

# MATERNAL AND CONGENITAL SYPHILIS IN KARNATAKA, INDIA

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**Abstract.** Screening women for syphilis during pregnancy and providing proper treatment are the cornerstones of congenital syphilis prevention. During 2008-2011, 6,221 pregnant women were screened for syphilis using the Rapid Plasma Reagin (RPR) and Treponema Pallidum Hemagglutination (TPHA) tests at R.L. Jalappa Hospital, Kolar, Karnataka, India. The seroprevalence of syphilis during pregnancy ranged from 0.57% to 0.78% during the study. Of the 35 women with a positive test, 26 (74.28%) were detected at the time of labor and 9 (25.71%) were detected during antenatal care. None of the women detected at the time of labor received penicillin therapy for syphilis. Adverse fetal outcomes due to untreated syphilis during pregnancy were seen in many of the cases. During the study 26 infants (3.69/1,000) were diagnosed with congenital syphilis. Our findings show detection and treatment of syphilis during pregnancy needs to be strengthened in the study area to reduce the incidence of congenital syphilis.

**Keywords:** syphilis, seroprevalence, pregnancy, RPR, TPHA, India

## INTRODUCTION

Each year 12 million people contract syphilis despite the availability of inexpensive therapy and effective preventive measures (WHO SEARO, 2009). One sixth of those with syphilis are pregnant women (WHO SEARO, 2009).

Ten to 70% of the infected mothers, if untreated, give birth to children with congenital syphilis (Singh and Romanowski, 1999). The neonates with congenital syphilis may be symptomatic at birth or may manifest disease later, before age 2, or even later (LaFond and Lukehart, 2006).

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Congenital syphilis is a cause of infant mortality (Mabey and Peeling, 2011).

Congenital syphilis can be effectively prevented by prenatal screening and treating those infected pregnant women and their sexual partners (Hart, 1986). Eliminating congenital syphilis (ECS) contributes to reducing child mortality and improving maternal health, two important millennium development goals of the WHO (WHO, 2007, 2011). Reduction in the prevalence of syphilis during pregnancy and the incidence of congenital syphilis are indicators of successful syphilis control programs. There have been few studies of the prevalence of syphilis in pregnant women and congenital syphilis in India (Mathai *et al*, 2001; Sethi *et al*, 2007; Parveen *et al*, 2012).

There is no data regarding the sero-

prevalence of syphilis during pregnancy and the incidence of congenital syphilis in the Kolar region of Karnataka, India. Therefore, we conducted a retrospective study to obtain this data at RL Jalappa Hospital, Kolar, which is a tertiary care center for rural population.

## MATERIALS AND METHODS

We reviewed the results of rapid plasma reagin (RPR, Span diagnostics; Surat, India) and *Treponema pallidum* hemagglutination (TPHA) (Plasma Tec Lab, UK) testing results among 6,221 pregnant women attending the antenatal clinic or presenting in labor to the R.L. Jalappa Hospital, Kolar, Karnataka, India during 2008-2011.

A titer of 1:4 or greater was considered a positive RPR test. For the TPHA test, a full cell pattern covering the bottom of the well was considered a positive test. Positive and negative controls were used for quality control. The results were considered valid if the control results were appropriate. During the same period, 20 serum samples from neonates born to seropositive women were also tested with the RPR and TPHA tests.

The percentage of syphilis seropositivity among pregnant women was calculated using the total number of pregnant women screened for syphilis in each year during the study period. The number of neonates with congenital syphilis per 1,000 live births was calculated by using the total number of live births at the hospital during one year as the denominator. The definition for a probable case of congenital syphilis used the US CDC criteria to calculate the incidence of congenital syphilis (CDC, 1997).

