

Epidemiological characterization of congenital syphilis in a health region of the northern zone in the state of Ceará, Brazil

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ABSTRACT. The study sought to investigate the epidemiological profile of congenital syphilis in a health region in the State of Ceará, in the period from 2015 to 2019. This is a descriptive epidemiological study, with a quantitative approach, with secondary data collected through the Health System. Information on Notifiable Diseases and Live Birth Information System. There were a total of 248 cases: 65 cases in 2015, 50 in 2016, 45 in 2017, 51 in 2018 and 37 in 2019. The incidence of congenital syphilis was: 8.1 (2015), 6.1 (2016), 5.1 (2017), 5.3 (2018) and 3.9 (2019). In 62.9% of cases from all the years, women were between 20 and 34 years old and in 45.5% of cases they had less than eight years of educational instruction. 57.2% never had a miscarriage, 63.3% had vaginal deliveries and 59.2% had full-term deliveries. Most women received prenatal care (95.9%). In 49.5% of cases, the diagnosis of maternal syphilis occurred during prenatal care. Only 67 (27%) of the pregnant women were treated properly and only 52 (29%) had their partners treated. The study shows a flaw in prenatal care with low effectiveness of the prevention actions, determining factors in the control of congenital syphilis.

Keywords: prenatal care; epidemiology; congenital syphilis.

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Introduction

Syphilis is a systemic disease, curable and exclusive to human beings. Caused by the *Treponema pallidum*, a Gram-negative bacteria belonging to the spirochaete group, discovered in 1905 (Brasil, 2017).

When the infection occurs in pregnant women who haven't received the treatment or haven't received appropriate treatment, the disease can be transmitted to the fetus and it's nominated Congenital Syphilis. The CS occurs due to a vertical transmission of the *Treponema pallidum* from the mother to the fetus. Transplacentally, during labor or breastfeeding, or if there is physical contact between the newborn and the mother's sores (Guerra, Costa, Santos, Silva, & Barcelos, 2017).

The Pan American Health Organization informs that Latin America and Caribbean countries count 460 thousand cases of gestational syphilis per year, leading to the birth of 164,000 to 344,000 children with congenital syphilis (CS) (Organização Pan-Americana da Saúde [OPAS], 2015). In Brazil, during the year of 2017, there was an increase of 28.5% in the rate of syphilis detection in pregnant women, along with a 16.4% detection increase of congenital syphilis and 31.8% increase in detection of acquired syphilis, maintaining the increase in the detection rates since 2010, confirming that the country is experiencing an increase of the numbers of syphilis diagnoses over recent years (Brasil, 2018).

In Brazil, the prevalence of syphilis in pregnant women is monitored by national and regional representative cross-sectional studies in parturients. In the last paper the incidence rate of CS presents a frequently raise, registering the highest amount in the year of 2016 (10.2%). Between 2010 and 2017, the detection rates of acquired syphilis (cases per 100 thousand inhabitants) shows up some variance, remaining stable between 2012 and 2014, increasing in 2015 (9.6%) and reaching the highest peak in the year of 2016 (10.2%). The rate of syphilis detection in pregnant women (cases per thousand live births) remains with little variance, presenting the highest number in 2016 (8.1%) (Ceará, 2017).

These diseases even shows adverse indicators concerning its control. The notification is registered in the Information System of Notifiable Diseases (SINAN) upon filling and sending an Notification Form specifically

for the disease, although the SINAN has well-known yet unevenly distributed limitations between the regions and brazilian states.

Therefore, the prenatal care is more than necessary to the pregnant woman with syphilis. The nurse has an extreme important role in the congenital syphilis control, establishing specific strategies such as lab exams, rapid testing, active search of syphilis pregnancies, ending the treatment at least 30 days before the delivery (Horta, Martins, Nonato, & Alves, 2017).

