

# Characteristics and Neonatal Outcomes of Teenage Pregnant Women Diagnosed with Syphilis at Siriraj Hospital

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## ABSTRACT

**Objective:** To demonstrate the characteristics of teenage pregnant women diagnosed with syphilis during pregnancy and neonatal outcomes.

**Methods:** This is a retrospective study. Medical records of teenage pregnant women who were diagnosed with syphilis during pregnancy and delivered at Siriraj Hospital and their newborn babies from 2011 to 2016 were reviewed. Demographic data and clinical factors were retrieved. Neonatal outcomes including gestational age at birth, birth weight, and diagnosis of congenital syphilis were recorded. STATA version 12.0 was used to analyze the data and p-value less than 0.05 was considered statistically significant.

**Results:** During 2011-2016, there were 28 eligible women. The mean age was  $17.6 \pm 1.2$  years. Seventy-five percent of them were unemployed and one-fourth had been educated less than or up to primary school level. The median number of partners was 4 and their sexual debut started from the age of  $15.3 \pm 0.9$ . A quarter also had other sexually transmitted infections (STIs). Congenital syphilis was diagnosed in 12 newborns (12/28, 42.8%). The mothers of the newborns with congenital syphilis were more likely to be unemployed, had first antenatal care (ANC) after 20 weeks of gestation, had <4 ANC visits, had high initial non-treponemal titer and poor treatment of syphilis before deliveries ( $p < 0.05$  for all). Preterm birth and very low birth weight were significantly more common in newborns with congenital syphilis.

**Conclusion:** Some socio-economic factors are associated with the risk of syphilis infection. Almost half of the teenage pregnant women diagnosed with syphilis delivered babies with congenital syphilis. Inadequate antenatal care and poor treatment of maternal syphilis are the predictive factors of congenital syphilis.

**Keywords:** Teenage pregnancy; pregnancy outcomes; syphilis (Siriraj Med J 2018;70: 298-301)

## INTRODUCTION

Teenage pregnancy, or pregnancy during the age of 10-19 years, is a global health concern. According to World Health Organization, the estimation of pregnancy and childbirth among teenagers is 17 million per year, especially in developing and underdeveloped countries.<sup>1</sup> In Thailand, from 1992 to 2013, the incidence of teenage pregnancy has increased from 0.6 to 1.7 and 40.7 to 51.2 per 1,000 pregnancies in the age group of 10-14 years and in that of 15-19 years, respectively.<sup>2</sup>

Teenage pregnancy prevention is currently one of the national priorities due to its medical and socioeconomic consequences. Among this population, the maternal health risks such as urinary tract infection, preterm labor, preeclampsia, anemia, sexually transmitted infections (STIs) and postpartum depression are prevalent.<sup>1,3</sup> In addition, fetal complications occur more commonly, including fetal growth restriction, low birth weight, neonatal infection and stillbirth.<sup>3</sup> Also, long-term social problems such as unqualified education and career, child

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abuse and low socioeconomic status have been reported.<sup>1,3</sup> Moreover, the daughters of teenage pregnancies are more likely to be teenage mothers themselves.<sup>1</sup>

Teenage mothers are prone to have STIs because of limited sexual education and lack of awareness that STIs may lead to long-term sequelae.<sup>4</sup> Syphilis, a bacterial STI caused by *Treponema pallidum subsp. pallidum*, has shown obvious impact on pregnancy, especially during early stage.<sup>5-9</sup> Half of untreated pregnancies affected by syphilis have early fetal loss/ stillbirth, neonatal death, prematurity/ low birth weight or clinical evidence of syphilis in newborns.<sup>10</sup> In Thailand, although the prevalence of syphilis was 2.8-3.6 per100,000 during 2009-2012, the incidence of congenital syphilis was as high as 10 per 100,000 live births.<sup>11</sup>

As the population of interest is in the age of sex debut, they are at risk for having the early stage of syphilis. Thus, the study aimed to describe the characteristics of teenage pregnancy with first-time diagnosis of syphilis and pregnancy outcomes.

## MATERIALS AND METHODS

The descriptive study was approved by the Siriraj Institutional Review Board. (Si 481/2017) The study was conducted in the Department of Obstetrics and Gynecology, Faculty of Medicine Siriraj Hospital, Mahidol University, Thailand. Twenty-eight medical records of teenage pregnant women diagnosed with syphilis during 2011-2016 and those of their newborns were reviewed.

Pregnant women aged less than 19 years, diagnosed with any stages of syphilis and giving birth at Siriraj Hospital were included. Women with a past history of syphilis were excluded. Demographic data including maternal age at time of diagnosis, parity, age of sex debut, number of partners, STIs in both women and their partners and antenatal care (ANC) history were collected. Stages and treatment of syphilis were also recorded.