All the pregnant women were also screened for HIV with an ELISA test (J

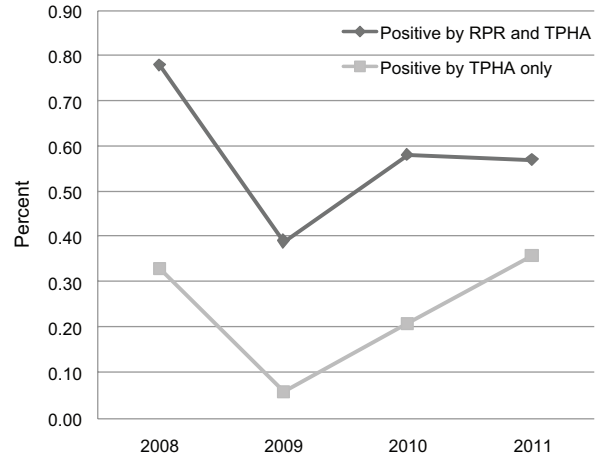


Fig 1—Percent positivity of antibodies to syphilis in pregnant women.

Mitra, New Delhi, India) or using the Tri Dot test (Diagnostic Enterprises, New Delhi, India). The clinical details of the women who tested positive for syphilis were obtained from their medical records.

## RESULTS

The number of pregnant women tested for syphilis during 2008-2011 and the percent positivity are shown in Fig 1.

A total of 6,221 women were screened for syphilis during 2008-2011, of whom 35 were positive by both RPR and TPHA and 15 were positive with TPHA only. All RPR positive tests also had a positive TPHA test (Fig 1). These likely represent active syphilis (Hawkes *et al*, 2011). The prevalence of syphilis during 2008 was 0.78%, during 2009 was 0.4%, during 2010 was 0.58% and during 2011 was 0.57%. The prevalence of women with a positive TPHA test alone was around 0.3% per year (Fig 1).

Of the 35 women positive with both the RPR and TPHA tests, 9 (25.71%) were detected during an antenatal check-up

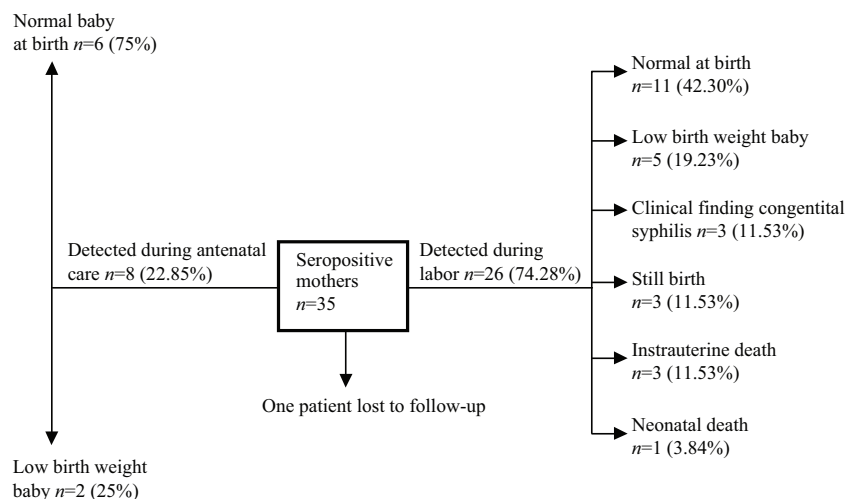


Fig 2—Pregnancy outcomes in women seropositive for syphilis.

and 26 (74.28%) were detected at the time of labor. The outcomes of the pregnancies in 34 of these 35 women are shown in Fig 2.

Six of the 8 seropositive women detected during antenatal screening gave birth to normal babies and 2 delivered low birth weight babies. The outcomes of pregnancy in the 26 seropositive women detected at the time of labor can be classified into six categories: a normal baby at birth ( $n=11$ ;42%), a low birth weight baby ( $n=5$ ;19%), a baby with clinical manifestations of congenital syphilis ( $n=3$ ;12%), a still birth ( $n=3$ ;12%), an intrauterine death ( $n=3$ ;12%) and a neonatal death ( $n=1$ ;4%); the neonatal death baby died 2 days after birth.

Of the 3 neonates with features of congenital syphilis at birth, two had a maculopapular rash, hepatomegaly and one had a saddle nose, polydactyly, congenital talipes equino valgus, wide anterior fontanelles and cardiac defect provisionally diagnosed as tetralogy of Fallot. All the neonates with features of congenital syphilis had both a positive RPR test and a

positive TPHA test.

