Syphilis and Pregnancy: a Two-Period (2006 and 2011) Comparative Study of a Puerperal Women Population

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ABSTRACT

Introduction: in 2005, syphilis in pregnant women was included in the list of diseases of compulsory notification, in an attempt to control the vertical transmission **Objective:** to compare two periods in a population of mothers for verification of congenital syphilis as a factor of prenatal care. **Methods**: this is a retrospective and prospective comparative cross-sectional observational study of CS cases occurred in two distinct periods, with a total of 1,024 mothers, 512 each period (2006 and 2011), in four hospitals in the city of Campo Grande, State of Mato Grosso do Sul. The diagnosis was based on the criteria proposed by the Ministry of Health. An interview with bed was carried out and test verified during prenatal period or time of hospitalization. **Results**: the prevalence of congenital syphilis in the first period (2006) was of 2.3%, and in the second (2011), 0.58%. A significant association was observed between the two periods, and also an increased frequency of infectious and sexually transmitted diseases from 3.5% (2006) to 10.1% (2011). No significant association was observed between the periods studied with the variables related to maternal-fetal syphilis infection, partner treatment, and treatment of other children. **Conclusion**: the unawareness about the importance of syphilis prevention, in addition to the necessary attention when a pregnant's card is completed, and the increased identification of other infectious diseases during prenatal care in 2011 compared to 2006 was observed. There was no appropriate treatment of patients and partners, nor tracing of children in neither period.

Keywords: syphilis, congenital syphilis, prenatal care, STD.

INTRODUCTION

Puerperal and prenatal attention should be based on actions to ensure health promotion and prevention, as well as diagnosis and treatments that should occur during this process. Therefore, a prenatal and puerperal humanized care is essential for the mother and the neonatal welfare[1]. According to the Ministry of Health, sexually transmitted diseases (STD) are a major concern worldwide, due to the number of people infected each year with some STD. As reported by the World Health Organization, the estimate is of, approximately, 12 million new cases of people infected annually with some sex-related disease, among which syphilis has a great representativeness[2].

Although syphilis (SF) is a disease of known etiology, achieving 100% of success in its prevention, treatment and cure, and also meeting everyone's reach, an increase of this disease is still verified. In 2005, the Ministry of Health included syphilis in pregnant women in the diseases of compulsory notification list, in an attempt to control the vertical transmission of *Treponema pallidum* and properly monitor the infection process, and therefore plan and evaluate measures of treatment, prevention, and control[2]. In Brazil, the prevalence of syphilis in puerperal women is of 1.6%, approximately four times superior to infection with HIV, representing about 50,000 mothers infected in 2004. This fact points at the quality of the health care, and 4,000 new cases can occur every year, with an incidence rate of 1.6 case per 1,000 liveborn[3].

Prenatal care is a right to all pregnant women, and it is the health professional duty to act in the best possible way, and the failure in doing so is considered one of the main factors of congenital syphilis (CS). The main objectives of the prenatal period are the following: to take care of the pregnant woman from the beginning to the end of pregnancy, the birth of a healthy child, and the welfare of both[1]. The high rate of pregnant women not tested, the prenatal interruptions, and no screening procedures for HIV/syphilis are factors that difficult the prevention of CS and promove the vertical transmission[4].

Macedo *et al*. observed that inaction of health system managers to prevent vertical transmission through counseling service, epidemiological surveillance, and tracing of the partner are factors affecting the prevention of HIV and syphilis vertical transmission[5]. No prenatal care and its inadequate or incomplete performance can cause congenital syphilis. Further information are necessary to pregnant women, as well as a greater interest from health professionals[6].

The Ministry of Health preconizes the realization of two exams to check the seropositivity for syphilis through VDRL test (Venereal Disease Research Laboratory). However, a study accomplished in 2004 involving 2,857 pregnant women observed that 51% of them were not submitted to any test for syphilis[7]. We still face a serious public health problem, despite the fact that syphilis is a STD, and preventive measures can become effective mechanisms in its decrease and/or eradication, where diagnosis is fast and efficient, and the treatment involves low cost medications and dynamics.

OBJECTIVE

The objective of the present study is to compare two distinct periods, 2006 and 2011,in four main maternity hospitals under agreement with the Health System (SUS), to certify the frequency of congenital syphilis as a factor of prenatal care. Relate the sociodemographic data in puerperal populations during two periods (2006 and 2011). Check the frequency of syphilis, other STD, prenatal infections in the evaluated population, as well as the characteristics related to the syphilitic infection in this population.

