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RESEARCH ARTICLE

Profile of Anemia Status in Adolescent Girls; Case Study at SMP Negeri 27 Padang

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Abstract

Introduction: *The prevalence of anemia in adolescent girls worldwide is reported to be around 40-88%. Adolescent girls with anemia can affect work productivity or academic ability at school due to a lack of enthusiasm for learning and focus.Anemia in adolescent girls can continue throughout their lives and put them at risk of becoming anemic pregnant women who can give birth to premature babies and leading to stunting. This study aims to determine the descriptionof hemoglobin levels in female adolescents at SMP Negeri 27 Padang.*
Method: *The research was descriptive, using a sample of 116 adolescent girls selected by proportionate stratified random sampling. Hemoglobin levels were examined using the Point of Care Testing (POCT) method using capillary blood.*
Results: *The resultsshow that most hemoglobin levels are normal, namely 60 respondents (51,7%), low hemoglobin levels are 55 respondents (47,4%), and high hemoglobin levels are 1 respondents (0,9%).*
Conclusion: *It can be concluded that hemoglobinlevels among adolescent girls at SMP Negeri 27 Padang generally have normal hemoglobin levels.*

Keywords: *Adolescent girls, anemia, hemoglobin*

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INTRODUCTION

WHO states that globally the prevalence of anemia in women aged 15 years and over is 28%. Southeast Asia is the region with the highest prevalence of anemia, namely 42%.[1] Based on Riskesdas data, the incidence of anemia in adolescent girls in Indonesia in 2013 was recorded at 22.7% and increased in 2018 to 32% with the proportion of anemia in the 13-18 and 15-24 age groups.[2,3]

Research conducted by Manampiring Survey in four provinces (West Sumatra, Riau, Bengkulu, and Lampung) found that school-age children including adolescents who suffer from anemia were 45.31%.10 According to the West Sumatra Provincial Health Office in 2014 there were 1.833 junior high school students and 1.718 high school students who suffered from anemia. This data was taken from a survey of several cities in West Sumatra Province.[4]

In general, anemia often occurs in women and adolescent girls compared to men. Teenage girls are at higher risk of anemia because they menstruate, which causes them to lose a lot of blood, so they need more iron than boys. In addition, teenage girls are growing, so their nutritional needs increase. However, with the current beauty standards, teenage girls try to go on a strict diet to get a slim body. A strict diet makes the intake of nutrients less than what is needed.[5]

Anemia in adolescent girls can continue throughout the girl's life and is at risk of becoming a pregnant woman with anemia who can give birth to premature or low birth weight (LBW) babies6, due to disruption of red blood cell formation, placenta formation, and fetus,[7] which will then give birth to the next generation of stunting which is not only stunted but also has a low IQ and is at risk of various chronic diseases.[6] Anemia is a condition characterized by decreased hemoglobin levels in the blood.[7,8] Hemoglobin is a coloring agent found in erythrocytes that functions to transport oxygen and carbon dioxide in the body8. The formation of hemoglobin is greatly influenced by iron. Lack of iron intake can reduce hemoglobin in the body.[9,10] Most adolescent girls have low iron status due to low quality food consumption and menstruation experienced every month. Adolescent girls need an iron intake of around 12-14 mg/day. Adolescent girls who lose iron during menstruation need iron supplements. To follow up on this, the Indonesian government is preventing and treating anemia in adolescent girls by providing iron tablets through school institutions.[11]

METHODS

The type of research used is descriptive with a population of 347 female adolescents at SMP Negeri 27 Padang. Respondents numbered 116 people who were determined by proportionate stratified random sampling. Data on age and compliance with consumption of iron suplement tablets (TTD) consumption were obtained by interviewing respondents. Nutritional status data were obtained by calculating the Body Mass Index (BMI) by measuring the weight and height of respondents using a weight scale and microtoise. Hemoglobin level data were obtained from capillary blood samples of respondents which were examined using the point of care testing (POCT) method using the Easy Touch GCHb tool. Data were analyzed descriptively and presented in narrative and tabular form.

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RESULT AND DISCUSSION

Characteristics of adolescent girls based on age, compliance with TTD consumption, and nutritional status can be seen in Table 1. Based on Table 1, it was found that the adolescent girls in this study were mostly 13 years old, namely 82 respondents (70.7%). Ages 12-14 years are included in the middle adolescent category, where their development is modified by body image, very focused on themselves, and have many dreams.[13] At this age, additional nutritional intake is needed because at adolescence the development of reproductive organs is still not optimal, emotions tend to be unstable, and mentality is not yet mature, which can result in a lack of attention to fulfilling nutritional needs.[14]

Table 1. Characteristics Of Adolescent Girls Based On Age, Compliance With Consumption Of Iron Supplement Tablets, And Nutritional Status

