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Risk of Low Birth Weight Infants from Adolescent Mothers: Review Case Study in Siriraj Hospital

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ABSTRACT

Objective This study aimed to compare maternal and neonatal outcomes of teenage to adult pregnancy, focused to the risk of low birth weight infant (LBW).

Study design Retrospective study.

Materials and Methods A total of 140 pregnant women age below 20 years and 280 pregnant women age 20-25 years who delivered in Siriraj Hospital in July and August 2006 were enrolled. Demographic data, obstetric and neonatal outcomes were reviewed and compared between two groups.

Results Teenage mothers were significantly more likely to be anemic and use substance abuse. They have significant higher risk for preterm birth (RR 2.10, CI 1.18–3.74) and LBW infant (RR 2.42, CI 1.37–4.29). The relative risk of LBW infant is highest in mother age 13-16 years (RR 3.98, CI 2.01-7.90).

Conclusion Teenage pregnancy is risk factor of many poor obstetric outcomes especially low birth weight infant and preterm delivery.

Keywords: teenage mother, low birth weight, perinatal outcomes

Introduction

Teenage pregnancy, defined by the maternal age less than 20 year-old, is recognized in many countries as the cause of higher maternal risk and adverse neonatal outcomes. Each year, almost 750,000 women aged 15–19 become pregnant especially in the under developed and the developing countries.[1] In Thailand, data in the 2002 indicated the teenage birth rates were 49 per 1,000 women aged 15-19.[2] Although these rates have decreased over the past decade, teenage pregnancy continues to be a challenging public health issue around the world.

Several studies looked for the adverse outcomes associated with teenage pregnancy such as preeclampsia, premature rupture of membranes, gestational diabetes mellitus and, more interestingly, low-birth weight (LBW), premature, and small-for-gestational-age infants.[3-6] Various data from different demographic areas show lacking of agreement of this enhancing risk.[4,5,7] Therefore, it is important to focus on each population, especially for

difference maternal race or background. Low birth weight infant is one of the most common adverse pregnancy outcomes discussed worldwide and also the important public health problem in Thailand. This condition can lead to many neonatal morbidities and mortalities using much of the estimates caring for these infants. According to previous data, the incidence of low birth weight infant in Thailand in 1998 was 8.1 %.[8] In attempt to lower this rate, the Ninth Five-Year National Health Development Plan 2002-2006, Thailand, plan to limit the low birth weight infant to 7% of total live birth. Teenage mother has been discussed as one of the important risk factors of delivering low birth weight infant.

The purpose of this study was to compare the maternal complications and fetal outcomes of the teenage pregnancy to those of adult pregnancy delivered in Siriraj Hospital and focusing on the incidence of low birth weight infant.

Materials and Methods

The data were collected from the labor records, perinatal records and patient's information charts from the Department of Obstetrics and Gynecology, Siriraj Hospital. Inclusion criteria were restricted to the women age below 20 years in the study (teenage) group and age 20-25 years in the comparison (adult) group, who delivered in Siriraj Hospital during July and August 2006. Since mothers from 20 to 25 years old had the lowest risk of maternal and neonatal adverse outcomes, they served as the reference group in all comparisons. According to the previous study, prevalence of low birth weight infant in Thailand were 12% and 4% in teenage and adult pregnancy respectively[5], the sample sizes were calculated using 5% type I error and 20% type II error. After calculation, a total of 140 cases of teenage pregnancies and 280 adult pregnancies were selected for evaluation. A systematic random sampling technique was applied to identify study and control cases from a registry book of delivery in the selected interval. Hospital medical record chart numbers of selected cases were used to retrieve their prenatal and hospital records. The maternal charts were reviewed for demographic information, past medical illness and obstetric history. The data were recorded including age, gravidity, parity, previous abortion, gestational age at delivery, prepregnancy body mass index (BMI) using weight before pregnancy or during first trimester in case of inadequate data, hematocrit and substance abuse of tobacco, alcohol and amphetamine. Anemia in pregnancy was defined as hemoglobin concentration less than 10 g/dl or hematocrit level less than 30%. Any patients with maternal medical problems before the current pregnancy, positive test of anti-HIV antibody and multifetal gestation were excluded from the study.

