

CORRELATION OF NUTRITIONAL STATUS AND DIETARY HABIT WITH THE INCIDENCE OF ANEMIA IN ADOLESCENT GIRLS

Anik Sulistiyanti¹, Nessatania Selfiani Widodo², Dian Nirmala Sari³

Diploma III Midwifery Study Program, Faculty of Health Sciences / Duta Bangsa University Surakarta^{1,2}, Diploma III Midwifery Study Program / Politeknik Banjarnegara³

Email: anik_sulis@udb.ac.id¹, nessatania17@gmail.com², nirmalasaridian26@gmail.com³

ARTICLE INFO	ABSTRACT
--------------	----------

Received:	<i>Adolescence is a period where growth occurs rapidly, so that the nutritional needs of adolescence also increase. One of the nutrients whose needs are increasing is iron. The purpose of this study was to determine the relationship between nutritional status and diet with the incidence of anemia in adolescent girls. The method used in this research is an analytic observational research with a cross sectional research design. The research population is all adolescents girls at SMK Citra Medika Sragen. The research sample was 160 adolescent girls using simple random sampling technique. Data analysis using univariate analysis and bivariate analysis using chi square test with 95% confidence level. The results of the study using statistical tests with chi-square values obtained on nutritional status with the incidence of anemia were p value = 0.008 < 0.05. The results of the analysis of eating patterns with the incidence of anemia are p value = 0.004 < 0.05 with an OR of 0.409. The conclusion of this study is that there is a correlation between nutritional status and dietary habit with the incidence of anemia in adolescent girls.</i>
Revised:	
Approved:	

KEYWORDS	Nutritional Status, Dietary Habit, Anemia
----------	---



This work is licensed under a Creative Commons Attribution-ShareAlike 4.0 International

INTRODUCTION

Adolescent girls are more at risk of suffering from anemia than young men who experience menstruation every month, often maintain their appearance, want to get an ideal body so that they go on a diet and eat less. Abnormal menstrual patterns can cause anemia due to excessive blood loss, so that the hemoglobin contained in the blood is also wasted (Agustina, et al., 2020)

Cases of anemia in developing countries, especially Indonesia is recorded as one of the countries where the number of anemia sufferers is quite large, consisting of 26.4% children, 12.4% males aged 13-18 years, 16.6% males in Indonesia. over 15 years, 22.7% women aged 13-18 years, 22.7% women aged 15-49 years, and 37.1% pregnant women (Charles, Ismail, & Ahmad, 2020)

Adolescence is a period where growth occurs rapidly, so that the nutritional needs of adolescence also increase. One of the nutrients whose needs are increasing is iron. (WHO, 2018)

Anemia is a nutritional problem that must be handled seriously in adolescence so that hemoglobin levels can be said to be normal with 12-16 g% for every routine examination carried out by health workers (Hesty, Novita & Ibnu, 2018)

Anemia can occur in childhood, adolescent girls and pregnant women as well as postpartum and breastfeeding mothers. Especially in adolescent girls to increase hemoglobin levels in the blood and prevent anemia conditions, they should consume foods containing heme iron to meet the physiological needs of the body obtained from nutritious foods such as vegetables and fruits that are reddish and orange in color and consume vitamin C every day. (Engidaw, Wassie, & Teferra, 2018)

BMI can describe the individual nutritional status of an adolescent. (Sharmila, 2017) One of the risk factors for anemia is nutritional status. (Thamban, 2018). Girls who are overweight tend to be at risk of anemia compared to girls with normal weight. This is similar to previous studies in children aged 2-19 years which showed that the prevalence of anemia increased along with the increase in BMI from normal to overweight (Ekayanti, 2020).

Lack of nutrition in thin women has an effect on cases of anemia, but there is an increase in hepcidine concentrations in children aged 2-19 years. overweight, especially extreme obesity which can interfere with iron absorption, resulting in iron deficiency anemia (McClung, 2009)

The causes of malnutrition and anemia include irregular eating patterns, not consuming a balanced nutritious breakfast so that iron deficiency anemia will occur which results in decreased concentration of learning due to lack of oxygen in the brain and hemoglobin, loss of saturation in the brain and low iron reserves in the body (Joosten, 2018).

