

Publication status: This preprint has not been published elsewhere.

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<https://doi.org/10.1590/SciELOPreprints.17205>

Submitted on: 2026-07-29

Posted on: 2026-07-30 (version 1)

(YYYY-MM-DD)

Distribution of Congenital Syphilis Hospitalizations According to Sex and Race/Color: An Ecological Study Using Secondary Data

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Abstract

Introduction: Congenital syphilis remains a major public health challenge and is considered a sensitive indicator of the quality of prenatal care. Objective: To analyze the distribution of hospitalizations due to congenital syphilis according to sex and race/color. Methods: An ecological, retrospective study was conducted using aggregated data from the Brazilian Hospital Information System (SIH/SUS) for 2023. Absolute and relative frequencies were calculated, and associations between categorical variables were assessed using chi-square or Fisher's exact test. Results: A total of 187 hospitalizations were identified. Females accounted for 54.0% of cases. Most hospitalizations occurred among individuals classified as brown (pardo) (73.8%). Conclusion: The findings highlight persistent social inequalities associated with congenital syphilis hospitalizations.

Keywords: Congenital syphilis, Hospitalization, Health information systems, Epidemiology, Social inequalities

Resumo

A sífilis congênita permanece como um importante problema de saúde pública e é considerada um indicador sensível da qualidade da assistência pré-natal. Objetivo: Analisar a distribuição das internações por sífilis congênita segundo sexo e raça/cor. Métodos: Estudo ecológico, retrospectivo, realizado com dados secundários agregados do Sistema de Informações Hospitalares do Sistema Único de Saúde (SIH/SUS), referentes ao ano de 2023. Foram calculadas frequências absolutas e relativas, e as associações entre as variáveis categóricas foram avaliadas pelos testes do qui-quadrado de independência ou exato de Fisher, adotando-se nível de significância de 5%. Resultados: Foram

identificadas 187 internações por sífilis congênita. O sexo feminino representou 54,0% dos casos. A maior proporção de internações ocorreu entre indivíduos classificados como pardos (73,8%), seguidos por brancos (16,6%), pretos (9,1%) e amarelos (0,5%). Não foi observada associação estatisticamente significativa entre sexo e raça/cor. Conclusão: Os achados evidenciam a persistência de desigualdades sociais relacionadas às internações por sífilis congênita e reforçam a necessidade de fortalecer a assistência pré-natal e as ações de vigilância em saúde, especialmente entre populações socialmente vulneráveis.

Palavras-chave: Sífilis congênita, Hospitalização, Sistemas de informação em saúde, Epidemiologia, Desigualdades sociais.

Introduction

Congenital syphilis remains a major global public health problem and is widely recognized as a sentinel event reflecting failures in prenatal care and health systems (1,2). Despite the availability of inexpensive diagnostic tests and effective treatment, preventable cases continue to occur, particularly in low- and middle-income countries (1). Vertical transmission of syphilis is associated with severe adverse outcomes, including stillbirth, neonatal death, and the need for hospitalization (3).

In Brazil, congenital syphilis persists as a relevant public health concern and reflects structural inequalities, barriers to healthcare access, and limitations in surveillance systems (2,4). Secondary health information systems, such as SIH/SUS, play a central role in monitoring severe outcomes and supporting epidemiological analyses (5). However, studies using aggregated data must adopt analytical strategies consistent with their ecological design.

Analyzing the distribution of congenital syphilis according to sociodemographic characteristics, including sex and race/color, is essential for identifying vulnerable populations and guiding targeted public health interventions. Therefore, this study aimed to analyze the distribution of hospitalizations due to congenital syphilis according to sex and race/color using secondary data from the Brazilian Hospital Information System.

Methods

An ecological, retrospective study was conducted using secondary aggregated data from the Hospital Information System of the Brazilian Unified Health System (SIH/SUS). Data on hospitalizations due to congenital syphilis recorded in 2023 were included. Variables analyzed were sex (male/female) and race/color (white, black, brown/pardo, yellow).

Descriptive analyses were performed using absolute frequencies (n) and proportions (%). Associations between categorical variables were assessed using the chi-square test of independence. Fisher's exact test was applied when expected cell counts were below five.