In accordance with Thai National Guideline to eliminate congenital syphilis<sup>11</sup>, maternal syphilis was diagnosed using clinical signs and seropositivity of both treponemal and non-treponemal antibodies. Venereal disease research laboratory (VDRL) and *Treponema pallidum* hemagglutination (TPHA) were used in our setting. A single dose of benzathine penicillin G 2.4 million units was used for early stage of syphilis and three doses of benzathine penicillin G 2.4 million units were for late stage of syphilis treatment. Serological follow-up using VDRL was suggested at 1, 3, 6 and 12 months after the treatment. Incomplete treatment or delivery within four weeks after treatment was considered as 'poor treatment'.

Preterm birth was defined as delivery before completion of 37 weeks of gestation. Low birthweight and very low birthweight were classified by neonatal birthweight of less than 2,500 and 1,500 grams, respectively. Birth asphyxia was defined as Apgar score at 1 or 5 minutes was lower than 7.

All newborns were followed up at 2, 4, 6, 9 and 12 months. To diagnose congenital syphilis, cerebro-spinal fluid (CSF) analysis for VDRL, cell count and protein; blood for complete blood count (CBC) for platelet counting and liver function test; long bones radiographs; chest x-rays; neuroimaging; ophthalmologic examination and auditory test were performed after birth.<sup>7,12,13</sup> Newborns are classified into proven or highly suspicious for congenital syphilis when one of the criteria is met. Those who are born to mother with inadequate or no treatment of syphilis, had abnormal physical examination or investigative findings, or had a 4-fold serum titer of nontreponemal test more than the mother's titer, or had a positive dark-field test or PCR in lesions or body fluids.

## Statistical analysis

STATA version 12.0 (StataCorp LP, College Station, TX, USA) was used. Descriptive statistics, as well as Chi-square test, student t-test or Wilcoxon rank sum test, were used as appropriate. *P* value <0.05 was considered statistically significant.

## RESULTS

During 2011-2016, 28 teenage pregnant women were diagnosed with syphilis and gave birth at Siriraj Hospital. The mean age was 17.8±1.1 years. Most of them were unemployed and one forth had been educated to only primary school level. The median number of partners was 4[2-6] and their sex debut started from the age of 15.3±0.9 years. A quarter also had other sexually transmitted infections (STIs), including 1 human immunodeficiency virus (HIV), 1 hepatitis B, 1 genital herpes, 2 condyloma accuminata and 2 trichomoniasis.

The average gestational age at birth was 36.5±4.2 weeks of gestation. Seventy-eight percent were delivered vaginally and all of them were alive at birth. The mean birth weight was 2,553±800 grams with nearly 40 percent being in low birth weight range. There were nine newborns who were diagnosed as birth asphyxia. Congenital syphilis was found in 12 newborns (12/28, 42.8%). Three of them had neurosyphilis.

The mothers of newborns with congenital syphilis were more likely to be unemployed, had the first ANC after 20-week gestation, had ANC <4 visits, had high initial non-treponemal titer and had poor treatment

of syphilis before delivery ( $p < 0.05$  for all). Preterm birth and very low birth weight were more common in newborns with congenital syphilis, at 75.0% vs 12.5%,  $p = 0.001$ ; and 33.3% vs 0.0%,  $p = 0.013$ .

## DISCUSSION

Teenage women are vulnerable to STIs owing to their immature immune status which becomes worse during pregnancy. In addition, compatible with previous studies<sup>4,6,9</sup>, low socio-economic status and education, emotional immaturity, poor psychological well-being and ANC as well as multiple sex partners are commonly found. As a consequence, the present study has demonstrated that half of teenage pregnant women with syphilis give birth to infected newborns.

Nowadays, the prevalence of teenage pregnancy in Siriraj Hospital accounts for 7-8%.<sup>14,15</sup> Compared with pregnancies in other age groups, they are more likely to have multiple partners, co-incidental STIs, inadequate treatment before delivery, preterm birth and low birth weight.<sup>16</sup> Therefore, teenagers who get pregnant should be taken care of in the high-risk pregnancy clinics run by a multidisciplinary care team: obstetricians, pediatricians, psychiatrists and social workers. A sexual health policy in adolescents should be established and health education needs to be emphasized and spread among teenagers both in school and mass media.

