Gestational and congenital syphilis in the southeast region: epidemiological analysis

Sífilis gestacional e congênita na região sudeste: análise epidemiológica

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ABSTRACT

Introduction: Brazilian public health faces constant challenges to meet demographic and social changes, and despite current policies, rates of sexually transmitted infections, such as syphilis, especially in pregnant women and newborns, are still high. Primary Health Care is recognized as the best way to act on maternal and child health, with prenatal care being essential for the diagnosis and follow-up of pregnant women. **Objective:** To analyze the social and epidemiological profile of pregnant women and newborns with syphilis in the Southeast region of Brazil between 2019 and 2022. **Methods:** This is a descriptive and cross-sectional research, with data from Brazilian Epidemiological Indicators and the 2023 Epidemiological Bulletin of the Brazilian Ministry of Health. **Results:** According to the results, the Southeast region concentrates almost 50% of the cases of gestational and congenital syphilis in Brazil. Although many pregnant women receive prenatal care and are diagnosed in the first trimester, a significant proportion still receive incomplete treatment, which negatively affects the newborn. **Conclusion:** Syphilis continues to be a serious public health issue, especially in the Southeast, with alarming growth rates. Therefore, it is essential to implement public policies that improve the quality of prenatal care, ensuring continuous follow-up during pregnancy and in the postpartum period for effective diagnosis and treatment of syphilis.

Keywords: Syphilis. Congenital syphilis. Pregnancy. Women's health.

RESUMO

Introdução: A saúde pública brasileira enfrenta desafios constantes para atender às mudanças demográficas e sociais e, apesar das políticas atuais, as taxas de infecções sexualmente transmissíveis, como a sífilis, especialmente em gestantes e recém-nascidos, ainda são elevadas. A Atenção Primária à Saúde é reconhecida como a melhor forma de atuação em saúde materno-infantil, sendo o pré-natal essencial para o diagnóstico e acompanhamento de gestantes. **Objetivo:** Analisar o perfil socioeconômico de gestantes e recém-nascidos com sífilis na região Sudeste do Brasil entre 2019 e 2022. **Métodos:** Trata-se de uma pesquisa descritiva e transversal, com dados dos Indicadores Epidemiológicos Brasileiros e do Boletim Epidemiológico de 2023 do Ministério da Saúde. **Resultados:** De acordo com os resultados, a região Sudeste concentra quase 50% dos casos de sífilis gestacional e congênita no Brasil. Embora muitas gestantes recebam cuidados pré-natais e sejam diagnosticadas no primeiro trimestre, uma proporção significativa ainda recebe tratamento incompleto, o que afeta negativamente o recém-nascido. **Conclusão:** A sífilis continua sendo um grave problema de saúde pública, especialmente no Sudeste, com taxas de crescimento alarmantes. Portanto, é essencial implementar políticas públicas que melhorem a qualidade do pré-natal, garantindo acompanhamento contínuo durante a gravidez e no período pós-parto para diagnóstico e tratamento eficazes da sífilis.

Palavras-chave: Sífilis. Sífilis congenita. Gravidez. Saúde da mulher.

INTRODUCTION

Syphilis is a systemic infectious disease of great worldwide relevance, characterized by its chronicity, high incidence, and prevalence[(1)]. It is a sexually transmitted infection (STI) caused by the bacterium *Treponema pallidum,* an agent of the spirochetes group, responsible for several endemic forms of the disease[(2)].

Nowadays, despite its high dissemination, the methods for diagnosing and treating syphilis are widely known.

The disease can be classified in several ways. When acquired during pregnancy, it is called gestational syphilis; when the transmission occurs vertically, transplacentally or during childbirth, by contact with maternal genital lesions in the birth canal, it is called congenital syphilis. In addition, acquired syphilis can be classified as follows: recent (primary and secondary), latent (early, up to one year after infection; late, between one and two years after infection; and latent indeterminate, when chronology cannot be specified); and late syphilis.

