Original Article

The Study of Maternal and Neonatal Complications in Teenage Pregnancy

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Background: Pregnancy in adolescents is the important health problem around the world, especially for developing countries including Thailand.

Objective: To define the prevalence of teenage pregnancy at HRH Princess Maha Chakri Sirindhorn Medical Center as well as its complication in both maternal and neonatal aspects.

Materials and Methods: The present study is a prospective cohort study conducted in HRH Princess Maha Chakri Sirindhorn Medical Center, Nakhon Nayok, Thailand. The data was collected between August 2016 and May 2017. Participants were divided into 2 groups consisted of pregnant adolescents (age 10 to 19 years old) and pregnant adults (age 20 to 34 years old). Clinical information of newborns were collected at the age of 3 days.

Results: There were 1,258 pregnancies in total including 198 adolescent pregnancies, so the prevalence of adolescent pregnancy in our study was 15.7%. Adolescent pregnancy was associated with lower education level, anemia, and higher rate of vaginal delivery. The neonatal complication of teenage pregnancy found in the present study consisted of anemia (22.7%) and meconium-stained amniotic fluid (9.1%). In contrast, the gestational diabetes (1.5%) and neonatal hypoglycemia (6.6%) were lower in adolescent pregnancy, compared to adult pregnancy.

Conclusion: Teenage pregnancy showed the negative impact on both maternal and neonatal health, particularly for anemia in pregnant women and neonates as well as meconium-stained amniotic fluid.

Keywords: Teenage pregnancy; Maternal complication; Neonatal complication, Anemia, Meconium-stained amniotic fluid

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Teenage pregnancy is the pregnancy in woman ages between 10 and 19. According to the developing body in adolescent, the pregnancy in teenage usually associate with complications for both pregnant women and fetuses. Predisposing factors for adolescent pregnancy including lack of knowledge and inadequate use of contraceptive techniques, family problems, socioeconomic disadvantage, low educational attainment, being a victim of sexual abuse, poor parental supervision, fewer female friends, risky sexual behaviors, such as early sexual initiation and frequent changes of sexual partners[1,2]. The national survey on reproductive health in grade 11 students from the Bureau of Epidemiology, Department of Disease Control, Ministry of Public Health, Thailand found that 23.6% of male adolescents and 18.7% of female adolescents had history of sexual intercourse[3]. The mean age of first sexual intercourse in Thai male adolescents was 15.9 years old while in Thai female adolescents was 15.8 years from the survey conducted in the northern part of Thailand[4]. There were 15% of Thai adolescents who reported the first sexual intercourse before the age of 15[4]. The adolescent pregnancy is the important health problem around the world, especially in developing countries including Thailand[5]. The impact of teenage pregnancy does not only affect pregnant woman and fetuses, but also involve with family, social, and health system[6].

A previous systematic review have reported the common complications of teenage pregnancy including pregnancy-induced hypertension, prematurity and low birth weight[7]. In addition, various studies have shown other common maternal and neonatal complications of adolescent pregnancy including maternal anemia[7-12], premature rupture of membrane[7,13,14], sexual transmitted diseases[13,15], smoking during pregnancy[11,16], postpartum hemorrhage[15], perinatal asphyxia[15,17], and meconium-stained amniotic fluid[15,18,19]. It is well accepted that teenage pregnancy shows the great impact on both maternal and fetal health. However, there are some conflict results of obstetric and neonatal complication in teenage pregnancy among various studies. In addition, the neonatal outcomes were usually less mentioned in previous

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research.

In current study, the main objectives were to study the prevalence of teenage in postpartum women who delivered at HRH Princess Maha Chakri Sirindhorn Medical Center, Srinakharinwirot University as well as the maternal and neonatal complications found in adolescent pregnancy, compared to adult pregnancy. The benefits of this study were to know the prevalence and complications of teenage pregnancy as well as to provide the knowledge for appropriate care of any neonate born from adolescent mothers.

Materials and Methods

This is a prospective cohort study that conducted from August 2016 to May 2017 at HRH Princess Maha Chakri Sirindhorn Medical Center, Srinakharinwirot University, Ongkharak, Nakhon Nayok, Thailand. The present study was approved by the Human Research Ethics Committee of Srinakharinwirot University (SWUEC) with Certificate of Approval (COA) number as SWUEC/E-080/2558.

Participants

There were two groups of participants consisted of (1) pregnant adolescents (age 10 to 19 years old) and their offspring as well as (2) pregnant adults (age 20 to 34 years old) and their offspring. The exclusion criteria consisted of age >35 years old and history of psychiatric disorders.

