Compliance of Iron Suplementation, Prevalence And Determinant of Anemia In Pregnant Women

by Aras Utami

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ABSTRACT

Introduction: Iron deficiency anemia in pregnancy is associated with low birth weight, preterm birth and increasing risk of maternal and infant death. In Indonesia, iron tablet supplementation program for pregnant women has been already running and performed during antenatal care (ANC) visits, but the prevalence of anemia remains high. This study is aimed to identify the prevalence of anemia and compliance of iron supplementation, and to analyze factors related to anemia in pregnant women.

Methods: Cross sectional study was held on September-November 2016 in the work area of Rowosari Public Health Center, Semarang. Participants were 22-40 weeks pregnancy women. Data collection was done by measuring hemoglobin concentration with Hemocue and interview using questionnaire. Statistical analyses with 95% confidence intervals were considered to be significant if p<0,05 and 95% CI of OR did not pass 1.

Results: Among the 90 participants, the prevalence of anemia was 31.1%. Compliance rate of iron consumption were 71.1% (47.8% strictly compliant and 23.3% partial compliant). Bivariate analysis results showed partial compliant (OR = 8.67 (95% CI = 1.05-71.69), *p = 0.03*) and parity (OR = 10.17 (95% CI = 1.09-95,65); *p = 0.03*) as anemia risk factor. Education level, knowledge, gestational age, ANC visit, gestational age and income level were not associated with anemia.

Conclusion: There are significant association between compliance of iron supplementation and parity with anemia in pregnant women. The government needs to improve compliance of iron supplementation by involving family and community empowerment to reduce prevalence of anemia.

Keywords: Anemia, pregnancy, iron supplementation, compliance

INTRODUCTION

Anemia is the lack of the number of red blood cells.[1] WHO defines anemia if blood hemoglobin levels <12 g/dL in non-pregnant women and <11 g/dl in pregnant women.[2] Globally, the prevalence of anemia in children is 42.6%, in pregnant women by 38.2%, in non-pregnant women by 29%.[3] In Indonesia, the prevalence of anemia among pregnant women aged 15-49 years is 30% which hemoglobin concentration <11 g/dl and 0.5% which hemoglobin concentration >7 g/dl.[3]

Multiple factors like sociodemographic, economic, education, nutritional, and health related factors can cause anemia in pregnant women. Factors associated with anemia from previous studies were parity, wealth index, taking iron supplementation during pregnancy.[4,5]

Anemia may result from a number of causes, in which approximately 50% of cases of anemia are considered to be due to iron deficiency.[3] Iron deficiency anemia in pregnancy can be associated with low birth weight, preterm delivery, and increased risk of maternal and perinatal mortality.[6,7,8]

Iron and folic acid supplementation in pregnant women is the most common strategy in reducing iron deficiency anemia during pregnancy especially in developing countries.[9,10] Iron supplementation can reduce the risk of anemia in pregnant woman by 70% and decrease iron deficiency by 57%.[3] Iron tablet consumption is associated with pregnant women's awareness and compliance.[11]

Study from Indonesia Health and Demographic Survey data in pregnant women in the last five years (2002-2007) showed only 21% of pregnant women consume iron tablets according to minimum amount of 180 tablets as WHO recommended. One of the possible reasons for pregnant women do not consume according recommendation is their uncompliance.[12] This data has a weakness of having no information about the amount of iron tablets received in pregnant women and the source of iron tablets received. The prevalence of anemia in pregnancy in Semarang city from previous study is still high by 48,7%.[13] There is no recent study about

anemia and factors associated with anemia in Semarang. The aim of this study is to identify the prevalence of anemia and compliance of iron supplementation, and to assess factors related to anemia in pregnant women in the work area of Rowosari Public Health Center, Semarang City.

MATERIAL AND METHODS

This study was an observational study with cross-sectional design in the work area of Rowosari Public Health Center, Tembalang Sub-district, Semarang City. Areas were Rowosari, Meteseh, Bulusan, Tembalang and Kramas villages. The study was conducted in September-November 2016. The number of participants were all pregnant women (n=90) in 5 villages by criteria 20-40 weeks gestational age and could communicate well and approved participate the study by inform consent.

Dependent variable was anemia defined decreasing blood hemoglobin concentration <11 g/dl during pregnancy and measured by Hemocue. Categorization of anemia according to WHO criteria was categorized into 3 criteria: severe (haemoglobin level <7 g/dl), moderate (haemoglobin level 7-9.9 g/dl and mild anemia (haemoglobin level 10-10.9). Independent variables included compliance of iron tablet consumption, age, education, income level, knowledge, frequency of antenatal care visit, parity, and gestational age.