According to Annual reports from 2015 to 2016 of the Department of Obstetrics and Gynecology, Faculty of Medicine Siriraj Hospital, the prevalence of maternal syphilis in teenage was 1.27% compare to 0.6% in overall pregnant women.<sup>14,15</sup> Previous studies showed that the prevalence of maternal syphilis varied by global regions. In

European countries and the United States, the prevalence was 0.02-4.5% while that in Africa was 3-18%.<sup>8,17</sup> However, the common characteristics were teenage pregnancy and being unmarried.

Newborns of untreated maternal syphilis are likely to be infected, especially in mothers with early syphilis.<sup>6,9,18</sup> The present study showed that almost half of the newborns had congenital syphilis. The high incidence can be explained by the fact that these pregnant women had just started sexual activities and, most likely, practicing unprotected sex. As a consequence, most of them were in early stage of syphilis, but might be asymptomatic. Blood test for STIs during pregnancy in this high-risk population should be compulsory.

The strength of this study was the complete medical recording of the participants and their newborns of whom STI specialists took care. The main limitation was the small sample size as the study population was a specific group. Besides, the present study focused on only intra-partal and post-partal pregnancy outcomes, so the adverse outcomes during early pregnancy were not included. A prospective study on teenage pregnancy from the first ANC visit and outcomes of neonatal follow-up will better depict the impact of syphilis on pregnancy of this special population.

## CONCLUSION

Around half of newborns of teenage pregnant women diagnosed with syphilis at Siriraj Hospital between 2011 and 2016 had congenital syphilis. Inadequate antenatal care and poor treatment of maternal syphilis are the predictive factors. This emphasizes the importance of sexual health education in teenage population.

**TABLE 1.** Characteristics of teenage pregnancies with syphilis by neonatal outcomes at Siriraj Hospital during 2011-2016.

Characteristic	Total (N=28)	Congenital syphilis (N = 12)	No congenital syphilis (N= 16)	P-value
Age (years)	17.8±1.1	17.5 [16.7-18.2]	18.2 [17.7-18.9]	0.169
No education/Primary school	7 (25.0)	5 (41.7)	2 (12.5)	0.078
Being unemployed	21 (75.0)	12 (100.0)	9 (56.3)	0.008
Age of sex debut (years)	15.3±0.9	15.3±1.1	15.3±0.9	0.955
Number of partners	4 [2-6]	4 [2-5]	5 [2-7]	0.233
Coincidence with other STIs	7 (25.0)	3 (25.0)	4 (25.0)	1.000
Nulliparity	21 (75.0)	10 (83.3)	11 (68.8)	0.378
GA at the first ANC (weeks)	19.1±7.7	23.8±7.5	15.5±6.0	0.003
First ANC after GA 20 weeks	12 (42.9)	8 (66.7)	4 (25.0)	0.027
ANC < 4 visits	8 (28.6)	8 (66.7)	0 (0.0)	<0.001

**TABLE 1.** Characteristics of teenage pregnancies with syphilis by neonatal outcomes at Siriraj Hospital during 2011-2016. (Cont.)

Characteristic	Total (N=28)	Congenital syphilis (N = 12)	No congenital syphilis (N= 16)	P-value
GA at diagnosis of syphilis (weeks)	19.8±7.8	24.5±8.1	16.4±5.7	0.004
Initial VDRL titer ≥ 1:8	25 (89.3)	12 (100.0)	13 (81.3)	0.112
Initial VDRL titer ≥ 1:16	19 (67.9)	11 (91.7)	8 (50.0)	0.019
Incomplete/ no treatment or complete treatment <4 weeks before delivery	10 (35.7)	10 (83.3)	0 (0.0)	<0.001
Partner tested for syphilis	22 (78.6)	8 (66.7)	14 (87.5)	0.184
Partner treated for syphilis (N= 22)	11 (39.3)	6/8 (75.0)	5/14 (35.7)	0.076
GA at delivery (weeks)	36.5±4.7	33.6±4.7	38.7±1.7	<0.001
Delivery before 37 weeks	11 (39.3)	9 (75.0)	2 (12.5)	0.001
Delivery before 34 weeks	6 (21.4)	6 (50.0)	0 (0.0)	0.001
Newborn's birth weight (grams)	2,553±800	2,091±907	2,898±502	0.006
Birthweight <2,500 g	11 (39.3)	7 (58.3)	4 (25.0)	0.074
Birthweight <1,500 g	4 (14.3)	4 (33.3)	0 (0.0)	0.013
Birth asphyxia	9 (32.1)	6 (50.0)	3 (18.6)	0.080

Data presented in N (%) or mean±S.D. or median [IQR]

**Abbreviations:** ANC = antenatal care, Birth asphyxia = Apgar score ≤7 at 1 or 5 minutes, GA = gestational age, STIs = sexual transmitted infections

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