

Characteristics of mothers with children diagnosed with Congenital Syphilis

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Abstract

The development of health actions based on social, cultural, and economic aspects is essential. Thus, the objective of the study was to identify the socioeconomic and clinical characteristics of mothers with children diagnosed with Congenital Syphilis. This is a cross-sectional study, carried out with notification forms of congenital syphilis, from 2010 to 2017 in a health region in Northeast Brazil, totaling 522 cases. A higher percentage of vertical transmission was identified in young women, with a median age of 23 years, 92% (f=480) of mothers declared themselves as a brown-skinned, 75.7% (f=395) were housewives, and 44.1% (f=230) had an incomplete 5th to 8th grade education. Regarding the clinical characteristics, it was found that 94.6% (f=494) performed prenatal care, however, less than half (46.9%; f=245) were diagnosed within the same period, and 55.6% (f=290) received an inadequate treatment of syphilis. It was also observed that, with regards to the association of the characteristics of these pregnant women and prenatal care, a significant difference in the "diagnosis of maternal syphilis" (p: 0.001) and "treatment scheme" (p: 0.0001). Thus, the results of this study are essential for the health planning of the municipalities, which reinforces the importance of these indicators and of the situations of vulnerabilities during prenatal care, and it is also opportune to have permanent education with professionals, so that they recognize the use of these findings as tools for health practice.

Keywords: Health Profile. Mothers. Congenital syphilis.

INTRODUCTION

Congenital Syphilis (CS) is considered an old disease, with well-established and a low-cost treatment and diagnosis, but the World Health Organization (WHO) still considers it as a public health problem since from among the various communicable diseases in the pregnant-puerperal cycle, syphilis is the one with the highest transmission rate^{1,2}.

From 1998 to June 2019, 214,891 cases

of CS in children under one year of age were notified in the Information System for Notifiable Diseases (SINAN), of which 95,353 (44.4%) were residents in the Southeast Region, 64,991 (30.2%) in the Northeast, 24,343 (11.3%) in the South, 18,119 (8.5%) in the North, and 11,979 (5.6%) in the Midwest³.

Since 2010, Ceará has recorded an

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incidence of CS higher than the detection rate of syphilis in pregnant women. From 2010 to August 2018, 10,406 cases of CS were reported in SINAN in <1 year. There is a progressive increase in the incidence rate of CS: in 2010 there were 6.1 cases/1,000 live births and in 2018 it was 13.0 cases/1,000 live births. It is worth noting that these rates are higher than those found in all of Brazil⁴.

It should also be noted that this infection during pregnancy can have consequences such as abortion, stillbirth, premature birth, neonatal death, and early or late congenital manifestations. There is no vaccine against syphilis and previous infection does not provide protective immunity. Therefore, the person can be reinfected each time they are exposed, which justifies the more frequent screening during pregnancy⁵.

In Brazil, there are guidelines for the prevention, diagnosis, and treatment of syphilis, and its epidemiological surveillance model is based on the compulsory notification of public and private health services throughout the national territory, so that CS and syphilis in pregnant women are part of the group of compulsory notification diseases and, therefore, must be notified in SINAN, beginning from 1986 and 2005, respectively⁶. As a result, the control of vertical transmission of syphilis is still sought, a goal proposed by WHO in 2010, which provides for improvements in prenatal consultations, with early diagnosis of gestational syphilis and adequate treatment for pregnant women and their partners^{7,8}.

There is scientific evidence that the occurrence of CS may be related to the weaknesses of health services, since the screening for syphilis is not performed as recommended, and it does not have adequate coverage of prenatal care for pregnant women^{9,10}. In addition, maternal characteristics have also been associated with the occurrence of CS. In a national study, an association of CS cases was identified in women aged 20 to 34 years,

with less education, black skin color, no paid activity, late start of prenatal care, and fewer consultations, serological tests, and inadequate treatment⁸.

Therefore, it is understood that CS is preventable when a pregnant woman infected with syphilis is treated properly. Therefore, the greatest form of prevention is early detection in the prenatal period of pregnant women with syphilis and appropriate treatment. Moreover, developing actions aimed at the most vulnerable populations, focusing on the promotion of safe sex, education on pregnant women's health, awareness of STIs for women of their reproductive age and their partners, as well as strengthening the bond with this population¹¹.

