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EFFECT OF THE COVID-19 PANDEMIC ON CONGENITAL SYPHILIS NOTIFICATIONS IN BRAZIL

EFEITO DA PANDEMIA DE COVID-19 NAS NOTIFICAÇÕES DE SÍFILIS CONGÊNITA NO BRASIL

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Abstract. Syphilis is considered a Sexually Transmitted Infection and systemic infectious-contagious disease caused by the anaerobic bacterium *Treponema pallidum*, subspecies *pallidum*. With the advent of the COVID-19 pandemic, caused by the Severe *Acute Respiratory Syndrome Coronavirus* 2, an impact was observed on the performance of prenatal consultations and exams. In this context, the present study aimed to investigate the effect of the COVID-19 pandemic on congenital syphilis notifications in Brazil. This is a descriptive-exploratory study with data collection conducted between March and June 2023. The information regarding congenital syphilis notifications that occurred between 2018 and 2021 was extracted from the Notifiable Diseases Information System and made available on the platform of the Department of Informatics of the Sistema Único de Saúde. The data were grouped into two biennia: 2018-2019 (pre-pandemic period) and 2020-2021 (pandemic period). Descriptive statistics and percentage variation were used for data analysis. The results showed that between 2018 and 2021, 84,698 cases of congenital syphilis were reported in Brazil, with a higher number of cases in the pre-pandemic period (n= 51,174; 60.4%). There was a downward trend in notifications in Brazil during the health crisis, with a negative percentage variation of 34.4%, and with the Central-West (percentage variation = -5.2%) and North (percentage variation = - 4.6%) regions standing out. The sociodemographic and healthcare characteristics were similar between the pre-pandemic and pandemic periods. The study concludes that there was a decrease in reported cases of congenital syphilis, suggesting a potential underreporting in the different macro-regions of Brazil, possibly related to low adherence to prenatal care by pregnant women during the COVID-19 pandemic.

Keywords: COVID-19; Prenatal care; *Treponemal* infections; Syphilis, Congenital; Unified Health System.

Resumo. A sífilis é considerada uma Infecção Sexualmente Transmissível e infectocontagiosa sistêmica causada pela bactéria anaeróbica *Treponema pallidum*, subespécie *pallidum*. Com o advento da pandemia de COVID-19, ocasionada pelo *Severe Acute Respiratory Syndrome Coronavirus 2*, observou-se um impacto na realização de consultas e exames de pré-natal. Nesse sentido, o presente trabalho teve como objetivo investigar o efeito da pandemia de COVID-19 nas notificações de sífilis congênita no Brasil. Trata-se de um estudo descritivo-exploratório, com coleta de dados realizada entre março e junho de 2023, cujas informações referentes às notificações de sífilis congênita ocorridas entre 2018 e 2021 foram extraídas do Sistema de Informação de Agravos de Notificação e disponibilizadas na plataforma do Departamento de Informática do Sistema Único de Saúde. Os dados foram agrupados em dois biênios: 2018-2019 (período pré-pandêmico) e 2020-2021 (período pandêmico). Utilizou-se estatística descritiva e variação percentual para a análise dos dados. Os resultados mostraram que, no período entre 2018 e 2021, 84.698 casos de sífilis congênita foram notificados no Brasil, com predomínio de casos no período anterior à pandemia (n= 51.174; 60,4%). Houve uma tendência decrescente das notificações no Brasil durante a crise sanitária, com variação percentual negativa de 34,4, e com destaque para as regiões Centro-Oeste (variação percentual = - 5,2) e Norte (variação percentual = - 4,6). A caracterização sociodemográfica e assistencial foi similar entre os períodos pré-pandêmico e pandêmico. Concluiu-se que houve uma redução nos casos notificados de sífilis congênita, indicando uma possível subnotificação dos registros desse agravo nas distintas macrorregiões do Brasil, potencialmente relacionada à baixa adesão das gestantes ao pré-natal durante a pandemia de COVID-19.

Palavras-chave: COVID-19; Cuidado pré-natal; Infecções por *Treponema*; Sífilis congênita; Sistema Único de Saúde.