According to data from the Brazilian Ministry of Health, in 2021, Brazil recorded more than 167 thousand new cases of acquired syphilis, 74 thousand in pregnant women. As of June 2022, 79.5 thousand cases of acquired syphilis were reported, of which 31 thousand were in pregnant women, in addition to 12 thousand records of congenital syphilis, exceeding 122 thousand new occurrences of the disease in the country. In 2023, the numbers continued to grow, with 242,826 cases of acquired syphilis, 86,111 in pregnant women and 25,002 of congenital syphilis. In addition, there were 196 deaths from congenital syphilis in the same year[(3)]. These numbers are alarming, considering that syphilis is a widely-preventable disease[(3)].

Among the plausible reasons for the global pattern of growth and stability of the disease's rates, changes in sexual practices and the increase in travel and migrations[(4)] are highlighted, in addition to the factors that hinder access to the health system, such as the

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scarcity of prenatal care and the failure of educational and awareness campaigns[5].

Prenatal care provided by the health network is essential to prevent cases of gestational and congenital syphilis. The proper screening routine every three months enables early diagnosis and immediate treatment, ensuring quality of life for both the mother and the baby. Thus, more frequent tests during pregnancy, support from a specialized team, adequate management of the pregnant woman and the newborn, and the availability of clear guidelines are imperative to understand and manage the socio-epidemiological profile[5].

In the present study, our aim was to warn about the continuous and growing increase in cases of gestational and congenital syphilis, in addition to evaluating the impact of effective interventions on maternal and child health. Considering the high morbidity and mortality associated with the disease, it is a serious health issue, which requires priority in terms of society's leadership spheres.

OBJECTIVE

To evaluate the incidence rates of gestational and congenital syphilis in the Southeast region of Brazil, from 2019 to 2022, in addition to analyzing the social and demographic profile of the affected pregnant women and discussing the relevance of adequate treatment during pregnancy and its direct relationship with the reduction of rates of congenital syphilis, emphasizing the importance of effective prevention and control strategies for coping with this disease.

METHODS

This is a cross-sectional, descriptive, and quantitative study, with analysis of statistical indicators of gestational and congenital syphilis in the Southeast region of Brazil between 2019 and 2022. The data were obtained from public sources of the Ministry of Health: Indicators and Baseline Data on Syphilis in Brazilian Municipalities[6] and the Epidemiological Bulletin of Syphilis from October 2023[7].

The reported cases of gestational and congenital syphilis in the states of the Southeast region (i.e., Rio de Janeiro, Espírito Santo, Minas Gerais, and São Paulo), from 2019 to 2022, were considered. Additional variables were analyzed, such as the gestational age of the parturients at the time of diagnosis, categorized by pregnancy trimester, and the clinical classification of syphilis, which are the primary, secondary, tertiary, or latent stages. Factors, such as adequacy of prenatal care follow-up and adherence to the recommended treatment, were also considered seeking to establish significant data comparisons.

Data were organized, presented, and elaborated using the Microsoft Excel® and Google Sheet® tools, employing statistical analyses to convert absolute values into percentages. This transformation aimed to improve the comparability of data, making them clearer and facilitating the interpretation of the results.

The study strictly followed the standards established in Article 1 of Resolution No. 510, of April 7, 2016, of the Ministry of Health. The research was conducted using public databases, ensuring the preservation of the anonymity of the participants and the mitigation of any additional risks, in full compliance with the ethical guidelines in force[8].

RESULTS

Rates of gestational and congenital syphilis in Brazil are on continuous rise, regardless of the effects of the COVID-19 pandemic. Of the 83,034 cases of gestational syphilis recorded in 2022 in the country, 46.1% corresponded to residents of the Southeast region, while 20.5% were from the Northeast, 14.6% from the South, 10.5% from the North, and 8.1% from the Midwest (**Figure 1**). According to these data, the disparity in the incidence of cases is evident, with the Southeast region taking a significant and impactful role in public health.

By carefully analyzing data on the Brazilian regions, we observed that the Southeast recorded the highest average of cases between 2019 and 2022, reaching 12.8%, contrasting with the average of 7.8% in the Northeast. In parallel, there was a considerable increase in the detection rate in the North, accounting for a 44.4% increase in the same period, compared to 43.3% in the Southeast (**Figure 2**). As per these data, not only regional disparities are emphasized, but also significant patterns of increase in different areas of the country in the study period.