It is believed that the cause for the high numbers of congenital syphilis cases are related to unappropriate treatment of the pregnant woman as well as their partner(s), since sometimes the partners don't accept the treatment, assigning to the women the responsibility for the care. According to the data mentioned above, the importance of women health care outstands, mainly during the pregnancy, due to the specific care required at this period (Nunes et al., 2017).

Considering the magnitude of this public health issue and the need to establish prevention and control measures of syphilis vertical transmission, it has been necessary to acknowledge the socio demographic and epidemiological characteristics of congenital syphilis. The congenital syphilis is a concern for the counties in the Health Region of North Zone of Ceará, as long as in the whole state. Its epidemiological and operational indicators have no sign of reduction compatible to the aims of Health Ministry.

Thereby, this study has the aim to describe the incidence and epidemiological characteristics around congenital syphilis occurrence in 24 counties of an Health Region of North Zone of the State of Ceará, from 2015 through 2019.

Material and methods

This is a epidemiological, descriptive exploratory study with a quantitative approach.

This paper took place in the counties of a health region of Ceará State that united make the Health Macroregion of Sobral. The state of Ceará has its territory divided into 22 Health Regions, according to the Regionalization Master Plan of Health Services and Actions – PDR of the Ceará State from 2014, concerning the process of health regionalization and municipalization, following the Universal Health System principles. The Health Region studies in this research is located in the north of the Ceará State and it's shaped by twenty four surrounding cities, it's also the biggest office in municipalities quantity with a population of 629,957 inhabitants (Ceará, 2014).

The study was performed between January and July in 2020. To develop the research, two stages were necessary: Stage (1): Epidemiological profile: the data collection was performed seeking the description of the congenital syphilis profile, indication the municipalities that carry the highest incidence of the disease. Stage (2): Aspects related to prenatal care, data collection related to the prenatal care of pregnant women with syphilis. Data collection in both stages were performed through the Information System of Notifiable Diseases (SINAN) and the Live Birth Information System (SINASC), registered between the years of 2015 and 2019, within the Information System Sector of the Regional Health Office, therefore the year of 2020 wasn't included due to the 18 month period requested to the closure of CS cases in SINAN.

Numbers of cases of congenital syphilis per thousand live births were considered to the calculation of incidencia annual rates in each year of the 2015-2019 period. The analyzes and processing of the data were performed through the Tab Win (Tab for Windows, from the IT department of the Universal Health System (DATASUS) and Excel (Microsoft®) apps. The results were described in relative or/and absolute frequencies. The software Microsoft Office was used to process the analyzes of the database from the information system and analysed using descriptive statistics.

All recommendations from the 466/12 Resolution of the National Health Council were followed, concerning studies involving human beings. The project was approved by the Research Ethics Board of Vale do Acaraú State University – UVA (Process nº 1.633.568).

Results and discussion

Between the years 2015 and 2019, 248 cases of congenital syphilis were notified in the counties that make the health region of Ceará. 65 of these cases were in 2015, 50 in 2016, 45 in 2017, 51 in 2018 and 37 in 2019. In the same period, 607 cases of pregnant women syphilis were notified, presenting an expressive of rate of vertical transmission. We highlight the incidence of congenital syphilis cases per thousand live births: 8.1 in 2015; 6.1 (2016); 5.1 (2017); 5.8 (2018) and 3.9 in 2019. The Figure 1 shows the incidente rates of congenital and pregnant women syphilis in the health region between 2015 and 2019.

