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Anemia and Pregnancy Outcomes in Teenage Prenatal Care Clinic at Siriraj Hospital

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ABSTRACT

Objectives: To compare the prevalence of anemia and pregnancy outcomes between teenage pregnancies who received teenage prenatal care services and general prenatal care services at Siriraj Hospital and to evaluate various factors associated with anemia before delivery.

Materials and Methods: Medical records of 343 and 347 teenage pregnancies who received antenatal care (ANC) at teenage prenatal care clinic and general ANC clinic for more than 4 times and delivered at Siriraj Hospital were reviewed. Prevalence of anemia at first ANC and before delivery as well as pregnancy outcomes were compared. Various factors associated with anemia were also evaluated.

Results: Women in teenage prenatal care clinic were younger (16.9±1.2 vs. 17.5±1.3 years, p<0.001) than women in general prenatal care clinic. Prevalence of anemia at first ANC and before delivery were comparable between 2 groups (26.5% vs. 25.9%, p=0.859 and 20.4% vs. 19.9%, p=0.864). Improvement and deterioration of anemia status were also comparable (57.1% vs. 60.0%, p=0.695 and 12.3% vs. 12.8%, p=0.855). No differences of various pregnancy outcomes were observed including, preterm birth, low birth weight, primary cesarean delivery rates. Logistic regression analysis demonstrates that anemia at 1st ANC and maternal age <17 years significantly increased the risk of anemia before delivery (adjusted OR 4.7, 95% CI 3.1-7.0, and 1.8, 95% CI 1.2-2.8, respectively).

Conclusion: No difference of prevalence of anemia and pregnancy outcomes between women attending teenage and general prenatal care clinic. Anemia at 1st ANC and age <17 years old were independent factors for anemia before delivery.

Keywords: Teenage pregnancy, anemia in pregnancy

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ภาวะซีดและผลของการตั้งครรภ์ในสตรีตั้งครรภ์วัยรุ่นที่ได้รับการฝากครรภ์ในคลินิกมารดาวัยรุ่นของโรงพยาบาลศิริราช

สุภาเพ็ญ เลิศวุฒิวิวัฒน์, ภัทรวลัย ตลึงจิตร

วัตถุประสงค์: *เพื่อเปรียบเทียบความชุกของภาวะซีด และผลของการตั้งครรภ์ระหว่างสตรีตั้งครรภ์วัยรุ่นที่เข้ารับการฝากครรภ์กับคลินิกมารดาวัยรุ่นกับกลุ่มที่ได้รับการฝากครรภ์ในคลินิกทั่วไปของโรงพยาบาลศิริราช และศึกษาปัจจัยเสี่ยงต่อการเกิดภาวะซีดก่อนคลอด*

วิธีการวิจัย: *เป็นการศึกษาเชิงพรรณนาแบบย้อนหลัง โดยการทบทวนเวชระเบียนสตรีตั้งครรภ์วัยรุ่นจำนวน 690 ราย ที่ได้รับการฝากครรภ์ตั้งแต่ 4 ครั้งขึ้นไป และคลอดบุตรที่โรงพยาบาลศิริราช โดยมีกลุ่มที่เข้ารับการฝากครรภ์ในคลินิกมารดาวัยรุ่น 343 ราย และกลุ่มที่เข้ารับการฝากครรภ์ในคลินิกทั่วไป 347 ราย*

เก็บข้อมูลต่างๆ ได้แก่ ข้อมูลพื้นฐาน, ภาวะซีดที่การฝากครรภ์ครั้งแรก และภาวะซีดก่อนคลอด ข้อมูลการคลอดและผลของการตั้งครรภ์ ทำการเปรียบเทียบความชุกของภาวะซีด และผลของการตั้งครรภ์ระหว่างสตรีตั้งครรภ์ 2 กลุ่ม และวิเคราะห์ปัจจัยเสี่ยงของภาวะซีดก่อนคลอด