Thus, there is a need to reduce the incidence of syphilis during pregnancy and, consequently, vertical transmission. Therefore, it is relevant to know the context in which pregnant women who transmit syphilis to their children are inserted, since it is essential to develop health actions from social, cultural, and economic aspects, thus guiding the assistance of managers and health professionals according to the specificities of this population.

In this way, it will be possible to improve disease prevention measures and health promotion for pregnant women and children, perfecting the health practice, as well as the management process. Thus, this study aimed to identify the socioeconomic and clinical characteristics of mothers with children diagnosed with Congenital Syphilis in a health region in Northeast Brazil.

METHODS

This is an observational, cross-sectional study with a quantitative approach. It was set in the 11th Health Region of the state of Ceará, which is located in Northern Brazil and is formed by 24 municipalities, namely: Alcântaras, Cariré, Catunda, Coreaú, Forquilha, Frecheirinha, Graça, Groaíras, Hidrolândia, Ipu, Irauçuba,

Massapê, Meruoca, Moraújo, Mucambo, Pacujá, Pires Ferreira, Reriutaba, Santa Quitéria, Santana do Acaraú, Senador Sá, Sobral, Uruoca, and Varjota (Figure 1).

The choice of this Health Region as a field to be studied was made intentionally and is due to the number of cases of CS still present in the municipalities of that territory. In the year 2017, the studied region presented itself as the sixth Health Region with the highest incidence of CS among the 22 regions of the state of Ceará⁴. It also stands out, as it displays diverse social, economic, and cultural characteristics in the municipalities belonging to it, providing an expanded look at the investigation of the incidence rate of CS among these municipalities and the variables studied here.

The population was composed of all mothers with children diagnosed with CS in the municipalities that make up the 11th Health Region of Ceará, from January 2010 to December 2017. The cases notified from 2010 were investigated, considering that in Brazil during this period there was a progressive increase in the incidence rate of syphilis². Data collection took place from July 2018 to January 2019.

The data were collected through information collected on the CS Notification/Investigation Form, via access to the database made available by the regional SINAN. The variables related to the mothers' socioeconomic and clinical characteristics were selected: date of notification; notifying city; date of diagnosis; residence city/ neighborhood/ street/ number/ complement/ zone; mother's age (<14; 15 - 24; 25 - 34; 35 - 44); race/ color of mother (white; black; yellow; brown); mother's occupation (agriculture; industry; commerce; services; housewife; student; teacher; unemployed); education (illiterate; incomplete 1st to 4th grade; incomplete 4th grade; incomplete 5th to 8th grade; complete elementary education; incomplete secondary education; complete secondary education;

incomplete higher education; complete higher education); prenatal care during this pregnancy (yes; no); diagnosis of maternal syphilis (during prenatal care; at the time of delivery/curettage; after delivery; not performed); confirmatory treponema test at delivery/curettage (reagent; non-reagent; not performed); non-treponema test at delivery/curettage (reagent; non-reagent; not performed); treatment schedule (adequate; not adequate; not performed); partner(s) treated concomitantly with the pregnant woman (yes; no).

The data were entered into an electronic spreadsheet, organized using Excel 2017 software, and then processed and analyzed using the Statistical Package for the Social Sciences (SPSS) version 23 software.

The variables were expressed as frequencies and percentages, with measures of central tendency and dispersion also performed; specifically, mean, median and standard deviation. However, when testing normality by the Kolmogorov-Smirnov test, the age variable showed an asymmetric distribution, and the median was considered (50th percentile).

At that moment, it was decided to initially perform a descriptive analysis of the characteristics of the women, and subsequently the relationship between the socioeconomic and clinical characteristics of the mothers of children diagnosed with Congenital Syphilis was verified according to the prenatal care in the municipalities. As previously pointed out, prenatal care is the main program for monitoring pregnant women and preventing the transmission of syphilis from mother to child. Moreover, the Likelihood Ratio was applied to identify the relationship between categorical variables. Statistical tests were developed with a significance level of $p < 0.05$ and, therefore, 95% confidence.

The study was approved by the Research Ethics Committee of the Universidade Estadual Vale do Acaraú (UVA), with opinion number 3.377.307.



Source: Ceará State Health Department, 2014.

Figure 1– Territorial division of the 11th Health Region of Ceará, according to the health regionalization process of that state. Sobral, Ceará, Brazil.

It was also observed, with regard to the association of the characteristics of mothers of children with CS and prenatal care (Table 2), a statistical significance with the “diagnosis of maternal syphilis” ($p: 0.001$) and “treatment scheme” ($p: 0.0001$).