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INTRODUCTION

Syphilis is considered a Sexually Transmitted Infection (STI) and a systemic infectious-contagious disease caused by the anaerobic bacterium Treponema pallidum, subspecies pallidum. It is a major public health problem worldwide, and transmission occurs predominantly through sexual contact and the vertical route. When it is transmitted to the fetus via the placenta or through direct contact with the lesion at the time of delivery in untreated or inadequately treated pregnant women, it is called congenital syphilis.[1-2]

Congenital syphilis is a notifiable disease, and although vertical transmission has been reduced in different countries, it still remains the second leading cause of fetal death worldwide.[3] It is estimated that there are 300,000 fetal and neonatal deaths worldwide, as well as a high risk of premature death in more than 200,000 children with congenital syphilis.[4]

In Brazil, more than 74,000 cases of syphilis in pregnant women and 27,019 cases of congenital syphilis were recorded in 2021, representing incidence rates of 27.1 cases/1,000 live births and 9.9 cases/1,000 live births, respectively. In addition, 192 deaths were recorded, resulting in a mortality rate of 7.0 deaths/100,000 live births.[4] These figures highlight the seriousness of the problem globally and reinforce the need for strategies to improve this indicator.

The risk to the newborn (NB) is minimal when the pregnant woman receives adequate treatment during pregnancy. Approximately 60% to 90% of live newborns are asymptomatic, and clinical manifestations usually develop between three and eight weeks of age. Among the manifestations of early congenital syphilis are miscarriage, premature birth, fetal malformations, deafness, blindness, bone changes, mental disability, and death at birth. In these cases, it is extremely important that the newborn undergoes the correct course of care, including a full investigation with lumbar puncture for analysis of the cerebrospinal fluid and X-rays of the long bones.[2]

The World Health Organization (WHO) and member states are making efforts to implement actions aimed at preventing congenital syphilis, such as improving access to and the quality of maternal and child health services; identifying and treating all infected pregnant women and their partners; and establishing an adequate flow for surveillance, monitoring and evaluation of the health system.[5]

Thus, the diagnosis of gestational syphilis in primary care is carried out through screening and application of the Venereal Disease Research Laboratory Test (VDRL) and the rapid test (treponemal) during prenatal care, in the first and third trimesters of pregnancy, as well as at delivery or in the event of miscarriage/miscarriage, regardless of previous tests. Treatment consists of administering benzathine benzylpenicillin. When pregnant women present a reactive result, the treatment and cure should be monitored using the VDRL.[6]

However, in March 2020, the COVID-19 pandemic was declared, caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), due to its rapid infectivity, lethality, and high mortality.[7] At the time, health services were restructured to care for these patients, but structural limitations and excessive demand from the population for services collapsed the health system, contributing to a scenario of lack of assistance in preventive health actions, including those aimed at the maternal and child area.[8]

In Brazil, prenatal consultations and examinations fell by 14% in 2020.9 Considering the steady increase in recent years in the number of cases of syphilis in pregnant women and congenital syphilis in the country,[4] and the potential impact of the COVID-19 pandemic on early detection and case notification, we asked ourselves: has there been a reduction in congenital syphilis notifications in the context of the COVID-19 pandemic?

The aim of this study was to investigate the effect of the COVID-19 pandemic on congenital syphilis notifications in Brazil.

MATERIAL AND METHOD

This is a descriptive-exploratory study with a quantitative approach, conducted between March and June 2023, with data recorded in the Notifiable Diseases Information System and made available on the platform of the Department of Informatics of the Unified Health System (DATASUS).[10]

Inclusion criteria were all notifications of congenital syphilis recorded in Brazil between 2018 and 2021. No exclusion criteria were established. The extracted data was exported to a Microsoft Office Excel spreadsheet® 2021, organized according to the following sociodemographic and care variables: Brazilian macro-region, age group of the child, skin color/race, sex, education level and age group of the mother, prenatal care, presence of maternal syphilis, treatment of the partner, final classification and evolution of the case.

