

# ผลลัพธ์จากการตั้งครรภ์ในวัยรุ่น : กรณีศึกษาในโรงพยาบาลชลประทาน

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## Clinical Outcomes of Teenage Pregnancy: A Case Study in Chonprathan Hospital

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**หลักการและวัตถุประสงค์:** การตั้งครรภ์ในวัยรุ่นเป็นปัจจัยเสี่ยงสำคัญที่มีผลทั้งกับตัวมารดาที่ตั้งครรภ์และทารกแรกเกิด การศึกษานี้เพื่อประเมินผลลัพธ์ที่เกิดขึ้นต่อหญิงตั้งครรภ์วัยรุ่นและทารกแรกเกิดเปรียบเทียบกับการศึกษาในกลุ่มผู้ใหญ่ รวมทั้งเปรียบเทียบผลลัพธ์จากการตั้งครรภ์ระหว่างกลุ่มหญิงตั้งครรภ์วัยรุ่นที่ได้รับการดูแลจากการฝากครรภ์และกลุ่มที่ไม่ได้ฝากครรภ์

**วิธีการศึกษา:** การศึกษานี้เป็นแบบ retrospective cohort study ในหญิงตั้งครรภ์แรกวัยรุ่นอายุน้อยกว่า 20 ปี เปรียบเทียบกับหญิงตั้งครรภ์แรกวัยผู้ใหญ่อายุ 20 - 34 ปี ที่คลอดบุตรในช่วงระหว่างวันที่ 1 ตุลาคม พ.ศ. 2554 – 30 กันยายน พ.ศ. 2555 ตัวแปรที่ทำการศึกษาได้แก่ ภาวะแทรกซ้อนที่พบในการตั้งครรภ์ ผลต่อการคลอดและทารกแรกเกิด

**ผลการศึกษา:** ในช่วงศึกษาพบหญิงตั้งครรภ์วัยรุ่น 231 ราย และหญิงตั้งครรภ์วัยผู้ใหญ่ 503 ราย โดยกลุ่มวัยรุ่นมีประวัติฝากครรภ์น้อยกว่า และมีระดับความเข้มข้นของเลือดต่ำกว่ากลุ่มวัยผู้ใหญ่ พบหญิงตั้งครรภ์วัยรุ่นคลอดก่อนกำหนดและทารกแรกเกิดน้ำหนักตัวน้อยกว่ากลุ่มวัยผู้ใหญ่ (ร้อยละ 15.6 กับ 10.2 และร้อยละ 16.0 กับ 11.1 ตามลำดับ) แต่ความสัมพันธ์ดังกล่าวไม่มีนัยสำคัญทางสถิติเมื่อวิเคราะห์โดยการควบคุมปัจจัยด้านการศึกษา อาชีพ และการฝากครรภ์ในกลุ่มวัยรุ่นเมื่อมีการฝากครรภ์ครบ 4 ครั้ง จะลดความเสี่ยงต่อการคลอดก่อนกำหนดและทารกแรกเกิด น้ำหนักตัวน้อยได้ร้อยละ 91.6 และ 80.6 ตามลำดับ เมื่อเปรียบเทียบกับกลุ่มที่ไม่ฝากครรภ์

**สรุป:** การคลอดก่อนกำหนดและทารกแรกเกิดน้ำหนักตัวน้อยพบได้บ่อยในหญิงตั้งครรภ์วัยรุ่น การไม่ได้รับการดูแล โดยการฝากครรภ์เป็นปัจจัยสำคัญที่สามารถป้องกันได้ ดังนั้นหญิงตั้งครรภ์วัยรุ่นควรได้รับการส่งเสริมเพื่อให้ได้รับการดูแลที่เหมาะสม โดยการฝากครรภ์เพื่อช่วยลดภาวะดังกล่าวได้

**Background and Objective:** Teenage pregnancy is a risk factor to both mother and newborn. This study aimed to compare the clinical outcomes of teenage pregnancies with those of adult and studied the association of antenatal care on clinical outcomes of teenage pregnancies.

