

## FACTORS ASSOCIATED WITH ANEMIA IN TRIMESTER III PREGNANT WOMEN

Andini Majidah<sup>1</sup>, Tri Maryani<sup>2</sup>, Niken Meilani<sup>3</sup>

<sup>123</sup>Department of Midwifery, Health Polytechnic Ministry of Health Yogyakarta, Indonesia

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### ABSTRACT

The anemia incidence rate of Yogyakarta City has continued to increase from 2013 until 2015 and the highest ranking in DIY province in 2015 is 32.39%. Several studies have shown that independent predictors of anemia in pregnant women, aged 15-24, family >5, multigravida, low income, current clinical illness, intestinal parasite infection, no history of contraceptive use, third-trimester pregnancy, bleeding over-menstruating and low body mass index. But there are still differences from several studies. This study was to know knowledge of factors associated with anemia in trimester III pregnant women in Yogyakarta 2017. This was an observational analytic study with cross-sectional design on 107 trimesters III pregnant women in Pakualaman Public Health Centre, Jetis Public Health Center and Matrijeron Public Health Center of Yogyakarta City with purposive sampling technique. The data analysis used the chi-square test. Based on results of this study, the variables with no significant association with anemia were maternal age ( $p = 0.243$ ), education ( $p = 0.208$ ), income ( $0.533$ ), and adherence to tablet Fe ( $p = 0.378$ ). Multivariate analysis showed that pregnant women with parity 2-3, 3 times more at risk of anemia in the third trimester than pregnant women with parity <1 (95% CI 1,135-8,183). Parity is the most dominant factor in relation to the incidence of anemia in pregnant women trimester III.

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### Corresponding Author:

Niken Meilani,

Department of Midwifery, Health Polytechnic Ministry of Health Yogyakarta.

Mangkuyudan Street, MJIII/ 304, Mantrijeron, Yogyakarta, Indonesia 55143. Telp : [\(0274\) 374331](tel:0274374331)

Email: [nikenbundaqueena@gmail.com](mailto:nikenbundaqueena@gmail.com)

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### INTRODUCTION

The success of maternal health efforts can be seen from the indicator of Maternal Mortality Rate (MMR). MMR is the number of maternal deaths during pregnancy, childbirth and post-partum caused by pregnancy, childbirth, and postpartum or its management, but not for other reasons such as accident or fall in every 100.000 live births. This indicator is not only able to assess the maternal health program, moreover able to assess the degree of public health, because of its sensitivity to the improvement of health services, both in terms of accessibility and quality.<sup>1</sup>

The decline in MMR in Indonesia occurred from 1991 to 2007, from 390 to 228, but the IDHS in 2012 showed a significant increase in MMR, which there were 359 maternal deaths per 100,000 live births. MMR again showed a decline to 305 maternal deaths per 100,000 live births based on the Inter-Census Population Survey (SUPAS) in 2015, but these figures do not achieve the global targets of the MDGs (*Millennium Development Goals*) 5<sup>th</sup> namely reducing the MMR to 102 per 100,000 live births and still far from the 3<sup>rd</sup>

target of SDGs (*Sustainable Development Goals*), which reduces maternal mortality to below 70 per 100,000 live births by 2030.<sup>1</sup>

Anemia is the most common hematological disorder in pregnancy. According to the latest standards set by 'WHO', it is classified as anemia if the concentration of *Hemoglobin* (Hb) in *peripheral* blood is 11 g /dl or less. The result of research of Medical Faculty in Indonesia shows that the prevalence of anemia in pregnant mother in Indonesia is 50-63%, while research of Puspongoro and *Anemia World* the same time mention 51% pregnant woman suffering from anemia causing death to 300 souls per day.<sup>2,3</sup>

The prevalence of pregnant woman anemia in Province of Special Region Yogyakarta 2015 (14.85%) has fulfilled the target of The Strategic Plan of Special Region Yogyakarta, but the increase of prevalence of anemia still occur in Yogyakarta and Sleman from 2013 until 2015. The prevalence of anemia of Yogyakarta City 2015 is the highest of 32.39 %, while Kulonprogo Regency 13%, Bantul 19.21%, Gunung Kidul 9.87%, and Sleman 10.36%.<sup>3</sup>

