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Clinical and socioeconomic determinants of congenital syphilis in Posadas, Argentina

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SUMMARY

Objectives: To explore clinical and socioeconomic factors related to congenital syphilis in Posadas, Argentina.
Methods: Data were collected from 102 mothers who had given birth to an infant with congenital syphilis at Dr. Ramón Madariaga Central Hospital (2005–2007) and 306 control mothers. Clinical and demographic information were collected from clinical records, and socioeconomic details were obtained by interview. Multivariable logistic regression was used to explore the relationships between congenital syphilis and clinical and socioeconomic factors.
Results: Receiving the recommended number of prenatal health checks had a clear protective effect on congenital syphilis in the univariate analysis (odds ratio (OR) 0.52, 95% confidence interval (CI) 0.31–0.86), as did being in a stable relationship (OR 0.23, 95% CI 0.14–0.38). Furthermore, women with secondary education or above were over four-times less likely to have a child with congenital syphilis compared to women who had not completed primary school education, even after controlling for the number of prenatal health checks and other factors (adjusted OR 0.24, 95% CI 0.08–0.72). In addition, women with previous stillborn births were over three-times more likely to have a baby with congenital syphilis after controlling for education and prenatal care (adjusted OR 3.37, 95% CI 1.24–9.16).
Conclusions: There is a clear opportunity for reducing the burden of congenital syphilis by promoting syphilis screening and treatment in women with previous stillborn births. In addition, the potential impact of more general policies addressing social determinants of health, such as those improving education, must not be overlooked.

1. Introduction

Untreated syphilis during pregnancy is an important public health concern: it may lead to congenital disease and is a significant cause of adverse pregnancy outcomes (including stillbirth, miscarriage, intrauterine growth retardation, premature delivery, and early neonatal death).[1,2] Congenital syphilis can be prevented by detection and treatment of maternal syphilis at least 30 days before childbirth. Antenatal screening for syphilis is inexpensive and technically feasible even in low-resource settings, as is effective treatment with penicillin. Nevertheless, in 2005 it was estimated that over two million pregnant women globally test positive for syphilis every year, and between 692 100 and 1 527 600 infants are born with congenital syphilis.[3] The problem is particularly visible in the Americas region (excluding the USA and Canada), which has the highest seroprevalence of maternal syphilis at 3.9%, and where nearly half a million cases of congenital syphilis occur every year.[4] Addressing the barriers to accessing antenatal healthcare services is an important challenge for the control of congenital syphilis in the area, but is not sufficient and should be complemented with other measures such as enhancing the quality of care received.[5] A study in Bolivia showed that while 76% of women had received prenatal care, only 17% had had syphilis testing carried out.[6] Furthermore, the Pan American Health Organization (PAHO) estimates that in Latin America and the Caribbean, every year some 330,000 women who test positive for syphilis during pregnancy do not receive treatment.[7]

In 2007, the World Health Organization (WHO) launched a campaign for the global elimination of congenital syphilis.[8] The four pillars of this campaign are (1) ensuring sustained political

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commitment and advocacy; (2) increasing access to and quality of maternal and newborn health services; (3) screening and treatment of pregnant women and their partners; and (4) establishing surveillance, monitoring, and evaluation systems. Currently, there are policies recommending universal syphilis screening during pregnancy in every country worldwide, but it is its implementation that is weak in many settings, particularly populations with the highest disease burden. Implementation strategies must address the barriers to universal adoption of the simple and effective preventive strategies available and ensure they are reaching all population groups. Studies have shown congenital syphilis to be related to low socioeconomic status of the mother,[9] and social disparities have also been observed with regard to a woman's access to antenatal care, as well has her experience of it and the benefits derived.[10] Socially generated differences in prenatal care can have an enormous impact on health inequalities because they influence the early years of life, when individuals are particularly vulnerable.[11] Implementation of the current prevention may be significantly improved by targeting individuals most at risk. Therefore, it is necessary to explore the social determinants of maternal and congenital syphilis and to identify the most vulnerable populations. In line with this, the objectives of the present study were to explore the clinical and socioeconomic factors related to maternal and congenital syphilis in Posadas, Argentina.

