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ABSTRACT

Background and objectives: in 2017 and 2018, Roraima experienced the most significant increase in congenital syphilis incidence rates among all federal units. This phenomenon occurred in parallel with the significant Venezuelan migration to the region. The study aimed to analyze the relationship between the increase in cases of congenital syphilis registered at the *Hospital Materno Infantil Nossa Senhora de Nazareth* and the Venezuelan migratory crisis. **Methods:** this is a document-based, descriptive research, covering the 2017/2018 and 2020/2021 periods, developed from data collected in copies of congenital syphilis report/investigation forms from the hospital. **Results:** in the 2017/2018 biennium, the peak of Venezuelan migration in Roraima, fewer cases of syphilis occurred than when the migratory flow declined. In the 2020/2021 biennium, there was a decrease in the migratory flow due to the closing of the border and the acceleration of the interiorization process. Although it is the period with the highest number of reports of congenital syphilis among Venezuelan mothers, the percentage is considerably lower than that recorded among Brazilian women. The incidence rate was higher among the group of Brazilian mothers (7.5/1,000 live births, in the 2017/2018 period, and 11.5/1,000 live births, in the 2020/2021 period). **Conclusion:** Venezuelan migration, although it may have eventually exerted some influence on the total number of cases of congenital syphilis, cannot be considered the determining factor for the increase in cases of the disease in the hospital in the defined period, and other factors deserve to be assessed as decisive in this case.

Keywords: Maternal and Child Health. Congenital Syphilis. Migration and Health. Epidemiological Monitoring.

RESUMO

Justificativa e objetivos: em 2017 e 2018, Roraima apresentou o aumento mais significativo nas taxas de incidência de sífilis congênita entre todas as unidades federativas. Este fenômeno ocorreu paralelamente à significativa migração venezuelana para a região. O estudo teve como objetivo analisar a relação entre o aumento de casos de sífilis congênita registrados no Hospital Materno Infantil Nossa Senhora de Nazareth e a crise migratória venezuelana. **Métodos:** trata-se de uma pesquisa documental, descritiva, abrangendo os períodos 2017/2018 e 2020/2021, desenvolvida a partir de dados coletados em cópias de fichas de notificação/investigação de sífilis congênita do hospital. **Resultados:** no biênio 2017/2018, pico da migração venezuelana em Roraima, ocorreram menos casos de sífilis do que quando o fluxo migratório diminuiu. No biênio 2020/2021, registrou-se uma diminuição do fluxo migratório devido ao encerramento da fronteira e à aceleração do processo de interiorização. Embora seja o período com maior número de notificações de sífilis congênita entre mães venezuelanas, o percentual é consideravelmente inferior ao registrado entre as brasileiras. A taxa de incidência foi maior entre o grupo de mães brasileiras (7,5/1.000 nascidos vivos, no período 2017/2018, e 11,5/1.000 nascidos vivos, no período 2020/2021). **Conclusão:** A migração venezuelana, embora possa eventualmente ter exercido alguma influência no total de casos de sífilis congênita, não pode ser considerada o fator determinante para o aumento de casos da doença no hospital no período definido, e outros fatores merecem ser destacados. ser considerada decisiva neste caso.

Palavras-chave: Saúde Materno-Infantil. Sífilis Congênita. Migração e Saúde. Vigilância Epidemiológica.

RESUMEN

Antecedentes y objetivos: en 2017 y 2018, Roraima experimentó el aumento más significativo en las tasas de incidencia de sífilis congénita entre todas las unidades federales. Este fenómeno se produjo en paralelo con la importante migración venezolana a la región. El estudio tuvo como objetivo analizar la relación entre el aumento de casos de sífilis congénita registrados en el Hospital Materno Infantil Nossa Senhora de Nazareth y la crisis migratoria venezolana. **Métodos:** se trata de una investigación descriptiva, documental, que abarca los períodos 2017/2018 y 2020/2021, desarrollada a partir de datos recolectados en copias de formularios de informe/investigación de sífilis congénita del hospital. **Resultados:** en el bienio 2017/2018, pico de migración venezolana en Roraima, ocurrieron menos casos de sífilis que cuando el flujo migratorio disminuyó. En el bienio 2020/2021 se produjo una disminución del flujo migratorio debido al cierre de fronteras y la aceleración del proceso de interiorización. Si bien es el período con mayor número de reportes de sífilis congénita entre madres venezolanas, el porcentaje es considerablemente menor que el registrado entre las mujeres brasileñas. La tasa de incidencia fue mayor entre el grupo de madres brasileñas (7,5/1.000 nacidos vivos, en el período 2017/2018, y 11,5/1.000 nacidos vivos, en el período 2020/2021). **Conclusión:** La migración venezolana, si bien eventualmente pudo haber ejercido alguna influencia en el número total de casos de sífilis congénita, no puede considerarse el factor determinante del aumento de casos de la enfermedad en el hospital en el período definido, y otros factores merecen ser considerados. considerarse decisivo en este caso.

