

Relationship Between Consumption of Iron (Fe) and Breakfast Habits with the Incidence of Anemia in Adolescent Girls at SMP Negeri 6 Karawang Barat

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Keywords: Anemia Status, Iron Consumption, Breakfast Habits.

Abstract: Anemia is a globally public health problem. Anemia is a condition when the Hb level is below the normal value (<11 g/dl). Adolescent girls have high risk of anemia. Several factors cause anemia, including consumption of iron (Fe) and the habits of delaying breakfast. The purpose of this study was to determine the relationship between consumption of iron (Fe) and breakfast habits with the incidence of anemia in adolescent girls at SMP Negeri 6 Karawang Barat. This study used a cross sectional design. The sampling technique in this study was the cluster random sampling with a total sample of 63 students of class VIII. Data analysis in this study used the chi-square test. Statistic tests showed a P-Value <0,05 for the category of consumption of iron (Fe) sourced foods and consumption of Fe supplements which showed a significant relationship between the consumption of iron (Fe) paint foods and consumption of iron (Fe) supplement and the incidence of anemia in adolescent girls. Statistical test showed a P-Value >0,05 for the category of breakfast habits which showed no significant relationship between breakfast habits and the incidence of anemia in adolescent girls at SMP negeri 6 Karawang.

1 INTRODUCTION

Adolescents are one of the groups that are prone to anemia. This causes inhibition of growth and decrease in the immune system, so the body is easily to infected. Anemia is a condition in which the total of red blood cells or hemoglobin levels is below the normal value (<11 g/dl). Hemoglobin has a role as an oxygen carrier and nutrients to the brain and nutrients to brain and throughout the body. Deficiency of red blood cells will have an impact on the body's system because it plays a role in distributing nutrients needed during physiological and biochemical processes of body tissues. Easily tired, headache, pale and feel cold in the palms of the hand and feet is the result of a lack of haemoglobin in the body.

Anemia among adolescent girls still becomes a public health problem. WHO in 2018 states the prevalence of people in the world who had anemia was 40%. While in Indonesia the prevalence of anemia sufferers with an age range of 15-24 years old reaches 21,7% to 57%. According to the household health survey (SKRT) in 2018, the prevalence of

anemia in West Java was 41,5%. Based on Riskesdas data in 2018, 26,54% of adolescents in west java were anemic. Compared with the national prevalence of anemia sufferers which is 40%.

There are factors that cause anemia. Among them is the less-than-optimal storage of iron due to low absorption of iron due to a less diverse variety of foods, while in adolescence there is an increase in nutritional needs, this requires adolescent girls to meet the nutritional needs to support the growth and development of the body needed in adolescence. Arrange and paying attention to food and nutrition intake, including breakfast is one-way to prevent anemia. Breakfast is the habit of eating and drinking when you wake up in the morning until before doing school or other activities to meet about 300-600 or 15-25% according to the daily nutritional needs of an individual.

Delaying and skipping breakfast causes a lack of nutrients in the body in the morning, these causing diseases due to iron deficiency. Research conducted by Sirajuddin and Masniin 2015 stated that the wrong breakfast habit is one of the risk factors for the

incidence of nutritional anemia in schoolchild, students who breakfast 2-3 times a week 2,95 times are at risk of experiencing all of them compared to student who often breakfast. Fulfilment of nutrients, especially iron through a variety of food intake can reduce the risk of anemia. Breakfast is an important thing because the nutrients consumed at night have been converted into energy to be circulated throughout the body. The brain requires glucose as a source of energy for the body which is obtained at the time of breakfast. If someone skips breakfast, hypoglycaemia can occur, which is where the body's glucose level is below normal, which is characterized by using, shaking, and having difficulty concentrating.

Based on the description above, it is known that the prevalence of anemia in adolescent in West Java reaches 26,54% (Risksdas,2018). In Addition, a similar study was also conducted by Sari et al in 2018 which stated that 11,68% of adolescent girls at SMPN Tempuran Karawang Regency were anaemic. Several previous studies have explained the prevalence of anemia among adolescent girls, but there is no evidence that explained the relationship between factors that cause anemia, such as consumption of iron and breakfast habit on the incidence of anemia I adolescent girls in the West Karawang region. So, the researcher is interested in researching further regarding "The Relationship Between Iron Consumption and Breakfast Habit with The Incidence of Anemia in Adolescent Girls" which will be conducted at SMP Negeri 6 Karawang Barat.