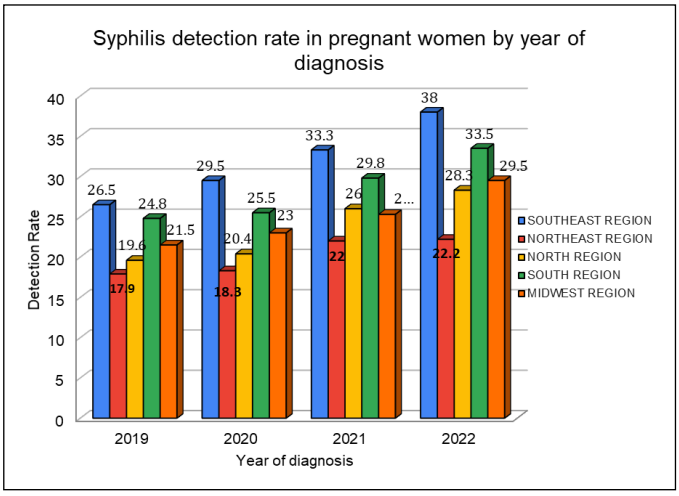

Figure 1. Detection rate of pregnant women with syphilis, per year of diagnosis.

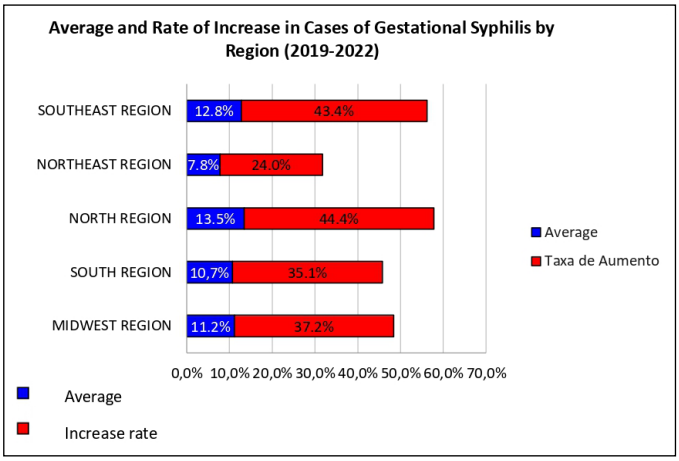

Figure 2. Mean and rate of increase in cases of gestational syphilis, per region (2019–2022).

Considering the diagnosis of syphilis in relation to gestational age, we verified that the first trimester was the period with the highest incidence of notifications in 2022, accounting for 20,085 cases, followed by the third trimester, with 9,121, and the second trimester, with 7,308. It is worth noting that, in the third trimester, there has been an annual increase in the records since 2019, with successive increases of 2,084, 1,592, and 3,495 absolute cases, respectively (**Figure 3**).

Regarding the clinical stages of the disease, latent syphilis stood out as the most prevalent, representing 51.7% of the cases on average. Conversely, secondary syphilis presented the lowest rates, remaining stable over the years, with percentages of 3.2% in 2019; 2.7% in 2020; 2.8% in 2021; and 3% in 2022 (**Figure 4**).

Regarding the profile of pregnant women at the time of diagnosis, we observed the highest rate in the age group from 20 to 29 years, representing 61.3% of the cases in 2022. It is noteworthy that, although the lowest rates have been verified in the age group from 10 to 14 years, we identified significant numbers of cases since 2019 — 281, 297, 277, and 275, respectively[6].

As for the level of education of pregnant women diagnosed with syphilis, we noticed that, on average, between 2019 and 2022, approximately 25.2% held a high school degree, followed by 16.3% with elementary school, and 5.3% with college degree. Thus, there was an incidence higher than 50% in the groups with lower level of education[7].

