Public Health of Indonesia
Rosanty A and Yunus R. Public Health of Indonesia. 2017 August;3(3):102-106 ISSN: 2477-1570
http://stikbar.org/ycabpublisher/index.php/PHI/index

Original Research

HEMOGLOBIN LEVELS IN PREGNANT WOMEN LIVING IN COASTAL AND PLATEAU AREAS, KENDARI, INDONESIA

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Accepted: 5 September 2017
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ABSTRACT

Background: Insufficient hemoglobin levels are one of the most vulnerable health problems during pregnancy. Hemoglobin levels less than 11 g/dL indicate anemia in pregnant women. However, it is assumed that there is a difference of hemoglobin levels between pregnant women in coastal and plateau areas.

Objective: To compare the hemoglobin levels in pregnant women who live in the coastal and plateau areas in the working area of the Community Health Center of Mata, Kendari.

Methods: This was an observational analytic research with cross sectional approach, conducted in May-June 2014. There were 38 pregnant women using quota sampling, divided into 19 respondents in coastal areas and 19 respondents in plateau areas. Blood sampling was performed in each respondent, and categorized into mild, moderate, and severe anemia. Data were analyzed using chi-square test.

Results: The proportion of pregnant women with anemia in the working area of the Community Health Center of Mata was 94.74%. Chi-square test showed p-value 0.307 (>0.05).

Conclusion: There was no significant difference in hemoglobin levels in pregnant women in coastal and plateau areas in the working area of the Community Health Center of Kendari district.

Key words: Hemoglobin, pregnant women, coastal, plateau

BACKGROUND

One of the most vulnerable health problems in pregnant women is lack of hemoglobin levels. Hemoglobin levels less than 11 g / dL indicates pregnant women suffer from anemia. This can increase the risk of getting low birth weight babies (LBW). In addition, if the pregnant mother is severely anemic, the risk of bleeding before and after labor is very likely to occur, even causing the death of the mother and baby.[1-3]

Anemia is one of the major problems that occur during pregnancy in developing countries, including Indonesia. Based on the 2007 Basic Health research, the prevalence of anemia in pregnancy was 14%. Several studies in Indonesia have found anemia rates ranging from 20-80%.[4,5] Hemoglobin level is a biochemical

indicator to determine nutritional status. If there is a decrease in hemoglobin levels, then the red blood cell volume and hematocrit levels are below the normal value in a person's body.[6]

Anemia caused by lack of hemoglobin levels can be experienced by anyone, both male and female. However, women are so susceptible to anemia, because it has lower iron reserves than men, small body mass and blood loss during menstruation leads to women susceptible to anemia. Similarly in pregnant women, the need for iron increases from 1 mg / day to 2.5 mg / day in early pregnancy, and to 6.5 mg / day in the 3rd trimester.

According to the World Health Organization (WHO), the prevalence rate of anemia in non-pregnant women is 30.2% while for pregnant women is 47.40%. The incidence of anemia varies due to differences in socioeconomic conditions, lifestyle, and health behavior in different cultures. Anemia affects nearly half of all pregnant women in the world, 52% are in developing countries, while 23% in developed countries are commonly caused by malnutrition, malaria, worm infections, and schistomiasis. Human immunodeficiency virus (HIV) infections and hemoglobin abnormalities as additional factors.[7]

Based on the 2001 national health survey data, the anemia rate in pregnant women was 40.1%, indicated that anemia is quite high in Indonesia. When estimated in 2003-2010, the prevalence of anemia remains above 40%, and then there will be maternal mortality as much as 18 thousand per year caused by bleeding after childbirth. This condition with an estimated 30-70% of mothers died due to severe anemia and by 20-40% of mothers died of indirect causes of anemia.[8]

Anemia is very dangerous for pregnant women. It has an effect that can harm the fetus and fetal death in the womb. The most common cause of anemia in pregnancy is iron deficiency (about 62.3%). Anemia occurs from the empty reserves of body iron, so the supply of iron for erythropoiesis is reduced, which in turn the formation of hemoglobin is reduced.[9]

However, iron reserves in the body can be obtained from the consumption of foods containing iron. Simple amounts of iron can be obtained from meat, fish and vegetables. In addition to the lack of food reserves in the body, anemia can also be experienced due to the influence of the living environment.

Kendari city is an area with varied natural conditions. Terrain and hills with altitude on the northern part of Kendari Bay to Nipa-nipa Mountain are between 0-300 meters above sea level. In the south, those range from 0-100 meters above sea level. While in the western part, it is a gently sloping plain with small surrounding hills. In addition, there are large coastal areas around the bay.[10]

The effect of hemoglobin on the environment is influenced by the percentage of oxygen in an area. Generally, oxygen levels reach 100% in coastal areas, and reach 25% in areas with altitude 9,000 meters above sea level. The higher the distance of an area from the sea surface, the lower the oxygen levels in the area.