Data collection

The recruitment process was done at postpartum ward when participants were clinically stable after delivery. All experimental protocol was clearly introduced to them. If they decided to participate in this study, the informed consent would be signed. After that all participants underwent the interview process and complete physical examination. The information of pregnant women including age, gravida, parity, gestation age (GA), education level, history of abortion, underlying disease, mode of delivery, complications of pregnancy (i.e., pregnancy-induced hypertension, gestational diabetes, urinary tract infection, sexually transmitted diseases) history of substance abuse, history of tobacco and alcohol use during pregnancy, history of premature rupture of membrane, and postpartum condition including postpartum hemorrhage were collected. The medical records of postpartum examination by Obstetrician were also collected. Laboratory data including hematocrit (Hct) level (anemia is indicated when Hct level <33%), mean corpuscular volume (MCV), hemoglobin typing, Anti-HIV, Venereal disease research laboratory (VDRL) test, hepatitis B surface antigen (HBsAg) were also noted.

Clinical information of newborn including gender, apgar score at 1, 5, and 10 minutes, neonatal complication (i.e., premature birth (GA <37 weeks), low birth weight (birth weight <2,500 gram), perinatal asphyxia (apgar score at 5 minutes <7), respiratory symptoms such as respiratory distress syndrome (RDS), transient tachypnea of newborn (TTN) and congenital pneumonia. All respiratory conditions were diagnosed by attending neonatologist based on clinical manifestation and chest radiograph, neonatal sepsis (the diagnosis was based on clinical symptoms, maternal history, and abnormal laboratory profiles including complete blood count (CBC), C-reactive protein (CRP) and hemoculture), anemia (Hct <40%), hypoglycemia (plasma glucose <40 mg/dL), neonatal jaundice (abnormal microbilirubin level according to the infants' age in hours), birth injury, meconium stained amniotic fluid, congenital anomaly and malformation, and neonatal death. The full physical examination of newborn was performed by Pediatrician. All neonatal data was collected at 72 hours after birth.

Statistical analysis

The maternal and neonatal information were collected using the descriptive statistics. The neonatal complication between neonates of adolescent mothers and neonates of adult mothers were compared using Chi-square test or Fisher's exact test. The independent t-test is used to compare the experimental data between 2 groups. To find the association between teenage pregnancy and neonatal complication, the relative risk with 95% confidence interval (CI) were selected. The statistical package for the social sciences (SPSS) version 23.0 was used for statistical analysis (IBM SPSS Statistics). The significant difference was considered if the p-value was less than 0.05.

Results

The prevalence data were collected from postpartum women who delivered at HRH Princess Maha Chakri Sirindhorn Medical Center, Srinakharinwirot University from August 2016 to May 2017. The total number of delivery was 1,258 cases that divided into 198 adolescent mothers and 1,060 adult mothers. Thus, the prevalence of adolescent pregnancy in our study was 15.7%.

For studying the pregnancy and neonatal complications of adolescent pregnancy compared to adult pregnancy, postpartum women over the age of 35 and their offspring were excluded for data analysis due to the exclusion criteria. Thus, only the clinical information of 797 adult postpartum women were included in part of pregnancy and neonatal complications.

Our results revealed that adolescent pregnancy showed the higher rate of anemia than adult pregnancy. In contrast, gestational diabetes was more common in adult pregnancy, compared to teenage pregnancy. Other parameters of pregnancy complications and personal history between adolescent and adult pregnancies were shown in Table 1.

During delivery, the normal labor is significantly higher in adolescent pregnancy, compared to adult pregnancy. However, the mean gestational age, mean birth weight, apgar score, and gender distribution between 2 groups were not statistically different as shown in Table 2.

The most common neonatal complication in adolescent pregnancy was neonatal jaundice followed by

Table 1. The pregnancy complications and personal history between adolescent and adult pregnancies

Clinical parameters	Adolescent pregnancy (n=198) (%)	Adult pregnancy (n=797) (%)	p-value
Pregnancy complications			
Anemia	22.7	10.7	<0.001*
Hypertension	5.1	4.9	0.93
Preeclampsia	2	2	1.00
Gestational diabetes	1.5	8.4	0.001*
Urinary tract infection	3	1.9	0.28
Assisted delivery	35.4	51.9	<0.001*
Postpartum hemorrhage	9.1	6.8	0.28
Personal history			
Education ≤Grade 6	20	11	<0.001*
History of abortion	5.1	15.2	<0.001*
Substance use	1	0.3	0.18
HIV infection	0.5	0.4	0.59
Other sexual transmitted diseases	1.5	1.1	0.71