**Methods:** A retrospective cohort study was conducted in teenage pregnant women (aged <20 years) and adult pregnant women (aged 20 to 34 years) who were primigravida and delivered during 1 October 2011 to 30 September 2012. The outcomes were complication of pregnancy, perinatal and neonatal outcomes.

**Results:** There were 231 teenage pregnancies and 503 adult pregnant women included in this study. The teenage group had fewer prenatal visits and lower hematocrit than adult group. The premature and low birthweight infants were more common in teenage group than in adult group (15.6% vs. 10.2% and 16.0% vs. 11.1%, respectively) but these relations were non-significant when analyzed and adjusted for levels of education, employment status and antenatal care. In teenage pregnancies, complete antenatal care could reduce the risk of preterm labor and low birthweight infant (91.6% for preterm labor and 80.6% for low birthweight infant) when compared with non-antenatal care group.

**Conclusion:** Teenage pregnancies had a higher incidence of preterm labor and lower birth weight in newborn. Poor antenatal care was an important preventable factor. Teenage pregnant woman should be encouraged to attend the adequate antenatal care to prevent complications that might occur.

**Keywords:** Clinical outcomes, neonatal outcomes, teenage pregnancy

## Introduction

Teenage pregnancy is considered to be a problem in both developing and developed countries. This is especially true in the developing countries due to 90% of all reported cases are in these countries<sup>1</sup>. Reports from the Reproductive Health Bureau, Ministry of Public Health showed an increase in unwanted pregnancy below the age of 20 from 13.9% in 2004 to 16.5% in 2011<sup>2</sup>. The reports of the incidence of teenage pregnancy in Thailand ranged from 9.0% to 36.5% depending on duration, places and targeted population that were studied<sup>3-7</sup>.

Teenage pregnancy is itself a risk factor to both the mother and the newborn. Studies have shown more maternal complications such as anemia, pregnancy induced hypertension in teenage pregnancy when compared with the older group<sup>4,6-11</sup>. Maternal death and socio-economic problems were also higher in teenage pregnancies<sup>1,12</sup>. There was also an increase in neonatal complications and neonatal death<sup>13,14,16,18,19</sup>. There were different results in the previous studies especially when they were analyzed and adjusted for other factors such as race, education, antenatal care<sup>6,13,15,16</sup>. This study aimed to investigate the clinical outcomes of teenage pregnancies compared with adult pregnancies and the effects of antenatal care on clinical outcomes of teenage pregnancies.

## Materials and Methods

A retrospective cohort study was undertaken and permitted by the Ethics Committee of Chonprathan hospital. The study was performed in teenage pregnant women (aged below 20 years) and adult pregnant women (aged 20 to 34 years), regardless of ethnicity who were primigravida and delivered at Chonprathan hospital during 1 October 2011 to 30 September 2012. All medical records were reviewed for demographic characteristics, histories of pregnancies and deliveries of mothers and babies. The outcomes of the study were divided into three groups:

Groups of outcomes	Specific measures
1. Complications of pregnancy	Anemia (Hct <33 %), pregnancy induced hypertension (PIH), premature rupture of membrane (PROM), antepartum / postpartum hemorrhage (APH / PPH)
2. Perinatal outcomes	Mode of delivery
3. Neonatal outcomes	Stillbirth, premature baby (gestational age < 37 wk), low birthweight infant (birthweight < 2,500 gm), small for gestational age (SGA), appropriate for gestational age (AGA), large for gestational age (LGA), APGAR score at 1 and 5 minutes

## Statistical analysis

An estimation of sample size for the present study was based on a difference in the preterm labor incidences, as the primary outcome between women whose first pregnancy was at teenage (15%) and those at age 20–34 years (8%)<sup>9</sup>, given the statistical significance level of 0.05 and statistical power of 80%. The calculation required at least 180 samples for the study group (teenage pregnancies), and 540 for the comparison group (adult pregnancies).

