Anemia Among Teenage Pregnancy In Northwestern Malaysia: What Are The Factors?

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Abstract

Introduction: Anemia in pregnancy is an important public health problem associated with increased maternal and perinatal morbidity and mortality.

Objectives: This study aimed to determine the prevalence, associated factors and outcomes of anemia among teenage pregnancy in health clinics in northwestern of Malaysia from 2010 to 2012.

Methods: A cross-sectional study was conducted using records of teenage pregnant mothers aged less than 20 years old registered in the government health clinics from 2010 to 2012. A simple random sampling was applied, and data was obtained from antenatal card and birth registry. Anemia among teenage pregnancy was defined as hemoglobin concentration less than 11gm/dl or hematocrit of less than 33% detected at booking. Simple and multiple logistic regressions were used for data analysis.

Results: A total of 196 cases were included in the study. The mean age of teenage pregnant mothers was 18.2 (SD 1.02) years old, and Malay accounts 54.6%, followed by Chinese 22.4% and Indian 16.3%. The prevalence of anemia among teenage pregnancy was 53.1% (95% CI: 46.0, 60.0). Gestational age at booking was strongly associated with anemia among teenage pregnancy. Late booker has 16 times higher odds to get anemia compared to early booker (AOR 16.33; 95% CI: 6.51, 40.99). The percentages of low birth weight, small for gestational age and prematurity among teenage pregnant mothers with anemia were 24.0%, 30.8% and 15.4%, respectively.

Conclusion: Strategies should focus on preconception care, adolescent-friendly health clinics and promotion of early antenatal booking, especially among young teenage mothers.

Key words: anemia, teenage pregnancy, late booking, maternal outcomes, fetal outcomes

Introduction

Anemia is the most prevalent nutritional deficiency during pregnancy. It is defined by the World Health Organization as hemoglobin level of less than 11 g/dL, or hematocrit less than 33%, at any point during pregnancy.[1] The United States Centers for Disease Control and Prevention (CDC) refers anemia of pregnancy as a hemoglobin level of less than 11 g/dL, or hematocrit less than 33%, in the first or third trimester or hemoglobin less than 10.5 g/dL, or hematocrit less than 32%, in the second trimester.[2] Anemia of pregnancy primarily affects women of low socio-economic status. Globally, by using the WHO criteria, 52% of pregnant women from undeveloped or developing countries are anemic compared with 20% from industrialized nations.[1] The highest prevalence is among pregnant women in India (88%), followed by Africa (50%), Latin America (40%), and the Caribbean (30%).

The risk of anemia in pregnancy increases with the progression of pregnancy. According to the CDC criteria, among low-income pregnant women in the United States, 8% are anemic when they enrolled into the antenatal program in the first trimester, 12% in the second trimester, and 34% in the third trimester.[3] The prevalence of third-trimester anemia is viewed by the US Department of Health and Human Services as a major indicator of reproductive health among low-income women, with the highest prevalence in African Americans (48.5%), followed by American Indians and Alaska Natives (33.9%), Hispanics and Latinas (30.1%), Asians, Native Hawaiians, and other Pacific Islanders (29%), and Whites (27.5).[3]

In Malaysia, a cross-sectional study in 2007 found the overall prevalence of anemia in pregnancy was 35%.[4] The majority was of the mild type (10-11g/dl). The prevalence was higher in the teenage group, Indians followed by Malays and Chinese being the least, grandmultiparas, the third trimester pregnant women and those from urban residence. It was similarly noted worldwide that anemia was a significant complication in teenage pregnancy.[5] In addition, teenage pregnancy was also associated with a higher risk of pregnancy-induced hypertension, preterm delivery, low birth weight, instrumental delivery and perinatal morbidity.[5,6,7] Baby born to a teenage mother was also found to have a low Apgar score at birth.[8] Thus, teenage pregnancy and anemia are important public health issue: it is common, largely preventable and associated with negative sequelae, both for the teenagers who become pregnant and for their children.

