

The prevalence of anemia in pregnant women and its associated risk factors in North Sumatera, Indonesia

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Abstract. The gestation period is the period that determines the quality of human resources in the future because the development of the child is determined from the time of the fetus in utero. The most common nutrition problems suffered by pregnant women in Indonesia is Chronic Energy Deficiency (CED) and anemia. The aim of this research to determine the prevalence of anemia in pregnant women and the risk factors associated with anemia in urban and rural areas of North Sumatera Province. This research is as descriptive analytic with cross-sectional approach. Total sample 140 pregnant women from the Medan City, Langkat District and South Labuhan Batu District, and was from June to October 2016. Data collected by using interviews, hemoglobinometer tool and analyzed with Chi-square test. Anemia was in 40.7% of pregnant women, and the incidence of anemia is more common in pregnant women in urban areas than in rural areas. The factors associated with anemia in pregnant women is parity, knowledge of nutrition, diet and the risk of chronic energy deficiency ($p < 0.05$). This study concludes that the prevalence of anemia in pregnant women in North Sumatra was higher than the national prevalence.

1. Introduction

The gestation period is a period that will determine the quality of human resources in the future because the development of the child is determined ever since the fetus in the womb. Pregnant women are one of the groups that most vulnerable to nutritional problems such as chronic energy deficiency (CED) and anemia. World Health Organization (WHO) has reported that 56% of pregnant women in developing countries suffer from anemia.[1] The Basic Health Research Ministry of Health of the Republic of Indonesia in 2013 showed the prevalence of anemia in pregnant women in Indonesia was about 37.1%.[2] The consequences of anemia in pregnant women included are an increased risk of maternal morbidity and mortality.[3] Also, maternal anemia is associated with a higher risk of having a baby with low birth weight, premature birth, perinatal and neonatal mortality.[4]

Anemia is also one of the causes of bleeding after childbirth that resulted in maternal mortality. It is reported that the national Maternal Mortality Rate (MMR) is about 307/100,000 live births. The



causes of maternal mortality include hemorrhage in 58% of it was triggered by anemia during pregnancy. Meanwhile, the neonatal mortality rate is approximately 987/100,000 live births. Twenty-nine percent of the cause of infant mortality was because the mother suffered from chronic energy deficiency (CED) during pregnancy.[5] In general, the causes of anemia are inadequate intake of iron. Several factors influence the lack of iron intake during pregnancy: the declining fulfillment of iron and iron needs are increased for the fetus.[6] Also, anemia during pregnancy resulted from a decrease in hemoglobin levels due to increased plasma volume, which is greater than the volume of red blood cells. A decreased level of this hemoglobin occurs at age 8 to 32 weeks of gestation. Anemia can cause oxygen transport to be disrupted so that the nutrients to the fetus are reduced.[7] Iron deficiency anemia can cause pregnant women to be weaker, pale, listless, and bleed.

Iron tablet supplementation program (iron-folic acid supplementation or IFAs) in pregnant women is the main program that controls anemia in many countries who needs for iron intake which cannot be obtained from their daily diet [8], such as in Indonesia. Pregnant women are recommended to take one tablet IFA (consisting of 60 mg of elemental iron and 0.25 mg folic acid) every day for at least 90 days during pregnancy up to 42 days after birth. However, the prevalence of anemia especially in pregnant women in North Sumatera has not been recorded. Therefore, it is necessary to investigate the prevalence of anemia in pregnant women and to study its associated factors in North Sumatra.

2. Method

This study used cross-sectional design. Data collection was from four locations that two locations in the urban area, such as Medan Tuntungan and Medan Selayang, Medan City and two locations in the rural area, such as Aman Damai village, Sub-district of Sirapit, Langkat District, and Tanjung Village, Sub-district of Kuala Tanjung, Labuhan Batu Selatan District. The study was conducted from July to October 2016. The 140 pregnant women were selected by consecutive sampling.

The data collection was using a structured questionnaire to determine the socio-demographic profile of respondents, knowledge about anemia, iron-folic tablets adherence consumption, and food consumption patterns. Subsequently, this study did the measurement of weight and height, as well as the measurement of upper arm circumference (MUAC).

Hemoglobin level was examined through cyanmethemoglobin method using blood HemoCue photometer.[9] Classification of anemia based on WHO which is when hemoglobin levels <11 g/dL and the anemia has three levels based on hemoglobin level: mild anemia 9-11 g/dL, moderate anemia was 7-9 g/dL and severe anemia <7 g/dL. The data collected was processed and analyzed using SPSS program. Chi-square test was used for analysis.

3. Results

3.1. Overview of socio-demographic characteristics of respondents

Table 1 shows that 111 respondents are aged less than 35 years (79.3%). It is known to be the age of reproductive years of women. Respondents aged over 35 years were 29 respondents (20.7%). Seventy respondents (50%) had completed junior high school and further education above it, while another 70 respondents (50%) was educated only up to junior high school or below. Meanwhile, 112 respondents (87.1%) had a role as a housewife who does not work outside the house, but 17 respondents (12.1%) were working women. About 35 respondents (25%) have incomes below or as much as IDR 1,000,000, and 105 respondents (75%) have incomes more than IDR 1,000,000.