Continuous variables, including hematocrit, gestational age and birth weight were summarized using mean for central tendency and standard deviation for distribution. Comparison of these continuous variables between the two groups was subjected to student's t-test. Frequency of prenatal visits, complication of pregnancies, perinatal and neonatal outcomes included severity levels based on APGAR scores were described in percentage for each group. Comparison of outcomes between the teenage and adult groups and across prenatal visit frequency (none, 1-3 and 4 times) in teenage groups was subject to Chi-square test or Fisher's exact test, as appropriate. For determining magnitude and statistical significance of an association of the neonatal outcomes with ages of mothers or antenatal care, a logistic regression was applied using the variables for adjustment.

## Results

During the one year of study period, a total of 734 women of first pregnancy were conformed to the selection criteria. There were divided into two groups of 231 teenagers (age  $17.4 \pm 1.4$  years with the minimum of 13 years) and 503 adults (age  $26.2 \pm 4.2$  years). Teenage group had relatively lower education, more unemployment or informal sector employment (Table 1) and had no or fewer prenatal visits in a greater proportion (Table 2) than the adult group ( $p < 0.05$ ). On average, hematocrit during pregnancy of teenagers (34%) was relatively lower than that of adults (34.7%) ( $p < 0.05$ ). Other complications including PIH, PROM, APH and PPH were not significantly different between the two groups (Table 2).

Teenage group underwent Caesarean section or vacuum / forceps extraction in a lower proportion (30.7%) than adult group (56.7%) ( $p < 0.001$ ) (Table 3). One and two stillbirths were found in the teenage and adult groups, respectively. For outcomes to newborns, gestational age

**Table 1** General characteristics of teenage and reproductive age mothers

Characteristic	Teenage pregnancy (N=231)	Reproductive age pregnancy (N=503)	p-value
Age (yr.) (mean $\pm$ SD)	$17.4 \pm 1.4$	$26.2 \pm 4.2$	$< 0.001^*$
<b>Race (%)</b>			0.110
-Thai	95.24	92.64	
-Burmese	1.30	3.98	
-Cambodian	2.16	0.80	
-Laotian	1.30	2.39	
-Vietnamese	0.00	0.20	
<b>Education (%)</b>			$< 0.001^*$
-Elementary and lower	16.97	9.02	
-High school	83.03	50.41	
-Above high school	0.00	40.57	
<b>Employment status (%)</b>			$< 0.001^*$
-Unemployment	62.77	26.44	
-Informal sector**	27.71	19.88	
-Formal sector***	9.52	53.68	

\* Statistical significance ( $p < 0.05$ )

\*\* unskilled workers, housemaids, merchants, independently or self-employed

\*\*\* employed by private business and public settings

**Table 2** Antenatal care and complication of pregnancy

Characteristic	Teenage pregnancy (N=231)	Reproductive age pregnancy (N=503)	p-value
Numbers of prenatal visits (%)			0.001*
-None	6.52	2.20	
-1 time	6.52	3.81	
-2 times	10.87	6.61	
-3 times	10.87	8.02	
-4 times	65.22	79.36	
% Hct (Mean $\pm$ SD)	$34.0 \pm 3.2$	$34.7 \pm 3.3$	0.010*
Hct $< 33\%$ (%)	30.74	24.85	0.094
$\geq 33\%$ (%)	69.26	75.15	
PIH (%)	3.03	4.57	0.327
APH (%)	0.00	0.40	1.000**
PROM (%)	8.23	8.75	0.814
PPH (%)	0.00	1.79	0.064**

\* Statistical significance ( $p < 0.05$ )