The prevalence of pregnant woman's anemia in Pakualaman Public Health Centre is the highest among 18 Public Health Centre in Yogyakarta City that is 48.11%, second order of Jetis Public Health Center (47.23%), and the third rank of Mantrijeron Public Health Center (45.77%).<sup>4</sup> Anemia is one of the risks of low birth weight infant (LBWI), infection of fetus and mother, miscarriage, premature birth, and maternal death. 17 studies with a total sample of 245,407 in a meta-analysis entitled "*maternal anemia during pregnancy and infant low birth weight*" showed that the relative risk of anemia in the first, second and third trimesters of pregnancy was 1.26 (95% CI: 1.03-1.55), 0.97 (95% CI: 0.57-1.65), and 1.21 (95% CI: 0.84-1.76). The conclusions of this meta-analysis are maternal anemia, especially in the first trimester of pregnancy considered as risk factors for pregnancy outcomes.<sup>1,5</sup>

The study titled *Anemia and Associated Factors among Pregnant Women Attending Antenatal Care Clinic in Wolayita Sodo Town, Southern Ethiopia* with cross-sectional study design and 363 samples of pregnant women resulted in several independent predictors of anemia in pregnant women aged 15-24 years, the number of families >5, multigravida, low income, current clinical illness, intestinal parasite infection, no history of contraceptive use, third trimester pregnancy, excessive menstrual bleeding and low body mass index.<sup>6</sup> Based on the above description, the authors are interested to conduct a study entitled "Factors Associated with Anemia in Pregnant Women Trimester III in Yogyakarta 2017".

## METHOD

This type of research is quantitative using the observational analytic method with *the cross-sectional* design. The population of this study was all active third-trimester pregnant women of Antenatal Care at Pakualaman Public Health Centre, Jetis Public Health Center and Mantrijeron Public Health Center. The sample size was obtained by the formula of estimated proportion according to Lameshaw obtained the total sample of 107 pregnant women. This study used *cluster sampling* method, the number of samples of each Public Health Centre is 14 pregnant women from Pakualaman Public Health Center, 57 pregnant women from Mantrijeron Public Health Center and 36 pregnant women from Jetis Public Health Centre. The samples were selected that met the inclusion criteria in the pregnant mother who received the tablets added blood, active ANC, gestational age  $\geq 28$  weeks, no chronic energy shortage, no blood disorder and willing to be the respondent. The research was conducted on November - December 2017 at Pakualaman Public Health Center, Mantrijeron Public Health Center and Jetis Public Health Center of Yogyakarta City. The data used in this study using the primary data obtained using questionnaires given directly to the respondents. While secondary data include no medical records, gestational age, and Hb levels. Data analysis using *chi square* 95% confidence level with significance

<0,05. This study has passed the ethical test by the Committee of Ethics Poltekkes Kemenkes Yogyakarta with letter number LB.01.01/KE-02 /I/9/2018.

## RESULTS

### Characteristics of Research Subjects

Based on the results obtained as follows:

Table 1. Frequency Distribution of Respondent Characteristics based on Occupation, Education, Income, Abortion History, Drink Compliance Tablet Add Blood, Mother Age, and Parity in Yogyakarta City 2017

Variables	n	%
<b>Age</b>		
15-24	29	27.1
25-35	60	56.1
36-49	18	16.8
<b>Educational status</b>		
Primary Education	16	15
Secondary Education	72	67.3
Higher Education	19	17.8
<b>Income</b>		
< District Minimum Wage	40	37.4
≥ District Minimum Wage	67	62.6
<b>Parity</b>		
≤1	84	78.5
2-3	23	21.5
<b>Compliance Drink Tablet Add Blood</b>		
Obedient	76	71
Not obey	31	29

Based on Table 1, it shows that more than half of the respondents in this study were 25 to 35 years of pregnant women that were 60 people (56.1%). The majority of respondents were the mother who does not work that is as much as 72 people (69.2%). The last education majority of respondents were secondary education that is as much 72 people (67.3%). Family income is categorized as < District Minimum Wage and ≥ District Minimum Wage, while District Minimum Wage in Yogyakarta city Rp.1.700.000,-. Most of respondents have income ≥ District Minimum Wage was 67 people (62.6%). Most of the respondents had never experienced abortion as many as 97 people (90.7%). Parity is categorized into ≤1 and 2-3, the majority of mother parity ≤1 were 84 people (78.5%). The majority of respondents are obedient in consuming tablets plus blood as many as 76 people (71%).

