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The Prevalence of Preterm Delivery and Adverse Pregnancy Outcomes in Healthy Singleton Teenage Pregnancies at Charoenkrung Pracharak Hospital

Weena Sukhopon, M.D.*,
Watcharapot Anakrat, M.D.*,
Apichaya Pradyachaipimol, M.D.*

** Department of Obstetrics and Gynecology, Charoenkrung Pracharak Hospital, Division of Medical service, Bangkok Metropolitan Administration, Bangkok, Thailand*

ABSTRACT

Objectives: To determine the prevalence of preterm delivery and adverse pregnancy outcomes in healthy singleton teenage pregnancies.

Materials and Methods: Over 5-year period from January 2013 to June 2018, the prevalence of preterm delivery in teenage women aged 10-19 years who had delivered at Charoenkrung Pracharak Hospital was estimated. Data were retrieved from medical records, including obstetric data and neonatal outcomes. Other outcomes were compared between two subgroups, among 46 women aged 10-14 years (young adolescents) in the study group, and 224 women aged 15-19 years (adolescents) in control group, to determine adverse pregnancy outcomes and associated factors.

Results: The prevalence of preterm delivery among teenage pregnancies was 14.94 % and this was significantly higher in study group compared with control group (32.6% vs 13.8%, $p = 0.002$). Mean gestational age (GA) at first visit in the study group was more advanced than control group (25.7 ± 6.9 vs 18.4 ± 6.4 weeks, $p < 0.001$). A total number of antenatal visits was fewer in young adolescents (5.2 ± 3 vs 8 ± 3 times, $p < 0.001$) and these women had lower baseline hemoglobin levels compare to control group (10.92 ± 0.94 vs 11.31 ± 1.28 mg/dl, $p = 0.035$). Young adolescents had lower mean GA at delivery (37.6 ± 2.3 vs 38.4 ± 2.4 weeks, $p = 0.041$) and higher incidence of low birth weight newborns than control group (30.4% vs 16.1%, $p = 0.032$), but no difference in route of delivery.

Conclusion: The prevalence of preterm delivery among teenage pregnancies was 14.94% and significantly higher in young adolescents. These women had lower baseline hemoglobin level, mean GA at delivery and higher incidence of low birth weight newborns than control group.

Keywords: preterm delivery, teenage pregnancy, adverse pregnancy outcome.

Correspondence to: *Watcharapot Anakrat, M.D, Department of Obstetrics and Gynecology, Chareonkrung Pracharak Hospital, Division of Medical service, Bangkok Metropolitan Administration, Bangkholaem, Bangkok 10120, Thailand. E-mail: barbieaee@hotmail.com*

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ความชุกของการคลอดก่อนกำหนดและผลลัพธ์ไม่พึงประสงค์ของการตั้งครรภ์ในมารดาวัยรุ่นสุขภาพดีที่โรงพยาบาลเจริญกรุงประชารักษ์

วีณา สุโขพล, วัชรพจน์ เอนกรัตน์, อภิชญา ปรัชญาชัยพิมล

บทคัดย่อ

วัตถุประสงค์: *เพื่อศึกษาความชุกของการคลอดก่อนกำหนดและผลลัพธ์ไม่พึงประสงค์ของการตั้งครรภ์ในมารดาวัยรุ่นสุขภาพดี*

วัสดุและวิธีการ: *การศึกษาย้อนหลังโดยศึกษาความชุกการคลอดก่อนกำหนดในมารดาวัยรุ่นทั้งหมดจำนวน 1,211 คน มาคลอดที่โรงพยาบาลเจริญกรุงประชารักษ์ในช่วงเดือนมกราคม ปี พ.ศ.2556 จนถึงเดือนมิถุนายน ปี พ.ศ.2560 โดยเก็บข้อมูลย้อนหลังจากเวชระเบียน และศึกษาวัตถุประสงค์รองจากกลุ่มประชากรตัวอย่าง 270 คน ได้แก่ มารดาวัยรุ่นอายุ 10-14 ปี จำนวน 46 คน และอายุ 15-19 ปี จำนวน 224 คน เพื่อศึกษาและเปรียบเทียบผลลัพธ์ไม่พึงประสงค์ของการตั้งครรภ์ในมารดาวัยรุ่นและปัจจัยอื่นที่เกี่ยวข้อง*