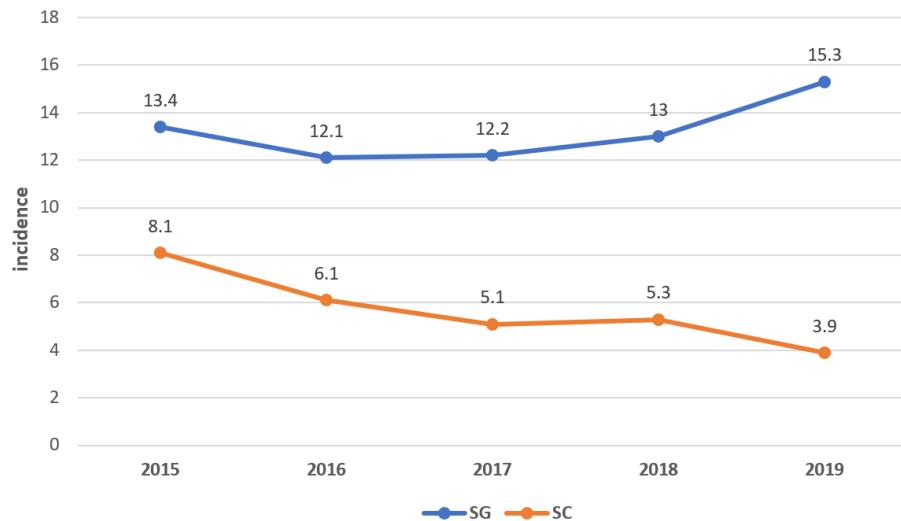


Figure 1. Incidence of syphilis in pregnant women (SG) and congenital syphilis (SC) in a health region of the State of Ceará, during the period of 2015 and 2019, second year of diagnosis. Ceará, Brazil, 2019.

Source: National System of Notifiable Diseases (SINAN) – Health Office of the State of Ceará. Data reviewed in December 2020.

Concerning the congenital syphilis profile in Table 1, we see that the most frequent maternal age of cases of Cs corresponds to the age group from 20 to 34 years old (62.9%), followed by the age group from 15 to 19 years old (21.3%). Concerning the race, 220 cases (88.7%) were registered in brown people, followed by white people with 15 cases (6.0%), 7 (2.82%) registered cases in black people. No cases between indigenous or yellow people were notified. The mother's educational level proves that 113 (45.5%) women have less than 8 years of school instruction, although there's 42 cases (16.9%) where the mother's educational level is ignored or was left blank.

Table 1. Socio demographic maternal profile of notified cases of congenital syphilis in a Health Region of the State of Ceará, during the period of 2015-2019. Ceará, Brazil, 2020.

Variables	N	%
Age		
10 – 14 years old	6	2.4
15 – 19 years old	53	21.3
20 – 34 years old	156	62.9
35 – 49 years old	28	11.2
Ignored	5	2.01
Skin color or Race	N	%
White	15	6.0
Black	7	2.82
Yellow	0	0
Brown	220	88.7
Indigenous	0	0
Ignored	6	2.41
Educational level	N	%
illiterate	7	2.82
1st to 4th grade incomplete of Elementary School	16	6.45
4th grade complete of Elementary School	20	8.06
5th to 8th grade incomplete of Elementary School	113	45.5
Elementary School Complete	14	5.64
High School incomplete	22	8.87
High school complete	9	3.62
College education incomplete	2	0.8
College education complete or more	3	1.2
Ignored	42	16.9

Source: National System of Notifiable Diseases (Sistema de Informação de Agravos e Notificação [SINAN], 2020).

Concerning the characteristics of gyneco-obstetrics, Table 2 shows that 49 (19.7%) previous pregnancies were primiparous and 32 (12.9%) gave birth four or more times. Of the pregnancies with children born alive, most of them 49 (19.7%) and 52 (20.9%) had none to one child alive, respectively. More than half of the sample, 142 (57.2%) never had a miscarriage and 38 (15.3%) had one miscarriage. Current pregnancy data

reveals that most, 147 (59.2%) of deliveries occurred between 37 to 41 weeks of gestational age, 201 (81%) were the only pregnancy, 157 (63.3%) were vaginal deliveries and 116 (46.7%) of the newborn weighed between 3000 and 3999 grams, followed by 42 (16.9%) weighing 2500 to 2999 grams and 26 (10.4%) weighing between 1500 and 2499 grams. We highlight the amount of ignored data, due to lack of registered data in the informational system.