Sixty-six respondents (47.1%) were in the third trimester. 50 respondents (35.7%) were in the second trimester. 24 respondents (17.1%) were in the first trimester. Based on the parity, 80 respondents (57.1%) had parity more than 2 and 60 respondents (42.9%) had parity below or as much as 2. From distance pregnancy, 89 respondents (63.6%) had more than two years of distance pregnancy, and 51 respondents (36.4%) had less than or as much as two years of distance pregnancy. In the amount of visit to antenatal care, a total of 117 respondents (83.6%) did ANC less than or as

many as four times and 23 respondents (16.4%) did ANC more than 4 times. Compliance of consuming iron tablet was in 51 respondents (36.4%).

Table 1. Distribution of socio-demographic characteristics of respondents (n = 140).

Variable	N	%
Age		
< 35 years	111	79.3
≥ 35 years	29	20.7
Education		
≤ Junior high school	70	5.0
> Junior high school	70	50.0
Job		
No job (housewife)	122	87.1
Working women	17	12.1
Incomes		
≤ IDR 1,000,000	35	25.0
> IDR 1,000,000	105	75.0
Gestational age		
trimester I	24	17.1
trimester II	50	35.7
trimester III	66	47.1
Parity		
≤ 2 times	57	80.0
> 2 times	8	20.0
Distance pregnancy		
≤ 2 years	89	63.6
> 2 years	51	36.4
Ante Natal Care		
≤ 4 times	117	83.6
> 4 times	23	16.4
Obedient to Fe consumption		
Yes	51	36.4
No	89	63.6
Total	140	100

3.2. Overview of prevalence of anemia in pregnant women

The classification of anemia among respondents based on hemoglobin level is in Table 2. 33.6% of respondents suffered from mild anemia, 5% was moderate anemia, and 2.1% was severe anemia. On the other hand, 83 respondents (59.3%) were normal (without anemia). The prevalence of anemia in the study is 40.7%. Subsequently, anemia is more experienced in respondents who live in urban areas (34 respondents of urban areas) than rural areas (23 respondents of rural areas) (Table 3).

Table 2. The prevalence of anemia among pregnant woman.

Status	N	%
Mild Anemia	47	33.6
Moderate Anemia	7	5.0
Severe Anemia	3	2.1
Normal	83	59.3
Total	140	100.0

Table 3. The prevalence of anemia among pregnant woman.

Location	Anemia		Normal		Total	
	n	%	n	%	n	%
Urban	34	39.1	53	60.9	87	100.0
Rural	23	43.4	30	56.6	53	100.0
Total	57	40.7	83	59.3	140	100.0

3.3. Factors associated with anemia in pregnant women

Table 4 shows the results of the analysis of the relationship between the respondent's ages with the incidence of anemia in pregnant women with age < 35 years showed that there were 42 mothers (37.8%) had anemia. Meanwhile, maternal age > 35 years showed that there were 15 mothers (51.7 %) had anemia. The results showed no significant relationship between age and status of anemia in pregnant women ($p = 0.17$).

Analysis of the relationship between the respondents' education with the status of anemia in pregnant women (Table 4) showed that 33 respondents (47.1%) with junior high school or below had anemia, and 24 respondents (34.3%) who had completed junior high school and further education had anemia. Statistical analysis showed that there was no significant relationship between education and the status of anemia in pregnant women. The same results were also in the relationship between the amounts of monthly income with anemia.

Table 4. Bivariate analysis of factors related to the incidence of anemia in pregnant women.