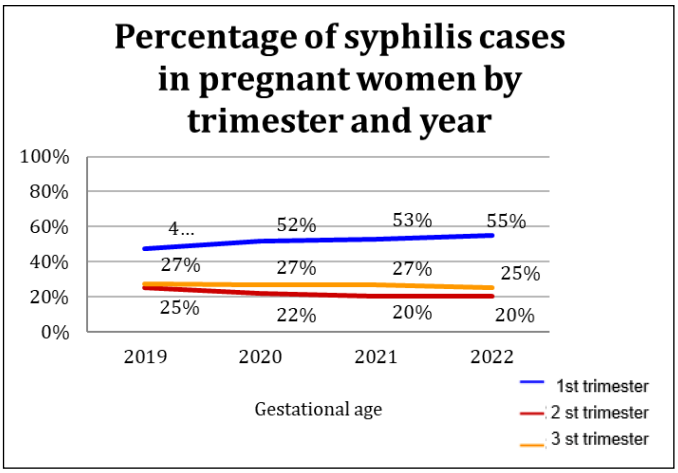

Figure 3. Cases of gestational syphilis, according to gestational age, per year of diagnosis.

Within the context of congenital syphilis in infants under one year of age, we verified a distribution pattern similar to that of gestational syphilis, with the Southeast region leading the number of notifications (11,581 in 2022), followed by the Northeast, accounting for 7,315 cases; the South, with 3,497; the North, with 2,418; and the Midwest, with 1,657 cases in the same year. In addition, throughout the study period, the Southeast region presented, on average, a crude mortality rate (total number of deaths per one thousand inhabitants) of 7.2 (**Figure 5**).

The main treatment for gestational syphilis, according to the guidelines of the Ministry of Health, involves the use of Benzathine penicillin, the only drug effective in preventing congenital syphilis, successfully overcoming the placenta barrier. In line with these guidelines, over 90% of cases, in 2022, were properly treated with this drug. However, we observed a low percentage of treatment of the sexual partners of pregnant women affected with syphilis, with only 35.6% of them receiving treatment in 2022. The state with the lowest treatment rate was Rio de Janeiro (25.2%)[7].

Considering the panorama of cases of congenital syphilis and its relationship with pregnant women's prenatal care, from 2019 to 2022, there was a slight reduction in the percentage. In 2019, 83.3% of cases of congenital syphilis were associated with mothers who received prenatal care, while in 2022 this number slightly decreased to 82.9%. Conversely, the rates of cases of congenital syphilis involving mothers who did not receive prenatal care remained stable, with a mean of about 12.3% (**Figure 6**). In this context, 60% of maternal syphilis diagnoses were made during prenatal care; only 29.5% of women were diagnosed at childbirth; and 5.5%, after giving birth[7].

Throughout the analyzed period, unfavorable gestational outcomes, including deaths, abortions, and stillbirths, accounted for 9.1% of all cases of congenital syphilis in Brazil. In 2022 alone, there were 1,811 abortions and stillbirths due to the disease, representing 6.8% of the total diagnoses and 78.6% of unfavorable outcomes[7].

Moreover, as for cases of congenital syphilis in 2022, only 1,030 records were linked to mothers who followed the recommended

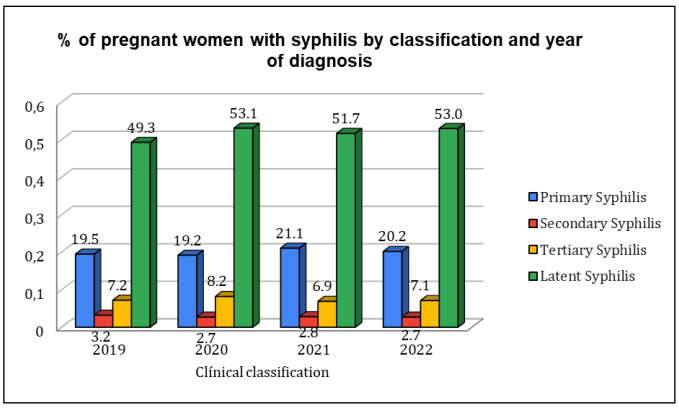

Figure 4. Percentage distribution of gestational syphilis, according to clinical classification, per year of diagnosis.