Palabras clave: Salud Materno Infantil. Sífilis congénita. Migración y Salud. Vigilancia Epidemiológica.

INTRODUCTION

According to data from the Ministry of Health (MoH), released in the 2019 Epidemiological Bulletin, the state of Roraima presented, between 2017 and 2018, the most significant increase in the incidence rates of congenital syphilis (CS) among all federative units (132.0%). In addition to the worrying increase, the bulletin also recorded that the mortality rate due to CS in children under one year of age (per 100,000 live births) in Roraima, in 2018, was 8.5, i.e., above the national mortality coefficient of 8.2.¹ The 2020 Bulletin, in turn, revealed that Roraima is among the twelve states that, in 2019, had syphilis detection rates in pregnant women higher than those in Brazil.² These data, however, hide an important sociodemographic aspect that significantly affected the provision of public services, including in the health field, in the state of Roraima, from 2015 onwards: the migration of predominantly low-income people from Venezuela.³

Venezuelan migration in the second half of the 2010s can be considered a watershed in Roraima's history.⁴ The state had never received such a significant population contingent in an international migration process that was beyond the Brazilian authorities' control. The state's geographic position, which is the main entry point for Venezuelans into Brazil, made migration an especially challenging process in terms of controlling demographic growth.

Among the socio-structural impacts caused by the massive Venezuelan migration, one of the most persistent for state public management was that related to migrants' demands for medical and hospital care.⁵ According to Roraima's 2020 epidemiological report, 2,792 births to Venezuelan mothers were registered, equivalent to 20.9% of all births that occurred that year.⁶

Local health authorities were concerned about controlling the disease during neonatal care. As soon as it was realized that many Venezuelan pregnant women did

not receive prenatal care (mainly rapid screening tests for syphilis and/or VDRL) and did not receive adequate medical treatment in their country of origin, which increases the risk of vertical transmission of the disease.⁷

This study aimed to analyze the relationship between the increase in the number of cases of CS in Roraima, more specifically at the *Hospital Materno Infantil Nossa Senhora de Nazareth* (HMINSN), and the Venezuelan migration crisis.

METHODS

The study was descriptive in nature, supported by a documentary basis, with a quantitative approach and retrospective temporal directionality. It was developed from data collected in copies of CS report/investigation forms – which consist of forms standardized by the MoH and filled out by health professionals – collected in HMINSN archives: the largest maternity hospital in Roraima and which until May 2021 was the only public maternity hospital in the state.

The time frame of this study focuses on two specific biennia: 2017/2018 and 2020/2021. This choice of periods deserves clarification as to the underlying reasons. Initially, the proposal for the work was to cover from 2017 to 2020. However, the authors became aware that the file containing copies of report forms for 2019 was damaged by a fortuitous event, making them unavailable for consultation. It was then considered that the absence of case records from 2019 could be overcome by a methodological strategy that will be explained below.

The two biennia were considered landmark moments in relation to the flow of Venezuelan migrants to Roraima. In 2017 and 2018, the flow reached its peak (with around 85 thousand Venezuelans settled in the state), and demands for health services by migrants reached records. In 2020 and 2021, the border was closed due to the COVID-19 pandemic, which caused the migration flow to significantly reduce.⁸ The research hypothesis then focused on the comparison between the two periods: the first with high-intensity migratory flow and the second with medium-intensity flow.