Table 1– Descriptive analysis of the socioeconomic and clinical characteristics of mothers with children diagnosed with Congenital Syphilis by the municipalities of the 11th Health Region from 2010 to 2017. Sobral, Ceará, Brazil.

Variables		f	%
Age range*	<14	9	1.7
	15-24	284	54.4
	25-34	184	35.3
	35-44	35	6.7
	Ignored	10	1.9
Race/Color of mother	White	31	5.9
	Black	4	0.8
	Yellow	1	0.2

to be continued...

RESULTS

In the 11th Health Region of the state of Ceará, from January 2010 to December 2017, 522 cases of CS were reported in SINAN. Regarding the socioeconomic and clinical characteristics of the mothers of these children diagnosed with CS (Table 1), 54.94% ($f=284$) comprised the age group between 15 and 24 years, with a median age of 23 years, 92% ($f=480$) of the mothers declared themselves to be brown, 75.7% ($f=395$) were housewives, and 44.1% ($f=230$) had an incomplete 5th to 8th grade education.

Regarding prenatal care, 94.6% ($f=494$) of these women were followed-up during pregnancy, however, less than half (46.9%; $f=245$) were diagnosed with syphilis in the same period. Regarding the confirmation tests applied at childbirth/curettage, 78% ($f=407$) of women were not tested with the treponema test, but 92% ($f=480$) of women did perform the non-treponema test during childbirth/curettage.

In this study, despite a large percentage of women having performed prenatal care during the pregnancy of their children with CS, more than half (55.6%; $f=290$) received inadequate treatment for syphilis, 16.1% ($f=84$) were not treated, and 66.1% ($f=345$) of their partners did not do it concurrently with the pregnant women.

...continuation table 1

Variables	f	%	
	Brown	480	92.0
	Ignored	6	1.1
Mother's occupation **	Agriculture	4	0.8
	Industry	12	2.3
	Commercial	6	1.1
	Services	8	1.5
	Housewife	395	75.7
	Student	34	6.5
	Teacher	2	0.4
	Unemployed	2	0.4
	Ignored	59	11.3
Mother's schooling	Illiterate	10	1.9
	Incomplete 1st to 4th grade	25	4.8
	Complete 4th grade	21	4.0
	Incomplete 5th to 8th grade	230	44.1
	Complete elementary school	41	7.9
	Incomplete high school	38	7.3
	Complete high school	37	7.1
	Incomplete higher education	1	0.2
	Complete higher education	4	0.8
	Ignored	114	21.8
	Not applicable	1	0.2
Prenatal care during this pregnancy	Yes	494	94.6
	No	8	1.5
	Ignored	20	3.8
Diagnosis of maternal syphilis	During prenatal care	245	46.9
	At delivery/curettage	153	29.3
	After delivery	93	17.8
	Not performed	2	0.4
	Ignored	29	5.6
Treponema confirmation test at delivery/curettage	Reagent	41	7.9
	Non-reagent	10	1.9
	Not performed	407	78.0
	Ignored	64	12.3
Non-treponema test at delivery/curettage	Reagent	480	92.0
	Non-reagent	12	2.3
	Not performed	10	1.9
	Ignored	20	3.8
Treatment schedule	Adequate	65	12.5
	Inappropriate	290	55.6
	Not performed	84	16.1
	Ignored	83	15.9
Partner(s) treated concurrently	Yes	86	16.5
	No	345	66.1
	Ignored	91	17.4

*Age: Median: 23 years old **Categorization of occupations according to sectors of activities established by the Ministry of Labor and Employment (MLE).

Table 2– Association between socioeconomic and clinical characteristics of mothers with children diagnosed with Congenital Syphilis and prenatal care in the municipalities of the 11th Health Region from 2010 to 2017. Sobral, Ceará, Brazil.