2 METHOD

This research is an observational study using a cross sectional design was conducted in Maret 2022. The sample in this study were 63 student who were still student in 8th grade at SMP Negeri 6 Karawang Barat. A total of 63 adolescent girl from the 10 classes in SMP Negeri 6 Karawang Barat were selected as subject for this study by cluster random sampling technique.

Data was taken in this study include antropometric data, Hb level data was taken using Hb Diaspect Easy Touch, iron intake data consisting of dietary intake data from iron sources and consuming Fe supplement using a questionnaire and forms SQ-FFQ, and breakfast habits of adolescent using a questionnaire. To collect the data during the Covid-19 pandemic, the researcher and respondent always obey the health protocol in prevention Covid-19 such as wearing masks, maintaining distances, and

washing hand with soap before entering and leaving the SMP Negeri 6 Karawang.

The variables in this study include the dependent variabel and independent variable. Dependent variable was anemia status in adolescent girls. Anemia is a condition when the body experiences a decrease in haemoglobin levels based on age and gender groups. Haemoglobin or red blood cells have a role in carrying oxygen and nutrients to the brain a throughout the body. Anemia causes the blood to be unable to transport and bind oxygen from the lungs to the rest of the body, causing the body to tire easily so it will interfere with daily activities (Muhayati & Ratnawati, 2019). Anemia status was measured by taking the blood by laboratory analysis to assess Hb level by Hb Diaspect Easy Touch. Respondents were categorized anemia if Hb level <11 g/dl and normal if Hb level 11 g/dl. The independent variable were iron (Fe) consumption and dietary habits using questionnaire and forms SQ-FFQ. In this study, the data was edited, entry an analysed by univariate and bivariate using SPSS software. Then the data will be analysed by using the chi-square test.

Data collection was carried out by means of the respondent reading the agreement text to become a respondent then the respondent signed the agreement, after that, anthropometric measurements were carried out to obtain data on the weight and height of the respondent. To Hb checking, the researcher firs confirmed to the respondents would do a Hb check using Hb diaspect Easy Touch. After that, respondents will be interviewed regarding their breakfast habits and iron consumption using a questionnaire and forms SQ-FFQ.

3 RESULT AND DISCUSSION

Respondent Characteristics

The majority of adolescent girl at SMP Negeri 6 Karawang barat are 15 years old (77,8%). The respondents were in the age range of 14-17 years old. The majority of adolescent girl's mother's education at SMP Negeri 6 Karawang Barat is in the high school category (34,9%). Then in the category of mother's work, the majority work as housewives (92,1%) compared to working mothers (7,9%).

Prevalence of Anemia

From a total of 63 students participated in this study, 42 (66,7%) respondents had anemia. Based on the results of Hb measurements that have been carried out using the Hb Diaspect Easy Touch test, it was found that the Hb levels of adolescent girls in SMP Negeri

6 Karawang Barat ranged from 9,5-14 g/dl with an average Hb level of 11,1 g/dl.

Intake of Food Sources of Iron (Fe)

The majority of food intake of iron sources for adolescent girls in SMP Negeri 6 Karawang Barat not fulfilled (65,1%), with an average iron intake of 14,6 mg/day with a range of iron intake between 5,25-20,70 mg/day.

Intake of Supplement Fe

The majority of adolescent girls at SMP Negeri 6 Karawang Barat did not consume Fe supplement (79,4%) compared to those who took fe supplement (20,6%). The average value of Fe supplement intake was 0,81 with a range of Fe supplement intake

between 0-1 grains/week. At SMP Negeri 6 Karawang Barat there is an activity of giving Fe supplement from the health centre. The health centre gives Fe supplement of “Ferrous Fumarate Folic Acid”, each student is given 4 tablets every month which they explain to take 1 tablet of Fe supplement/week.

Breakfast Habits

The majority of adolescent girls at SMP Negeri 6 Karawang Barat are adolescent who do not obey breakfast (52,4%) at least <5 times a week and get an average intake of 123,9 kcal with ideal intake breakfast of 300-600 kcal or supply 15-25% of daily needs.

Table 1: Distribution of Adolescent Girls based on Characteristics.

Variable	Category	n	%	Median	Min-Max	SD
Age				15,00	14-17	0,503
	14	3	4,8			
	15	49	77,8			
	16	10	15,9			
	17	1	1,6			
Total		63	100			
Mother’s Education						
	Not In School	2	3,2			
	SD	9	14,3			
	SMP	21	33,3			
	SMA	22	34,9			
	SMK	2	3,2			
	D3	4	6,3			
	D4	1	1,6			
	S1	1	1,6			
	S2	1	1,6			
Total		63	100			
Mother’s Work						
	Laundry Worker	1	1,6			
	Housewives	58	92,1			
	Trader	1	1,6			
	Private Employee	1	1,6			
	Self-employed	1	1,6			
	Businessman	1	1,6			
Total		63	100			

Table 2: Distribution of Adolescent Girls Based on Hb Level Intake of Food Sources of Iron (Fe).