Preliminary study conducted at SMK Citra Medika Sragen stated that no previous research had been conducted. The results of the preliminary study were obtained data that 20 people said they had never followed a healthy and regular diet, skipped breakfast and did not know about the types of foods that contain iron so that they complained of symptoms of anemia such as feeling dizzy, weak and lethargic, especially when getting menstruation every month. The purpose of this study was to determine the relationship between nutritional status and diet with the incidence of anemia in adolescent girls. Based on the description above, the authors are interested in examining the correlation between nutritional status and dietary habit with the incidence of anemia in adolescent girls.

RESEARCH METHOD

This study uses an analytic observational research type, namely research that tries to explore how and why health phenomena occur, then analyze the dynamics of the correlation between phenomena both between independent variables and dependent variables, between independent variables. The research design was cross sectional. The research population is all adolescent girls at SMK Citra Medika Sragen. The research sample was 160 adolescent girls using simple random sampling technique. Data collection using primary data is data or materials collected by the researchers themselves at the time of conducting research. Data collection was carried out by calculating BMI to monitor nutritional status and dietary surveys as well as anemia examination carried out by hemoglobin examination in adolescents.

This study uses univariate analysis of data and bivariate analysis using chi square test with 95% confidence level

RESULT AND DISCUSSION

Univariate analysis

1. Nutritional Status of Adolescent Girls

Table 1. Frequency distribution of nutritional status in adolescent girls

No	Nutritional status	Frequency	%
1	Less BMI	53	33,1
2	Normal BMI	89	55,6
3	BMI More	18	11,3
	Total	160	100,0

From table 1 above, the results show that respondents have nutritional status in the Less BMI category as many as 53 respondents (33.1%), Normal BMI as many as 89 respondents (55.6%), and the More BMI category as many as 18 respondents (1.3%).

2. Dietary Habit in Adolescent Girls

Table 2. Distribution of Frequency of Dietary Habit in Adolescent Girls

No	Dietary habit	Frequency	%
1	Regular	75	46,9
2	Irregular	85	53,1
	Total	160	100,0

From table 2 above, the results show that the dietary habit of adolescents have a regular dietary habit of 75 respondents (46.9%) and most of the respondents have irregular dietary habit as many as 85 respondents (53.1%).

3. Incidence Anemia in Adolescent Girls

Table 3. Distribution Incidence of Anemia Frequency in Adolescent Girls

No	Incidence of Anemia	Frequency	%
1	Anemia	85	53,1
2	Non-Anemia	75	46,9

Total 160 100,0

From table 3 above, it is found that 75 respondents (46.9%) are in the non-anemia category and most of the respondents are in the anemia category, as many as 85 respondents (53.1%).

Bivariate Analysis

The following is a cross table of the relationship between nutritional status and the incidence of anemia in adolescent girls and the relationship between diet and the incidence of anemia in adolescent girls.

1. Correlation of Nutritional Status with the Incidence of Anemia in Adolescent Girls

Table 4. Cross Table Correlation of nutritional status with the incidence of anemia in adolescent girls

Nutritional status	Anemia		Non-anemia		Frequency		ρ -value
	N	%	N	%	N	%	
Less BMI	30	35,3	23	30,7	53	33,1	0,008
Normal BMI	45	52,9	44	58,7	89	55,6	
BMI more	10	11,8	8	10,7	18	11,3	
Total	85	100	75	100	160	100	

From table 4 above, it can be seen that 30 respondents (35.3%) have a low BMI category and have anemia, while 23 respondents (30.7%) do not have anemia. Adolescents with normal BMI category were 45 respondents (52.9%) had anemia and 44 respondents (58.7%) did not have anemia. Adolescents with BMI more who experienced anemia as many as 10 respondents (11.8%) and 8 respondents did not experience anemia. The results of statistical tests with chi-square obtained p value = 0.008 < 0.05 then H_0 is rejected and H_a is accepted which means statistically it can be concluded that there is a correlation of nutritional status with the incidence of anemia in adolescent girls.