ผลการศึกษาวิจัย: *กลุ่มสตรีตั้งครรภ์วัยรุ่นที่เข้ารับการฝากครรภ์ในคลินิกมารดาวัยรุ่นมีอายุเฉลี่ยน้อยกว่า (16.9±1.2 กับ 17.5±1.3 ปี, p<0.001) กลุ่มที่เข้ารับการฝากครรภ์ในคลินิกทั่วไป ทำการเปรียบเทียบความชุกของภาวะซีดที่ฝากครรภ์ครั้งแรกและก่อนคลอด (18.1% กับ19.6% , p=0.859 และ 20.4% กับ 19.9%, p=0.864) เปรียบเทียบภาวะซีดที่ดีขึ้นและแย่ลงระหว่างทั้ง 2 กลุ่ม (57.1% กับ 60.0%, p=0.695 และ 12.3% กับ 12.8% ตามลำดับ, p=0.855) ไม่พบความแตกต่างของผลของการตั้งครรภ์ทั้ง 2 กลุ่ม ทั้งในเรื่องของการคลอดก่อนกำหนด ทารกน้ำหนักตัวน้อย หรืออัตราการผ่าตัดคลอดบุตร จากการวิเคราะห์การถดถอยโลจิสติก พบว่า ภาวะซีดที่การฝากครรภ์ครั้งแรกและอายุของสตรีตั้งครรภ์ที่น้อยกว่า 17 ปี จะเพิ่มความเสี่ยงต่อการเกิดภาวะซีดก่อนคลอด (adjusted OR 4.7, 95%CI 3.1-7.0, และ 1.8, 95%CI 1.2-2.8 ตามลำดับ)*

สรุป: *ความชุกของภาวะซีดและผลของการตั้งครรภ์ในสตรีตั้งครรภ์วัยรุ่นที่ได้รับการฝากครรภ์ที่คลินิกมารดาวัยรุ่นและคลินิกทั่วไปไม่แตกต่างกันอย่างมีนัยสำคัญ ภาวะซีดที่การฝากครรภ์ครั้งแรกและอายุของสตรีตั้งครรภ์ที่น้อยกว่า 17 ปี เป็นปัจจัยที่สัมพันธ์กับการเกิดภาวะซีดก่อนคลอด*

Introduction

Adolescent pregnancies have become a significant problem worldwide. Most adolescent pregnancies (95%) were in developing countries[1]. Similar problems also exist in Thailand. Data from Thai Birth Registration showed that adolescent birth rate among those aged between 10-19 years was increasing from 1992 to 2013[2].

Adolescent pregnancies have been reported to contribute to 23% of overall morbidity due to pregnancy and childbirth[1]. Previous studies showed that adolescent pregnancy was an important risk for anemia in pregnancy, preterm birth, low birth weight, and NICU admission[1,3-7]. One risk factor is dietary inadequacy for the adolescent herself and for her fetal growth. Other factors lead to poor pregnancy outcome, including lack of knowledge about pregnancy, limited access to antenatal care service, low income, lack of privacy, and negative attitude about teenage pregnancy i.

In developing countries, anemia in teenage pregnancy is critical issue. Major causes are malnutrition and iron and folic deficiency; which are associated with low socioeconomic status and maternal environment[8]. This issue also exists in Thailand. To tackle on this problem, teenage prenatal care clinic was established on 1st May 2012 by the multidisciplinary team from Faculty of Medicine Siriraj Hospital and Faculty of Nursing Mahidol University. Until April 2015 there were about 700 adolescent women aged under 19 years at delivery and without underlying diseases.

This study was aimed to compare the prevalence of anemia between women who received teenage prenatal care service and women who received general prenatal care service. Other pregnancy and neonatal outcomes were evaluated and compared between 2 groups. Various factors associated with anemia before deliveries were also evaluated.

Materials and Methods

The retrospective cohort study was conducted at the Department of Obstetrics and Gynecology, Faculty of Medicine Siriraj Hospital after obtaining the ethical approval from Siriraj Institutional Review Board, Mahidol University (COA=Si080/2014).

study revealed that prevalence of anemia among teenage pregnancy was 30%. It was estimated to be 20% among those who attended teenage prenatal care clinic. At 95% significance level and 80% power, the sample size was estimated to be 313 in each group, including 10% loss.

In antenatal clinic, we do physical examination to ensure that women and her baby are healthy. Pregnant women were examined, weight checks, and did urinalysis pending on the stage of the pregnancy, health care providers may also do blood tests and imaging tests, such as ultrasound exams. There was no collecting in depth information about an individual knowledge, socioeconomic status, psychosocial problems, family supporters, as well as contraceptive planning after child birth.

Teenage women were invited to join teenage prenatal care clinic according to their willingness. The work processes in this clinic include maternal history record with psychosocial status evaluation, general physical and antenatal examination, and education according to the knowledge gap identified by questionnaire testing. Counseling on pregnancy problems including nutritional status, assessment for preterm delivery risk, preparation before delivery, breastfeeding, and also contraception after child birth were given respectively. Accounting for the nature of teenagers, the participants always meet the same health care providers every visiti to make them familiar and feel comfortable to disclose any problems to all medical staff.

Data was reviewed from medical records. Teenage women are defined as girls within the ages of 13-19 at delivery[8]. They had antenatal care more than 4 times and delivered at Siriraj Hospital from May 2012 to April 2015. Pregnant women with thalassemia, multi-fetal pregnancy, with medical conditions that may affect maternal hematocrit, and pregnant women with fetal anomaly were excluded.