After review the literature, we chose the adverse outcomes most commonly reported to be associated with teenage pregnancies. Maternal complications such as pregnancy induced hypertension, premature rupture of membranes, mode of delivery and postpartum hemorrhage were collected. The perinatal adverse outcomes included low birth weight infant, birth asphyxia, neonatal jaundice who received phototherapy and the perinatal mortality were reviewed. Birth weight was categorized as <1,000 g is extremely low birth weight infant, 1,000-1,499 g is very low birth weight infant and 1,500-2,499 g to low birth weight infant.

The prevalence of important demographic data, risk factors and adverse outcomes were compared between the study and control groups. Variables were compared using unpaired student's t-test and Pearson Chi-square test. Relative risk ratio and 95% confident interval of these complications were calculated. Level of significant was $p<0.05$.

The present study has been reviewed and approved by the Ethics Committee, Faculty of Medicine Siriraj Hospital, Mahidol University.

Results

During the study periods, from the systematic random sampling, 420 births were selected for analysis included 140 teenage pregnancies and 280 adult pregnancies. Maternal histories and characteristics in both groups were shown in table 1.

The mean age of teenage mothers was 17.3 years, with the youngest case was 13 years old, and the mean age of adult group was 22.6 years. Primipara pregnancy was higher in the teenager as expected but the history of previous abortion was not statistically different. There was no significant different of body mass index, underweight mothers and total weight gain throughout pregnancy period. In the teenagers, hematocrit level was statistically significant lower than adult (33.6±0.85% vs 34.8± 3.23%) although there was no clinically significant and there were more anemic patients in this group. Substance abuse of tobacco, alcohol and amphetamine were found significant higher among the teenagers (6.4% vs 1.5%).

The pregnancy complications and neonatal outcomes were compared between 2 groups (table 2). There were significant increase in risk of preterm birth (RR 2.10, 95%CI 1.18–3.74) and low birth weight infant (RR 2.42, 95%CI 1.37–4.29) in the teenager group. But the differences for preeclampsia, premature ruptured of membranes, delivery by cesarean section, postpartum hemorrhage and neonatal jaundice between 2 groups were not statistically significant. There was no birth asphyxia in this study.

Further analysis was performed by dividing the teenager into younger (13-16 years old) and older (17-19 years old) teenagers. We found no low birth weight infant from mother age below 15 years old in this study. As shown in table 3, there was statistically significant higher risk in younger teenager group (RR 3.98, 95%CI 2.00-7.90). The risks of low birth weight infant in older teenager increase 1.86 times compared with the adult group although there was no statistical significance (95%CI 0.95-3.63).

Discussion

There were numerous reports on the increasing risk of poor obstetric outcomes associated with pregnancy in teenager, particularly in developing countries with limited obstetric facilities. Low birth weight and prematurity are major problems worldwide. Many of the existing studies originated from diverse population showed difference in the incidence of these problems. This study surveyed these complications especially the low birth weight infant associated with teenage pregnancy in Bangkok, Thailand, represented by the population delivery in Siriraj hospital.

Adolescents were more likely to be primigravida which known to be the risk factor of some adverse pregnancy complications. There was the higher rate of anemia in pregnancy in the teenage group which may caused by poor nutrition of the mother but the 1% difference in this study has no clinically significant. We found more substance abuse (tobacco, alcohol and amphetamine) in the teenager increasing risk for some problems such as small for gestational age infant or preterm labor.[9] When we compared the obstetric outcomes in both groups, teenage pregnancies have about 2 times increased risk of preterm births (RR 2.10; 95%CI 1.18-3.74) and low birth weight infants (RR 2.42; 95% CI 1.37-2.49). The relative risk of delivery low birth weight infant in the younger teenage mothers was higher than the older teenagers, RR 3.98 and 1.86 respectively. The results showed younger teenage mother has the highest incidence of low birth weight infant (27%) follow by the older teenager (12.6%) and the lowest in the adult group (6.8%). This result may be explained by that the younger teenagers age 13-16 years tended to be unmarried, still in high school, unplanned pregnancy and they also have the problems of biological immaturity concomitant with inadequate nutrition and poor maternal self care.