\*\* Based on Fisher's exact test

at delivery for teenage group was  $38.2 \pm 2.6$  weeks (minimum 24 weeks) and for adult group was  $38.5 \pm 2.0$  weeks (minimum 26 weeks). The premature babies were more common in teenage group (15.6%) than in adult group (10.2%) ( $p = 0.036$ ). The weight of the babies born of teenage group were 2,869.9 g. on average, compared with 3,030.1 g. for adult group ( $p < 0.001$ ). As a consequence, the low birthweight infants were more common in the teenage group (16.0%) than in the adult group (11.1%) ( $p = 0.065$ ). Teenage group had a slightly higher proportion (6.1%) of SGA than the adult group (4.4%). A low APGAR score (0 – 3) at 5 min. was slightly more common in the teenage group (2.2%) than the adult group (0.2%) ( $p = 0.016$ ).

When using logistic regression analysis and adjusted for levels of education, employment status and antenatal care, the teenage group had more premature and low birthweight babies than in adult group (7.7%, 4.9%, respectively) (Table 4) but statistically non-significant.

**Table 3** Perinatal and neonatal outcomes

Characteristic	Teenage pregnancy (N=231)	Reproductive age pregnancy (N=503)	p-value
<b>Delivery mode (%)</b>			<0.001*
- Normal delivery	69.26	43.34	
- Caesarian section	30.74	55.06	
- Vacuum extraction (V/E)	0.00	0.80	
- Forceps extraction (F/E)	0.00	0.40	
- Breech assisting	0.00	0.40	
Stillbirth (%)	0.43	0.40	0.945
GA Mean $\pm$ SD (wk.)	38.2 $\pm$ 2.6	38.5 $\pm$ 2.0	0.067
GA < 37 wk. (%)	15.58	10.18	0.036*
$\geq$ 37 wk. (%)	84.42	89.82	
Birth weight Mean $\pm$ SD (g.)	2,869.9 $\pm$ 522.2	3,030.1 $\pm$ 499.8	<0.001*
Birth weight < 2,500 g. (%)	16.02	11.13	0.065
$\leq$ 2,500 g. (%)	83.98	88.87	
<b>Newborn characteristic (%)</b>			0.180
- AGA	90.04	88.67	
- SGA	6.06	4.37	
- LGA	3.90	6.96	
<b>APGAR score at 1 min. (%)</b>			0.225
- 0 – 3	4.33	2.40	
- 4 – 7	3.46	5.19	
- 8 – 10	92.21	92.42	
<b>APGAR score at 5 min. (%)</b>			0.016*
- 0 – 3	2.16	0.20	
- 4 – 7	1.73	1.00	
- 8 – 10	96.10	98.80	

\* Statistical significance (p<0.05)

When compared the teenage pregnancies across prenatal visit frequency (none, 1-3 times or incomplete and 4 times or complete antenatal care), there were few differences in the mean age between the three groups (17.3  $\pm$  1.6, 16.8  $\pm$  1.6 and 17.6  $\pm$  1.3 years, respectively) but no difference in the levels of education and employment status (Table 5). The non-antenatal care group had lower level of hematocrit than the complete antenatal care group (32.2% vs. 34.3%, p=0.047). There were correlations

between gestational age, birth weight and prenatal visit frequency. Non-antenatal care group had more premature and low birthweight babies than the other two groups (p<0.001) (Table 5). A low APGAR score (0 – 3) at 1 and 5 min. was most common in the non-antenatal care group.

In teenage pregnancies when using logistic regression analysis and adjusted for age of mother, level of education and employment status, the study showed that antenatal

**Table 4** Association between teenage pregnancy and neonatal outcomes

Pregnancy	Premature baby			Low birthweight infant		
	Odds ratio*	p-value	95% CI	Odds ratio*	p-value	95% CI
Adult	1.000	-	-	1.000	-	-
Teenage	1.077	0.805	0.60 – 1.93	1.049	0.867	0.60 – 1.84

\* adjusted for level of education, employment status and antenatal care

care could reduce risk of preterm labor and low birthweight infant especially when there was complete antenatal care, 91.6% for preterm labor (p=0.002) and 80.6% for low birthweight infant (p=0.047) (Table 6).

