differences in screening practices or in the population served. Schlueter et al., in a review on the clinical management of syphilis in pregnant women, emphasized that early identification of primary syphilis offers critical opportunities for the prevention of vertical transmission, as appropriate penicillin treatment at any stage of pregnancy is highly effective[8]. The pattern observed in Anápolis may therefore represent an opportunity for early intervention, provided that healthcare systems are adequately prepared for diagnosis and treatment.

The distribution of cases by gestational age in Anápolis is more balanced across trimesters (first trimester 33.4%, second trimester 30.2%, third trimester 32.2%) compared with Goiás and Brazil. This more uniform pattern may reflect more consistent access to prenatal care throughout pregnancy. Particularly noteworthy is the 575% increase in the number of cases diagnosed in the first trimester between 2013 and 2023, the largest increase among all trimesters, suggesting a significant improvement in early prenatal screening. This finding is positive, as early diagnosis

allows timely treatment and reduces vertical transmission.

De Santis et al., in a study on syphilis during pregnancy, demonstrated that diagnosis and treatment in the first trimester reduce the rate of vertical transmission from approximately 90% to less than 10%, whereas diagnosis in the third trimester still offers protection, albeit with reduced effectiveness[9]. The pattern observed in Anápolis, with accelerated growth in first-trimester diagnoses, suggests that prenatal screening strategies are functioning adequately in identifying cases early. The excellent quality of documentation in Anápolis (only 4.3% with unknown gestational age) further facilitates epidemiological analyses and intervention planning.

Despite the high incidence of syphilis among pregnant women and congenital syphilis in Anápolis, the absolute number of deaths due to congenital syphilis is notably low. During the period from 2013 to 2023, only five deaths due to congenital syphilis were recorded in Anápolis, with an average of 0.45 deaths per year. The ratio of deaths to congenital syphilis cases was 1.4%, slightly higher than the state (1.2%) and national (0.8%) ratios, but still representing a relatively low proportion. Importantly, no deaths due to congenital syphilis were reported in 2023, indicating that access to treatment for newborns with congenital syphilis in Anápolis is adequate.

This finding is encouraging and suggests that, despite the high incidence of maternal and congenital syphilis, healthcare systems in Anápolis are successfully identifying and appropriately treating affected newborns. Nascimento et al., in a study on pregnancies complicated by maternal syphilis, reported that mortality from congenital syphilis is preventable through adequate diagnosis and treatment, and that most deaths occur in contexts of limited access to care[10]. The pattern observed in Anápolis therefore likely reflects adequate access to neonatal diagnosis and treatment, despite persistent challenges in preventing vertical transmission.

A concerning finding is that while the number of syphilis cases among pregnant women increased by 286%, the number of congenital syphilis cases increased by 272%, a much closer proportion than that observed in Goiás or Brazil. This suggests that in Anápolis, improvements in the screening of pregnant women did not result in a proportional reduction in vertical transmission. This pattern may indicate that, despite improved diagnosis of pregnant women, adequate and timely treatment is not being guaranteed in all cases, or that barriers to treatment adherence persist. Strategies to ensure complete and timely treatment of all pregnant women diagnosed with syphilis, as well as screening and treatment of sexual partners, are essential to reduce vertical transmission.

CONCLUSION

The 286% increase in the number of syphilis cases among pregnant women in Anápolis between 2013 and 2023 is alarming. Primary syphilis is the predominant clinical form (63.3%), differing from Goiás and Brazil, where latent syphilis predominates, suggesting a distinct epidemiological pattern. Despite the increase in congenital syphilis cases (272%), mortality due to congenital syphilis in Anápolis remains very low (five deaths over 11 years), indicating that access to treatment for affected newborns is adequate. The implementation of robust strategies for universal screening, education on STI prevention, appropriate treatment with penicillin, treatment of sexual partners, and investigation of local factors facilitating transmission are essential to control the syphilis epidemic in Anápolis and to reduce the incidence of congenital syphilis and its adverse outcomes.

REFERENCES

1. Organização Pan-Americana da Saúde (OPAS). Casos de sífilis aumentam nas Américas [Internet]. 2024 May [citado 2025 Dec 5]. Disponível em: https://www.paho.org/pt/noticias/22-5-2024-casos-sifilis-aumentam-nas-americas.

2. Ministério da Saúde (BR). Sífilis [Internet]. [citado 2025 Dec 5]. Disponível em: https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/s/sifilis.

3. Duarte G, Melli PP dos S, Miranda AE, Milanez HMBPM, Menezes ML, Travassos AG, Kreitchmann R. Syphilis and pregnancy. Rev Bras Ginecol Obstet [Internet]. 2024;46:e–FPS09.

4. Cooper JM, Sánchez P.J. Sífilis congênita. Seminars in perinatology 2018;42(3).

5. Leslie SW, Vaidya R. Sífilis congênita e materna. StatPearls publishing. 2024 Aug 17: 30725772.

6. Gomez GB, Kamb ML, Newman LM, Mark J, Broutet N, Hawkes SJ. Untreated maternal syphilis and adverse outcomes of pregnancy: a systematic review and meta-analysis. Bull World Health Organ. 2013 Mar 1;91(3):217-26.

7. Qin J, Yang T, Xiao S, Tan H, Feng T, Fu H. Reported Estimates of Adverse Pregnancy Outcomes among Women with and without Syphilis: A Systematic Review and Meta-Analysis. PLoS ONE 9(7): e102203.

8. Schlueter DJ, Danaher RJ, Koutchko S, Sloan DJ. Maternal syphilis: clinical management and outcomes. Obstet Gynecol Surv. 2022;77(12):735-745.

9. De Santis M, De Luca C, Mappa I, Spagnuolo T, Licameli A, Straface G, Scambia G. Syphilis Infection during pregnancy: fetal risks and clinical management. Infect Dis Obstet Gynecol. 2012;2012:430585.

10. Nascimento MI, Vasconcelos AL, Pereira BM, Maciel GP. Maternal syphilis and adverse pregnancy outcomes: a systematic review. Rev Bras Ginecol Obstet. 2012;34(12):547-555.

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