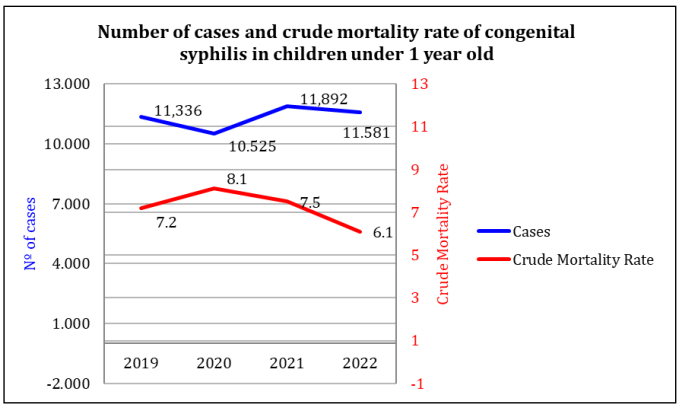

Figure 5. Cases and deaths from congenital syphilis in infants under one year of age, per study year.

treatment scheme. In the same period, about 5,196 cases were associated with mothers who received treatment considered inadequate, while 3,822 were related to mothers who did not undergo any treatment (**Figure 7**).

DISCUSSION

Currently, several researchers seek to understand the persistence of high rates of STIs, especially syphilis and acquired immunodeficiency syndrome (AIDS), which are responsible for over half of the cases in Brazil[9]. Nevertheless, despite knowledge of the main causative agents and widely-disseminated intervention strategies, gestational and congenital syphilis rates remain high, especially in the Southeast region of the country[7].

It is worth highlighting that the figures are even more alarming. Despite public policies that require mandatory notification to health agencies, many cases remain underreported or are incorrectly registered, hindering the accuracy in assessing the incidence of these diseases[10].

Compulsory notification of occurrences plays a fundamental role in monitoring and preventing vertical transmission of diseases[9]. According to the guidelines of the Ministry of Health, it is essential to notify them within seven days, reporting the cases to epidemiological surveillance and registering them in the Notifiable Diseases Information System (*Sistema de Informação de Agravos de Notificação*)[11].

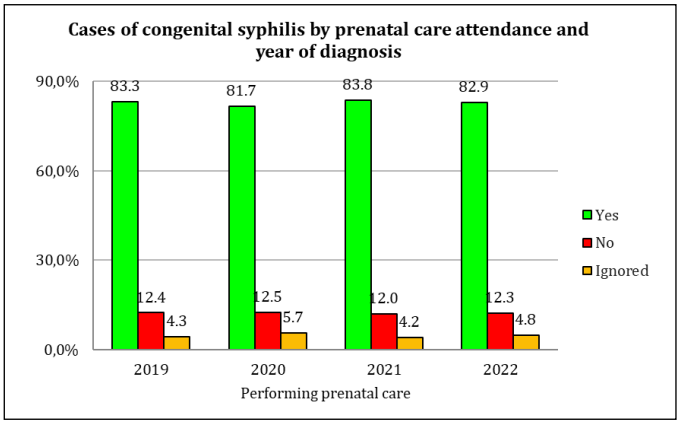

Figure 6. Cases of congenital syphilis, according to information on mother's prenatal care, per year of diagnosis.

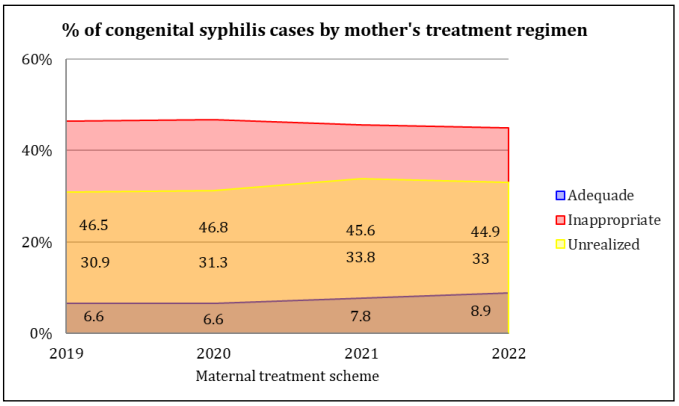

Figure 7. Cases of congenital syphilis, according to mother's treatment scheme, per year of diagnosis.

By investigating the high rates of gestational and congenital syphilis in the Southeast region of Brazil, we identified specific regional characteristics. In 2022, this region housed the largest portion of the Brazilian population, representing approximately 41% of all inhabitants of the country, and stood out as the second region with the highest rate of illiteracy (2.1 million people)[12].