There was no published study on anemia in teenage pregnancy in Northwestern Malaysia. Therefore, it is important to identify the problem and suggest strategies for maternal health program planners and implementers to target and evaluate interventions. The aim of this study was to determine the prevalence, associated factors and outcomes of anemia among teenage pregnancy in health clinics in northwestern of Malaysia from 2010 to 2012.

Methods

Study design and participants
This study was a cross-sectional study conducted from September 2013 to May 2014 in northwestern Malaysia. Ethical approval was obtained from the Human Research

Ethics Committee USM on 6th February 2014. Records of teenage pregnant mothers aged less than 20 years old registered in the government health clinics from 2010 to 2012 were reviewed in the study. Those who were diagnosed with thalassemia or other blood disorders were excluded.

Sample size calculation was done in accordance with the objectives. The biggest sample size was 216, obtained by using single proportion formula to determine the proportion of low birth weight as one of the outcomes of anemia in teenage pregnancy. The total number of teenage pregnancy registered in the health clinics from 2010 to 2012 was 592. Thus, a simple random sampling using random number generator was applied to select the data from the registration list.

Data collection

The sources of data were from antenatal card and birth registry. A proforma was designed to obtain three main components of information. They were the women's socio-demographic data, obstetric data, and fetal and maternal outcomes. The information obtained included respondent's age, which was defined as a difference of year of current pregnancy and the year they were born. Parity was referred to total number of fetus delivered by individual mothers. Level of education was the last formal education received when they got pregnant, regardless whether they completed the level or not. It was classified into secondary level and below, and tertiary level.

Obstetric data included gestational age at booking, number of antenatal care and gestational age at diagnosis. Anemia in pregnancy was defined as hemoglobin concentration less than 11gm/dl or hematocrit of less than 33%.[1] In this study, anemia among teenage pregnancy refers to anemia detected at booking.[9] Gestational age at booking was classified as early booking (≤ 12 weeks period of gestation) and late booking (> 12 weeks period of gestation). Number of antenatal care was classified as adequate (>4 times antenatal visits) and inadequate (<4 times antenatal visits). The fetal outcomes assessed in this study were low birth weight, small for gestational age and prematurity. The maternal outcomes assessed were postpartum hemorrhage, preeclampsia and heart failure.[10]

Statistical analysis

Data was analysed using SPSS version 22. Variables were screened using simple logistic regression. Variables that were significant in univariable analysis were tested using multiple logistic regression analysis. *P*-values of <0.05 were considered statistically significant. All significant variables with p<0.25 from univariable analysis, or clinically significant variables were selected based on Forward LR and Backward LR methods. These variables included marital status, employment status, educational level, gestational age at booking and number of antenatal visits.

Results

After excluding records with incomplete data, a total of 196 cases were included in the study. Table 1 shows the socio-demographic and obstetric characteristics of the study sample. The mean age of teenage mothers was 18.2 (SD 1.02) years and Malay accounted for 107 (54.6%), followed by Chinese 44 (22.4%), Indian 32 (16.3%) and

others 13 (6.7%). A majority 120 (61.2%) of teenage mothers were single. Most of them received secondary education and below 179 (91.3%).

The prevalence of anemia among teenage pregnancy from 2010 to 2012 was 53.1% (95% CI: 46.0, 60.0). Simple logistic regression analysis found that marital status, educational level, employment status, gestational age at booking and number of antenatal visits were significantly associated with anemia among teenage pregnancy (Table 2).

Table 3 shows the multiple logistic regression analysis to determine factors associated with anemia in teenage pregnancy. Only gestational age at booking was a significant factor. Compared to teenage pregnant women who came for early antenatal booking, those who came after 12 weeks period of amenorrhea had 16 times odds to experience anemia during pregnancy, after controlling for other variables.

The percentages of fetal and maternal outcomes of anemia in teenage pregnancy are shown in Table 4. The percentage of low birth weight among anemic mothers was 24.0%. Small for gestational age and prematurity accounted for 30.8% and 15.4% in anemic mothers, respectively. Maternal outcomes of mothers with anemia were post-partum hemorrhage, preeclampsia and heart failure, which was 2.9% respectively. As compared to non-anemic teenage pregnant women, none of them experienced these adverse outcomes.