In Indonesia, iron supplementation is the supplementation of iron and folic acid in the form of tablets, each tablet of 60 mg elemental iron in the form of Ferro Sulfate, Ferro Fumarate, or Ferro Gluconate and 0.4 mg folic acid. Compliance in consuming iron tablets is the obedience of pregnant women to do health worker advice (midwife, doctor, obstetric) to consume iron tablets. Compliance was measured by the accuracy of the amount of tablets consumed and the procedure consuming the tablet.

Compliance of participants in consuming iron supplementation divided into three categories. Participants who reported regular consumption (once daily) for 90 days of pregnancy and not missing any dose per week and consume iron tablet by using water were considered as strictly complying with iron supplementation guidelines. Participant was considered partially compliant if pregnant women consumed 90 iron supplementation irregulary and or consumed iron tablet with tea, coffee. Category of non-compliant participant were defined as not consumeiron tablets any, or take iron tablets <90 tablets.

Data collection was done by measuring hemoglobin concentration by Hemocue and independents variables was collected by interview with questionnaire. The researcher used chi square statistic test for bivariate analysis.

RESULTS

a. Characteristic of participants

Results of this study are shown in tables 1-3. Table 1 showed the majority of participants were aged >30 years. A half of all participants were senior high school educated. More than half (67.8%) of the study participants had no working, but had more income than regional minimum wage in Semarang City (> Rp 1.909.000, -).

Table 1. The caracteristic of participants in the work area of Rowosari PHC, Semarang, 2016

Variable	n (90)	Frequency (%)
Age (years)		
<20	2	2.2
20-30	38	42.2
> 30	50	55.6
Education		
Primary school	6	6.7
Junior high school	12	13.3
Senior high school	45	50.0
Bachelor degree/post graduate	27	30.0
Working status		
Not working	61	67.8
Working	29	32.2
Income level		
Less	16	17.8
Good	74	82.2
Knowledge		
Less	14	15.6
Good	76	84.4
Gestational age		
$\geq$ 28 weeks	65	72.2
<28 weeks	25	27.8
The frequency of ANC visit		
1	1	1.1
2	2	2.2
3	4	4.4
$\geq$ 4	83	92.2
Parity		
> 3	5	5.6
$\leq$3	85	94.4
Compliance		
Non-compliant	26	28.9
Partially compliant	21	23.3
Strictly compliant	43	47.8

Knowledge level of anemia and iron tablet supplementation were categorized into 2 (good and less). Good knowledge was to score $\geq$ 60% and less knowledge if score < 60%. The majority of participants had good knowledge. The majority of the participants were pregnant women of gestational age $\geq$ 28 weeks. Almost all of participant (92.2%) had more than 4 times of antenatal care visits to midwife, doctor, or obstetrician. The majority of participants had maternal parity $\geq$ 3. Compliance rate of iron consumption in this study was quite high (71.1%).

Table 2. Prevalence of anemia among pregnant women in Rowosari PHC, Semarang, 2016

Variable	N (90)	N (%)
Anemia	28	31.1
Severe anemia	0	0
Moderate anemia	8	8.9
Mild anemia	20	22.2
No anemia	62	68.9

b. *Prevalence of anemia among pregnant women*

The overall prevalence of anemia in this study was 31.1%. There was no participant classified as severe anemia. The majority of anemia participants were categorized as mild anemia.

Table 3. Factors associated with anemia among pregnant women in Rowosari PHC, Semarang, 2016

Variable	Anemia		The *p-value*	OR (95% CI)
	Yes	No		
Age (years)				
<20	1 (3, 6%)	1 (1, 6%)	0.56	0.43 (0.025-7.31)
> 30	12 (42, 9%)	26 (42, 2%)	0.87	0.93 (0.37-2.31)
20-30	15 (53, 6%)	35 (56, 5%)		
Education				
Low	6 (21, 4%)	12 (19, 4%)	1.00	1.00 (0.28-3.54)
Medium	13 (46, 4%)	32 (51, 6%)	0.69	1.23 (0.44-3,439)
High	9 (32, 1%)	18 (29%)		
Income level				
Less	2 (7, 1%)	14 (22, 6%)	0.13	0.26 (0.06 to 1.25)
Good	26 (92, 9%)	48 (77, 4%)		
Knowledge				
Less	2 (7, 1%)	12 (19, 4%)	0.21	0.32 (0.07-1.54)
Good	26 (92, 9%)	50 (80, 6%)		
Gestational age				
> 28 weeks	19 (67, 9%)	46 (74, 2%)	0.53	0.73 (0.28-1.95)
<28 weeks	9 (32, 1%)	16 (25, 8%)		
The frequency of ANC visits				
1-2 times	0 (0%)	3 (4, 8%)	0.55	1.48 (1.28-1.70)
≥ 3	28 (100%)	59 (95, 2%)		
Parity			0.03*	
> 3	4 (14, 3%)	1 (1, 6%)		10.17 (1.09-95.65)
≤3	24 (85, 7%)	61 (98.4%)		
Compliance				
Non-compliant	14 (50%)	12 (19, 4%)	0.05	0.37 (0.13-1.09)
Partially compliant	1 (3, 6%)	20 (32, 3%)	0.04*	8.67 (1.05-71,69)
Strictly compliant	13 (46, 4%)	30 (48, 4%)		