To determine whether a young age increase risk of adverse outcomes of pregnancy, i.e. low birth weight and prematurity, Fraser et al. has performed stratified analyses of the white women, 13-24 years old (≤17, 18-19 and 20-24 years), in Utah who delivered singleton children between 1970 and 1990.[3] Relative risk for subgroups of that study population was examined to eliminate the confounding influence of marital status, educational level and the adequacy of prenatal care, younger teenage mothers (13 to 17 year of age) had a

significantly higher risk of delivering low birth weight infant, prematurity and small for gestational age than mothers who were 20-24 year of age. Older teenager (18 or 19 years old) also had a significant increase in this risk although the relative risk was lower than the younger age group. Our study showed consistent results. In addition, there are many studies that reported the similar results.[4,10,11]

After comparison with previous study in Thailand, our results were similar with the recent study of Watcharaseranee et al.[12] who studied primigravida women age 13-20 and 20-25 years who gave birth at Chonburi hospital in 2001 to 2005 and found significantly increase incidences of preterm birth and low birth weight infant. Our report was also consistent with the existed studies.[12,13]

Preterm birth was also found significant increased in the teenage group and also the one of the cause of low birth weight infant. The association between preterm birth and teenage pregnancy remained controversial. There is some evidence that the higher preterm birth rate among teens may be more closely related to their disadvantaged socioeconomic status than to biologic immaturity. Although some studies which adjusted for these factors concluded that adolescents are not at an appreciably increased risk for preterm birth,[14,15] most studies have found elevated rates, particularly among the youngest teens.[3,16,17] Our study also showed this increased risk, however, we have not adjusted other confounding factors.

No statistically significant difference in PROM, preeclampsia, cesarean section rate, postpartum hemorrhage and neonatal jaundice were observed. This might be limited by inadequate sample size for these uncommon outcomes in our study.

We concluded that teenage pregnancy is the one of the important risk factors of poor obstetric outcomes especially in low birth weight infant and preterm delivery. They also have higher rate of some conditions that may lead to adverse pregnancy outcomes such as anemia, primigravida and substance abuse. If the obstetrician can prevent the preventable factors or correct the high risk conditions in antenatal care, we may reduce the incidence of low birth weight infant. Thus, our study implicated that we should pay attention and gives her adequate antenatal care to prevent this problem.

Table 1. Comparison of demographic data between teenage and adult groups

Demographic data	Teenage group (n=140)	Adult group (n=280)	P value
Mean age (years) ± SD	17.3±1.39	22.6±1.44	<0.001
Primipara	129 (92.1%)	204 (72.9%)	0.014
Previous abortion	16(11.4%)	51(18.2%)	0.073
Mean GA at delivery (weeks) ±SD	38.3±2.3	38.7±1.6	0.48
Mean prepregnancy BMI (kg/m2) ± SD	25.2±3.63	25.4±3.56	0.554
Underweight	3 (2.4%)	2 (0.7%)	0.158
Mean total weight gain (kg) ± SD	12.8±5.3	13.5±4.3	0.200
Mean weight gain per week (kg) ± SD	0.33±0.14	0.35±0.11	0.209
Mean hematocrit (%) ± SD	33.6±0.85	34.8±3.23	0.02
Anemia	18/134 (13.4%)	12/275 (4.4%)	0.001
Substance abuse	9 (6.4%)	4 (1.5%)	0.005