METHODS

A cross-sectional, observational, comparative, retrospective and prospective study of CS cases occurred in a sample of 1,024 puerperal women from four major maternity hospitals of the city of Campo Grande, State of Mato Grosso do Sul. The sampling was divided in two investigation periods with 512 patients each: from

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February 1st, to April 30, 2006 (2006), and from September 2010 to September 2011 (2011). The sample was by convenience, excluded those not presenting the pregnant woman card.

In both periods puerperal women were submitted to non-treponemal serological tests (VDRL - Venereal Disease Research Laboratory) and, in cases of false-positive suspicion (collagenosis, VDRL reactivity due to pregnancy), they were submitted to treponemal tests (Fluorescent Treponemal Antibody Absorption FTA-Abs, ELISA syphilis, and TPHA). The diagnosis was based on criteria proposed by the Brazilian Ministry of Health and by the Centers for Disease Control and Prevention (CDC)[8,9] as well. According to these criteria, it was considered SF carrier every pregnant woman with: 1) VDRL above 1:4 and absence of prior treatment, or 2) title lower than or equal to 1:4, but without previous treatment and presenting any of the following conditions: absence of prenatal monitoring, sexual intercourse with different partners injectable drugs consumption, or clinical or radiological signs of congenital syphilis showed by neonate.

Considering the CS, the CDC are classified into two categories, depending on the laboratory findings: the clinical history of the pregnant woman, and the prenatal maternal treatment during follow-up. In cases of suspected SF, all criteria mentioned earlier and recommended by the Ministry of Health were considered.

Data were collected through questionnaire after childbirth through direct interviews with puerperal women during the period of 2011, and subsequently assembled by Excel and Prism version 4.01 software. Data from a study published in 2006 for this population were used for comparison. The study was approved by the Research in Human Beings Ethics Committee of the Federal University of Mato Grosso do Sul, under protocol 858, dated March 8, 2007.

RESULTS

The average mother's age of the general population of 1,024 puerperal women was of 24.45 ± 6.2 years, and among infected women of the first period (2006), 8.3% (1/12) of the sample was composed of adolescents (those in the 12 to 17 years and 11 months age group), 41.7% (5/12) in the age group from 20 to 29, and 50% (6/12) in the age group from 20 to 30, according to data shown in **Table 1**.

Considering the demographic and epidemiological characteristics of the analised population in 2006 and 2011, most puerperal women were from the urban area of Campo Grande (MS), where the study took place. In terms of ethnicity of the infected group, in the first period (2006) 47.1% (6/507) were white, although 39,2% (4/507) considered themselves mulatto, a percentage showing an association with the second period (2011), in which 75,9% (3/495) are mulatto. In relation to schooling, in the first period (2006), 32.4% (6/506) presented an incomplete lower school level, 22,3% (5/506) high school level, another relevant percentage when compared to the second period (2011): 27.9% (2/464) also reported complete high school level. Marital *status* was more prevalent in both periods, but is also calls our attention single women status: both periods showed significant results, 30.33% (5/464) in 2006, and 55.4% (1/464) in the period of 2011, as described in **Table 2.**

The frequency of CS observed in the first period (2006) was 2.34% (12/512), and in the second period (2011), 0.58% (3/512). Considering the two periods, the frequency of CS was 1.46% (15/1,024). The coefficient of CS found for 2006 was 23.4 cases per 1,000 liveborn, and 5.85 cases per 1,000 liveborn for 2011, showing a decrease in the second period (2011). In both periods studied (2006 and 2011), perinatal mortality coefficient of CS was zero.

None of the groups presented SF concomitant contamination with other sexually transmitted diseases, but it was observed an increase in the frequency of infectious and sexually transmitted diseases in the second period studied (2011).

In the first period (2006), 2.34% (12/512) showed seropositivity for shyphilis, 0.97% (5/512) for toxoplasmosis, and 2.54% (13/512) for *Chlamydia spp*. In the second period (2011), 5.85% (30/512) showed IgM serology reactive for toxoplasmosis, 6.64% (34/512) for rubella, and 4.69% (24/512) for CMV (cytomegalovirus), and (11/512) for *Chlamydia spp,* as described in **Table 3**.

When the presence of infections in pregnant women in 2006 and 2011 was compared, a significant association between the periods studied was observed, and also an elevation of the frequency of sexually and infectious transmitted diseases, from 3.5% (2006) to 10.1% (2011). These data are shown in **Table 4**.