* Significant difference

Table 2. The clinical information of delivery between adolescent and adult pregnancies

Delivery parameters	Adolescent pregnancy (n=198)	Adult pregnancy (n=797)	p-value
Mean maternal age (year)	18.4 (±1.8)	26.9 (±3.6)	<0.001*
Mean GA (week)	38.4 (±1.5)	38.1 (±1.5)	0.02
Mode of delivery			
Normal labor	64.6%	48.1%	<0.001*
Mean birth weight (gram)	2,958.7 (±450.5)	3,030.7 (±493.5)	0.06
Apgar score at 5 min			
Score <7	0.5%	0.9%	1
Score <3	1%	0.1%	0.1
Gender ratio (male:female)	0.92:1	1.02:1	0.52

* Significant difference

transient tachypnea of newborn (TTN) and sepsis which were not significantly different from adult pregnancy. However, newborns of adolescent pregnancy were higher rate of anemia and meconium-stained amniotic fluid than newborns of adult pregnancy. In contrast, the prevalence of neonatal hypoglycemia was lower in newborns of adolescent pregnancy, compared to adult pregnancy as shown in Table 3.

Discussion

The present study aimed to investigate the prevalence as well as the neonatal complications of teenage pregnancy. Our results showed that the prevalence of adolescent pregnancy in HRH Princess Maha Chakri Sirindhorn Medical Center, Srinakharinwirot University was 15.7%. This prevalence is higher than previous reports of the prevalence or incidence of teenage pregnancy from Chonburi hospital which found around 9%[20] and 12.7% from Sakon Nakhon Hospital[10]. However, our prevalence of teenage pregnancy was lower than various studies which demonstrated around 19.3%[12], 20.8%[15], and 24.3%[21] from Pharnomsarakarm Hospital (Chachoengsao Province), Uthong Hospital (Suphanburi Province), and Satuk Hospital (Buriram Province). Although there is still required more information, it should be noticed that the prevalence of adolescent pregnancy is slightly higher in community

Table 3. The neonatal complications between adolescent and adult pregnancies

Neonatal parameters	Adolescent pregnancy (n=198)	Adult pregnancy (n=797)	Relative risk (95% CI)	p-value
Birth history				
Premature birth	6.1%	9.3%	0.65 (0.36 to 1.18)	0.16
Low birth weight	10.6%	10.3%	1.03 (0.66 to 1.62)	0.90
Birth injury	2.5%	1.12%	0.25 (0.48 to 0.50)	0.10
Malformation	2.5%	1.5%	1.68 (0.6 to 4.71)	0.36
Neonatal death	0.5%	0.4%	1.34 (0.14 to 12.83)	0.59
Respiratory system				
Meconium-stained amniotic fluid	9.1%	4.4%	2.07 (1.2 to 3.58)	0.01*
Transient tachypnea of newborn (TTN)	14.1%	9.9%	1.43 (0.95 to 2.13)	0.10
Respiratory distress syndrome (RDS)	1.5%	1.1%	1.34 (0.37 to 4.91)	0.71
Infection				
Pneumonia	7.1%	5.4%	1.31 (0.73 to 2.35)	0.39
Sepsis	11.1%	10.4%	1.07 (0.69 to 1.66)	0.80
Metabolism				
Hypoglycemia	6.6%	11.5%	0.57 (0.33 to 0.99)	0.048*
Neonatal jaundice	18.2%	14.4%	1.26 (0.9 to 1.77)	0.22
Hematologic system				
Anemia	10.1%	3.8%	2.68 (1.56 to 4.62)	0.001*
Polycythemia	1%	0.3%	4.03 (0.57 to 28.4)	0.18

* Significant difference

hospitals than provincial hospitals and medical school hospital. The increase prevalence of teenage pregnancy can be explained by early puberty, younger age of first sexual intercourse, and less rate of contraception[4,20].

Previous study has shown that teenage pregnancy is likely to develop the prenatal, perinatal, and postnatal complications[7] due to the immature physical and mental growth. Pregnancy in adolescent is likely to be unplanned pregnancy leading to inappropriate care. Unplanned pregnancy in adolescent mother usually associate with late initiation of antenatal care or even lack of antenatal care. According to inadequate antenatal care, any risk factors or underlying diseases in adolescents with pregnancy are not detected or late diagnosed leading to higher rate of pregnancy complication in teenage pregnancy, compared to adult pregnancy. Thus, the teenage pregnancy is a type of high-risk pregnancy, not only for maternal aspect, but also in fetal and neonatal aspects.