The recorded cases were grouped into two biennia (2018-2019 and 2020-2021), corresponding to the pre-pandemic and pandemic periods of COVID-19, respectively. Descriptive statistics, presented in relative (%) and absolute (n) frequencies, were used to analyze the categorical variables. In order to examine the differences in cases reported by Brazilian macro-region between the biennia, the Percentage Variation (PV) was calculated using the following formula[11]:

$$VP = \frac{\text{\% of notified cases of congenital syphilis from 2020 to 2021 - \% of cases from 2018 to 2019}}{\text{\% of notified cases of congenital syphilis from 2018 to 2019}} x100$$

The data used in this study is in the public domain, which means that it does not need to be approved by a Research Ethics Committee. The ethical precepts established in Resolution 466/12 of the National Health Council were respected.

RESULTS AND DISCUSSION

Between 2018 and 2021, 84,698 cases of congenital syphilis were notified in Brazil. There was a prevalence of notifications in the pre-pandemic period (n= 51,174; 60.4%). There was a downward trend in notifications in Brazil, with a negative percentage variation of 34.4, especially in the Central-West and North regions. Demographic characteristics were similar before and during the health crisis, with a preponderance of cases reported in the Southeast (Table 1).

TABLE 1 - Distribution of demographic characteristics of notified cases of congenital syphilis in Brazil before and during the COVID-19 pandemic. Brazil, 2023

Variable	Period				Total	
	Pre-pandemic		Pandemic			
	n	%	n		n	%
Sex						
Female	24.096	47,1	15.808	47,2	39.904	47,1
Male	24.057	47,0	15.780	47,1	39.837	47,0
Ignored/White	3.002	5,9	1.919	5,7	4.921	5,8
Not informed	19	0,1	17	0,1	36	0,1
Age group						
Up to 6 days	48.551	94,9	31.735	94,7	80.286	94,8
7 - 27 days	904	1,8	599	1,8	1.503	1,8
28 days to <1 year	622	1,2	430	1,3	1.052	1,2
1 year (12 to 23 months)	967	1,9	710	2,1	1.677	2,0
2 to 4 years	67	0,1	29	0,1	96	0,1
5 to 12 years	63	0,1	21	0,1	84	0,1
Race/color						
Brown	26.874	52,5	17.533	52,3	44.407	52,4
White	12.439	24,3	7.831	23,4	20.270	23,9
Black	2.170	4,2	1.510	4,5	3.680	4,3
Indigenous	157	0,3	75	0,2	412	0,4
Yellow	113	0,2	67	0,2	180	0,2
Ignored/White	9.421	18,4	6.508	19,4	15.929	18,8
Reporting region						
Southeast (PV= 0.91)	22.462	43,9	14.874	44,3	37.336	44,1
Northeast (PV= 1.1)	14.432	28,2	9.544	28,5	23.976	28,3
South (PV= 0)	6.840	13,4	4.480	13,4	11.320	13,4
North (PV= - 4.6)	4.474	8,7	2.796	8,3	7.270	8,6
Central-West (PV= - 5.2)	2.966	5,8	1.830	5,5	4.796	5,7
Total	**51.174**	**60,4**	**33.524**	**39,6**	**84.698**	**100**

Source: SINAN/DATASUS, 2023.
PV= percentage change

Table 2 shows that the final classification of recent congenital syphilis was predominant in both periods analyzed.

TABLE 2 - Distribution of the characteristics of notified cases of congenital syphilis in Brazil before and during the COVID-19 pandemic, according to the classification and evolution of the case. Brazil, 2023.