Discussion

Teenage pregnancy is an important health problem worldwide.[11] In Malaysia, even though it shows a decreasing trend, the small percentage may not represent a true picture and some teenage pregnant mothers may not come to the formal health system, thus were not captured in the current statistics.[12] In addition, almost half of teenage pregnant mothers in Malaysia were complicated with anemia during pregnancy.[13] Thus, it is important to study on anemia and teenage pregnancy in our setting.

In the present study, the prevalence of teenage pregnant mother who became anemic was 53.1%. It was relatively low compared to other studies elsewhere. The prevalence of anemia among teenage pregnancy were 61% and 75% in Western Kenya and Pakistan, respectively.[14,15] The difference in the prevalence could possibly be due to the difference in the setting of the studies. Those studies were conducted in rural setting, whereas this study had a wider representative sample, which included mothers from urban residence. When compared with neighboring countries, this study showed a prevalence rate that seemed higher than that of Thailand (15%).[16] The rate is higher than in most developed countries such as America, Australia and United Kingdom.[1]

Adequate antenatal care has been highlighted as an important factor in reducing adverse pregnancy outcomes.[17] Teenage pregnant mothers in this study took less advantage of the available antenatal care. This was shown by a later gestational age at

the first visit or booking, and fewer numbers of visits during the pregnancy. In addition, the presence of anemia among these teenage pregnant mothers was highly associated with late antenatal booking. It was the only significant factor after controlling for other confounding variables. The situation might be explained by a lack of awareness of the services available in the community and a lack of knowledge regarding the importance of early and regular care. The teenage mothers may also have believed that they were not eligible for antenatal care or preferred not to reveal their pregnancies. The promotion of early and comprehensive antenatal care by health providers is an essential strategy if the outcomes of teenage pregnancies are to be improved.[18]

This study also found that teenage pregnant mothers who had anemia were more likely to have low level of education, unemployed and single, through univariable analysis. Anemia during pregnancy was significantly associated with low level of education.[19] It had been reported that pregnancy or childbirth often causes teenage girls to drop out of school. While this is certainly true for most pregnant girls, it also happens that problems at school and poor academic achievement precede the pregnancy. Thus, teenage pregnancy can be a cause and also an effect of school dropout.[20] Combined, these adverse factors lead to fewer vocational opportunities for the young mothers and often translate into lower incomes for the rest of their lives.[1]

Teenage pregnant mothers in this study who had anemia were noted to have higher percentage of adverse maternal and fetal outcomes. The percentage of prematurity among anemic mothers was 15.4%, as compared to 9.8% among non-anemic mothers. The increased risk of preterm labor may be due to poor nutrition, inadequate antenatal care and lower levels of education. In addition, 24% and 30.8% of anemic teenage mothers gave birth to low birth weight and small for gestational age infants, respectively. It may be explained by biological immaturity and poor socio-economic environment as well as dietary habits. Many pregnant teenagers are at risk of nutritional deficiencies from poor eating habits, including attempts to lose weight through dieting, skipping meals, food faddism, snacking and consumption of fast food. Furthermore, maternal requirements for growth may compete with the fetal requirements.

Maternal outcomes of teenage mothers with anemia were post-partum hemorrhage, preeclampsia and heart failure, which was 2.9% respectively. Postpartum hemorrhage was significantly associated with anemia in pregnancy[21], and it was also an important outcome of teenage pregnancy.[15] Similarly, pre-eclampsia was associated with anemia[22] and teenage pregnancy[8]. Thus, the adverse maternal outcomes were the results of anemia, as well as teenage pregnancy itself. Teenage mothers who became pregnant required a comprehensive health care service, in addition to strong support from family members and partners.