In 2006, twelve pregnant women presented positive diagnosis for syphilis, and 75% (9/12) of them reported prior prenatal care, and in 2011, 100% (3/3) reported the same. In the first period (2006), the percentage of maternal syphilis diagnosis was of 58% (7/52) after delivery; in the second period (2011), 66,7% (2/3) before delivery. In the first period (2006), 67% (9/12) of pregant women did not follow treatment properly; in the second period (2011), 66,7% (2/3) of them did so, seeking the prevention of *Treponema pallidum* (TP) vertical transmission.

Considering the treatment of the partner, in the first period (2006), 58% (7/12) did not receive it appropriately, and in the second period (2011), 66,7% (2/3). As for the tracing of children in cases of syphilis in the first period (2006), 58% (7/12) were not treated, and in the second period (2011), 66,7% (2/3) were treated. When pregnant infected women of the two periods (2006 and 211) were compared, no significant association was found between the studied periods with the variable related to maternal-fetal syphilitic infection, partner and other children treatments, according to data shown in **Table 5**.

Table 1 – Percentage of population analysed according to age group and the studied periods in the city of Campo Grande, Mato Grosso do Sul State (n = 1,024).

Age Group	Population Analysed				Infected with *Treponema pallidum*			
	2006		2011		2006		2011	
	n	%	n	%	n	%	n	%
10+-20	115	22.3	127	24.72	1	8.3		0
20+-30	288	56.4	273	53.30	5	41.7	3	100
30+-40	103	20.1	105	20.62	6	50.0		0
40+-45	6	1.2	7	1.36	0	0		0

Table 2 – Demographic and epidemiological characteristics related to maternal syphilis according to the studied periods in the city of Campo Grande, Mato Grosso do Sul State (n = 1,024).

	Ano de 2006				Ano de 2011			
	Population Infected with *T. pallidum*		General Population		Population Infected with *T. pallidum*		General Population	
	n	%	n	%	n	%	n	%
Birthplace								
Campo Grande	4	50.79	257	50.8	3	100	351	68.5
Other city	3	33.60	170	33.6	0	0	114	22.3
Other state	5	15.61	79	15.6	0	0	47	9.2
Total	**12**	**100**	**506**	**100**	**3**	**100**	**512**	**100**
Area								
Urban	10	91.32	463	91.3	3	95.3	487	95.9
Countryside	2	8.68	44	8.7	0	4.7	21	4.9
Total	**12**	**100**	**507**	**100**	**3**	**100**	**508**	**100**
Ethnic group								
Yellow	0	1.9	9	1.8	0	1.2	6	1.2
White	6	47.1	239	47.1	0	19.5	96	19.4
Black	2	11.8	60	11.8	0	3.4	16	3.2
Mulatto	4	39.2	199	39.3	3	75.9	377	76.2
Total	**12**	**100**	**507**	**100**	**3**	**100**	**495**	**100**
Schooling								
Illiterate	0	0.4	2	0.4	0	0.58	3	0.7
Incomplete lower school	6	32.4	164	32.4	0	20.9	107	23.1
Complete lower school	1	19	96	19	1	17.2	87	18.7
Incomplete high school	0	18.6	94	18.6	0	15.8	80	17.2
Complete high school	5	22.3	113	22.3	2	27.9	143	30.8
Incomplete college	0	5.5	28	5.5	0	5.07	26	5.6
Complete college	0	1.8	9	1.8	0	3.55	18	3.9
Total	**12**	**100**	**506**	**100**	**3**	**100**	**464**	**100**
Marital status								
Single	5	30.33	152	30.2	1	55.4	283	57.6
Cohabitee	5	28.23	142	28.2	0	8.4	42	8.6
Married	2	39.76	200	39.8	2	32.4	166	33.8
Divorced	0	1.79	9	1.8	0	3.8	0	0
Total	**12**	**100**	**503**	**100**	**3**	**100**	**491**	**100**

Note: Most of the Tables analysed presented a total coefficient of less than 512, as blank questions were not considered.

DISCUSSION

Comparing the periods studied (2006 and 2011), it was verified an increased frequency of syphilis among HIV-infected pregnant women between the ages of 20 and 30, as also observed in other studies[6,10,11], while 50% of infected pregnant women in the period of 2006 were in the age group from 30 to 40 years. Observing both periods, and considering the demographic and epidemiological characteristics, data regarding ethnicity, educational level, and marital status call attention due to values that did not prevail in the first period (2006), but that are equivalent to those shown in the second period (2011). Even though infected pregnant women in both periods had completed high school, the unawareness of the disease and the lack of information were observed, hindering the understanding of the infection particularities[4,6,7,12].