Low oxygen levels will increase the production of erythropoietin hormone that induces hematopoietic stem cells into erythrocytes, whereas in areas with high oxygen levels, the body will produce erythrocytes normally. So the neighborhood can affect the hemoglobin level in a person's blood.[11]

METHODS

This was an observational analytic research with cross sectional approach, conducted in May-June 2014. The population of this

study was pregnant women living in the area of community health center of Mata Area Kendari. There were 38 samples recruited using quota sampling, divided into 19 respondents in coastal areas and 19 respondents in plateau areas. The inclusion criteria of the samples were only pregnant women in trimester II and III. Blood sampling was performed in each respondent, and categorized into mild, moderate, and severe anemia. Data were analyzed using chi-square test.

RESULTS

Table 1 shows that pregnant women who were in trimester II were 63.16% and in trimester III were 36.84%. While Table 2 shows that the majority of pregnant women in coastal areas had mild anemia (84.21%) and 10.53% of respondents had moderate anemia. While in mountain areas, most of respondents had moderate (42.11%) and mild anemia (52.63%). Of all respondents, only 1 respondent had no anemia, both in coastal areas and plateau areas.

Table 1. Frequency distribution of respondents based on gestational age

Gestational age	f	%
Trimester II	24	63.16
Trimester III	14	36.84
Total	38	100

Table 2. Frequency distribution of hemoglobin levels of pregnant mothers in coastal and plateau areas

Hemoglobin levels (Hb)	f	%
In coastal areas		
Moderate Anemia	2	10.53
Mild Anemia	16	84.21
Normal	1	5.26
Total	19	100
In Plateau areas		
Moderate Anemia	8	42.11
Mild Anemia	10	52.63
Normal	1	5.26
Total	19	100

Table 3. Difference of hemoglobin levels of pregnant mothers in coastal and plateau areas using chi-square test

	Value	df	Asymp. Sig. (2-sided)	Monte Carlo Sig. (2-sided)			Monte Carlo Sig. (1-sided)		
				Sig.	95% Confidence Interval		95% Confidence Interval		Sig.
					Lower Bound	Upper Bound	Lower Bound	Upper Bound	
Pearson Chi-Square	15.000[a]	13	.307	.158[b]	.042	.274			
Likelihood Ratio	19.721	13	.102	.184[b]	.061	.307			
Fisher's Exact Test	14.128			.211[b]	.081	.340			
Linear-by-Linear Association	.382[c]	1	.537	.579[b]	.422	.736	.168	.464	.316[b]
N of Valid Cases	38								

Table 3 shows that the value of x2 count (15.000) was lower than x2 table (22,362), with p value (0.307) (>0.050). it can be concluded that Ho was accepted, which indicated that there was no significant difference of hemoglobin levels in pregnant women who live in the coastal areas and plateau areas in Kendari district.

DISCUSSION

The purpose of this study was to determine differences in hemoglobin levels of pregnant women who live in coastal and plateau areas. Findings in this study revealed that there was no significant difference in hemoglobin levels for pregnant mothers in coastal and plateau areas. This is in contrast with previous study revealed that there is a significant difference in hemoglobin level between pregnant women living in coastal areas and in plateau areas.[12]

The low level of hemoglobin in pregnant mothers in coastal areas is likely due to high oxygen pressure resulting in normal erythrocyte formation. But in pregnant women, normal formation of erythrocytes is not necessarily good. It is because at the time of pregnancy, erythrocyte production is still lower than the formation of plasma, thus causing the blood becomes more dilute.

Similarly, pregnant mothers in plateau areas had low level of hemoglobin, which might be because of the plateau areas in Kendari were not high enough. So the formation of oxygen does not increase, but normal. In addition, currently in these areas, pregnant women tend to choose to use motor vehicles, instead of walking. Thus, the capacity of the lungs is similar to that of pregnant women in the coastal areas. By walking, oxygen into the lungs will increase and cause an increase in hemoglobin levels. This is suspected to be the underlying cause of the absence of significant differences in pregnant women's hemoglobin levels living in coastal areas and in plateau areas in Kendari district, but there was a difference in maternal anemia status from both areas (see Table 2).

However, besides a geographical factor as revelaed in this study, there are many other factors identified in literatures affecting hemoglobin levels, such as the compliance in consuming iron tablets, nutritional status, maternal education, pregnant women's work and parity. Astrini[13] revealed that pregnant women who consumed iron tablets obediently were still susceptible to mild anemia, while pregnant women who did not consume iron tablets tend to have moderate anemia.

Pregnant women in both areas in this study admitted that tend to be lazy to consume iron tablets because they feel nausea, discomfort in the pit of the stomach and vomiting. But, because of the high rate of anemia in both areas, especially in the area of the Community health Center of Eye Health Center, it is recommended to pregnant women to do prevention as early as possible by consuming blood booster tablets. To reduce nausea, it is advisable not to consume with tea. And to facilitate the absorption of iron, it is advisable to consume together with vitamin C, in the form of tablets or fruits that contain vitamin C.

CONCLUSION

Based on the results of this study, there was no significant difference in hemoglobin levels in pregnant women in coastal and plateau areas in the working area of the Community Health Center of Kendari district.

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Cite this article as: Rosanty A, Yunus R. Hemoglobin Levels in Pregnant Women Living in Coastal And Plateau Areas, Kendari, Indonesia. Public Health of Indonesia 2017;3(3):102-106