Variable	Category	n	%	Mean	Median	Min-Max	SD
Hb Value				11,1	10,8	9,5-14	1,030
	Not In Anemia	21	33,3				
	Anemia	42	66,7				
Total		63	100				

Table 3: Distribution of Adolescent Girls Based on Intake of Food Sources of Iron.

Variable	Category	n	%	Mean	Min-Max	SD
Intake of Food Sources of Iron				14,6	5,25-20,70	2,966
	Not Filled (<15 mg/dl)	41	65,1			
	Filled	22	34,9			
Total		63	100			

Table 4: Distribution of Adolescent Girls Based on Intake of Supplement Fe.

Variable	Category	n	%	Mean	Min-Max	SD
Intake of Supplement Fe				0,81	0 - 1	0,396
	No	50	79,4			
	Yes	13	20,6			
Total		63	100			

Table 5: Distribution of Adolescent Girls Based on Breakfast Habits.

Variable	Category	n	%	Mean	Min-Max	SD
Breakfast Habit				123,9	0-392	0,503
	No Breakfast	33	52,4			
	Breakfast	30	47,6			
Total		63	100			

The Relationship between Consumption of Food Sources of Iron with the Incidence of Anemia in Adolescent Girls

It's known that the majority of respondents who experience anemia are found in respondents whose body iron need are not filled as many as 41 person (100%), while respondents who experience anemia with iron intake are filled as many as 1 person (4,5%). Then, the majority of normal respondents were found in respondents whose iron intake was filled as many as 21 people (95,5%). Based on the result of the *Pearson chi-square test*, a *p-value* off 0,000 was obtained (*p-value* <0,005) which indicates that there is a significant relationship between the consumption of food sources of iron and the incidence of anemia in adolescent girls at SMP Negeri 6 Karawang Barat.

Table 6: The Relationship Between Consumption of Food Sources of Iron with The Incidence of Anemia.

Konsumsi Zat Besi (Fe)	Anemia Status		Total n (%)	P Value
	Anemia n (%)	Normal n (%)		
Not Filled	41 (100%)	0 (0,0%)	41 (100%)	0,000
Filled	1 (4,5%)	21(95,5%)	22 (100%)	

The Relationship Between Consumption of Supplement Fe with The Incidence of Anemia in Adolescent Girls

It's known that the majority of respondents who experience anemia are found in respondents whose do not consume supplement Fe as many as 37 person

(74%), while respondents who experience anemia whose consume supplement Fe as many as 5 people (38,5%). Based on the result the *person chi-square test*, a *p-value* off 0,023 was obtained (*p-value* <0,005) which indicates that there is a significant relationship between the consumption of supplement Fe and the incidence of anemia in adolescent girls at SMP Negeri 6 Karawang Barat.

Table 7: The Relationship Between Consumption Supplement Fe with The Incidences of Anemia.

Consumption Supplement Fe	Anemia Status		Total n (%)	P Value
	Anemia n (%)	Normal n (%)		
Yes	5 (38,5%)	8 (61,5%)	13 (100%)	0,023
No	37 (74,0%)	13 (26,0%)	50 (100%)	

The Relationship Between Breakfast Habit with The Incidence of Anemia in Adolescent Girls

Its known that 26 person (78,8%) respondents who experience anemia are found in respondents whose don't do breakfast, while respondents who experience anemia whose do breakfast as many as 16 person (53,3%). Then, 14 people (46,7%) normal respondents were found in respondents whose do breakfast. Based on the result of the *pearson chi-square test*, a *p-value* off 0,060 was obtained (*p-vlue*0,005) which indicates that there is no significant relationship between breakfast habit and the incidence of anemia in adolescent girls at SMP Negeri 6 Karawang Barat.

Table 8: The Relationship of Breakfast Habit with the Incidences of Anemia.