		Prenatal care during this pregnancy				p
		Yes		No		
		f	%	f	%	
Age range	< 14	6	85.7	1	14.3	0.079*
	15 – 24	273	99.3	2	0.7	
	25 – 34	175	97.2	5	2.8	
	35 – 44	34	100.0	0	0.0	
Race / Color of mother	White	29	96.7	1	3.3	0.891*
	Black	4	100.0	0	0.0	
	Yellow	1	100.0	0	0.0	
	Brown	457	98.5	7	1.5	
Mother's occupation**	Agriculture	4	0.9	0	0.0	0.997*
	Industry	12	2.7	0	0.0	
	Commercial	6	1.3	0	0.0	
	Services	8	1.8	0	0.0	
	Housewife	379	85.2	5	100.0	
	Student	32	7.2	0	0.0	
	Teacher	2	0.4	0	0.0	
	Unemployed	2	0.4	0	0.0	
Education	Illiterate	8	80.0	2	20.0	0.164*
	Incomplete 1st to 4th grade	25	100.0	0	0.0	
	Complete 4th grade	21	100.0	0	0.0	
	Incomplete 5th to 8th grade	219	99.1	2	0.9	
	Complete elementary school	41	100.0	0	0.0	
	Incomplete high school	38	100.0	0	0.0	
	Complete high school	35	97.2	1	2.8	
	Incomplete higher education	1	100.0	0	0.0	
Complete higher education	4	100.0	0	0.0		
Diagnosis of Maternal Syphilis	During prenatal care	243	100.0	0	0.0	0.001*
	At delivery/curettage	139	96.5	5	3.5	
	After delivery	89	98.9	1	1.1	
	Not performed	1	50.0	1	50.0	
Treponema confirmation test at delivery/curettage	Reagent	40	100.0	0	0.0	0.436*
	Non-reagent	9	100.0	0	0.0	
	Not performed	386	98.2	7	1.8	
Non-treponema test at delivery/ curettage	Reagent	455	98.3	8	1.7	0.669*
	Non-reagent	12	100.0	0	0.0	
Treatment schedule	Adequate	65	100.0	0	0.0	0.0001*
	Not adequate	282	99.6	1	0.4	
	Not performed	75	92.6	6	7.4	
Partner(s) treated concomitantly with the pregnant woman	Yes	86	100.0	0	0.0	0.073*
	No	331	97.9	7	2.1	

*Likelihood ratio; **Categorization of occupations according to sectors of activities established by the Ministry of Labor and Employment (MLE).

DISCUSSION

In this study, a higher percentage of vertical transmission of syphilis was demonstrated in young women of reproductive age, brown skin, housewives, and with low level of education, of which almost all had the opportunity to be attended by prenatal care; however, the minority received a diagnosis of Syphilis at the same period, and consequently did not receive adequate treatment, as well as their respective partners.

These findings are similar to the country's context. In Brazil, the highest percentage of cases of CS in 2017 occurred in children whose mothers were between 20 and 29 years old (53.4%). Regarding the race/color of the mothers of children with CS, the majority declared themselves as brown (56.8%), and a significant number of mothers also had an incomplete the 5th to 8th grade education. Regarding access to prenatal care, 81.8% of these mothers received prenatal care, while 13.1% did not¹².

In a study developed in six federal units in Brazil, the median age was also 23 years in Ceará, Amazonas, and Rio de Janeiro¹³. In a study carried out at the Hospital de Bogotá in Colombia, it was shown that 83.6% of pregnant women affected by syphilis are between 18 and 35 years old¹⁴. In Japan, a study reported the occurrence of an increasing rate of CS which was higher in women aged 20 to 29 years¹⁵. As a result, it appears that both the studied region and other national and international regions present a higher CS rate in predominantly young women.

Similar results also occurred in other locations, where many women who have children diagnosed with CS worked domestically, and where white women were more protected against this disease¹⁶. In a study conducted in Sergipe, 85% of women also declared themselves to be brown¹⁷, as well as Rio Grande do Sul, and in a

municipality in Ceará, most of these mothers had an incomplete primary education or were illiterate^{11,18}.

Given this, it is possible to identify that there is a predominance of these socioeconomic characteristics in several regions, configuring, thus, that women who have this profile are more vulnerable to the transmission of the disease to their children, since it is a population possibly affected by the existence of social determinants that sometimes need to be reinforced in health planning.

In reference to the monitoring performed during prenatal care and childbirth, this study identified weaknesses in the quality of care provided to women who transmitted syphilis vertically to their children, due to the fact that they did not allow a timely diagnosis of the disease and treatment as is recommended. According to the Ministry of Health (MH), testing for syphilis is advised in the first prenatal consultation, ideally during the 1st trimester, at the beginning of the 3rd trimester (starting the 28th week), at the time of delivery, or in case of abortion, risk exposure, and sexual violence¹⁹.