Conclusion

The prevalence of anemia detected at booking among teenage pregnancy in northwestern Malaysia was high. It was strongly associated with late gestational age at first antenatal booking. The results suggested that anemia predates the pregnancy in the majority of cases. Hence, preconception care, including iron and folic acid supplementation, is advocated to reduce this problem. It should be targeted to teenagers as well. In addition, strategies promoting early antenatal booking with adolescent-friendly health services were of great importance. All of these efforts would help to ensure safe motherhood and achieve the relevant targets of the Millennium Development Goals.

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Table 1: Socio-demographic and obstetric characteristics of teenage pregnancy (n=196)

Variables	Mean (SD)	Freq (%)
Age (year)	18.2 (1.02)	
Ethnicity		
Malay		107 (54.6)
Chinese		44 (22.4)
Indian		32 (16.3)
Others		13 (6.7)
Marital status		
Single		120 (61.2)
Married		76 (38.8)
Educational level		
Secondary and below		179 (91.3)
Tertiary		17 (8.7)
Employment status		
Unemployed		153 (78.1)
Employed		43 (2.9)
Parity	1.2 (0.42)	
BMI (kg/m^2)	22.2 (3.57)	
Gestational age at booking (weeks)	19.2 (8.74)	
Number of antenatal care	8.3 (3.48)	

Table 2: Simple logistic regression analysis of factors associated with anemia among teenage pregnancy

Variable	b	Crude OR (95% CI)	Wald statistic (df)	p value[a]
Age	-0.43	0.65 (0.47, 0.89)	7.22 (1)	0.172
Marital status				
Married		1.00		
Single	1.14	3.12 (1.69,5.73)	13.41(1)	<0.001

Ethnicity
Malay		1.00		
Chinese	0.43	1.53 (0.70,3.33)	1.16 (1)	0.283
Indian	0.09	1.09 (0.44,2.74)	0.04 (1)	0.849
Others	0.72	2.05 (0.62,6.83)	1.37 (1)	0.242

Educational level
Tertiary		1.00		
Secondary and below	-0.32	2.18 (1.26,4.21)	7.57 (1)	0.042

Employment status
Employed		1.00		
Unemployed	0.83	2.29 (1.14,4.59)	5.41 (1)	0.02

BMI status
Underweight		1.00		
Normal	0.48	1.61 (0.51,5.11)	0.66 (1)	0.416
Overweight	0.04	1.04 (0.29,3.72)	0.01 (1)	0.947
Obese	-0.04	0.96 (0.26,3.53)	0.01 (1)	0.952

Parity
Primigravida		1.00		
Multiparity	0.55	1.73 (0.78,3.83)	1.82 (1)	0.177

Antenatal care
Inadequate		1.00		
Adequate	-1.22	0.29 (0.10,0.83)	5.31 (1)	0.021

Gestational age at booking
Early		1.00		
Late	2.79	16.33 (6.51,40.99)	35.41 (1)	<0.001

[a]Wald test

Table 3: Multiple logistic regression analysis of factors associated with anemia in teenage pregnancy

Variable	b	Adjusted OR (95% CI)	Wald statistic (df)	p value [b]
Gestational age at booking				
Early booking (≤12 POA)	0.00	1		
Late booking (>12 POA)	2.79	16.33 (6.51,40.99)	35.41 (1)	<0.001

[b]logistic regression statistic

Table 4: Fetal and maternal outcomes among anemic mothers in Kinta District (n= 196)

Outcome	Anemia	
	No n (%)	Yes n (%)
Low birth weight		
No	79 (85.9)	79 (76.0)
Yes	13 (14.1)	25 (24.0)
SGA		
No	70 (85.9)	72 (69.2)
Yes	13 (14.1)	32 (30.8)
Prematurity		
No	83 (90.2)	88 (84.6)
Yes	9 (9.8)	16 (15.4)
Postpartum hemorrhage		
No	92 (100.0)	101 (97.1)
Yes	0 (0.0)	3 (2.9)
Pre-eclampsia		
No	92 (100.0)	101 (97.1)
Yes	0 (0.0)	3 (2.9)
Heart failure		
No	92 (100.0)	101 (97.1)
Yes	0 (0.0)	3 (2.9)