During the study period at our hospital 26 infants were diagnosed with having probable congenital syphilis using CDC criteria (CDC, 1997) giving a yearly incidence of congenital syphilis of 2.96-4.66 cases per 1,000 live births (Table 1).

Twenty serum samples from neonates born to seropositive mothers were tested for syphilis. All 14 neonates born to mothers with both positive RPR and TPHA tests had positive tests for syphilis; 2 of 6 neonates born to mothers with a positive TPHA test alone had a positive RPR test with titers of 8 and 32.

Of the 35 women with a positive test for syphilis, 6 (17%) also had a positive HIV test. Except for one, all were detected at the time of labor. Neonates born to these mothers also had positive tests for both syphilis and HIV.

## DISCUSSION

The prevalence of syphilis among pregnant women has a bearing on the burden of congenital syphilis in the population. The prevalence of syphilis among the women in our study ranged from 0.57 to 0.78 during the study.

The prevalence of maternal syphilis has been reported to be between 0.7% and 3.9% from different parts of the world as per the World Health Organization (WHO SEARO, 2009). The prevalence in

Table 1  
Prevalence of congenital syphilis per 1,000 live births, 2008-2011.

Year	Number of live births	Number of cases of congenital syphilis	Rate of syphilis per 1,000 live births
2008	1,285	6	4.66
2009	1,686	5	2.96
2010	1,871	7	3.74
2011	2,195	8	3.64
Total	7,037	26	3.69

Southeast Asia is estimated to be 1.48% and in India it was reported to be 1.5% during 2003-2007 (WHO SEARO, 2009). A more recent report by the WHO shows the prevalence of syphilis among pregnant women in India is less than 0.5% (WHO, 2011). The prevalence rate found in our study of 0.5% is comparable to the recent WHO report.

A lower prevalence of syphilis in pregnant women has also been reported by other studies from India (Sethi *et al*, 2007; Parveen *et al*, 2012). Sethi *et al* (2007) found the prevalence of syphilis among the women receiving antenatal care in Chandigarh reduced from 3% in 1996 to 0.8% in 2005, which they attribute to greater awareness and better education of women. Syndromic management of venereal diseases may also have played a role in the reported reduction in the prevalence of syphilis during pregnancy (Sharma and Khandpur, 2004).

Of the positive cases in our study, 9 (25.71%) were detected during the antenatal care and 26 (74.28%) were detected at the time of labor. This shows most cases of syphilis were not detected earlier enough to prevent the vertical transmission. None of the women detected during labor in our study had received therapy for syphilis. Many had adverse fetal outcomes due

to untreated syphilis (Singh and Romanowski, 1999; LaFond and Lukehart, 2006). This is in contrast to women who received treatment during antenatal care. Although there is a decreasing trend in the number of syphilis cases, the late detection in a large percentage of these cases is concerning.

Our findings suggest a problem in the late detection of syphilis cases in pregnant women at primary and community health centers. In India, 70% of pregnant women receive antenatal care available at different levels of the health care system (Ministry of Health and Family Welfare, 2011). There is a need to improve early detection and treatment of syphilis at these health centers. The populations who do not access these facilities needs to be identified, educated and encouraged to get testing. Rapid immunochromatographic tests for syphilis have been developed which may further simplify testing (Goel *et al*, 2005; Tucker *et al*, 2010). Two of the neonates in our study were born to mothers with a negative RPR test but a positive TPHA test and had serological evidence of congenital syphilis. Such a finding could represent early primary syphilis in the mother, active syphilis missed by the test or late untreated syphilis. It may be wise to consider treating all pregnant

women with a positive treponemal test in the absence of documented treatment for syphilis (Hawkes *et al*, 2011).

The Pan American Health Organization (PAHO) has set a goal of fewer than 0.5 cases of syphilis per 1,000 newborns (PAHO, undated). The incidence of congenital syphilis in our study varied between 2.96 and 4.66 per 1,000 live births. These findings show the need to improve detection and treatment strategies for syphilis in pregnant women to reach a goal similar to the PAHO.

In conclusion, our study findings show the need to improve syphilis screening and treating programs during pregnancy. We recommend that all women attending antenatal clinics be screened for syphilis as early in the pregnancy as possible and proper treatment provided to achieve the goal of eradicating congenital syphilis.

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