ผลการศึกษา: *จากการศึกษาพบความชุกของการคลอดก่อนกำหนดในมารดาวัยรุ่นร้อยละ 14.94 โดยกลุ่มมารดาวัยรุ่นอายุ 10-14 ปี สัมพันธ์กับการคลอดก่อนกำหนดอย่างมีนัยสำคัญทางสถิติเมื่อเทียบกับกลุ่มมารดาวัยรุ่นอายุ 15-19 ปี (ร้อยละ 32.6% และ ร้อยละ 13.8, p = 0.002) โดยกลุ่มมารดาวัยรุ่นอายุ 10-14 ปี มีอายุครรภ์เฉลี่ยที่มาฝากครรภ์ครั้งแรกสูงกว่า (25.7 ± 6.9 vs 18.4 ± 6.4 สัปดาห์, p < 0.001) จำนวนครั้งที่มาฝากครรภ์ทั้งหมดน้อยกว่า (5.2 ± 3 vs 8 ± 3 ครั้ง, p < 0.001) และมีค่าฮีโมโกลบินพื้นฐานที่ต่ำกว่าเมื่อเทียบกับกลุ่มมารดาวัยรุ่นอายุ 15-19 ปี (10.92 ± 0.94 vs 11.31 ± 1.28 มก./ดล., p = 0.035) ผลลัพธ์พบว่ามารดาวัยรุ่นอายุ 10-14 ปี มีอายุครรภ์ ณ วันคลอดน้อยกว่า (37.6 ± 2.3 vs 38.4 ± 2.4 สัปดาห์, p = 0.041) และมีน้ำหนักตัวทารกที่ต่ำกว่าเกณฑ์สูงกว่ากลุ่มมารดาวัยรุ่นอายุ 15-19 ปี อย่างมีนัยสำคัญทางสถิติ (ร้อยละ 30.4 vs ร้อยละ 16.1, p = 0.032) อย่างไรก็ตาม ช่องทางการคลอดไม่ได้แตกต่างกันในสองกลุ่มการศึกษา*

สรุป: *จากการศึกษาพบความชุกของการคลอดก่อนกำหนดในมารดาวัยรุ่นร้อยละ 14.94 และมีความสัมพันธ์กับมารดาวัยรุ่นกลุ่มอายุน้อย (10-14 ปี) อย่างมีนัยสำคัญทางสถิติ และพบว่ากลุ่มมารดาวัยรุ่นอายุน้อย (10-14 ปี) มีค่าฮีโมโกลบินพื้นฐานต่ำกว่าอายุครรภ์ ณ วันคลอดน้อยกว่าและน้ำหนักทารกที่ต่ำกว่าเกณฑ์สูงกว่ากลุ่มมารดาวัยรุ่นอายุ 15-19 ปี อย่างมีนัยสำคัญทางสถิติ*

คำสำคัญ: *คลอดก่อนกำหนด มารดาวัยรุ่น ผลลัพธ์ไม่พึงประสงค์ของการตั้งครรภ์*

Introduction

Teenage pregnancy is a societal and public health problem, both in Thailand and worldwide. Over the past decade, adolescent pregnancy occurred far more frequently in underdeveloped and developing countries than in developed countries.

In Thailand, the number of childbearing adolescents increased from 2000 to 2012. During this period, the number of childbirths per 1,000 girls aged 15-19 had risen from 31.1 to 53.4 and from 0.5 to 1.8 for girls aged 10-14[1-4].

Adolescent pregnancy is a problem that concerns every country. The adolescent birth rate is one of the World Health Organization's indicators for its sustainable development goals that must be achieved by every nation by 2030. Also, the WHO has set decrements on the numbers of births delivered by 10- to 14-year-old mothers and by 15- to 19-year-old mothers as part of increasing the quality of life and health conditions of every person[1-4].

Complications in adolescent pregnancy can affect the mother's health, e.g., preterm labor, preeclampsia, premature rupture of membranes, anemia, and postpartum hemorrhage, and the infant's health, e.g., preterm delivery, low birth weight, intrauterine growth retardation, and death[3, 5-16].

Charoenkrung Pracharak Hospital is the center known as tertiary care center. The hospital not only has referred cases from hospitals within Bangkok Metropolitan Administration but also trains residents and medical students. In the past, Charoenkrung Pracharak Hospital, had an adolescent pregnancy rate of about 6.1%, which the Department of Health considers to be too high. This study described the prevalence of preterm delivery and unexpected consequences among teenage pregnancies who gave birth at Charoenkrung Pracharak Hospital in order to reduce preterm delivery among pregnant adolescents.

Materials and methods

For this cross-sectional study, the authors reviewed the charts of maternity patients who delivered at Charoenkrung Pracharak Hospital from January 1, 2013 to June 30, 2018. The research proposal was approved by the ethical committee of the Medical Service Department, Bangkok Metropolitan Administration.