Characteristics	Group		Total	P
	Anemia	Normal		
Age (years)				
< 35	42 (37.8%)	69 (62.2%)	111 (100.0%)	0.17
≥ 35	15 (51.7%)	14 (48.3%)	29 (100.0%)	
Education				
≤ Junior high school	33 (47.1%)	37 (52.9%)	70 (100.0%)	0.12
> Junior high school	24 (34.3%)	46 (65.7%)	70 (100.0%)	
Income (IDR/month)				
≤ 1 million	15 (42.9%)	20 (57.1%)	35 (100.0%)	0.72
> 1 million	42 (40.0%)	63 (60.0%)	105 (100.0%)	
Job				
No job	52 (42.6%)	70 (57.4%)	122 (100.0%)	0.41
Working	5 (29.4%)	13 (70.6%)	17 (100.0%)	
Gestational age				
Trimester 1	6 (25.0%)	18 (75.0%)	24 (100.0%)	0.17
Trimester 2	30 (40.0%)	50 (60.0%)	80 (100.0%)	
Trimester 3	35 (47.0%)	66 (53.0%)	66 (100.0%)	
ANC				
≤ 2 times	14 (38.9%)	22 (61.1%)	36 (100.0%)	0.79
> 2 times	43 (41.3%)	61 (58.7%)	104 (100.0%)	
Parity				
≤ 2 times	41 (36.6%)	71 (63.4%)	112 (100.0%)	0.04
> 2 times	16 (57.1%)	12 (42.9%)	28 (100.0%)	
Distance pregnancy				
≤ 2 years	39 (43.8%)	50 (56.2%)	89 (100.0%)	0.32
> 2 years	18 (35.3%)	33 (64.7%)	51 (100.0%)	
Consumption of iron tablet				
No	23 (45.1%)	28 (54.9%)	51 (100.0%)	0.42
Yes	34 (38.2%)	55 (61.8%)	89 (100.0%)	
Knowledge about anemia				
Poor	27 (50.9%)	26 (49.1%)	53 (100.0%)	0.05
Good	30 (34.5%)	57 (65.5%)	87 (100.0%)	
Diet				
Healthy / balanced	11 (61.1%)	7 (38.9%)	18 (100.0%)	0.05
Less healthy	46 (37.7%)	76 (62.3%)	122 (100.0%)	
Risk of chronic energy deficiency (CED)				
CED	15 (62.5%)	9 (37.5%)	24 (100%)	0.02
Normal	42 (36.2%)	74 (63.8%)	116 (100.0%)	

There is no significant relationship between gestational ages with anemia (Table 4). There was also no relationship between numbers of ANC visit with anemia. However, there was a significant relationship ($p = 0.04$) between parity and anemia in pregnant women. Women with parity > 2 times were more likely to have anemia (16 women, 57.1%) than mothers with parity ≤ 2 (41 mothers,

36.6%). Unlike the parity, there was no significant relationship between distance pregnancy and consumption of iron tablet with anemia among pregnant women.

There was asignificant relationship ($p = 0.05$) between mother's knowledge about anemia on the incidence of anemia among pregnant women. The similar results were also in the relationship between diet and anemia in pregnant women ($p = 0.05$). Moreover, there is also significant results ($p = 0.02$) between therisk of chronic energy deficiency and anemia in pregnant women.

4. Discussion

Pregnant women who suffer from anemia were found more in urban areas than in rural areas. The prevalence of anemia in the study is higher than the national prevalence.[2] The results are consistent with Fatimah who found the prevalence of anemia among pregnant women in Maros, Southern Sulawesi was 41%.[10] However, Tristiyanti [11] found the higher prevalence of anemia in Bogor was (62.5%).

The analysis showed that the association between parity and the incidence of anemia among pregnant women ($p = 0.04$). Pregnant women with parity more than twice hadmore chance of developing anemia. This study is in line with the results of Murtini who found an increased prevalence of anemia in pregnant women with higher parity.[12] Multiparity (more than four times) was very risky for developing anemia. The more often a woman experience pregnancy and childbirth, the more bleeding after childbirth and the risk of suffering from anemia. Arisman adds that multiparity women would deplete the body's energy reserves and the risk of anemia is anincrease.[13]

There was asignificant relationship ($p = 0.05$) between mother's knowledge about anemia on the incidence of anemia among pregnant women. The results are consistent with studies conducted by Sivi in pregnant women in Jebres, Surakarta, that found an association between nutritional knowledge with anemia.[14] Likewise, the results of the study by Majid who found a lack of knowledge in of pregnant women about nutrition and anemia will reduce levels of hemoglobin.[15] Nutrition knowledge will affect the selection of food and nutrient consumption. The more knowledge of nutrition of pregnant women, the more diverse the consumption of nutritious foods so that they meet their nutritional needs.[16]

The analysis of this study showed that the association between diet and anemia in pregnant women ($p=0.05$). The results are consistent with studies by Fatimah *et al.* [10] who found that the relationship between food consumption patterns of pregnant women with low hemoglobin levels in Maros, South Sulawesi. Another study reported that high consumption of foods containing protein such as eggs was associated with anemia in pregnant women.[17] Iron absorption increased when followed by consumption of high biological-value protein.[18]

The results of this study indicate that there is a relationship between risk of CED with anemia in pregnant women ($p = 0.02$). These findings coincide with the results of research by Hardinsyah in pregnant women in Bogor that found pregnant women who suffer from CED has a chance of anemia by 2.76 times compared to normal pregnant women.[19] The same study reported by Fatimah *et al.* found that pregnant women with an average of 23.23 cm in themeasurement of upper arm circumference (MUAC) experiencing anemia by 69%.[10] Studies in Tanzania also reported that the lower the size of MUAC, the higher degree of anemia in pregnant mothers.[20]

5. Conclusions

The prevalence of anemia in pregnant women in North Sumatra (40.7%) is higher than the national average. Anemia is more common in pregnant women who live in urban areas than rural areas. Factors associated with anemia in pregnant women are knowledge about nutrition, diet and CED status of pregnant women. It is urgently neededto move to prevent anemia and CED in pregnant women through improvement of food consumption, increased knowledge of nutrition and maternal health.

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