Among them, 343 women received prenatal care services in teenage pregnancy clinic of Siriraj Hospital and the remaining 347 women received general prenatal

care.

Baseline characteristics such as, parity, BMI, and hematocrit at first ANC were recorded. Pregnancy and delivery data including total weight gained, second hematocrit, gestational age at delivery, route of delivery, birth weight, intra-partum and neonatal complications, were also evaluated.

The prevalence of anemia was defined as less than the 5th percentile of hemoglobin and hematocrit cutoff for each trimester[9]. Various information was compared between women in both groups to determine associated factors and differences in pregnancy outcomes. Various factors associated with anemia before deliveries were also evaluated.

Descriptive statistics were produced for demographic data of patients. Continuous data was expressed by mean and standard deviation (SD) while categorical data was expressed as numbers and percentages. In comparing baseline characteristics between clinic and non-clinic group, unpaired t test or Mann-Whitney-U test for continuous data and Chi-square or Fisher's exact test for categorical data were used as appropriate. Multiple logistic regression analysis was used to identify independent factors related to anemia. Service and factors with uni-variate p-value of < 0.1 were chosen into multiple logistic regression analysis. All analyses were performed using PASW Statistics 18 (SPSS Inc., Chicago, IL, USA). Statistical significance was defined as a P-value of less than 0.05. All two-sided tests with p-value < 0.05 were considered statistically significant.

Results

Medical records of a total of 690 adolescent mothers delivering at Siriraj Hospital were reviewed. The study group comprised of 343 teenage women who received teenage prenatal care services of Siriraj Hospital and the comparison group comprised of 347 teenage women who received general antenatal care.

Table 1 showed baseline characteristics of the participants. Both groups were comparable in terms of age, parity, BMI, total weight gained, number of visiting, first hematocrit, and anemia status. There was some significant difference between women in teenage prenatal care service and general prenatal care service. Women in teenage prenatal care service were statistically younger than the general service group (16.9±1.2 vs. 17.5±1.3 years, p<0.001).

Table 1. Baseline characteristics of patients.

	Teenage prenatal care clinic	**General prenatal care clinic**	**P**
	n = 343	**n = 347**	
Primigravidarum	299 (87.2)	293 (84.4)	0.358
Age (years)	16.9 ± 1.2	17.5 ± 1.3	<0.001
BMI (kg/m²)	25.4 ± 3.7	25.7 ± 4.1	0.248
Normal weight	180 (52.5%)	165 (47.6%)	0.416
Overweight	116 (33.8%)	127 (36.6%)	
Obesity	47 (13.7%)	55 (15.9%)	
Total weight gained (kg)	14.6 ± 4.9	15.0 ± 5.6	0.295
Within recommendation	112 (32.7%)	119 (34.3%)	0.308
Under recommendation	200 (58.3%)	186 (53.6%)	
Over recommendation	31 (9.0%)	42 (12.1%)	
ANC ≥ 8 times (antenatal care visits)	220 (64.1%)	231 (66.6%)	0.555
First Hct (%)	34.6 ± 3.2	34.8 ± 3.2	0.423
Anemia	91 (26.5%)	90 (25.9%)	0.859

The prevalence of anemia at first ANC and before delivery were comparable between 2 groups (26.5% vs. 25.9%, p=0.859 and 20.4% vs. 19.9%, p=0.864) as revealed in Table 2. Improvement and deterioration of anemia status were also comparable between the 2 groups (57.1% vs. 60.0%, p=0.695 and 12.3% vs. 12.8%, p=0.855).

Table 2. Anemic status of participants.

	Teenage prenatal care clinic n = 343	General prenatal care clinic n =347	P
Anemia in 1st ANC	91 (26.5%)	90 (25.9%)	0.859
Anemia at before delivery	70 (20.4%)	69 (25.9%)	0.864
Improvement	52/91 (57.1%)	54/90 (60.0%)	0.695
Deterioration	31/252 (12.3%)	33/257 (12.8%)	0.855

No differences of various pregnancy outcomes were observed between groups, including, preterm birth, low birth weight, and primary cesarean delivery rates as demonstrated in Table 3.

Table 3. Pregnancy outcomes of participants.