Authors of a survey conducted by the Institute of Health Policy Studies (*Instituto de Estudos para Políticas de Saúde* – IEPS) showed that the state of Rio de Janeiro, in 2021, had the lowest coverage of primary health care (PHC) in Brazil, with only 57.2% of the population having access to Health Centers (*Unidades Básicas de Saúde* – UBSs)[13]. This reality evidences how social, economic, and demographic factors directly impact access to health services. The relationship between low coverage of PHC and higher incidence of congenital syphilis is notorious, as many pregnant women do not have access to prenatal care and information about the disease, its prevention, and treatment.

The current situation in Brazil reflects a history of delays in public health measures. For instance, syphilis only became a compulsory notification disease in 2005. In 2011, rapid screening tests were implemented at UBSs, followed by the distribution of crystalline penicillin by the Ministry of Health in 2017. Only in 2019 were pre-exposure and post-exposure prophylaxes adopted[14]. These milestones highlight a history of late responses in addressing these issues.

The expansion of the Family Health Strategy (FHS) should be prioritized as a crucial action to control the high rates of gestational and congenital syphilis, working together with UBSs[10]. This is due to the ability of the FHS in promoting, preventing, and rehabilitating the population, resulting in more comprehensive coverage of services and the improvement of the health environment.

The development of bonds between healthcare professionals and communities allows more effective control of the profile of this population, in addition to facilitating the follow-up of pregnant women. The active search for pregnant women enables additional prenatal care consultations, screening tests, distribution of contraceptive methods and those for the prevention of STDs, such as condoms, and complete treatment schemes for pregnant women and their sexual partners[14].

According to the Ministry of Health, the follow-up of pregnant women should be continuous, covering the preconception, pregnancy, and postpartum periods. Testing for syphilis is essential at several times: before pregnancy, at the beginning of pregnancy, in the third trimester of pregnancy, and at childbirth, as well as in case of abortion, risk exposure, or sexual violence. In addition, vaccination against hepatitis B, regular follow-up, and the use of condoms are essential, with the follow-up of the sexual partner and the newborn[15].

It is worth noting that congenital syphilis is a disease that can cause irreversible lesions. In the case of bone alterations resulting from syphilis, these remain observable in postmortem teeth, evidencing the systemic severity of the disease over time and its prolonged impact, affecting even lasting bone structures such as the teeth[16].

In this study, we addressed a topic of great relevance in Brazil nowadays, not only because of the serious consequences that congenital

syphilis can cause, but also because of the continuous increase in its incidence over the years. It is a disease that can be prevented by identifying and treating the cases of maternal syphilis.

Regarding the methodology, the analyzed data are based on a large population sample, which were collected from the notifications of gestational and congenital syphilis throughout the Southeast region of Brazil.

Although the notification of syphilis is compulsory, there is the possibility of underreporting, resulting in the underestimation of the presented data.

Strengths

In this article, we gathered relevant information from several sources (original articles, guidelines, previous reviews), allowing a perspective of epidemiology, as well as of diagnosis, treatment, and challenges in the control of syphilis, and facilitating the understanding of the current status of the disease, pointing out consensus, gaps, and trends.

Limitations

The study design imposes some limitations — the cross-sectional model employed does not allow us establishing causal relationships of the analyzed data, but rather creating and discussing hypotheses based on the observed results.

CONCLUSION

The incidence of gestational and congenital syphilis is a crucial indicator of the quality of maternal and child care. Currently, the Southeast region of Brazil continues to present the highest incidence rate of cases, evidencing a continuous and worrisome increase in this condition.

All in all, strict surveillance and follow-up during prenatal care are essential to prevent the vertical transmission of syphilis, minimizing possible adverse repercussions for newborns.

Approval by the Human Research Ethics Committee

Not required for articles with data obtained from public databases.

Participation of each author

FRD: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. DLMM: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing. FEFM: Data curation, Formal analysis, Methodology, Project administration, Resources, Software, Validation. RBPD: Conceptualization, Methodology, Project administration, Validation, Visualization, Writing – original draft. JBRC: Conceptualization, Methodology, Project administration, Validation, Visualization, Writing – original draft. FBBMM: Conceptualization, Methodology, Project administration, Validation, Visualization, Writing – original draft. MILA: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare no conflicts of interest.

Use of AI in manuscript construction

No AI tools were used in the preparation of this manuscript.

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