### Discussion

Teenage pregnancy is an important social problem of Thailand and is a health risk factor for both mothers and newborns. According to many studies in both

**Table 5** Characteristics and outcomes in teenage pregnancy and prenatal visit frequency

Characteristic	Number of ANC			p-value
	None (N=15)	1 – 3 (N=65)	4 (N=150)	
<b>Education (%)</b>				0.750
-Elementary and lower	22.22	19.35	15.75	
-High school	77.78	80.65	84.25	
<b>Employment status (%)</b>				0.754
- Unemployment	60.00	61.54	63.33	
- Informal sector	26.67	32.31	26.00	
- Formal sector	13.33	6.15	10.67	
%Hct (Mean ± SD)	32.2 ± 3.6	33.8 ± 3.3	34.3 ± 3.0	0.041 <sup>c</sup>
Hct < 33% (%)	53.33	33.85	26.67	0.079
≥ 33% (%)	46.67	66.15	73.33	
GA Mean ± SD (wk.)	34.7 ± 5.2	37.2 ± 2.8	39.0 ± 1.4	<0.001 <sup>a,b,c</sup>
(min. – max.)	(24.0 – 40.0)	(28.0 – 41.0)	(34.0 – 42.0)	
GA < 37 wk. (%)	46.67	29.23	6.00	<0.001*
≥ 37 wk. (%)	53.33	70.77	94.00	
Birth weight Mean ± SD (g.)	2,270.0 ± 820.3	2,725.2 ± 604.9	2,995.5 ± 371.4	<0.001 <sup>a,b,c</sup>
(min. – max.)	(560.0-3,250.0)	(1,160.0-3,775.0)	(1,745.0-3,975.0)	<0.001*
Birth weight < 2,500 g. (%)	46.67	27.69	7.33	
≤ 2,500 g. (%)	53.33	72.31	92.67	
<b>APGAR at 1 min. (%)</b>				0.005*
- 0 - 3	20.00	7.69	1.33	
- 4 - 7	6.67	3.08	2.67	
- 8 - 10	73.33	89.23	96.00	
<b>APGAR at 5 min. (%)</b>				<0.001*
- 0 - 3	20.00	1.54	0.67	
- 4 - 7	6.67	4.62	0.00	
- 8 - 10	73.33	93.85	99.33	

\* Statistical significance (p<0.05),

<sup>a</sup> difference between no ANC group and incomplete ANC group, statistical significant

<sup>b</sup> difference between incomplete ANC group and complete ANC group, statistical significant

<sup>c</sup> difference between no ANC group and complete ANC group, statistical significant

**Table 6** Association between antenatal care grouping and neonatal outcomes in teenage pregnancy

ANC	Premature baby			Low birthweight infant		
	Odds ratio*	p-value	95% CI	Odds ratio*	p-value	95% CI
None	1.000	-	-	1.000	-	-
Incomplete	0.467	0.331	0.101 - 2.166	0.813	0.799	0.166 - 3.985
Complete	0.084	0.002*	0.017 - 0.416	0.194	0.047*	0.039 - 0.975

\* Statistical significance (p<0.05)