Table 2. Gyneco-obstetric profile of notified cases of congenital syphilis in a Health Region of Ceará, from 2015 to 2019. Ceará, Brazil, 2020.

Variables		
Previous pregnancies		
Nº of previous pregnancies	N	%
0	49	19.7
1	37	14.9
2	46	18.5
3	25	10.0
04 or more	32	12.9
Ignored	59	23.7
Nº of live birth children	N	%
0	49	19.7
1	52	20.9
2	46	18.5
3	25	10.0
04 or more	17	6.85
Ignored	59	23.7
Nº of miscarriages	N	%
0	142	57.2
1	38	15.3
2	8	3.22
3	3	1.20
04 or more	3	1.20
Ignored	54	21.7
Current pregnancies		
Nº of weeks into the pregnancy when the delivery occurred	N	%
<22 weeks	0	0
22 – 27 weeks	4	1.61
28 – 31 weeks	8	3.22
32 – 36 weeks	35	14.1
37 – 41 weeks	147	59.2
42 or more	11	4.43
Ignored	43	17.3
Type of pregnancy	N	%
First pregnancy	201	81.0
Second pregnancy	1	0.4
Third pregnancy or more	0	0
Ignored	46	18.5
Type of delivery	N	%
Vaginal	157	63.3
Cesarean	45	18.1
Ignored	46	18.5
Birth weight	N	%
0 a 999g	2	0.8
1000 – 1499g	5	2.0
1500 – 2499g	26	10.4
2500 – 2999g	42	16.9
3000 – 3999g	116	46.7
4000g or more	5	2.0
Ignored	52	20.9

Source: SINAN (2020).

Concerning the prenatal care, Table 3 shows that 238 (96.9%) of women received prenatal care and 123 (49.5%) had the syphilis diagnosed during prenatal care. 72 (29.0%) were diagnosed at the moment of delivery or curettage. Most of the women, 212 (85.4%) performed non-treponemal testing, highlighting 8 (3.2%) that weren't tested at all. 172 (69.3%) didn't perform a treponemal test. Only 67 (27%) of the pregnant women received proper treatment and 52 (20.9%) had their partners treated.

Table 3. Variables from the case monitoring process of congenital syphilis in a Health Region of Ceará, from 2015-2019. Ceará, 2020.

Variables		
	N	%
Prenatal care		
Yes	238	95.9
No	4	1.61
Ignored	6	2.41
Moment of diagnose of maternal syphilis	N	%
During prenatal care	123	49.5
Delivery/curettage	72	29.0
After delivery	32	12.9
Not performed	3	1.20
Ignored	18	7.25
Treponemic tests	N	%
Reactive	33	13.3
Non-reactive	15	6.04
Not performed	172	69.3
Ignored	28	11.2
Non-treponemic tests	N	%
Reactive	212	85.4
Non-reactive	17	6.85
Not performed	8	3.22
Ignored	11	4.43
Treatment plan	N	%
Appropriate	67	27.0
Inappropriate	134	54.0
Not performed	29	11.6
Ignored	18	7.25
Treated partner	N	%
Yes	52	20.9
No	157	63.3
Ignored	39	15.7

Source: SINAN (2020).

In this epidemiological study, considering the period from 2015 to 2019, the results show a total of 248 cases. Although, these numbers were not in concordance with the Pan American Health Organization (OPAS, 2015) goals to erradicating the disease, it is far from reaching the extinction of this condition. The Health Ministry establishes goals and aims, seeking an incidence of congenital syphilis lower than 0.5/thousand live births until 2015 (Ceará, 2018).

We found differences in incidences of congenital syphilis between the counties in the area studied. Certainly the counties are in different stages of development and organization of the epidemiological monitoring system, as well as in the health care system. However, the differences can mean an improvement in notification of the cases over the years, credited to the progress in epidemiological monitoring in the counties and the State.