Variable	Period				Total	
	Pre-pandemic		Pandemic			
	n	%	n	%	n	%
Final ranking						
Recent congenital syphilis	47.848	93,5	30.772	91,8	78.620	92,8
Stillbirth/abortion due to syphilis	1.812	3,5	1.126	3,4	2.938	3,5
Syphilis ruled out	1.417	2,8	921	2,7	2.338	2,8
Late congenital syphilis	97	0,2	29	0,1	126	0,1
Ignored/White	-	-	676	2,0	676	0,8
Evolution						
Live	45.320	88,6	29.491	88,0	74.811	88,3
Death from the notified condition	677	1,3	371	1,1	1.048	1,2
Death from another cause	335	0,7	222	0,7	557	0,7
Ignored/White	1.614	3,2	1.360	4,1	2.974	3,5
Not informed	3.228	6,3	2.080	6,2	5.308	6,3
Total	**51.174**	**60,4**	**33.524**	**39,6**	**84.698**	**100**

Source: SINAN/DATASUS, 2023.

The data show that cases of congenital syphilis were mostly reported in the Southeast and Northeast regions, with a reduction in records between the periods analyzed, mainly in the Central-West and North regions, potentially due to the underreporting of cases during the COVID-19 pandemic. It is recognized that the underreporting of cases is a chronic problem in the country, aggravated in the context of the pandemic, when attention was focused primarily on respiratory cases, resulting in a drop in maternal and child healthcare indices.[2,12]

Historically, pregnant women in the North, Northeast, and Central-West regions have shown lower adherence to prenatal care appointments.[13] The reorganization of the Unified Health System services during the pandemic, due to the high demand for acute and severe cases of COVID-19, especially in the North and Northeast states,[14] was an obstacle to users' access to health facilities for treatment of other conditions. This context partly explains the lower number of syphilis notifications recorded during the pandemic.

The literature indicates that the lack of adequate maternal treatment is the main factor contributing to the underreporting of congenital syphilis cases. Reducing the barriers to women's access to prenatal care is a growing, timely, and necessary demand to promote changes in the epidemiological profile.[15]

In this sense, it is clear that, with the health system overloaded with respiratory cases, coupled with the isolation and/or social distancing recommended by government agencies, there has been a reduction in the population's search for health units, as well as a reduction in the provision of preventive actions that have an impact on the notification of congenital syphilis, such as, for example, early screening and prenatal consultations by a multidisciplinary team in primary care, as well as a reduction in the provision of rapid tests for the early diagnosis and treatment of new cases.[8-9]

Regarding the profile of reported cases, there was no discrepancy between the sexes. The predominant age group was six days or less, and white race/skin color predominated in the records. Another study conducted in Brazil, with data on the notification of congenital syphilis cases between 2009 and 2019, pointed to a predominance of diagnoses in children under 7 days old (96.3%) and with a final diagnosis of recent congenital syphilis (92.7%) among the 180,818 cases analyzed,16 corroborating the findings of this study.

Table 3 shows the maternal and care characteristics of the notified cases of congenital syphilis.

TABLE 3 - Distribution of notified cases of congenital syphilis in Brazil before and during the COVID-19 pandemic, according to maternal and care characteristics. Brazil, 2023.

Variable	Period				Total	
	Pre-pandemic		Pandemic			
	n	%	n	%	n	%
Age group (in years)						
9-14	422	0.8	242	0.7	664	0.8
15-19	11,699	22.9	6,980	20.8	18,679	22.1
20-24	17,371	33.9	11,753	35.0	29,124	34.4
25-29	10,422	20.4	7,284	21.7	17,706	20.9
30-34	5,937	11.6	3,738	11.1	9,675	11.4
35-39	3,144	6.1	1,972	5.9	5,116	6.0
40-44	857	1.7	646	1.9	1,503	1.8
45-49	66	0.1	34	0.1	100	0.1
50-54	4	0.1	2	0.1	6	0.1
≥ 65	1	0.1	1	0.1	2	0.1
Ignored/White	1,251	2.4	871	2.6	2,123	2.5
Mother's schooling						
Illiterate	270	0,5	181	0,5	451	0,5
1st to 4th grade of elementary school incomplete	2.037	4,0	1.048	3,1	3.085	3,6
Completed 4th grade of elementary school	1.450	2,8	885	2,6	2.335	2,8
5th to 8th grade incomplete	10.936	21,4	6.372	19,0	17.308	20,4
Complete primary education	5.413	10,6	3.517	10,5	8.930	10,5
High school incomplete	6.695	13,1	4.348	13,0	11.043	13,0
Completed high school	9.041	17,7	6.276	18,7	15.317	18,1
Higher education incomplete	595	1,2	376	1,1	971	1,1
Higher education completed	483	0,9	324	1,0	807	1,0
Not applicable	233	0,5	156	0,5	389	0,5
Ignored/White	14.021	27,4	10.041	30,0	24.062	28,4