Thus, if migration were at the center of the factors that could explain the changes in the number of cases of CS in recent years in Roraima, it would be expected that the report forms from the years prior to 2019 would present data on an increase in cases, or, at least, that they would be data pointing to more cases than those recorded in the years after 2019, when the migratory flow cooled down.

The study population was made up of all CS report/investigation records, including cases with an unfavorable outcome, such as cases of miscarriages and stillbirths, and incomplete records (only page 1 of 2) completed by the *Hospital Materno Infantil Nossa Senhora de Nazareth* (HMINSN/ESU) Epidemiological Surveillance Unit from 2017 to 2018 and from 2020 to 2021, totaling 459 copies of report forms.

Copies of report forms for indigenous patients

were excluded from the study, in addition to four other original report/investigation forms with a case note of "DISCARDED" that remained in the HMINSN/ESU files but were not forwarded to the Municipal Health Department of Boa Vista, for report purposes (CS hypothesis ruled out by ESU employees themselves).

As one of the objectives of this research was to reach the total universe of report/investigation forms for CS at HMINSN, it was not necessary to carry out a sample calculation.⁹

Data collection consisted of two main steps. Firstly, the information provided in copies of report/investigation forms from 2017/2018 and 2020/2021, filed in the hospital's ESU database, was collected manually. A form adapted by the authors was used as a data collection instrument, prepared based on information present in the MoH report/investigation form, in order to delimit the variables of interest for the study.

The report forms for the condition under analysis are important sources of health research, as they contain social, epidemiological, clinical and laboratory data on pregnant women and their unborn children.¹⁰ However, it is worth noting that they do not contain a specific field for determining the nationality of mothers of children diagnosed or investigated with CS.

There is a recommendation from the Health Surveillance Superintendence of the municipality of Boa Vista that, from November 29, 2017, information regarding the nationality of patients should be included in the forms of Compulsory Reportable Diseases and Immediate Compulsory Reportable Diseases. In 2022, this document was reiterated, however, despite this, at least at HMINSN, information regarding nationality began to be, eventually, noted additionally in the section dedicated to the mother's residential data. In most cases, this information was ignored in reports. In 81.2% (373 records), there was no information on nationality and only in 18.7% (86 records) this note was present.

Faced with this scenario, the second stage of collection dealt with the primary collection of data regarding mothers' nationalities, precisely because the majority of report forms did not consider such information. To this end, a spreadsheet was created with the names of mothers whose nationalities were unknown, and research was carried out with the HMINSN Medical Archiving and Statistics Service, which has a record of all patients admitted to the hospital.

After completing the data collection stage, the information obtained by consulting the 459 records was tabulated and organized in an Excel spreadsheet (version 2204, Microsoft®) by year of report. Data analysis was carried out using descriptive statistics procedures, with results presented in tables.

To calculate the CS incidence rate, the number of reported/investigated cases of CS at HMINSN was used, divided by the number of live newborns in Roraima¹¹ during the two years under study, multiplied by a thousand.

The research was approved by the Research Ethics Committee of the *Universidade Federal de Roraima*, with

registration on Platform Brazil, according to Process 51435021.6.0000.5302.

RESULTS

For the time frame of two biennia (2017/2018 and 2020/2021), records of 459 CS report/investigation forms were found at HMINSN, including incomplete copies (which only contained page 1 of 2), but with information on relevance to the research and which, therefore, could not be excluded.

Table 1 (below) provides the distribution of cases reported/investigated at HMINSN according to maternal nationality with the time frame of 2017/2018 and 2020/2021. The method of organizing the table – according to mothers' nationality and year of service – makes it possible to understand, at a comparative level, the quantitative impact of migration compared to registration of cases over two biennia.

The data present in the table demonstrate progressive increase, in absolute value, of reports in the maternity ward for the periods analyzed. Furthermore, 2017 had the lowest occurrence of CS reports among mothers of Venezuelan nationality, representing only 2.70% (n=02) of total cases for that year, as opposed to 97.30% (n=72) of case records among Brazilian mothers.

In turn, the year with the highest number of reports among children of Venezuelan migrants was 2020, with 25.71% (n=36) of total cases (i.e., 140), as opposed to 73.57% (n= 103) of children of Brazilian women. It is important to highlight that, in 2021, there has been a drop in the number of reports among Venezuelan migrants compared to the previous year, totaling 14.67% (n=22) or 150 cases registered that year.