Characteristics	f	%
N = 116		
Age (in a year)		
12	4	3,4
13	82	70,7
14	30	25,9
Compliance with Consumption of Iron Supplement Tablets		
Compliance		
No Compliance	25	21,6
	91	78,4
Nutritional Status		
Poor	4	3,4
Less	7	6,1
Good	82	70,7
More	10	8,6
Obesity	13	11,2

In this study, it was found that most female adolescents were non-compliant in consuming TTD, namely 91 respondents (78.4%). The results of this study are in line with research conducted by Adnyana, et al. and Rahayuningtyas, et al. who conducted research on knowledge of anemia and factors related to compliance with TTD consumption in female adolescents, stating that most female adolescents had low compliance in consuming TTD. 15,16 According to research by Budiarni and Subagio on attitudes and compliance with TTD consumption, it was found that most respondents were non-compliant in consuming TTD because the TTD tasted bad, and the fishy smell made them nauseous.[17]

In this study, it was found that most female adolescents had normal nutritional status, namely 82 respondents (70.7%). This study is in line with Islami, et al. and Atik, et al. who conducted research on the description of hemoglobin levels and the incidence of anemia related to diet and

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nutritional status in adolescent girls, found that most adolescent girls have normal nutritional status.[18,19] The nutritional needs of adolescent girls are in accordance with the amount of food received and excreted, so that their nutritional status is normal.[20]

The results of hemoglobin level examination in adolescent girls can be seen in Table 2.

Table 2. Hemoglobin Levels In Female Adolescents At SMPN 27 Padang

Hemoglobin Levels Categories (g/dl)	**f**	**%**
N = 116		
Low (<12)	55	47,4
Normal (12-16)	60	51,7
High (>16)	1	0,9

Based on Table 2, it is known that the most hemoglobin levels are normal, namely 60 respondents (51.7%). The results of this study are similar to Pebrianti and Katharina and Chibriyah who conducted research on hemoglobin levels in adolescent girls related to knowledge about nutritional needs, BMI, diet, and physical activity, stating that most adolescent girls have normal hemoglobin levels.[21,22] This can occur due to the habit of eating breakfast, getting enough rest, and sufficient iron intake. Green vegetables, nuts, fruits, and fresh meat are foods that contain iron.[23]

However, in this study, low hemoglobin levels were still found in 55 respondents (47.4%). This result is similar to Novitasari who conducted a study on hemoglobin levels in adolescent girls and their relationship to protein, iron, vitamin C, and zinc intake, obtained results that 28 respondents (40.6%) had low hemoglobin levels.[24] Iron deficiency is the cause of decreased hemoglobin levels. In this study, high hemoglobin levels were found in 1 respondent (0.9%). High hemoglobin conditions usually occur due to the body's reaction to decreased oxygen levels. The body tries to immediately supply oxygen through hemoglobin. Hemoglobin levels are also influenced by behavior and place of residence, where smokers and people who live in the highlands also have high hemoglobin levels.[25]

The results of the examination of hemoglobin levels in adolescent girls with age characteristics can be seen in Table 3.

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Table 3. Hemoglobin Levels In Adolescent Girls Based On Age Characteristics

Hemoglobin Levels Categories (g/dl)	Age (in a year)					
	12		13		14	
	f	%	f	%	f	%
N = 116						
Low (<12)	1	25,0	41	50,0	13	43,3
Normal (12-16)	3	75,0	40	48,0	17	56,7
High (>16)	0	0,0	1	1,2	0	0,0

Based on Table 3, it can be seen that the most normal hemoglobin levels were found in adolescent girls aged 13 years, namely 40 respondents (48.8%). The results of this study are supported by Purba who conducted a study on adolescent girls related to the description of hemoglobin levels based on age, where the most normal hemoglobin levels were found in adolescent girls aged 12-14 years, namely 150 respondents (74.9%).[26] As age increases, a person's level of comprehension and mindset will become more mature, so that the knowledge they gain will be better. Adolescents who have good knowledge tend not to experience anemia because they will try to meet their nutritional needs to increase their iron needs.[27] The results of the examination of hemoglobin levels in adolescent girls with characteristics of compliance with TTD consumption can be seen in Table 4.

Table 4. Hemoglobin levels in adolescent girls based on compliance characteristics for consuming Iron Supplement Tablets (TTD)

Hemoglobin Levels Categories (g/dl)	Compliance with Consumption of Iron Supplement Tablets			
	Compliance		No Compliance	
	f	%	f	%
N = 116				
Low (<12)	12	48,0	43	47,3
Normal (12-16)	13	52,0	47	51,6
High (>16)	0	0,0	1	1,1

In this study, normal hemoglobin levels were most common in female adolescents who were not compliant with taking iron tablets, as many as 47 respondents (51.6%). Similar results were found by Syah, et al. who conducted a study on compliance with iron tablets and iron intake on the incidence of anemia, stating that 71 respondents (65.7%) who were not compliant with iron tablets had normal hemoglobin levels30. This was influenced by the respondents' dietary patterns who were accustomed to consuming protein-based foods, therefore their iron intake was met from the food intake consumed every day.[31]

In this study, normal hemoglobin levels were also found in 13 respondents (52.0%) who were compliant with taking iron tablets. According to Yuanti's research on the effect of iron tablets on increasing hemoglobin levels in adolescents, it was stated that there was a significant effect

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between iron tablets and increasing hemoglobin levels.[32] Generally, after consuming iron tablets routinely for more than 4 weeks, there will be an increase in hemoglobin levels of around 2 g/dl.[33]

In this study, low hemoglobin levels were also found most common in female adolescents who were not compliant with taking iron tablets, as many as 43 respondents (47.3%).