2. Correlation of Dietary Habit with the Incidence of Anemia in Adolescent Girls

Table 5. Cross Table Correlation of Dietary habit with the incidence of anemia in adolescent girls

Dietary habit	Anemia		Non-anemia		Frequency		OR	ρ -value
	N	%	N	%	N	%		
Regular	40	47,1	35	46,7	75	46,9	0,409	0,004
Irregular	45	52,9	40	53,3	85	53,1		
Total	85	100	75	100	160	100		

From table 5 above, it can be seen that 40 respondents (47.1%) had a regular diet and experienced anemia, while 35 respondents (46.7%) did not have anemia. Adolescents with irregular dietary habit as many as 45 respondents (52.9%) experienced anemia and 40 respondents (53.3%) did not experience anemia. The results of statistical tests with chi-square obtained p value = 0.004 < 0.05 with OR =

0.409 then H_0 is rejected and H_a is accepted, which means that statistically it can be concluded that there is a correlation of dietary habit with the incidence of anemia.

Discussion

From the results of the study, it was known that the nutritional status of adolescent girls had nutritional status with the category of Less BMI as many as 53 respondents (33.1%), Normal BMI as many as 89 respondents (55.6%), and the More BMI category as many as 18 respondents (11.3%). Nutritional status is the respondent's body condition seen from the food consumed and the use of nutrients. BMI value is one of the measuring tools that can be used to monitor nutritional status. Nutritional status is closely related to daily food consumption, if the food consumed is good, the nutritional status is also good, otherwise if the food consumed lacks nutritional value, it will cause malnutrition and anemia.

Nutritional status can be influenced by food intake. Assessment of nutritional intake can be seen from eating habits such as frequency of staple foods, breakfast habits, consumption of animal or vegetable side dishes, consumption of vegetables and fruit and consumption of sweet tea after eating. Eating habits, frequency of eating, amount of food and types of food such as animal and vegetable side dishes eaten by respondents in Islamic boarding schools tend to be the same. The variety of food menus provided by Islamic boarding schools is almost the same; therefore, all students consume almost the same food every day (Otuneye, 2017)

This may be related to this study that eating habits were not significantly associated with anemia in adolescent girls. This is in line with research in Ethiopia which explains that consumption of tea and consumption of side dishes is not a risk factor for anemia. Research in Canada also shows that consumption of animal side dishes is not associated with anemia (Chen, 2018)

The results of this study are also supported by research from Hesty, 2018 which states that anemia in adolescent girls occurs due to lack of protein, iron, and other micronutrient deficiencies, exacerbated by a lack of knowledge related to nutrition that can affect behavior. iron deficiency and 41% was a combination of iron and vitamin B12 deficiency. Data shows that in urban areas, about 60% of adolescent girls and about 76% in rural areas lack protein intake. Statistics The results of the analysis showed a correlation between protein intake and the incidence of anemia in adolescent girls. Lack of animal protein intake and combined with single consumption of staple foods resulted in lower iron intake. Knowledge tests conducted on anemic adolescent girls showed 39% of them had low results related to nutritional knowledge (Hesty, 2018)

This is supported by previous research which states that the results obtained with 73% anemia cases which is a high prevalence of anemia occur in young women in the city of Kediri as much as 29.93% and in Jakarta as many as 19.6% with a target at young women aged about 12 to 15 years. Government program policies have not run optimally to carry out iron (Fe) supplementation in schools. It was found that overweight BMI was found in 13% of adolescent girls and 18.5% of obese adolescents. Adolescents who are overweight are more likely to be obese and are more prone to anemia than those with normal weight. Likewise, young women who are underweight or thin are prone to anemia

due to blood thinning or hemodilution that occurs in the body, which affects the absorption of iron (Utami, et al., 2022).

Based on research in Mexico it is known that iron deficiency can also occur 2-4 times in obese women and children. This is due to an increase in the production of hepcidin which can inhibit iron absorption (Capeda et al., 2011), while in India, the prevalence of anemia occurs mostly in underweight adolescent girls of 34.21%. This is due to the lack of information about the right diet and the habit of young women skipping meals for the sake of an ideal body

Eating behavior and body image are causes of anemia because of the amount and quality of nutrition with inappropriate dietary adequacy, limitations on consuming food that are not in accordance with nutrition and health regulations that can worsen the quality of nutritional status in adolescent girls (Regasa & Haidar, 2019).

CONCLUSION

Based on the results of the study above, it can be concluded that the nutritional status of adolescent girls shows that most of them have a normal BMI. The diet of adolescent girls shows that most have irregular dietary habit. The incidence of anemia in adolescent girls shows that most of them are anemic. From the results of the bivariate analysis, it can be concluded that there is a correlation of nutritional status with the incidence of anemia and there is a correlation of dietary with the incidence of anemia in adolescent girls.