c. *Factors associated with anemia in pregnant women*

Table 3 showed no statistical relationship between participants age, education, income level, knowledge, gestational age, frequency ANC and anemia (p value >0.05, OR < 1 and CI (*confidence interval*) was wide). There was no significant relationship between frequency ANC and anemia (p >0.05), but CI did not pass 1. This could be due to less large of the study samples.

In the present study, there was significant association between partially compliant in iron tablet consumption and anemia (OR = 8.67, 95% CI = 1.05-71.69, p = 0.03) with reference to strictly compliant. Pregnant women having partially compliance in iron tablet consumption had risk of 8.67 times having anemia compared than pregnant having strictly compliance in consumption of iron tablets. There was no increased risk of anemia in non compliant pregnant women compared than strictly

compliant (OR = 0.37, 95% CI = 0.13 to 1.09, P = 0.05).

Table 3 showed that there was statistical correlation between parity and the incidence of anemia (OR = 10.17, 95% CI=1.09-95.65, p = 0.03). Mothers with parity >3 were at risk 10,17 times having anemia compared than mothers with parity ≤ 3.

DISCUSSION

The prevalence of anemia among pregnant women in the study area was 31.1%. This prevalence is almost consistent with prevalence of anemia among pregnant women in Indonesia of 30%.[3] However, this prevalence is lower than the prevalence of anemia from previous study in Semarang City in 2009 of 48.7%.[13] This is probably related to the better prevention programs of anemia in Semarang City. According to the public health problem category by World Health Organization, the prevalence of anemia in this study is categorized as a moderate level public health problem.

Among many factors that may cause anemia, iron deficiency anemia is the most common cause of anemia in pregnancy and responsible for 50% of anemia during pregnancy reflecting the increased demands for iron in pregnancy.[3] One of the common program in anemia prevention and treatment is iron tablet supplementation.

The compliance rate of pregnant women in the consumption of iron tablet supplementation in this study was also quite good at 71.1%. Non-compliant pregnant women (28.9%) may be associated with side effects of iron tablet supplementation. Side effects include the discomfort in epigastrium, nausea, vomiting and diarrhea. Participants who experienced side effects in the study were 10.3%, such as nausea and vomiting. Nausea during pregnancy is probably affected by the physiological process as a result of hormonal adaptation. In this study, bivariate analysis showed that compliance rate was significantly associated with anemia in pregnant woman. Similar result was reported by other studies conducted in Ethiopia.[5] Previous study also showed that pregnant women who consume iron tablet supplementation with sufficient quantities have a smaller risk of anemia.[15] Iron supplementation can increase hemoglobin and feritin levels during pregnancy.

In this study, parity was also associated with anemia in pregnancy. This is according to previous study conducted in India that multi parity tend to have anemia in pregnancy.[16] Parity more than 3 is one of risk factors of anemia in pregnancy. This is due to too often

pregnancy can decrease the nutrient and micronutrient reserves of the mother's body.[17]

Other independent variables unrelated to pregnancy anemia were maternal age, education level, income level, knowledge, gestational age, and frequency of ANC visits. Other studies have also shown that maternal age, gestational age, education level, and occupational status are not associated with anemia in pregnant women.[4] This may be due to other factors not studied by researcher such as pregnant women's diets.

CONCLUSION

The prevalence of anemia in pregnant women in Rowosari Public Health Center, Semarang City is still high of 31.1%. Factors associated with anemia are compliance and parity. The suggestion that can be done is by increasing the compliance of iron consumption in pregnant women to reduce the risk of anemia by involving family and society around pregnant mother; in pregnant women with multiparity, iron consumption should be more than non multiparitywomen; subsequent research as a supporter of this study is expected with a larger sample size and with more complete variables, especially for food recall.

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