It should also be noted that when the Treponema Rapid Test (RT) is used as the first test, in the reactive cases, a sample of venous blood must be collected and sent for a non-treponema laboratory test and diagnosis definition, as well as it should preferably be performed on the pregnant woman at the time of delivery¹⁹. In this study, the data revealed that the non-treponema test was prioritized by the health services.

Moreover, the importance of the moment of the diagnosis of maternal syphilis it is revealed, as well as the treatment scheme, which, when associated with prenatal care, showed significant differences; thus, confirming them as essential conditions for the elimination of CS. The MH states that benzathine penicillin is the only safe and effective option for

adequate treatment of pregnant women, and the prescription is performed according to the clinical stage. Therefore, it is important to emphasize that the earlier this diagnosis is made, the more effective the treatment of syphilis will be, as the circulating antibodies will disappear more quickly and the non-treponema tests will become negative, or even stabilize at low titers¹⁹.

Like the municipalities under study, in the state of Maranhão presented similar results, in which the diagnosis of maternal infection occurred, mainly, during childbirth or curettage, which was late and constituted a failure in prenatal care for the correct management of infection²⁰.

Likewise, the findings identified that the majority of pregnant women did not receive adequate treatment and their partners were not treated concurrently. This information was also revealed in other Brazilian states and municipalities. In Santa Maria, Rio Grande do Sul, 71.7% of maternal syphilis treatments were considered inadequate, an important part did not undergo treatment (18.0%), and 48.5% did not have their partners treated throughout the occurrence (2007-2016)²¹. Between the years 2008 and 2013, in the city of Belém, state of Pará, treatments for syphilis during pregnancy of mothers were also inadequate or incomplete in 64.8% of cases, and practically all partners did not undergo treatment (98%)²².

Thus, there is a weakness during the prenatal monitoring process, in which it is necessary to see health management regarding the results presented, in order to investigate the weaknesses in the work process. In this context, the need for training professionals regarding the syphilis follow-up protocol is evident, based on the Permanent Health Education Policy (PHEP), as a way to promote the transformation of health work practices²³.

Also noteworthy is the availability of an adequate work structure, as professionals need an organizational flow, interprofessional teams, and sufficient inputs during assistance. These are needed in order for it to be possible to conduct an active search with quality, meet these women, promote essential care in this phase of the life cycle, and together with this, establish an effective contact with sexual partners, ensuring that these pregnant women are not reinfected, and mainly, that there is no transmission to the fetus.

In addition, it is essential to raise the awareness of health teams at the time of this service, with regards to all situations of vulnerability in which these pregnant women are involved, especially in the actions of Primary Health Care (PHC). However, it is worth noting that links between all the services of the Health Care Network (HCN) must exist, because through effective communication between professionals, it is possible to provide comprehensive care for these women, contributing to actions coping with CS.

Under this premise, it is opportune to consider the sociodemographic, behavioral, and health care factors, since these are associated with the occurrence of syphilis in women and must be taken into consideration in the development of universal strategies aimed at the prevention and control of syphilis but focusing on situations of greater vulnerability²⁴.

Therefore, this descriptive survey of the characteristics of pregnant women with syphilis is essential for directing strategies, thus, adapting the assistance given to these women according to their specificities. However, it is emphasized that an investigation with a multivariate analysis is essential, verifying the multicausal effect in the outcome of vertical transmission of syphilis.

CONCLUSION

The study identified the socioeconomic and clinical characteristics of mothers with children diagnosed with CS in a health region of Northeast Brazil, in which it was concluded that the findings were similar in other regions, including in international territories. Therefore, predominantly young, brown, pregnant housewives, with a low education were found to be more vulnerable to the transmission of the disease to their babies.

When reporting the characteristics studied and prenatal care, the diagnosis of maternal syphilis and the treatment regimen showed a significant association, reinforcing the importance of both in monitoring pregnant women for the control of CS. At that time, it was found that the majority

of pregnant women did not have a diagnosis of maternal syphilis in a timely manner, nor was the treatment carried out as recommended.

Thus, the results of this study are essential for the health planning of the municipalities, which reinforces the importance of these indicators and of the situations of vulnerability during prenatal care. It is also opportune to have long-term education with professionals, so that they recognize the use of these findings as tools for health practices.

It is noteworthy that, because it depends on secondary data, the research has some limitations: the possibility of underreporting of CS, as well as some variables which were “ignored” in the notification form.

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