REFERENCES

1. Agustina R, Nadiya K, Andini EA, Setianingsih AA, Sadariskar AA, Prafiantini E, et al. (2020). Associations of meal patterning, dietary quality and diversity with anemia and overweight-obesity among Indonesian school-going adolescent girls in West Java. *PLoS ONE* 15(4): e0231519.
2. Capeda-Lopez AC, Osendarp SJ, Melse-Boonstra A, Aeberli I, Gonzalez-Salazar, Feskens E, Villalpando S & Zimmermann MB. (2011). Sharply higher rate of iron deficiency in obese Mexican women and children are predicted by obesity-related inflammation rather by differences in dietary iron intake. *Am J Clin Nutr* 93(5):975-83
3. Charles Shapu R, Ismail S, Ahmad N, Lim PY, Abubakar Njodi I. (2020). Systematic Review: Effect of Health Education Intervention on Improving Knowledge, Attitudes and Practices of Adolescents on Malnutrition. *Nutrients*. 2020; 12(8):2426.
4. Chen Q, Pei C, Zhao Q. (2018). Eating more but not better at school? Impacts of boarding on students' dietary structure and nutritional status in rural Northwestern China. *Sustain*. 10(8).

5. Ekayanti I, Rimbawan R, Kusumawati D. (2020). Risk factors for anemia in female students at the Darussalam Islamic boarding school, Bogor. *Media Gizi Indonesia* ;15(2):79.
6. Engidaw, M. T., Wassie, M. M., & Teferra, A. S. (2018). Anemia and associated factors among adolescent girls living in Aw-Barre refugee camp, Somali regional state, Southeast Ethiopia. *PLOS ONE*, 13(10), e0205381.
7. Hesty Permata Sari, Novita Puri Subardjo, Ibnu Zaki.(2018). Nutrition education, hemoglobin levels, and nutrition knowledge of adolescent girls in Banyumas district. *Indonesian Journal of Nutrition and Dietetics*. Vol.6, No.3 :107-112.
8. Joosten, E. (2018). Iron deficiency anemia in older adults: A review. *Geriatrics and Gerontology International*, 18(3), 373-379.
9. Masfiah, S., Maqfiroch, A. F. A., Rubai, W. L., WIjayanti, S. P. M., Anandari, D., Kurniawan, A., ... & Aji, B. (2021). Prevalence and Determinants of Anemia among Adolescent Girls: A School-Based Survey in Central Java, Indonesia. *Global Journal of Health Science*, 13(3), 1-37.
10. McClung JP, Karl JP. (2009).Iron deficiency and obesity: The contribution of inflammation and diminished iron absorption. *Nutr Rev*. 67(2):100-104.
11. Otuneye AT, Ahmed PA, Abdulkarim AA, Aluko OO SD. (2017). Relationship between dietary habits and nutritional status among adolescents in Abuja municipal area council of. *Niger J Paediatr*.44(3):128-135.
12. Regasa, R. T., & Haidar, J. A. (2019). Anemia and its determinant of in-school adolescent girls from rural Ethiopia: A school based cross-sectional study. *BMC Women's Health*, 19(1), 1-7.
13. Sharmila P, Kumar RSR. (2017). Correlation between Prevalance of Anemia and Body Mass Index among Adolescent Girls. *Int J Sci Res*. 2017;6(11):. https://www.ijsr.net/get_abstract.php?paper_id=4111703
14. Thamban V , V enkatappa KG, P .K. S, E.M. S. (2018). Anemia in relation to body mass index among female students of North Kerala: a pilot study. *Int J Res Med Sci*. 2018;6(11):3607. doi:10.18203/2320-6012.ijrms20184416
15. Utami, A., Margawati, A., Pramono, D., & Wulandari, D. R. (2022). Prevalence of Anemia and Correlation with Knowledge, Nutritional Status, Dietary Habits among Adolescent Girls at Islamic Boarding School. *Jurnal Gizi Indonesia (The Indonesian Journal of Nutrition)*, 10(2), 114-121.
16. WHO. (2018). *Worldwide Prevalence of Anemia*. Geneva: World Health Organization