	Teenage prenatal care clinic n = 343	General prenatal care clinic n = 347	P
Anemia	70 (20.4%)	69 (19.9%)	0.864
Delivery GA (weeks)	38.7 ± 1.6	38.7 ± 1.4	0.915
Preterm	22 (6.41)	20 (5.8%)	0.843
Estimated blood loss (ml)	234.9 ± 135.9	244.8 ± 153.7	0.270
PPH	9 (2.62%)	7 (2.02%)	0.782
Blood Transfusion	1 (0.3%)	3 (0.9%)	0.624
Birth weight (g)	2952.1 ± 378.0	2978.9 ± 388.3	0.359
LBW	28 (8.2%)	30 (8.7%)	0.927
Primary Cesarean delivery	6 (1.7%)	8 (2.3%)	0.478
Maternal complication	65 (19.0%)	50 (14.4%)	0.134
Male newborn	170 (49.6%)	165 (47.6%)	0.651
Neonatal outcome			
NICU	3 (0.9%)	0	0.122
Phototherapy	45 (13.1%)	44 (12.7%)	0.953
Neonatal complication	12 (3.5%)	7 (2.0%)	0.339
Asphyxia	7 (2.0%)	2 (0.6%)	0.086
RDS	2 (0.6%)	0	0.247
Jaundice	238 (69.4%)	234 (67.4%)	0.639

Multiple logistic regression analysis was used to identify independent factors related to anemia, adjusted for potential confounders, including age, parity, BMI, total weight gained, anemia at 1st ANC, and teenage prenatal care service group. The teenage prenatal care service was not significantly associated with anemia. However, anemia at 1st ANC and age under 17 years were the only 2 significant factors independently associated with anemia before delivery. Anemia at 1st ANC significantly increased the risk of anemia before delivery more than 4 times (adjusted OR 4.68, 95% CI 3.11-7.03, p<0.001) and age below 17 years also significantly almost doubled the risk of anemia before delivery (adjusted OR 1.80, 95% CI 1.16-2.78, p=0.008) as showed in Table 4.

Table 4. Independent factors of anemia.

Factor	Adjusted OR(95% CI)	P
1st Anemia	4.68 (3.11, 7.03)	< 0.001
BMI		
Normal weight	1.0	0.315
Overweight	0.69 (0.39, 1.22)	
Obesity	1.06 (0.45, 2.50)	
Total Weight Gained		
Within recommendation	1.0	0.426
Under	1.46 (0.82, 2.60)	
Over	1.27 (0.53, 3.04)	
Age < 17	1.80 (1.16, 2.78)	0.008
Multiparous	0.86 (0.45, 1.65)	0.653
Clinic	1.14 (0.76, 1.71)	0.534

Discussion

The current study attempted to compare the prevalence of anemia between women who received teenage prenatal care service and women who received general prenatal care service. The overall prevalence of anemia in teenage pregnancy at first ANC was about 25% and minimally decreased to 20% after receiving prenatal care which was not a statistically significant difference between the two groups. No differences of various pregnancy outcomes including preterm birth, low birth weight, and primary cesarean delivery rates. Furthermore, we found that anemia at 1st ANC and age under 17 years were the significant factors independently associated with anemia before delivery.

The prevalence of anemia in teenage pregnancy at Siriraj Hospital is higher than other studies in developed country[17]. No service effect on prevalence of anemia and pregnancy outcomes were found. This finding is not consistent with other studies that found positive effects in teenage prenatal care rather than in the total population[18,19]. There are several possible explanations for this. Our sample size was too small to see the different between both groups. In teenage prenatal care clinic, we majorly emphasized on psychosocial support to welcome teenagers to visit for antenatal care rather than medical treatment. Teenage pregnancies with anemia were given the same iron supplement in both groups and the compliance was not assessed. The socioeconomic status of the women was not assessed, nor was the adequacy of prenatal care formally evaluated. However, the poor pregnancy outcome rate (e.g. preterm birth, low birth weight, primary cesarean delivery rates, maternal and neonatal complications) of teenage pregnancies delivered at

Siriraj Hospital is lower in this study compare with other studies in teenage group[21-23].

The results from logistic regression analysis revealed that the only 2 factors independently associated with anemia before delivery were anemia at 1st ANC and age under 17 years, which were consistent with previous study at Siriraj Hospital[25]. These findings may be associated with malnutrition becauseteenager concerns about weight gain, and have poor iron supplement compliance which leading to malnutrition and fetal growth restriction. The possibility of anemia before delivery should be anticipated and evaluated among women who were a higher risk for better care and appropriate management.

Because this study was retrospective and it was not possible to randomize study teenagers into teenage prenatal care and general prenatal care groups, the finding are subject to selection bias. An effort was made to statistically control for measurable differences among study groups, but the groups may have differed on other characteristics that affect pregnancy outcomes but could not be measured in this study. Future prospective studies are needed to verify the achievement of teenage prenatal care service by further data collection about health behavior, compliance, socioeconomic status, planned pregnancy, and private cases.

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