Table 2. Comparison of obstetric outcomes between teenage and adult groups

Obstetric outcomes	Teenage group n = 140 (%)	Adult group n = 280 (%)	RR (95% CI)
Antepartum hemorrhage	0	1 (0.4)	N/A
PROM	24 (17.1)	44 (15.7)	1.09 (0.69 – 1.72)
Preterm birth	21 (15)	20 (7.1)	2.10 (1.18 – 3.74)
Preeclampsia	3 (2.1)	5 (1.8)	1.20 (0.29 – 4.95)
Cesarean section	22(15.7)	61(21.8)	0.72 (0.46 –1.12)
Postpartum hemorrhage	3 (2.1)	4 (1.4)	1.48 (0.34 – 6.52)
LBW infant	23 (16.4)	19 (6.8)	2.42 (1.37 – 4.29)
VLBW infant	2 (1.4)	0	N/A
Birth asphyxia	0	0	N/A
Neonatal jaundice	30 (21.4)	44 (15.7)	1.36 (0.89 – 2.07)

N/A = not available

Table 3. Risk of low birth weight infant in younger and older teenage pregnancy compare with the adult group

Age group	Risk of LBW infant	Relative risk	95% CI
13-16 years	10/37 (27%)	3.98	2.00-7.90
17-19 years	13/103 (12.6%)	1.86	0.95-3.63
≥ 20 years	19/280 (6.8%)	1.0	

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ความเสี่ยงต่อทารกน้ำหนักตัวน้อยในกลุ่มมารดาวัยรุ่น: ศึกษากลุ่มผู้ป่วยในโรงพยาบาลศิริราช

จุฑาธิป ตันตยาคม, จปรัฐ ปรีชาพานิช

วัตถุประสงค์: *การศึกษานี้มีจุดประสงค์เพื่อเปรียบเทียบผลของการตั้งครรภ์ต่อมารดาและทารก ในกลุ่มมารดาวัยรุ่น เทียบกับกลุ่มผู้ใหญ่ โดยจะมุ่งประเด็นศึกษาไปที่ภาวะทารกน้ำหนักแรกเกิดน้อยกว่าปกติ*

รูปแบบการศึกษา: *การศึกษาแบบย้อนหลัง*

วัสดุและวิธีการ: *ศึกษากลุ่มสตรีตั้งครรภ์อายุต่ำกว่า 20 ปี จำนวน 140 คน และอายุระหว่าง 20-25 ปี จำนวน 280 คน ที่มาคลอดในโรงพยาบาลศิริราชตั้งแต่เดือนกรกฎาคมจนถึงสิงหาคม พ.ศ. 2548 โดยศึกษาข้อมูลทั่วไปของมารดาและเปรียบเทียบภาวะแทรกซ้อนทางมารดาและทารกระหว่างทั้ง 2 กลุ่ม*

ผลการศึกษา: *ในกลุ่มมารดาวัยรุ่นพบภาวะซีด และการใช้สารเสพติดมากกว่ากลุ่มผู้ใหญ่อย่างมีนัยสำคัญ ในกลุ่มมารดาวัยรุ่นยังพบความเสี่ยงต่อการคลอดก่อนกำหนด และทารกน้ำหนักแรกเกิดต่ำมากกว่าอย่างมีนัยสำคัญ (RR 2.10, CI 1.18–3.74 และ RR 2.42, CI 1.37–4.29 ตามลำดับ) ความเสี่ยงต่อการคลอดทารกน้ำหนักแรกเกิดน้อย จะพบมากที่สุดในกลุ่มมารดาอายุ 13-16 ปี (RR 3.98, CI 2.01-7.90)*

สรุป: *การตั้งครรภ์ในกลุ่มมารดาวัยรุ่น มีความเสี่ยงต่อการตั้งครรภ์หลายประการโดยเฉพาะอย่างยิ่ง การคลอดก่อนกำหนดและทารกน้ำหนักแรกเกิดน้อยกว่าปกติ*