In both periods (2006 and 2011), the frequency of CS was superior than the one preconized by the Ministry of Health, as eradication or reduction to 1 case per 1,000 liveborn is a national control goal[3]. A significant element that should be noted by professionals of the health area is the increase of other transmitted and infectious diseases, from 35/512 in the first period (2006) to 103/512 in the second (2011), totaling 138/1,024. The increase of reagent cases to toxoplasmosis, and the emergence of rubella and CMV infections in the second period (2011) are worth giving attention to. These infections were identified in pregnant women from the State of Sergipe in a study similar to ours[13].

Table 3 – Distribution of the studied population with STD and infectious diseases in relation to the studied periods in the city of Campo Grande, Mato Grosso do Sul State (n = 1,024)

Sexually Transmitted Diseases – Reagent Serologies	2006 n = 512		2011 n = 512	
	n	%	n	%
Syphilis	12	2.34	3	0.58
Toxoplasmosis (IgM)	5	0.97	30	5.85
Rubella (IgM)	0	0	34	6.64
HBV	3	0.58	1	0.20
HCV	0	0	0	0
CMV (IgM)	0	0	24	4.69
HTLV	1	0.20	0	0
Chagas Disease	0	0	0	0
HIV	1	0.20	0	0
Chlamydia spp. (IgA)	13	2.54	11	2.15
Total	**35**	**6.83**	**103**	**20.11**

Other relevant data was the high rate of *Chlamydia spp.*, which remained constant in both periods. These are information that deserve attention and also suggest another study for the contribution to the prevention of in preventing preterm births, premature amniorrexe and neonatal morbidities associated with *Chlamydia*[14]. All these infections are investigated through filter paper technique in PPG-MS (Pregnant Protection Program of Mato Grosso do Sul)[14], which has not ensured the reduction in the rate of congenital syphilis and other diseases. Still in the State of Mato Grosso do Sul, a survey from 2004 to 2007 showed the high rate of toxoplasmosis, chlamydia, and syphilis, revealing higher prevalences than data estimated by the Ministry of Health. Such a rate justifies the need for the systematization and analysis of the collected data, so that implementation of services becomes really effective[15].

Table 4 – STD and infectious diseases association according to the studied period in Campo Grande - MS (n = 1,024).

	Studied Period			Value of *p*	OR (IC 95%)
	2006	2011			
Infectious diseases and STD					
Present	35 (3.5%)	103 (10.1%)	138 (13.6%)	0.0001	0.29 (0.19-0.43)
Absent	477 (46.5%)	409 (39.9%)	886 (86.4%)		
Total	512 (50%)	512 (50%)	1,024 (100%)		

In 2002 and 2003, from 32,512 pregnant women also examined in the State of Mato Grosso do Sul, 252 (0.77%) were diagnosed with syphilis, 137 (0.42%) with toxoplasmosis, and 71 (0.21%) with HIV[16]. These data show the prevalence of syphilis among STDs, confirming the urgent need for the improvement of perinatal care, once all these aggravations can be timely identified and attendances of quality started.

Syphilis is a disease of easy diagnosis and treatment, and the prenatal care quality and the way it should be done are evidenced in different studies. Although its importance is unknown to pregnant

Table 5 – Variables related to maternal syphilis and association with the studied period in Campo Grande - MS (n = 15/1,024).

Variables related to syphilis in pregnant women	Studied Period		Value of *p*	OR (IC 95%)
	2006	2011		
Maternal syphilis diagnosis				
Before delivery	5 (42%)	2 (66.7%)		
After delivery	7 (58%)	1 (33.3%)	0.56	0.35 (0.02-5.11)
	12 (100%)	3 (100%)		
Maternal syphilis treatment				
Appropriate	3 (33%)	2 (66.7%)		
Inappropriate	9 (67%)	1 (33.3%)	0.24	0.16 (0.01-2.56)
	12 (100%)	3 (100%)		
Partner's treatment				
Yes	5 (42%)	1 (33.3%)		
No	7 (58%)	2 (66.7%)	1.00	1.42 (0.09-20.45)
	12 (100%)	3 (100%)		
Tracing of syphilis in other children				
Yes	5 (42%)	2 (66.7%)		
No	7 (58%)	1 (33.3%)	0.56	0.35 (0.02-5.11)
	12 (100%)	3 (100%)		

Fisher's Exact Test was used for comparison.

women, the professional should accomplish it in the best possible way, in a proper and correct way, which often does not occur[4,6,7,17].