During period of the study, the data were collected from all teenage pregnancies who gave births in that period. The sample size for the primary outcome was calculated from $n = [(Z\alpha/2)^2 P(1-P)]/d^2$, by using the prevalence 19.6% (from Chantrapanichkul et al's study[9]). The present study recruited 270 teenage pregnant women who delivered at Charoenkrung Pracharak hospital. The prevalence was calculated from 270 teenage pregnancies, which was the primary outcome. The pregnancy outcomes among teenage pregnancy were also determined. The young adolescents (study group) consisted of women aged 10-14 years and the adolescents group consisted of women aged 15-19 years. The inclusion criteria were: teenage pregnancy (women aged 10-19 years), singleton pregnancy, and neonates who delivered at 24-36 weeks of gestation or a birth weight of at least 500 grams. The exclusion criteria were: multiple gestation pregnancy, neonates with chromosomal or structural anomalies, mothers with chronic hypertension, autoimmune disease, or a history of cervical excision procedure or cervical cerclage, indicated preterm, no antenatal care, or birth before arrival.

The following variables were collected from medical records: maternal age, gestational age at delivery, marital status, body mass index, hematocrit, hemoglobin, number of antenatal care visits, anemia, delivery route, obstetric complications (including gestational diabetes mellitus, gestational hypertension, preeclampsia, premature rupture of membranes, postpartum hemorrhage, chorioamnionitis, and fetal growth restriction), and neonatal complications (including birth asphyxia, stillbirth, low birth weight, and admission to the neonatal intensive care unit).

Data were analyzed using SPSS version 26.0 software (SPSS Inc, Chicago, IL, USA). Descriptive statistics, including means, standard deviations, numbers, and percentages, were used to describe various characteristics as appropriate. Various

characteristics were compared between the groups using student's t-test, chi-squared test, or Mann-Whitney U test as appropriate. Results were considered statistically significant if $p < 0.05$.

Results

During January 1, 2013 to June 30, 2018, a total of the 22,686 births at Charoenkrung Pracharak Hospital. Of these 1,211 of 22,686 pregnant women were teenage pregnancies. A total of 181 were preterm birth from all teenage pregnancies. The prevalence of preterm birth among teenage pregnancies was 14.94 %.

For secondary outcome we selected 270 teenage pregnancy cases by simple random sampling technique (46 young adolescents and 224 adolescents).

Table 1 shows the cases' clinical characteristics. Compared to adolescents, young adolescents had significantly fewer antenatal care visits (5.2 ± 3 vs 8 ± 3, $p < 0.001$) and higher gestational ages at first visit (25.72 ± 6.89 weeks vs 18.39 ± 6.38 weeks, $p < 0.001$). The hemoglobin and hematocrit levels were statistically significantly different between the two groups (10.92 ± 0.94 mg/dl vs 11.31 ± 1.28 mg/dl and 32.67 ± 2.83% vs 33.93 ± 3.84%, $p = 0.035$).

Table 1. Clinical characteristics of young adolescent and adolescent mothers in this study.

Clinical characteristics	Young adolescents (10-14 years old, n=46)	Adolescents (15-19 years old, n=224)	p value
Maternal age (years)	13.83 ± 0.44	17.43 ± 1.38	< 0.001
BMI (kg/m^2)	24.73 ± 3.53	24.99 ± 4.20	0.938
Marital status			
Married	37 (80.4%)	200 (89.3%)	0.082
Divorce	9 (19.6%)	24 (1.71%)	
Total antenatal care visit (times)	5.2 ± 3	8 ± 3	< 0.001
Gestational age at 1st visit (weeks)	25.72 ± 6.89	18.39 ± 6.38	< 0.001
Hemoglobin (g/dl)	10.92 ±0.94	11.31 ± 1.28	0.035
Hematocrit (%)	32.67 ± 2.83	33.93 ± 3.84	0.035
Drug abuse	0 (0.0%)	3 (1.3%)	0.570
Smoking	2 (4.31%)	4 (1.8%)	0.688
Alcohol drinking	0 (0.0%)	2 (0.9%)	0.688
HBS Ag positive	0 (0.0%)	2 (0.9%)	0.688
HIV positive	0 (0.0%)	4 (1.8%)	0.472
Syphilis TP positive	0 (0.0%)	2 (0.9%)	0.688
Gravidity			
1	46 (100%)	222 (99.1%)	0.688
2	0 (0.0%)	2 (0.9%)	
Parity			
0	46 (100%)	222 (99.1%)	0.688
1	0 (0.0%)	2 (0.9%)	
Abortion			
0	46 (100%)	224 (100%)	
1	0 (0.0%)	0 (0.0%)	

BMI: Body mass index, HBS Ag: Hepatitis B surface Antigen, HIV: Human immunodeficiency virus, TP: Treponema pallidum
Data presented as mean ± standard deviation or n (%)

Table 2 shows the cases' obstetric complications and management. Anemia was the most common complication and occurred at similar rates in the two groups. Preterm labor occurred more often in young

adolescents than adolescents (32.6% vs 13.8%, p = 0.002); the overall prevalence of preterm birth in teenage pregnancy in our study was 14.94%. Young adolescents had significantly lower gestational ages at birth than adolescents (37.59 ± 2.28 weeks vs 38.38 ± 2.41 weeks, p = 0.041). There had no cesarean delivery in this study.