When analyzing incidence rates of cases of reported/investigated CS at HMINSN (per 1,000 live births), according to maternal nationality, a notable increase was observed between both groups over the two years, but with a higher incidence recorded among Brazilian mothers (Figure 1).

In table 2, which concerns access to prenatal care, it can be seen that 72.55% of mothers underwent follow-up; 20.92% did not undergo follow-up; 1.31% had this information ignored; and 5.23% did not fill out the form. When comparing groups of mothers, it is observed that, among Brazilian mothers, 76.09% had access to prenatal care

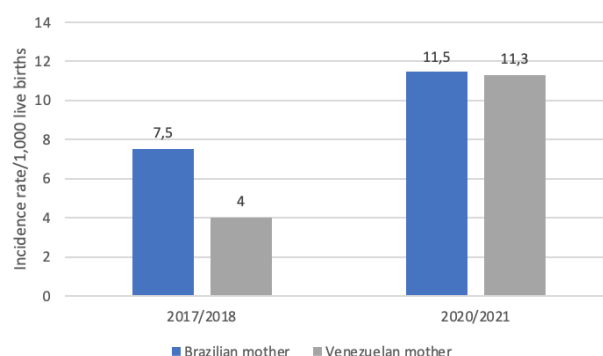


Figure 1. Incidence rates of reported/investigated cases of congenital syphilis (per 1,000 live births) according to mothers' nationality at Hospital Materno Infantil Nossa Senhora de Nazareth (2017/2018 and 2020/2021).

and 17.22% did not, while among Venezuelan mothers, 52.94% had access to prenatal care and 41.18% no.

It is noted that, regarding the moment of maternal diagnosis, among Brazilian women, 68.38% were diagnosed with syphilis in a timely manner during prenatal care and 22.11% at childbirth/curettage. This percentage is different in the case of Venezuelans, since 55.88% received the diagnosis during prenatal care, and a higher percentage was diagnosed only during childbirth/curettage (35.29%) compared to Brazilian women.

During the period under study, the evolution of cases that resulted in a live newborn was recorded in 55.56% of records, as can be seen in Table 3 (below). Cases in which there was no information or incomplete copies corresponded to 30.07% of records; cases that resulted in miscarriage, 6.10%; cases that resulted in stillbirths, 2.40%; and those whose case evolution was categorized as ignored, 4.14%.

With regard specifically to cases that progressed to an unfavorable outcome, the data in Table 4 (below) indicate that the year with the highest proportion of this type of outcome was 2018, with 30.52% (n=29) of all cases report/investigation of CS registered that year.

Among the cases with an unfavorable outcome, in 2018, as can be seen, 16.84% (n=16) were miscarriages, 5.26% (n=05) were stillbirths and 4.21% (n= 4), with death annotation in a non-specific field of Brazilian women. Only 3.16% (n=03) and 1.05% (n=01) of cases of miscarriage and stillbirth, respectively, were related to Venezuelan mothers.

Table 1. Distribution of reported/investigated cases of congenital syphilis according to mothers' nationality at Hospital Materno Infantil Nossa Senhora de Nazareth (2017/2018 and 2020/2021).

Mothers' nationality	2017 (n= 74)		2018 (n= 95)		2020 (n= 140)		2021 (n= 150)		Total	
	n	%	n	%	n	%	n	%	n	%
Brazilian	72	97.30%	86	90.53%	103	73.57%	128	85.33%	389	84.75%
Venezuelan	2	2.70%	8	8.42%	36	25.71%	22	14.67%	68	14.81%
Guyanese	0	0.00%	1	1.05%	1	0.71%	0	0.00%	2	0.44%
									459	100.00%

Source: developed by the authors.

Table 2. Distribution of reported/investigated cases of congenital syphilis according to information on mothers' epidemiological history (prenatal care and time of diagnosis) at no Hospital Materno Infantil Nossa Senhora de Nazareth (2017/2018 and 2020/2021).