In maternal aspect, our study demonstrated the low educational level in teenage pregnancy. This finding is similar to other studies that showed lower education level in adolescent mothers, compared to adult mothers[21-24]. Lower education level might lead poor knowledge on contraception, poor awareness of teenage pregnancy, and inadequate care during pregnancy[21].

Current study showed that anemia during pregnancy was more common in adolescent mothers, compared to adult mothers. This finding is similar to various studies that found the higher prevalence of anemia in adolescent pregnancy[7-12,15,20,21,24,25]. This finding might be explained by inadequate daily iron intake or lack of nutrient supplementation due to late or no antenatal care. The anemia in pregnant adolescents is found to correlate with postpartum conditions in both maternal and neonatal aspects[24].

In our study, type of delivery in adolescent pregnancy was mainly vaginal delivery that found in 64.6% of cases. This finding reveals the similar trend of lower rate of cesarean delivery in teenage pregnancy[7,10,11,13,15,17,21]. The lower rate of cephalopelvic disproportion (CPD) may be explained the higher rate of vaginal delivery in adolescent mothers[21]. However, in contrast to various studies[9,10,12,15,23,25,26], our study did not show the significant difference of premature birth, birth weight, prevalence of low birth weight (LBW; birth weight <2,500 gram), and neonatal death between adolescent and adult pregnancies.

The common neonatal complication in adolescent pregnancy found in our study consisted of neonatal jaundice, TTN, and sepsis. However, the prevalence of these neonatal complications in adolescent pregnancy were not significantly different from adult pregnancy. Interestingly, the prevalence

of neonatal anemia and meconium-stained amniotic fluid in newborn of adolescent pregnancy were statistically higher than cases of adult pregnancy. Neonatal anemia was defined in cases with hematocrit level <40%. In contrast to the strong evidences of maternal anemia in adolescent pregnancy, to the best of our knowledge, our study seems to be the first to find both maternal and neonatal anemia as the main complications in adolescent pregnancy. It is possible that neonatal anemia associated with maternal anemia observed in adolescent mothers is due to inadequate iron and folic acid supplementation[27] and high prevalence of thalassemia in Southeast Asia including Thailand[28].

The present study also found the higher prevalence of meconium-stained amniotic fluid in newborns of adolescent mothers, compared to adult mothers. This result is in line with previous studies[15,18,19,21]. In general, meconium-stained amniotic fluid in fetus usually reflect fetus distress and may lead to serious neonatal conditions such as meconium aspiration syndrome and pneumonia. It is possible that maternal anemia and malnutrition as well as unrecognized fetal distress in adolescent mothers may play the important role of this condition. In contrast, the gestational diabetes and neonatal hypoglycemia in adolescent pregnancy were lower than adult pregnancy. These findings are explained by the lower prevalence of gestational diabetes in adolescent pregnancy, compared to adult pregnancy found in our study and others[13,18,25]. According to our finding and other studies, the lower prevalence of gestational diabetes might cause the lower prevalence of neonatal hypoglycemia, the common neonatal complication of gestational diabetes.

There were some limitations in our study. First, this study was conducted in a tertiary care hospital which complicated cases were referred. Thus, the prevalence of some maternal and neonatal complications in our setting may be higher than general hospital. Second, the neonatal information was collected at 3 days after birth, so some neonatal problems may not be detected. Finally, even the number of pregnant women in this study were around 1,000 cases, the further study in larger population is still required to provide detail information of maternal and neonatal complications of adolescent pregnancy.

Conclusion

The present study demonstrated that maternal and neonatal anemia as well as meconium-stained amniotic fluid were significantly observed in adolescent pregnancy. Early nutritional support including folic acid and iron, as well as health education should be performed in any teenagers who got pregnant to prevent both maternal and neonatal complications of adolescent pregnancy.

What is already known on this topic?

The high prevalence of maternal complications in adolescent pregnancy.

What this study adds?

The negative impact of teenage pregnancy can be observed in both maternal and neonatal aspects. The presence of maternal and neonatal anemia in adolescent pregnancy from our study suggest iron and folic acid supplementation in pregnant adolescents as early as possible. In addition, the higher rate of anemia and meconium-stained amniotic fluid in newborns of pregnant adolescent should be aware in neonatal care.

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Potential conflicts of interest

The authors declare no conflict of interest.

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