2. Methods

2.1. Study participants

Study participants were recruited at the Dr. Ramón Madariaga Central Hospital in Posadas, Misiones, Argentina during 2005–2007. This area of Argentina has both public and private health care services. Between 60% and 65% of all birth in Misiones (approx. 6000 per year) occur in the public health services, and of these approximately 30–35% occur at Dr. Ramón Madariaga Central Hospital, a public hospital serving a predominantly urban population. One key consideration is that the mothers attending this hospital, and therefore eligible for inclusion in the study, are generally of a lower socioeconomic level compared to all births in Misiones Province. The incidence of congenital syphilis in the hospital-based population during the years of study is estimated to be between 10 and 25 cases per 1000 live-births. Live-born infants who met the PAHO recommended case definition for epidemiological surveillance purposes (''Any live-born infant, stillborn infant, or pregnancy outcome (e.g. spontaneous or other abortion) whose mother had clinical evidence (genital ulcer or lesions compatible with secondary syphilis) or a positive or reactive treponemal test (including rapid treponemal tests) or non-treponemal test during pregnancy, delivery, or puerperium, and who has not been treated or has been treated inadequately''[6]) were prospectively enrolled in the study as cases. Although the PAHO case definition also includes stillborn infants and other adverse pregnancy outcomes, we did not attempt to gather information on these cases and thus restricted our analysis to live-born infants. Serology was also available, and all case infants tested positive, but a priori we chose to use this more generic definition of congenital syphilis to aid comparability with other studies.

For every case, three live-born infants without a diagnosis of congenital syphilis were randomly selected from deliveries occurring in the hospital during the same month. This selection was made using the laboratory records, and so in order to be selected the mother must have undergone the standard laboratory tests. Controls were not matched by age or any other factor. The only criterion used for selection was the absence of untreated syphilis. Data were initially collected from the clinical records at the time of entry into the study, while interviews were by and large carried out sometime after the birth. Due to the setting of the study it was, at times, difficult to localize the women for interview and it is important to recognize that the present study includes only those mother–infant pairs who had provided their socio-demographic information by interview. Here we present the data collected from 408 mothers who gave birth to a live-born infant at Dr. Ramón Madariaga Central Hospital in Posadas, Argentina during 2005–2007: 102 had given birth to a child with congenital syphilis according to the predefined criteria, and 306 participants were controls. All participants consented to taking part in the study, and the study protocol was reviewed by the Dr. Ramón Madariaga Central Hospital Bioethics Committee and was approved by the Ministry of Health of Misiones, Argentina (Exp 6106-024-2007, Approval No. 414/2007).

2.2. Data

Clinical and demographic information, including treatment history for syphilis, were collected from available clinical records including laboratory data. Socioeconomic details were obtained by interview with the mothers either at home or in the primary health care centers.

Serum samples were obtained at the time of delivery for laboratory testing. Laboratory tests were performed in the hospital laboratory, using a standardized procedure: qualitative and quantitative treponemal tests (syphilis MHA-TP, Fujirebio®, Serodia laboratories) and non-treponemal tests (Venereal Disease Research Laboratory, Wiener laboratories SAIC, Argentina). Other information collected included the infant's birth weight, gestational age of the infant, and the presence of symptoms suggestive of congenital syphilis (according to the recommendations for the prevention of vertical transmission of congenital syphilis, 2003[12]).

The number of prenatal care visits was recorded and categorized as fewer than five, five to eight, or more than eight, according to current recommendations from the Argentinean Ministry of Health regarding standard prenatal care.[13] Furthermore, we recorded if the mother was HIV-positive, and if there was a history of stillbirths or miscarriages.

We recorded the mother's date of birth and the location of her primary residence, which was split into four categories with regard to the distance to the city center: center of Posadas, semi-center of Posadas (2–5 km from center), outskirts of Posadas (approximately 6–9 km from city center), and over 10 km from city center. We also collected information with regard to the mother's level of education. For analysis this was split into three categories: none or incomplete primary education, primary education, and secondary education or above. Information regarding the household, such as number of rooms and number of family members, was used to classify the households using an adaptation of the index of unsatisfied basic needs (NBI),[14] a commonly used indicator in Argentina. The NBI index measures poverty using non-monetary aspects. Households were deemed to satisfy basic necessities when they had a plumbed bathroom, no more than three people sharing a bedroom, and no more than four people dependant on one working person. As this indicator does not specifically take into account the earnings of the working individuals, we also collected information with regard to the total household monthly income in pesos. This was used to calculate a dichotomous variable: less than 4 pesos (roughly US$ 1) per capita per day, or at least 4 pesos per capita. In addition, we wanted to consider if the mother was in a stable relationship. For this we recorded if the mother lived with a partner, and used the duration of cohabitation as a proxy variable. Finally, we recorded the age at which she had become sexually active and the number of sexual partners she had had in the 3 years prior to the birth.