Variables	Mothers' nationality							
	Brazilian		Venezuelan		Guyanese		Total	
	n	%	n	%	n	%	n	%
Prenatal care during this pregnancy								
Yes	296	76.09%	36	52.94%	1	50.00%	333	72.55%
No	67	17.22%	28	41.18%	1	50.00%	96	20.92%
Ignored	5	1.29%	1	1.47%	0	0.00%	6	1.31%
Not reported	21	5.40%	3	4.41%	0	0.00%	24	5.23%
Moment of diagnosis								
During prenatal care	266	68.38%	38	55.88%	1	50.00%	305	66.45%
At childbirth or curettage	86	22.11%	24	35.29%	1	50.00%	111	24.18%
After childbirth	16	4.11%	2	2.94%	0	0.00%	18	3.92%
Not performed	5	1.29%	1	1.47%	0	0.00%	6	1.31%
Ignored	1	0.26%	0	0.00%	0	0.00%	1	0.22%
Not reported	15	3.86%	3	4.41%	0	0.00%	18	3.92%

Source: developed by the authors.

Table 3. Distribution of cases of congenital syphilis according to the evolution of children's case at Hospital Materno Infantil Nossa Senhora de Nazareth (2017/2018 and 2020/2021).

Case evolution	Mothers' nationality							
	Brazilian		Venezuelan		Guyanese		Total	
	n	%	n	%	n	%	n	%
Live	214	55.01%	40	58.82%	1	50%	255	55.56%
Death from congenital syphilis	0	0.00%	1	1.47%	0	0.00%	1	0.22%
Death from other causes	0	0.00%	1	1.47%	0	0.00%	1	0.22%
Miscarriage	22	5.66%	6	8.82%	0	0.00%	28	6.10%
Stillborn	9	2.31%	2	2.94%	0	0.00%	11	2.40%
Death annotation in non-specific field	6	1.54%	0	0.00%	0	0.00%	6	1.31%
Ignored	19	4.88%	0	0.00%	0	0.00%	19	4.14%
Not reported or unavailable due to lack of a copy of the back of the form	119	30.59%	18	26.47%	1	50%	138	30.07%

Source: developed by the authors.

Table 4. Percentage distribution of congenital syphilis cases by type of unfavorable outcome and year of report at Hospital Materno Infantil Nossa Senhora de Nazareth (2017/2018 and 2020/2021).

Type of unfavorable outcome	Mothers' nationality							
	2017		2018		2020		2021	
	Brazil	Venezuela	Brazil	Venezuela	Brazil	Venezuela	Brazil	Venezuela
Death from congenital syphilis	0.00%	0.00%	0.00%	0.00%	0.00%	0.71%	0.00%	0.00%
Death from other causes	0.00%	1.35%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Miscarriage	4.05%	0.00%	16.84%	3.16%	2.14%	0.71%	0.00%	1.33%
Stillborn	2.70%	0.00%	5.26%	1.05%	0.71%	0.00%	0.67%	0.67%
Death annotation in a non-specific field	0.00%	0.00%	4.21%	0.00%	1.43%	0.00%	0.00%	0.00%
Total	8.11%		30.52%		5.70%		2.67%	

Source: developed by the authors.

DISCUSSION

This research collected and organized information that could support debates within the scope of public health management and epidemiological surveillance regarding the effects of Venezuelan migration in Roraima, based on quantitative data obtained on cases of CS

among patients (mothers and children) treated in the 2017/2018 and 2020/2021 biennia at HMINSN.

From what can be seen, 2017 was the year with the lowest record of CS reports among Venezuelan mothers. Interestingly, that same year, according to data from the Federal Police, more than 70 thousand Venezuelans

entered Roraima.¹² The year with the highest number of reports among children of migrants was 2020, when the Brazil-Venezuela border was closed due to the COVID-19 pandemic, and many Venezuelan migrants were being internalized to other states. By the way, that same year, there was an increase in cases of CS in federative units that, proportionally, received few internalized migrants, such as Bahia, Sergipe, Amapá and Alagoas.¹³

These data challenge the considerations made in a study that states that "the disorderly displacement of Venezuelans" would have caused an "increase in the incidence of sexually transmitted infections such as syphilis".¹⁴ At least in the case of CS, this statement was not corroborated in the research. Even though the migratory process has influenced to some extent the increase in cases of CS, it is not possible to consider it as a determining factor.