Statistical significance was set at $p < 0.05$. Statistical analyses were conducted using R software (R Foundation for Statistical Computing, Vienna, Austria), version 4.3.2. All analyses were based on aggregated data, precluding individual-level inference.

Results and Discussion

A total of 187 hospitalizations for congenital syphilis were recorded in 2023. Females accounted for 101 cases (54.0%) (**Table 1**), while males accounted for 86 cases (46.0%). Regarding race/color, most hospitalizations occurred among individuals classified as brown (pardo), totaling 138 cases (73.8%), followed by white individuals (31 cases; 16.6%), black individuals (17 cases; 9.1%), and yellow individuals (1 case; 0.5%). The association between sex and race/color distribution was statistically significant ($p = 0.035$).

Table 1. Distribution of congenital syphilis hospitalizations by sex and race/color (2023)

Variable	n	%
Male	86	46.0
Female	101	54.0
White	31	16.6
Black	17	9.1
Brown (Pardo)	138	73.8
Yellow	1	0.5
Total	187	100.0

The distribution of hospitalizations according to sex and race/color is presented in (**Table 2**).

Table 2. Distribution of congenital syphilis hospitalizations by sex and race/color

Race/Color	Male (n)	Female (n)	Total
White	14	17	31
Black	10	7	17

Brown (Pardo)	61	77	138
Yellow	1	0	1
Total	86	101	187

Chi-square test: $\chi^2 = 2.49$; $df = 3$; $p = 0.478$.
 Fisher's exact test (Brown vs. other race/color categories): $p = 0.505$.

This study demonstrated that hospitalizations for congenital syphilis were unevenly distributed across sociodemographic groups, with a marked concentration among individuals classified as brown (pardo). This pattern is consistent with previous Brazilian studies that associate congenital syphilis with social vulnerability and unequal access to prenatal care (2,4).

Race/color in Brazil is closely related to socioeconomic conditions, access to healthcare services, and quality of prenatal follow-up. The predominance of hospitalizations among brown populations may reflect barriers to timely diagnosis and treatment during pregnancy rather than biological differences (3,6).

Although females accounted for a slightly higher proportion of hospitalizations, this finding should be interpreted cautiously, as the ecological design does not allow individual-level risk estimation (7,8). The observed association between sex and race/color indicates heterogeneity in case distribution but does not imply causality.

The use of aggregated secondary data entails important limitations, including underreporting, misclassification of race/color, and the inability to control for confounding factors. Additionally, hospitalizations represent only the more severe spectrum of congenital syphilis, which may underestimate the overall burden of the disease. Despite these limitations, the study provides relevant epidemiological evidence to support public health planning and reinforces the need to strengthen prenatal care and surveillance strategies.

Conclusion

In summary, hospitalizations for congenital syphilis in 2023 were unevenly distributed according to race/color, with a marked concentration among individuals classified as brown (pardo). Although no statistically significant association between sex and race/color was identified, the findings highlight persistent social inequalities and reinforce the importance of strengthening prenatal care and surveillance systems. These

results underscore the relevance of using health information systems to support public health planning and monitoring.

Author Contributions

Gilney Guerra de Medeiros: Conceptualization, methodology, formal analysis, writing – original draft. George Harrison Ferreira de Carvalho: Supervision, methodology, writing – review & editing. Rosilane de Lima Brito Magalhães: Validation, critical review and final approval.

Conflict of Interest

The authors declare that there is no conflict of interest.

Data Availability

All data supporting the findings of this study are available in the article and were obtained from publicly accessible secondary databases (SIH/SUS).

Declaração de disponibilidade de dados da pesquisa

Todos os dados que dão suporte aos resultados deste estudo são provenientes de bases de dados públicas do Sistema de Informações Hospitalares do Sistema Único de Saúde (SIH/SUS), disponibilizadas pelo Departamento de Informática do Sistema Único de Saúde (DATASUS). Os dados utilizados encontram-se disponíveis publicamente e podem ser acessados pelos seguintes endereços eletrônicos:

<https://datasus.saude.gov.br/acesso-a-informacao/sistema-de-informacoes-hospitalares-sih/>

<https://datasus.saude.gov.br/informacoes-de-saude-tabnet/>

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Use of Artificial Intelligence

Grammarly was used to assist in the technical-grammatical revision of the manuscript and language refinement. The scientific content, interpretation, and final responsibility remain with the authors.

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