Although the number of infected pregnant women in the second period (2006) was lower than in the first one (2006), it does not mean an improvement of the prenatal care quality, as the diagnoses did not occurr properly in neither period (during prenatal care) nor the monitoring and the appropriate treatment to pregnant women, as recommended by the Ministry of Health[2,3].

The treatment of the partner is another data that shows the fragility of the health service. Partners of infected pregnant women were not treated in both periods. For the Ministry of Health, the partner of a pregnant woman with syphilis or non-viral STD should be notified of the treatment, and even if he fails to attend, should be "object" of an active research of the epidemiological surveillance or family health teams of his neighborhood, and be considered a carrier of the same disease, yet do not present any clinical symptoms, and receive the same treatment[2].

Considered a serious problem of public health, congenital syphilis arises in these studies in different periods, as a devastating and ignoble consequence, as it is fully liable of treatment and cure, being necessary not only maternal care, but also the professional interest on positive results for syphilis[6]. Even so, prenatal care was not carried out correctly, as noted in both periods (2006 e 2011): in which treatment has not reached 100%. As most children are asymptomatic at birth, the application of serological tests must be performed carefully, and titles of non-treponemal serology of the child subject to comparison with those of the mother.

Another important matter to be noted is the case of non-reagent newborn with epidemiological suspicion. Serological tests should be repeated after three months, as a late positive result might ocurr[18-21]. From 1998 to 2004, 24,448 cases of the disease were reported. In 2003, a mortality rate of 2.7 per 100,000 in children under 1 year was observed, showing an insufficient control over this harm[3].

A survey from 1999 to 2002 revealed that from 7,309 fetal deaths in the municipality of Rio de Janeiro, 292 (4.0%) had CS as the basic cause; among these, 222 (5.3%) fetal, and 70 (2.3%) early neonatal[18], data that could be avoided if prenatal care was carried out correctly. Not only prenatal care, but also the newborn monitoring is important.

After evaluation of the syphilis eradication campaigns in Rio de Janeiro during 1999 and 2000, Saraceni *et al.*[22] proposed in their study a clinic to adequately attend seropositive children for syphilis, since there is not a specific policy for this monitoring. Both services and campaigns to eradicate syphilis should contemplate the entire health service, and not be limited to locations for pregnant women attendance only. When training or capability programs of the health care professionals are undertaken, it should be considered that the existing proposals have not yet achieved the objectives suggested[16,18,22], and once the information concerning prevention is shared, there is a greater chance to reach the general population.

Other important matter is the health professional attention and care, allied to the interest to reduce CS. To obtains such a purpose, the correct information reported in the pregnant woman card are extremely important[23,24]. Although SUS (Public Health System) offers the tests for the diagnosis, and also the medication and the assistance for prevention campaigns, there is no commitment to implement projects favouring the improvement of the service, the interest of professionals, and even capacitation and updating projects, resulting in gaps in services which offer prenatal care and do not reach the proposed objective, which is to decrease congenital syphilis[5,22,25].

The consequence of this existing gap is the difficulty to meet the women particular needs in the prenatal, delivery and puerperal moments, and also promoting to full health. To overcome this situation, is important an improved listening, an adequate approach regarding the biological, psychologial, social and cultural particularities are important, e as well as the way of being, living and feeling. These are the health care team responsibilities, according to its possibilities[3].

CONCLUSION

The frequency of SC found in this research was of 2.3, in 2006, and of 0.58, in 2011, in the selected locations, and a decrease in the rate was noted. Even so, it was not observed a significant improvement in prenatal care. According to the Ministry of Health, the ideal is to provide at least the eradication or reduction to 1 case per 1,000 liveborn. At no time the appropriate treatment of patients and partners or the trace of children occurred.

The social and demographic characteristics of puerperal women were studied, and most of them came from the urban area of the municipality where the research was conducted. Considering ethnicity, education, and marital status, there was an association of data that did not prevail in the period of 2006 with those of the period of 2011.

The frequency of syphilis and the increase of other infectious diseases were recorded, from a total of 35 cases in the period of 2006 to 103 cases in the period of 2011, showing seropositivity for toxoplasmosis, rubella, cytomegalovirus, and the continued increase of Chlamydia spp. during the period of 2011. No significant association between the periods studied and the variables related to the maternal-fetal syphilitic infection was observed.

Conflict of interest

There is no conflict of interest.

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