Performed prenatal care						
Yes	42.121	82,3	27.285	81,4	69.406	81,9
No	6.535	12,8	4.043	12,1	10.578	12,5
Ignored/White	2.518	4,9	2.196	6,5	4.714	5,6
Maternal syphilis						
During prenatal care	29.672	58,0	18.665	55,7	48.337	57,1
At the time of delivery/curettage	16.199	31,7	11.008	32,8	27.207	32,1
After childbirth	2.741	5,3	1.940	5,8	4.681	5,5
Ignored/White	2.193	4,3	1.650	4,9	3.843	4,5
Not done	369	0,7	261	0,8	630	0,7
Partner treatment						
No	26.826	52,4	17.226	51,4	44.052	52,0
Yes	11.442	22,4	5.713	17,0	17.155	20,3
Ignored/White	12.906	25,2	10.585	31,6	23.491	27,7
Total	**51.174**	**60,4**	**33.524**	**39,6**	**84.698**	**100**

Source: SINAN/DATASUS, 2023.

Regarding maternal characteristics, there was a predominance of cases in young women with low schooling, similar to that found in a study carried out in the Northeast of Brazil between 2019 and 2021, which pointed to a prevalence of gestational syphilis in women with incomplete primary education (n= 180; 38.8%).[17] In an investigation carried out in a public-private hospital in southern Brazil, the average age of pregnant women diagnosed with syphilis was 24.2 years,[18] while in a study in Florida, the average age of mothers with newborns diagnosed with congenital syphilis was 27.5 years in the 2018-2019 biennium.[19]

Most of the women had prenatal care, and more than half of the cases of gestational syphilis were diagnosed during their visits. However, there was a low rate of partner treatment in both periods. In Brazil, a previous study showed that 88.2% of pregnant women's sexual partners did not adhere to treatment.[12]

After the diagnosis of syphilis, mothers and their sexual partners should be treated[20] in order to avoid an increase in the prevalence of miscarriage, stillbirth, premature birth, low birth weight, and new cases of reinfection.[21] It is recognized that the majority of cases occur because the mother was not tested for syphilis during prenatal care or because she did not receive adequate treatment before or during pregnancy.[4] The majority of cases occur because the mother was not tested for syphilis during prenatal care.

However, there are no standardized strategies for notifying the partner, and it is essential to properly train professionals to meet the demands arising from diagnosis and treatment monitoring.[20] It is therefore necessary to improve prevention and health promotion actions for women so that the diagnosis of gestational syphilis is made early, allowing for correct referral, including of the partner, as a way of reducing the cases and consequences of congenital syphilis.

The main limitation of this research is the use of secondary data, in which many variables were filled in as "ignored" and/or blank, which makes it impossible to obtain a real diagnosis of the disease in the country.

CONCLUSION

The results point to a reduction in reported cases of congenital syphilis, especially in the North and Central-West regions of Brazil, potentially attributed to underreporting of records due to women's low adherence to

prenatal care during the COVID-19 pandemic. Records of congenital syphilis were concentrated in females, in the age group of up to six days old and in brown race/skin color, with a favorable final outcome in more than two-thirds of the reported cases. With regard to maternal characteristics, records were predominantly of young women with low levels of schooling.

The results found in this research can help health services expand campaigns and actions aimed at mothers and babies born during the COVID-19 pandemic, with a view to investigating potential cases of late congenital syphilis, making an early diagnosis, offering effective treatment, and obtaining a satisfactory final classification for both mother and child.

Furthermore, it is important to train health professionals to improve the way they fill in notifications, reducing the occurrence of ignored and blank fields. This will allow us to better characterize future cases and adopt more assertive prevention measures.

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