### Bivariate Analysis

Table 2. Results of Independent Bivariate Analysis of Independent Incidence of anemia in Pregnant Women Trimester III in Yogyakarta City 2018

Variables	Anemia status				Total		p-value
	Anemia		Not Anemia		n	%	
	n	%	n	%			
<b>Age</b>							
15-24	13	44.8	16	55.2	29	100	0.243
25-35	27	45	33	55	60	100	
36-49	12	66.7	6	33.3	18	100	
<b>Educational status</b>							
Primary Education	5	31.2	11	68.8	16	100	0.208
Secondary Education	39	54.2	33	45.8	72	100	

Variables	Anemia status				Total		p-value
	Anemia		Not Anemia		n	%	
	n	%	n	%			
Higher Education	8	42.1	11	57.9	19	100	
<b>Income</b>							
< District Minimum Wage	21	52.5	19	47.5	40	100	0.533
≥ District Minimum Wage	31	46.3	36	53.7	67	100	
<b>Parity</b>							
≤1	36	42.9	48	57.1	84	100	0.023
2-3	16	69.6	7	30.4	23	100	
<b>Compliance Drink Tablet Add Blood</b>							
Obedient	39	51.3	37	48.7	76	100	0.378
Not obey	13	41.9	28	58.1	31	100	

Table 2. shows that there is no relationship of maternal age, work, educator, income and adherence of tablets added blood with anemia incidence in third trimester pregnant women in Yogyakarta 2017, but there was a significant relationship between parity with anemia in pregnant women trimester III in the city of Yogyakarta in 2017( $p = 0.023$ ). 84 respondents with parity  $\leq 1$  more than half did not anemia as many as 48 people (57.1%), while pregnant women with parity 2-3 more than half had anemia as much 16 people (69.6%).

### Multivariate Analysis

This analysis was conducted to determine what factors influenced the incidence of anemia in pregnant women trimester III, then multivariate analysis was done by looking for the relationship between independent variables with the dependent. The result of bivariate analysis with a p-value  $< 0.25$  can be entered in the multivariate analysis stage. Based on the result of the bivariate analysis, it can be seen that the variables that qualify for multivariate entry are the mother's age, education, and parity. The result of multivariate analysis used logistic regression with the p-value of each variable.

Table 3. Multivariate Analysis Results in Independent Variables on Anemia Occurrence in Pregnant Trimester III in Yogyakarta City 2017

	Coefficient	SE	Wald	df	p-value	OR	IK 95%	
							Min	Max
Parity $\leq 1$	1.114	0.504	3.328	1	0.027	3.05	1.135	8.183
Constants	-0.827	0.453	3.328	1	0.068	0.438		

On the basis of multivariate analysis only parity variables have a p-value  $< 0.05$  so that only parity is related to the incidence of anemia in pregnant women trimester III. Table 3 showed that pregnant women with parity 2-3 three times greater risk than anemia in third-trimester pregnant women with parity  $\leq 1$  (95% CI 1135-8183).

### DISCUSSION

Iron deficiency arises when the need for iron increases, for example in women of reproductive age. At different age levels, there are daily variants of iron requirement. Low Hb concentrations correlate with maternal age of the crime (too old or too young). At the age of fewer than 20 years the condition is still in growth, so food input is widely used for maternal growth which can lead to fetal growth disorder. This is corroborated by a study conducted in Southern Ethiopia in 2015 showing that pregnant women aged 15-24 years (AOR: 9.89, 95% CI: 2.68-21.41) were among the predictors of anemia independent of pregnant women.<sup>6,7</sup>

Whereas in pregnant women over 35 years of age tend to have anemia caused due to the influence of the decline in iron reserves in the body. In the first pregnancy in women aged over 35 years will also have the risk of complication of labor and began to decrease the functions of reproductive organs.<sup>7</sup>

In this study found that pregnant women aged 36-49 years more than half experienced anemia as many as 12 people (66.7%). The results of the statistical test obtained *p-value* value of 0.243 which means there is no significant relationship between maternal ages with anemia in third-trimester pregnant women in the city of Yogyakarta in 2017. The results of this study is similar to a study conducted at Bangetayu Public Health Center Genuk sub-district, Semarang City year 2012 showed that the relationship between maternal age with anemia in third trimester pregnant women has *Pearson correlation* of 0.215, so it can be concluded that there is a weak relationship with positive relationship direction that is higher age, hence the higher anemia. While *p-value* of 0.095 which indicates that there is no significant correlation between age with anemia of pregnant mother trimester III.