It is a possibility that the increase of the incidence of this disease in Brazil and Ceará is explained by an improvement in the data quality on the National System of Notifiable Diseases affected by the following factors: increase in the frequency of diagnoses and notification of syphilis in pregnant women and newborns, the mandatory Non-Treponemic (VDRL) test performed in the moment of delivery, and the establishment of rapid testing as a detection strategy, and early treatment in cases of syphilis and HIV in pregnant women at the primary care health service units and hospitals (Lopes et al., 2016).

Congenital syphilis affects children born from mothers belonging to all reproductive age groups, showing unprotected sex practice regardless of age group. The highest concentration of notifiable cases occurred between women from 20 to 34 years old. This finding is justified by the fact that this is the peak of reproductive stage, which leads to a higher number of pregnancies at this age.

The early diagnosis in reproductive stage women and the performing of the VDRL test in women who express the intention of becoming pregnant during medical visits for the program for sexual and reproductive health, general gynecological appointments, including appointments for cervical and breast cancer prevention, can have a positive impact on the rates of diagnosis. Therefore, it is necessary to have a greater incentive for those family planning actions to be fully established in all primary care health services (Ceará, 2017).

The World Health Organization highlights that interventions related to light technology towards maternal and newborn care allow a great decrease in the occurrence of congenital syphilis. Congenital syphilis

prevention demands a greater discussion regarding the amplitude and severity of syphilis, mainly with pregnant women. This awareness must reach all levels of health services, from managers to care providers. Beyond that, the community must be informed and convinced that prevention and treatment can result in important gains for women and children's health (Vasconcelos et al., 2016).

Another important aspect is the high number of cases of syphilis between pregnant teenagers. These findings confirm early and unprotected sexual initiation, which leads to the need to promote safe sex practices. A study performed in the United States regarding the confidentiality in health services shows that the data are limited by pointing to the confidentiality of IST cases in teenagers and young adults. The study also shows that women are the most concerned about confidentiality, pointing out that men search for support for the IST over the internet. In addition to that, the confidentiality between young teenagers is very daunting. They are afraid to acquire health services because they imagine that one of the professionals will inform their parents about the private conversations with the doctors (Leichliter, Copen, & Dittus, 2017).

Prevention and intervention measures must be compatible to the specifics of each group, because the variance of behavior is associated to the different risks to become ill. Low adherence to condom wearing in sexual relations, especially for women, can be related to gender inequality on condom wearing negotiation with casual or serious partners. Given the risk of syphilis, it is essential to raise teenager's awareness towards an attitude change, promoting self protection (Nunes et al., 2017).

The data associated with the level of educational instruction in the area studied show higher incidence of women with low educational levels, i.e. not completing elementary school. In consonance with a study performed in Paraná, between 2011 and 2015, that shows that illiteracy and functional illiteracy are variables that are statistically associated to gestational syphilis where the higher prevalence occurred in women with less than 8 years of educational instruction (32.5%) (Padovani, Oliveira, & Peloso, 2018).

Therefore, we can infer that women with low educational levels are more likely to acquire syphilis, making the sexual transmission easier. Thus, we emphasize that education in our country requires special attention, because educational instruction is an important variable, makes information easier to understand, and to access formal labor markets, health services and, consequently, the improvement of health and life conditions of the population (Teixeira, 2015).

This research result points to brown color of the mother, age between 20-35 years old and maternal low educational level as independent risk factors to congenital syphilis. Although these findings were not unexpected, they are relevant for pointing to the contribution to social inequalities in determining a serious outcome and potentially predictable contracting of congenital syphilis. Previous studies on risk factors for congenital syphilis performed in Brazil and other countries around the world, such as United States and Bolivia, have already shown the role of socioeconomic characteristics, such as black and brown race and educational levels.

The results concerning the work process analysis of this research show that the number of pregnant women who received prenatal care were 95.8% (238 pregnant women), being considered a satisfactory statistic for the counties that belong to the focused health region. This finding can be related to the training of human resources and to the expansion of access of pregnant women to prenatal appointments, in consequence of the establishment of Family Health Strategy Teams (ESF) that, according to the Health Office of the State, in the year of 2014, 23 counties that make this health region had more than 80% of their territory covered by teams of Family Health Strategy. This coverage has been progressively growing over the years.