This result is in line with Rianti, et al. who conducted a study on compliance with TTD consumption with anemia status in adolescent girls, stating that 8 respondents (61.5%) who were not compliant with TTD consumption had low hemoglobin levels.[31] Adolescent girls need additional iron to balance iron loss caused by menstruation, where there is an increase in iron requirements for total blood expansion. Adolescent girls are at risk of anemia if iron requirements are not met.[34]

However, this study also found low hemoglobin levels in 12 respondents (48.0%) who were compliant with TTD consumption. This can occur because respondents consume foods that can inhibit iron absorption such as consuming tea and coffee, in addition to being supported by the habit of respondents who rarely rest, especially at night, often staying up late so that it has an effect on decreasing hemoglobin in the blood.[31] TTD consumption is one way that can be done to overcome anemia in adolescents. Bekti, et al., reported that TTD consumption is also influenced by adolescent knowledge about anemia and TTD.[35]

The results of the examination of hemoglobin levels in adolescent girls with nutritional status characteristics can be seen in Table 5 below.

Table 5. Hemoglobin levels in adolescent girls based on nutritional status characteristics

Hemoglobin Levels Categories (g/dl)	**Nutritional Status**									
	Poor		**Less**		**Good**		**More**		**Obesity**	
	f	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
N = 116										
Low (<12)	2	50,0	4	57,1	35	42,7	8	80,0	6	46,2
Normal (12-16)	2	50,0	3	42,9	48	58,5	2	20,0	7	53,8
High (>16)	0	0,0	0	0,0	1	1,3	0	0,0	0	0,0

In this study, it was found that the highest normal hemoglobin levels were in female adolescents with good nutritional status, namely 48 respondents (58.5%). This result is in line with Islami, et al. who conducted a study on the incidence of anemia related to diet and nutritional status, that 17 respondents (56.7%) with good nutritional status had normal hemoglobin levels.[18]

However, in this study, normal hemoglobin levels were found in female adolescents with poor nutritional status, namely 4 respondents (57.1%). This result is in line with the research of Sanjaya and Sari who conducted a study on the relationship between nutritional status and hemoglobin levels in female adolescents, stating that the results of the study showed that 2 respondents (3.3%) who had thin nutritional status had normal hemoglobin levels.[36]

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This can be caused by several other factors, namely lack of sleep, stress, food consumption, menstruation, physical activity and diet.[37] This study also found that low hemoglobin levels were highest in female adolescents with good nutritional status, namely 35 respondents (42.7%). This result is supported by Basith, et al. who conducted research on anemia in adolescent girls and the factors that influence it, stated that 22 respondents (44%) who had good nutritional status had low hemoglobin levels. This can occur due to unbalanced eating habits of adolescent girls, such as rarely consuming vegetables and often consuming foods high in carbohydrates and fat without balancing it with foods rich in protein, vitamins, and minerals.[38]

This study also found low hemoglobin levels in adolescent girls with poor nutritional status as many as 2 respondents (50.0%). According to Martini, adolescents with thin nutritional status have a 3.1 times greater risk of experiencing anemia compared to adolescents whose nutritional status is in the good category.[39] This can occur due to lack of nutritional intake in the body which causes malnutrition, especially iron, which is an important component in the formation of hemoglobin. Lack of iron intake in the body causes a lack of red blood cell forming materials, which results in red blood cells being unable to provide oxygen, causing anemia.[35,1]

CONCLUSION

Based on the research that has been conducted, it can be concluded that according to its characteristics, the respondents in this study were mostly aged 13 years as many as 82 respondents (70.7%), were not compliant in consuming TTD as many as 91 respondents (78.4%), and had good/normal nutritional status as many as 82 respondents (70.7%). Based on the results of the hemoglobin examination, it was found that most respondents had normal hemoglobin levels as many as 60 respondents (51.7%). The results of the hemoglobin examination based on characteristics found that normal hemoglobin levels were most in respondents aged 13 years as many as 40 respondents (48.8%), in the TTD consumption compliance group, normal hemoglobin levels were most in respondents who were not compliant in consuming TTD as many as 47 respondents (51.6%), and in the nutritional status group, normal hemoglobin levels were most in respondents with good nutritional status as many as 48 respondents (58.5%).

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