This is because age is not the only cause of anemia but there are other factors that are basic factors (socioeconomic, knowledge, education, and culture) and direct factors (consumption patterns of tablets plus blood, infection and bleeding). The most probable factor is parity because although pregnant women are reproductive (not at risk) the majority of pregnant women are nulliparous and primipara (at risk).<sup>8</sup>

Education is the process of behavioral change towards maturity and refinement of life. A mother, especially pregnant women who have a higher education can balance the pattern of consumption. If the pattern of consumption is appropriate then the intake of nutrients obtained will be fulfilled, so as to avoid anemia problem. If pregnant women are unable to choose a good nutritional intake to grow fetal growth, anemia or other complications may occur.<sup>9</sup>

The results showed that most of the mothers with basic education did not experience anemia as many as 11 people (68.8%), more than half of mothers with secondary education experienced anemia as many as 39 people (54.5%), while mothers with higher education more than half did not have anemia ie as many as 11 people (57.9%). The result of the bivariate analysis shows *p-value* >0,05 ( $p = 0.208$ ) which means that there is no correlation between education with the incidence of anemia in pregnant mother of trimester III. This is not in accordance with the theory that the higher the education of a person the smaller the risk of anemia. This happens because all pregnant women who are highly educated may not have knowledge about good health because formal education does not teach the nutritional needs of pregnant women in particular.

Revenue is the factor that most determine the quantity and quality of food so there is a close relationship between income with the nutrients consumed. Inadequate income can affect the purchasing power of pregnant women in buying the necessary food items during pregnancy. This can have an impact on the intake of eating less and the risk of nutritional anemia during pregnancy.<sup>10</sup>

The results showed that more than half of respondents with family income <District Minimum Wage had anemia as many as 21 people (52.5%), while respondents with family income  $\geq$  District Minimum Wage more than half did not experience anemia. This is in line with the theory that the greater the family income the more assured the food is consumed to meet the nutritional needs, but the results of bivariate analysis show *p-value* > 0.05 ( $p = 0.533$ ) which means there is no relationship between family income with the incidence of anemia in the mother pregnant trimester III. This is because this study only looks at family income without considering the number of families to meet their needs.

In developing countries with low community income conditions, the contributing factor to anemia is the lack of consumption of foods containing iron, especially iron from meat. Meat is a source of protein that has the integrity, iron, zinc, and vitamin B except for

folic acid. However, food is not the only factor that affects anemia, because anemia can also be affected by the level of iron absorption in the body. The absorption rate in the body between one and the other pregnant women is different because it is influenced by many factors.<sup>11</sup>

The results of this study obtained a *p-value* of 0.023 which means there is a meaningful relationship between parity with anemia in third-trimester pregnant women in the city of Yogyakarta in 2017. While the results of multivariate analysis showed only parity variables that have *p-value* <0.05 so that among other factors only parity that is related to the incidence of anemia in third trimester pregnant women and pregnant women with parity 2-3, 3 times more at risk of anemia in the third trimester than pregnant women with parity  $\leq 1$  (95% CI 1,135-8,183). This suggests that parity  $\leq 1$  minimizes the possibility of anemia in third-trimester pregnant women.

This is not in accordance with the theory that nullipara or primipara more at risk of anemia because of frequent hyperemesis gravidarum early in pregnancy so that the lack of food intake to meet the nutritional needs of pregnant women. This is likely due to pregnant women with parity  $\leq 1$  more active to get information about pregnancy so as to prevent the occurrence of anemia.<sup>12</sup>

Respondents in this study no one has parity >4 so it can not prove that women who experienced pregnancy more than 4 times can increase the risk of anemia. The number of parity more than 3 is an associated factor of anemia associated with the distance of pregnancy that is too close that is <2 years caused by too often her can deplete the nutrient reserves of the mother's body. In developing countries, especially in rural areas, mothers from low socioeconomic rates with large numbers of children and close proximity to breastfeeding for long periods without regard to nutrition during lactation will be very dangerous for their survival and often once causing anemia.<sup>12,13,14</sup>

Pregnant women are one of the prioritized groups in the supplementation program. The recommended daily supplementation dose is two tablets (one tablet contains 60 mg of iron and 200 mg of folic acid) taken during the second half of pregnancy because at that time the need for iron is very high. Giving tablets plus blood is a government program that is the amount of giving 90 tablets during pregnancy. Tablet added blood into this government program contains the composition of Ferro Sulfate 200 mg (equivalent to iron element 60 mg), Folic Acid 0.25 mg with packing contents of 30 tablets on each the wrapper.<sup>15</sup>

Compliance of tablets added blood consumption is very important in the success of anemia treatment. Obedience is obedient, obedient to command or rule, and disciplined. If pregnant women do not drink or drink tablets added to blood in a way that is not appropriate then the need for iron cannot be met so that it can cause anemia in pregnant women. The result of the research showed that pregnant women who were obedient in drinking tablets plus blood more than half had anemia that was 39 people (51.3%), while the non-adherent mother in drinking tablet plus blood more than half did not have anemia that was 28 people (58.1%). The result of the bivariate analysis showed that there was no correlation between maternal obedience in drinking tablet plus blood with anemia incidence in pregnant mother of trimester III ( $p = 0.378$ ). This happens because the consumption of iron outside the tablets plus the blood of each pregnant mother is different so that the obedient pregnant women may already consume iron from other foods so as to prevent anemia.