Although an increase of the proportion of pregnant women with syphilis that received prenatal care in the health region had occurred, those numbers can be considered just satisfactory. This result had been already foreseen in the Operational Plan, in addition, previously, policies focused in the improvement of prenatal care, such as humanization of childbirth, were established in Brazil.

Despite the increase of prenatal coverage, the quality of the pregnant women care is beyond the amount of medical appointments, it is associated with several factors and protocols that must be done during prenatal care. Congenital syphilis is an easily prevented disease, from early diagnosis and treatment in prenatal care, that begins in Health Primary Care in the Unified Health System (SUS). These actions are necessary to impact the decrease of morbimortality associated to vertical transmission. These actions must be present in SUS to assure the right to humanized care in reproductive planning, prenatal care, puerperium and child care in the health services (Ceará, 2018).

Access to inputs such as rapid tests, routine exams, medicines to treat gestational syphilis and technical material was intensified by the organization of Health Care Networks (RAS), using as the main core the Health

Primary Care that is essential to the establishment of decision-making and follow-ups of the prevention and treatment actions, because it must be considered the front door of the health care system. The attention towards the first contact of the users with the health services leads to the accessibility involving aspects such as closeness between health services and subscripted population, schedule availability, medical appointment dates and flexibility on appointment scheduling (Kleinubing, Paula, Padoin, Ferreira, & Silva, 2017).

In the focused health region, there was noted a large area of prenatal care coverage, but it also highlighted fragilities in carrying out the recommended routine referring specially to the VDRL testing and treatment of syphilis when diagnosed in pregnant women and their partners. There are still many issues between the health care professionals concerning the correct management of gestational syphilis and consequently towards the control of CS. The author states that special monitoring of pregnant women with syphilis is essential. The transportation and mobilization of community health agents, making domestic visits to the pregnant women and their partners would contribute a lot to the improvement and control of the cases (Guanabara, Leite-Araújo, Matsue, Barros, & Oliveira, 2017). Aspects like sociocultural behavior in the health assistance for pregnant women with syphilis, which goes beyond human, material and medical resources.

Before the significant increase of ignored data in the variables presented in this paper, we highlight the importance of appropriate filling of forms can affect the quality and pertinence of system information. Incomplete data affects the assessment of the quality of the system. In the analyzed period, the action for prevention and control of vertical transmission of syphilis developed in the counties of the region were weakened and did not reach the expected results. This condition expresses a great flaw in the acknowledgment of the real health situation, and, therefore, the action planning and monitoring of indicators (Oliveira, Duarte, Pavão, & Viacava, 2019).

Conclusion

This study shows that the determinant factor of congenital syphilis concentrates not only in the quality of the care offered to the women during prenatal care, but it is deep-rooted in social, economic, cultural and behavioral factors experienced by the women. Therefore, it must be a concern of public policies towards acting on the social determinants to improve the current health conditions.

Thus, this research shows that some limitations occurred from the use of secondary data, specifically concerning the possibility of duplicate notification of the same case. A high occurrence of blanks were observed in the studied variables. Besides, the incidence can be underrated due to under-registration of cases. Finally, the analysis of risk factors of congenital syphilis were restricted to the variables that were common to the data base on notifiable cases of congenital syphilis and on the number of live births.

Given the findings in this study, it is necessary to establish actions seeking the control of the disease, intensifying the notification, decreasing the underreported data, as well as intensifying measures related to sexual and reproductive health promotions of the population, timely diagnosis and treatment to avoid congenital syphilis.

Therefore, considering the need to decrease the cases, it is important that health professionals who play an important role in the prevention process, have access to information that show the magnitude of the problem in each region, and acknowledge flaws and also to build with the managers, the planning and monitoring strategies to be implemented.

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