Breakfast Habit	Anemia Status				Total		P Value
	Anemia		Normal		n	%	
	n	%	n	%			
Breakfast	16	53,3	14	46,7	30	100	
No Breakfast	26	78,8	7	21,2	33	100	0,060

Anemia in adolescents is one of the nutritional problems in the world, which is characterized by Hb levels below normal. In this study, it was found that the prevalence of anemia among adolescent girls at SMP Negeri 6 Karawang Barat was 66,7%. This is obtained from the data from Hb measurement carried out by researchers using the Hb Diaspect Easy Touch, the results show that the Hb levels of adolescent girls at SMP Negeri 6 Karawang Barat ranged from 9,5-14 g/dl with an average value of Hb levels of 11,1 g/dl.

One of the factors that causes anemia in adolescent girls is the consumption pattern of food sources of iron. This study it was found that 41 adolescent girls at SMP Negeri 6 Karawang Barat have a low intake of food sources of iron, with a *p-value* 0,000 which means there is a significant relationship between intake of food sources of iron and the incidence of anemia. This study is like the results of study conducted by Helda (2017) which found that 60,4% of adolescent girls at an integrated Islamic high school in Yogyakarta experienced all and 66,7% had low iron intake. The result of this study is due to the consumption patterns of adolescent girls where they prefer fast food which causes nutritional needs especially iron to be less fulfilled, and many of the adolescent girls in SMP Negeri 6 Karawang Barat do not like and rarely consume fruits and vegetables.

Deficiency of iron in the body is also one of the causes of anemia in adolescent girls. Iron is the most important component in the formation of red blood cells in the bone marrow and affects Hb levels in the body. This study was found that 74,0% of adolescent girls experience anemia due to not consume iron supplement, with a *p-value* of 0,023 which mean that is a significant relationship girl. This is like the study by Putra Kristian Adi et al (2020), where in this study there was a relationship between consumption of iron supplement and the incidence of anemia in adolescent girls. The existence of this relationship of this study is because respondents are less interested in taking Fe supplement due to several factors, one of which is fear of the side effects that occur after consuming Fe supplement such as nausea and among them some are

not allowed by their parents to consume Fe supplements which are prescribed by their parents provide by the program held at the school.

The next factor that causes anemia in adolescent is breakfast habits. The majority of adolescent girls at SMP Negeri 6 Karawang Barat it was found that 52,4% of them did not have breakfast before doing activities at school. This study found as many as 78,8% of adolescent girls experience anemia due to not having breakfast, whit a *p-value* of 0,060 which mean there is no significant relationship between breakfast habits and the incidence of anemia. This is similar to Jiwaning Basuki (2019) where based on the *p-value* they got was 0,167 which the value was >0,05 which means there is no significant relationship between breakfast habits and haemoglobin levels, which means there is no relationship with the incidence of anemia. There is no relationship in this category because of them not have breakfast. Some of them we have mother who work, so often do not have time to prepare breakfast for their family at home. Some of them also have reason that they are not used to breakfast because they are worried that they will feel stomachache after breakfast, so they prefer to eat during the first break.

4 CONCLUSIONS

1. Majority of adolescent girls at SMP Negeri 6 Karawang Barat are 15 years old (77,8%). As many as 38,1% of respondent's mothers have a high school education, and 92,1 of respondent's mothers work as housewives.
2. The prevalence of anemia in SMP Negeri 6 Karawang Barat was found 66,7% of adolescent girls experiencing anemia with an average Hb level of 11,1 g/dl.
3. 65,1% of the intake of food sources of iron for adolescent girls in SMP Negeri 6 Karawang Barat is in the low category with an average intake of 14,6 mg/day.
4. 79,4% of adolescent girls in SMP Negeri 6 Karawang Barat do not comply with taking Fe supplements given by health workers at schools and health centres.
5. There was a significant association between consumption of food sources of iron with the incidence of anemia among adolescent girls
6. There was a significant association between consumption of supplement Fe with the incidence of anemia among adolescent girls.

7. There is no significant relationship between breakfast habits and the incidence of anemia among adolescent girls.

It should be attention for adolescent girls, it is better to pay more attention to the daily nutritional needs especially iron, by paying attention and consuming foods that are a source of iron like beans, red meat, and egg. Do not forget also to pay attention to the inhibitors and substances that help the absorption of iron in the body. And for the health workers around to provide counseling about anemia in adolescent girls, so that adolescent know more about the causes and effects of anemia.

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ACKNOWLEDGEMENTS

The research would like to thank to the principal, school curriculum and teachers of SMP Negeri 6 Karawang Barat for allowing researchers to do research in SMP Negeri 6 Karawang Barat. Thanks also to the enumerators who helped complete the research. Especially thank you for the students of SMP Negeri 6 Karawang Barat who are willing to be respondents in this research.

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