\*\* adjusted for age of mother, level of education and employment status

Thailand and other countries<sup>3,4,6,7,9,11,13-16,18,19</sup>, most teenage pregnancies had a lower educational status, were unemployed, and in a lesser economical status when compared to the adult pregnant population. This study also confirmed that lesser education and being unemployed were common factors in teenage pregnancy. Similar to other studies, teenage pregnancy tended to have incomplete or non-antenatal care when compared to the adult pregnancy<sup>4-9,16</sup>. Some studies showed that teenage mothers tended to be of a higher risk of anemia<sup>4,6-11</sup>, while some studies differed<sup>3,5,17</sup>. In this study, hematocrit levels of teenage group were significantly lower than that of the adult group. There was no difference between the groups for the other maternal complications, like most studies that showed insignificant difference between the two groups<sup>4,5,7-9,11</sup>. However, postpartum hemorrhage was higher in the adult group in Thailand and Thato report<sup>6</sup>. This study showed that teenage group had a higher chance for normal delivery than adult group. In the other studies, teenage mothers either delivered by normal labor or Caesarian section more than the adult group<sup>3-9,11</sup> while other study showed no difference<sup>14</sup>. The difference of birth preference depends on maternal cooperation, pelvic dimensions, and baby size.

Many studies have shown that preterm labor and low birthweight infants were associated with teenage pregnancy<sup>3-5,7-9,11,13,14,16,18</sup>. Our finding was consistent with these but there was insignificant correlation when the data was sub-analyzed for education, occupation and antenatal care. This was consistent with the results of Thailand and Thato. Results from Stewart et al<sup>15</sup> found that when race, education, smoking history, and BMI were considered, maternal young age was significantly related to preterm labor but not related to birth weight of the newborn. Teenage pregnancy was also associated to preterm labor and lower birth weight newborn when the data was sub-analyzed for social aspects, race, and baby gender in the studies by Khashan, et al<sup>13</sup>. This was also observed in Chen, et al study<sup>16</sup> when race, marital status, smoking and alcoholic drinking during pregnancy, antenatal care was considered. Preterm labor and lower birth weight newborn in teenage

pregnancy may be associated with biological factors of teenager and environmental factors. Most studies have shown that teenage pregnancies have poor social opportunities such as education, occupation, and poor antenatal care<sup>3-9,11, 13-16,18</sup>. For the other outcomes of the babies, there were no differences for stillbirth and APGAR score at the first minute between the two groups. There was a difference of APGAR score at the fifth minute with the teenage pregnancy group having a lower score (0-3) more than the comparison. Many studies have different results, some studies showed that stillbirth<sup>5,14</sup>, small for gestational age infant<sup>8,15</sup>, low APGAR score<sup>5,11,16</sup> were significant in teenage pregnancies but in the other studies there were no differences<sup>4,6-9</sup>. These different results may be due to the variation between age grouping in each studies.

In developed countries with adequate antenatal care, there were no difference in risk of preterm labor or low birthweight infant for teenage pregnancy when compared to the adult pregnancy<sup>20</sup>. Heuston, et al<sup>21</sup> studied the benefit of antenatal care in teenage pregnancy, showed that antenatal care could reduce cost by decreasing the cost of taking care of the low birthweight infant. In developing countries with high incidence of teenage pregnancy, had a higher risk of poor antenatal care. And in the group that had adequate antenatal care the baby survived more than the poorer group<sup>22</sup>. A study in Bangladesh by Khatun and Rahman<sup>23</sup> proved a positive relation for higher birth weight with every antenatal visit. In Thailand, Suebnukarn and Phupong<sup>24</sup> studied in teenage pregnancies of less than 15 years old found that incomplete or non-antenatal care group had a higher chance of preterm labor and lower birth weight than the completed antenatal care group. This study compared none, incomplete and complete antenatal care groups of teenage pregnancy. The results were that antenatal care decreased the risk of preterm labor and low birthweight infant. This was especially true if the mother had complete antenatal care. Therefore, it should be encouraged to attend adequate antenatal care for all teenage pregnancies to decrease pregnancy related complication and risk to the newborn.

## Conclusion

Teenage pregnancy is an important social problem in Thailand with increasing incidences. There are consequences to both mothers and newborns. Teenage pregnancies have a higher chance of preterm labor and lower birth weight in the newborns. Poor antenatal care is a crucial factor for this, so teenage pregnant woman should be encouraged to attend adequate antenatal care in order to prevent complications.

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