Neonatal outcome were shown in Table 3. Compared to adolescents, young adolescents had a significantly higher incidence of low birth weight newborns (p = 0.032). The mean birth weight, birth asphyxia, and number of neonatal intensive care unit admission were similar in both groups. Stillbirths were not observed in this study.

Table 2. Comparison of obstetric complications and management between young adolescent and adolescent mothers.

Complication/management	Young adolescents (10-14 years old, n=46)	Adolescents (15-19 years old, n=224)	p value
GDM	0 (0.0%)	0 (0.0%)	
Preeclampsia	2 (4.3%)	3 (1.31%)	0.202
Antepartum hemorrhage	0 (0.0%)	0 (0.0%)	
Post-partum hemorrhage	3 (6.5%)	7 (3.1%)	0.233
Anemia	23 (50%)	101 (45.1%)	0.543
PROM	0 (0.0%)	15 (6.7%)	0.056
Antenatal corticosteroid use	3 (6.5%)	14 (6.3%)	0.579
Tocolytic use	1 (2.2%)	8 (3.6%)	0.528
Chorioamnionitis	0 (0.0%)	0 (0.0%)	
IUGR	0 (0.0%)	2 (0.9%)	0.688
Mode of delivery			
Vaginal route	46 (100%)	224 (100%)	
Gestational age (weeks)	37.59 ± 2.28	38.38 ± 2.41	
Preterm	15 (32.6%)	31 (13.8%)	0.041
Term	31 (67.4%)	193 (86.2%)	0.002

GDM: Gestational diabetes mellitus, PROM: Premature rupture of membranes, IUGR: Intrauterine growth restriction
Data presented as mean ± standard deviation or n (%)

Table 3. Comparison of neonatal outcome between young adolescent and adolescent mothers.

Neonatal outcomes	Young adolescents (10-14 years old, n=46)	Adolescents (15-19 years old, n=224)	p value
Birth weight (grams)			
2500 - 3999	32 (69.6%)	188 (83.9%)	0.032
< 2500	14 (30.4%)	36 (16.1%)	
Mean Birth weight (grams)	2749.35 ± 468.26	2881.76 ± 476.30	0.086
Apgar score			
At 1 min	8.89 ± 0.53	8.82 ± 0.75	0.523
At 5 min	9.89 ± 0.32	9.86 ± 0.63	0.786
Birth asphyxia	1 (2.2%)	4 (1.8%)	0.610
Still birth	0 (0.0%)	0 (0.0%)	
NICU admissions	2 (4.3%)	9 (4.0%)	0.587

NICU: Neonatal intensive care unit, Data presented as mean ± standard deviation or n (%)

Discussion

In this study, the prevalence of preterm delivery among teenage pregnancies was 14.94%, which was higher than previously reported (the incidence of teenage pregnancy in Thailand from 2013-2015 was 4.6%; 0.15% among young adolescents and 4.48% among adolescents)[2].

In this study, younger adolescents had significantly fewer antenatal care visits and significantly delayed antenatal care, compared to adolescents. The young adolescent cases observed here had inadequate antenatal care.

In this study, anemia was the most common antepartum complication (45.9%) and was observed at higher rates than previously reported. Poor nutritional habits and low-calorie intake were the most likely causes of anemia in teenage pregnancy[5-11].

In this study, preterm delivery was more prevalent in the young adolescents than in adolescents. The prevalence of preterm delivery in teenage pregnancy observed here was lower than previously reported[9-10]. The increased risk of preterm labor could be due to inadequate antenatal care, poor nutrition, and lower education levels[5, 9-11].

All the mothers in this study had normal vaginal deliveries, possibly because teenage pregnancy commonly involved preterm birth and therefore small infants. Previous studies found that teenage pregnancies involved normal vaginal deliveries more often than cesarean section deliveries[9,10].

Regarding neonatal outcomes, compared to adolescents, young adolescents had a significantly higher incidence of low birth weight, but similar rates of birth asphyxia and neonatal intensive care unit admissions.

Conclusion

In conclusion, at Charoenkrung Pracharak Hospital, from January 1, 2013 to June 30, 2018, the prevalence of preterm delivery among teenage pregnancies was 14.94%. Compared to adolescents, young adolescents had significantly fewer antenatal care visits and lower hemoglobin values but more preterm births. Anemia was the most common antepartum complication in both groups.

According to higher risk of preterm birth in teenage pregnancy, these women should be educated and counseled by healthcare provider to realize and reduce risk of this condition and complications themselves; these include early, and adequate antenatal care visits. Contraception should be advised to lowering further unwanted or adolescent pregnancy.

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Potential conflicts of interest

The authors declare no conflict of interest.

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