The CS incidence rate varied between the groups analyzed. In 2017/2018, the incidence among Brazilian mothers was approximately twice as high as among Venezuelan mothers. However, in the 2020/2021 period, there was a minimal difference in the incidence rate between these two groups (Figure 1).

Attention is drawn to the low percentage of prenatal care among Venezuelan migrants: a phenomenon that deserves further investigation. On the one hand, it is possible that the difference in prenatal care quality between Brazilian and Venezuelan women arises from obstacles to access to pregnancy monitoring services by migrants in Brazil, but, on the other hand, this could arise from limited access to prenatal care in their country of origin. Consideration of testing these hypotheses could lead to a new study.

In this regard, it is worth mentioning research that sought to identify, in Ecuador, whether there was a difference in morbidity between children born to migrant mothers and local mothers.¹⁵ Like Brazil, Ecuador has also received, in recent years, a large Venezuelan migratory contingent. The study by Ecuadorian researchers obtained a result similar to that found in this research: that Venezuelan mothers had a lower number of prenatal checks, when compared to local women. The research also demonstrated that, among migrant women who had undergone prenatal care, 71.90% did so with health services in Ecuador and 18.10% in their country of origin.

There is a correlation between the lack of prenatal care and stillbirth rates due to CS, which makes the scenario found in the research even more worrying.¹⁶ Although, in recent years, Brazil has made progress in expanding access to prenatal care throughout the national territory, regional inequalities are still found, especially in the North. Barriers persist in this region that make it difficult for pregnant women to have timely access to prenatal care,¹⁷ especially among the most vulnerable groups, such as indigenous people, black women and women with a low level of education.¹⁸ As seen, in Roraima, migrant women are added to these groups.

Thus, 2018, the period with the highest occurrence of deaths, miscarriages and stillbirths related to CS at HMINSN, coincided with the moment of the intense flow

of Venezuelan migrants to the state of Roraima. However, the research also indicated that the occurrence of these outcomes cannot be attributed to migrant women, considering that, of the 95 reports made that year, only eight were of children whose mother is Venezuelan (Table 1).

The unfavorable outcomes may be related to other factors, such as, probably, a global crisis in penicillin supply. A study that sought to analyze the shortage of benzathine penicillin in the city of Rio de Janeiro between 2013 and 2017 found that the lack of this antibiotic impacted CS control actions,¹⁹ highlighting that pregnant women who are inadequately treated or who do not undergo treatment can transmit the infection to their babies, which could lead to fetal or neonatal death, in addition to other complications.

The study had limitations related to the fact that certain copies of CS report/investigation forms were incomplete. This occurred in 19 situations and, in all of them, it was not possible to identify the evolution of children's case. As a form of mitigation, these situations were grouped under the "not reported or unavailable due to lack of copy of the back of the form" item.

The research also presented some other limitations, such as the existence of two models of CS report/investigation forms used by the hospital, a standard MoH model and an unofficial one, in addition to the lack of data filling in some forms.

In the first case, there was a need to adapt the "prenatal care" variable content in the following terms: the official MoH form presents as possible answers "1 - Yes", "2 - No" and "9 - Ignored". The unofficial form presents as an option the number of consultations carried out by the pregnant woman, which varies from 0 to 6 or ignored. For this variable, when using the second form model, prenatal care was considered to have been carried out from one consultation, considering that, during the first consultation, it is already recommended by the MoH that pregnant women undergo a treponemal test, preferably the rapid test. In the second case, in relation to the forms with fields not filled in, missing information was inserted in the "not reported" field.

This study plays a significant role in understanding the challenges faced by public health in relation to Venezuelan migration in Roraima, particularly with regard to cases of CS. Data collected questions previous assumptions, and highlights the importance of prenatal care while challenging the direct correlation between disordered migration and the increase in cases of CS. Furthermore, the research highlights the need for policies and interventions that aim to improve access to prenatal care, especially among vulnerable groups, including Venezuelan migrants. The complexity of the factors involved in this scenario requires a multifaceted approach to improving maternal and child health in migration contexts, with special consideration for prenatal care quality.

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