Anemia treatment is very important considering the many problems caused by anemia. Mothers who experience anemia can give birth to children with anemia as well. Some studies state that there is a relationship between hemoglobin levels and children's intellectual intelligence. This is consistent with previous studies. There is an influence of iron (Fe) intake with intellectual ability. Biologically, the mechanism that occurs in the body

when experiencing iron deficiency anemia can lead to cause problems in cognitive achievement.<sup>17</sup>

## CONCLUSION

Based on the result of the research, there are some conclusions, among others: there was no significant correlation between education, family income, adherence to tablet drinking. There was a significant relationship between parity with anemia in third trimester pregnant women in Yogyakarta city 2017. The most dominant factor affecting anemia in third-trimester pregnant women in Yogyakarta city 2017 is parity.

## SUGGESTION

Health workers need to provide information that prospective pregnant women need to prepare in subsequent pregnancies to reduce the risk of anemia.

## REFERENCES

- 1 Kementerian Kesehatan RI. *Profil Kesehatan Indonesia 2015*. [www.depkes.go.id](http://www.depkes.go.id). Accessed July, 8<sup>th</sup> 2017 at 08.07. 2016
- 2 Sabina, Shaikh dkk. *An Overview of Anemia in Pregnancy*. Journal of innovations in Pharmaceuticals and Biological Sciences (JIPBS). Vol 2. No. 2. hlm. 144-151. 2015
- 3 Dinas Kesehatan DIY. *Profil Kesehatan DIY 2016*. Yogyakarta : Dinkes DIY. 2016
- 4 Dinas Kesehatan Kota Yogyakarta. *Profil Kesehatan Kota Yogyakarta 2016*. Yogyakarta : Dinkes Kota Yogyakarta. 2016
- 5 Rahmati, Shoboo dkk. *Maternal Anemia during pregnancy and infant low birth weight: A systematic review and Meta-analysis*. International Journal of Reproductive BioMedicine. Vol 15. No. 3. hlm. 125-134. 2017
- 6 Lealem G. et al. *Anemia and Associated Factors Among Pregnant Women Attending Antenatal Care Clinic in Wolayita Sodo Town, Southern Ethiopia*. Ethiop J Health Sci. Vol 25. No 2. 2015
- 7 Proverawati, A. *Anemia dan Anemia Kehamilan*. Yogyakarta: Nuha Medika. 2011
- 8 Qudsiyah, Djarot, dan Nurjanah. *Hubungan antara Paritas dan Umur Ibu dengan Anemia pada Ibu Hamil Trimester III tahun 2012*. Jurnal Unimus. [www.jurnal.unimus.ac.id](http://www.jurnal.unimus.ac.id)
- 9 Marmi NU dan Raharjo B. *Aspek Dasar Kependidikan*. Jakarta: Bina Aksara. 2012
- 10 Sayogo S. *Gizi Remaja Putri*. Jakarta: EGC. 2006
- 11 Jufar, AH and Tewabech Z. (2014). *Prevalence of Anemia Among Pregnant Women Attending Antenatal Care at Tikur Anbessa Specialized Hospital Addis Ababa Ethiopia*. Journal of Hematology and Thromboembolic Disease 2014, Vol. 2. No 1: 1-6. 2014
- 12 Arisman. *Gizi dalam Daur Kehidupan*. Buku Kedokteran EGC. Jakarta. 2004
- 13 Tarwoto dan Wasnidar. *Anemia pada Ibu Hamil, Konsep dan Penatalaksanaanya*. Jakarta: Trans Info Media. 2007
- 14 Soebroto I. *Cara Mudah Mengatasi Problem Anemia*. Yogyakarta: Bangkit. 2009
- 15 Saifuddin AB. *Panduan Praktis Pelayanan Kesehatan Maternal dan Neonatal*. Jakarta : EGC. 2009
- 16 Wiknjosastro H. *Ilmu Kebidanan*. Jakarta: Yayasan Bina Pustaka Sarwono Prawirohardjo. 2006
- 17 Kusmiyati, Y; Meilani, N; Ismail, S. *Hemoglobin Level and Intelligence Quotient of Children*. Jurnal Kesehatan Masyarakat nasional Vol 8. No.3 Oktober 2018.