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ORIGINAL ARTICLE

The Relationship Between Nutritional Status and the Incidence of Anemia in Adolescent Girls

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ABSTRACT

Background: Nutritional status is a measure of a person's body condition that can be determined from the food consumed and the use of substances within the body. Anemia is a condition where the levels of hemoglobin, hematocrit, and the number of red blood cells are lower than normal values. **Methods**: This study used an analytic cross-sectional design with a sample of 80 female adolescents aged 12-14 years in junior high school. As the independent variable, nutritional status is calculated from the results of measuring weight and height, while the dependent variable is the incidence of anemia assessed by blood Hb levels. To analyze the correlation between the two variables, the Spearman Rank test was used at α = 5%. **Results**: The research findings showed that 71.3% of the subjects were in the normal nutritional status category, 13.8% were in the overweight category, and 10.0% were obese. The prevalence of anemia among the study subjects was 30.0%. The results of the correlation analysis yielded a p value = 0.825. **Conclusions**: It is concluded that there is no significant relationship between nutritional status and the incidence of anemia in adolescent girls.

Keywords: Nutritional Status, Anemia, Adolescent Girl, Hb Levels

INTRODUCTION

The main health issue among adolescent girls is the lack of nutritional intake, which triggers iron deficiency anemia and affects the nutritional status of adolescents (Rachmat & Dinda, 2021). One of the health factors affecting adolescent girls is nutritional status. Nutrition is one of the determining factors for achieving optimal and prime health (Heny, 2018). Adolescence, the nutritional needs increase, which is reflected in the rising recommended dietary allowances, which must be met by increasing the intake from all food groups (Lilolimba et al., 2011). Nutritional status positively correlates with hemoglobin levels, meaning poorer nutrition typically leads to lower hemoglobin levels (Sari, 2020).

The Riskesdas 2018 results show that the nutritional status of adolescents aged 13-15 years based on height-for-age (TB/U) and body mass index-for-age (IMT/U) is 29.58% for the prevalence of very short and short stature, while the prevalence of severely thin and thin is 7.57%. This data tends to show an increase compared to the 2013 Riskesdas results, where the prevalence of very short stature among adolescents aged 13-15 years was 11%, and the prevalence of very thin was 4%. (Rafa et al., 2021)

One way to address anemia is by providing iron supplements (TTD) to adolescent girls. (Rizki & Pratiwi, 2022). In addition to providing iron supplements to adolescent girls, we can also advise them to ensure proper food intake and maintain a healthy and clean lifestyle. Meanwhile, to address nutritional issues in adolescents, it is

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necessary to change their eating habits from minimal to balanced and highly nutritious meals. (Tri et al., 2024).

METHODS

This type of research is an analytical observational research with a cross sectional approach (Al-Faida, 2023) . The population in this study consists of seventh-grade female students at SMP Negeri 1 Ngancar who meet the inclusion and exclusion criteria, with a sample size of 80 individuals, selected proportionally. The instruments used include a digital scale to measure body weight, a microtoice to measure height, and a digital blood pressure monitor to measure blood Hb. Nutritional status is assessed by calculating the Body Mass Index (BMI) and comparing it to the nutritional status classification according to the Ministry of Health of the Republic of Indonesia. Sedangkan prevalensi anemia ditentukan dari kadar Hb darah yang dibandingkan dengan pengelompokan anemia menurut Kemenkes RI (Statistik, 2014). Correlation analysis was conducted using Spearman Rank Rho (α=5%). The results of this study have undergone an ethical review by the Ethics Committee of the Karya Husada Kediri Nutrition Academy.

RESULTS AND DISCUSSION

The normality test results for the data include nutritional status data and the incidence of anemia as shown in tables 1 and 2. Meanwhile, the correlation between nutritional status and anemia incidence is shown in Table 3.

Based on Table 1, it is known that the majority of subjects have good nutritional status (normal), totaling 57 subjects with a percentage of (71.3%). The nutritional status of children is said to be normal if the Body Mass Index by Age (BMI/U) of children aged 5-18 years is at the Threshold (Z-Score) -2 SD to +1 SD (Astuti, 2017).

Table 1. Distribution of Nutritional Status

Nutritional Status	F	%
Obese	8	10.0
Overweight	4	5.0
Normal	57	71.3
Thinnes	11	13.8
Severely Thinnes	0	0.0
Total	**80**	**100.0**

Most of the subjects in this study had normal nutritional status, indicating that most adolescent girls have a balance of nutrients between energy intake and expenditure in the body. However, there are some subjects with abnormal nutritional status categories. Such as undernutrition, overnutrition, and obesity.

Table 2. Distribution of Anemia Incidence

Anemia Status	F	%
Anemia	24	30.0
Non Anemia	56	70.0
Total	**80**	**100.0**

Table 2 provides an overview that the majority of subjects have anemia status categorized as NonAnemia (70.0%) with a total of 56 subjects. It can be determined as non-anemia if the Hb measurement result is at 12 g/dl. And anemia is identified when the Hb measurement result is <12 g/dl. The subjects in this study mostly did not have anemia.

Based on Table 3 above, the obesity nutritional status shows that the highest percentage of anemia is in the non-anemia status (75%), the excess nutritional status shows that the percentage of anemia is the same (50%), the normal nutritional status shows that the highest percentage of anemia is in the non-anemia status (71.9%), the undernutrition status shows that the highest percentage of anemia is in the non-anemia status (63.6%), and the malnutrition status shows that the percentage of anemia is the same, which is (0%). The value indicates that there

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is no tendency for worsening nutritional status to always be accompanied by a decrease or increase in the incidence of anemia. This is reinforced by the statistical test results with a p-value of 0.825, indicating that there is no significant relationship between nutritional status and the incidence of anemia at α= 5%.

Table 3. Nutritional Status Contingency Against the Incidence of Anemia

Nutritional Status	Anemia Status				Total		P value
	Anemia		Non Anemia				
	n	%	n	%	n	%	
Obese	2	25.0	6	75.0	8	100.0	0.825
Overweight	2	50.0	2	50.0	4	100.0	
Normal	16	28.1	41	71.9	57	100.0	
Thinnes	4	36.4	7	63.6	11	100.0	
Severely Thinnes	0	0.0	0	0.0	0	0.0	

The results of this study are in line with the research conducted by Oktaviana, R., & Permadi, M.R (M., 2022), titled "The Relationship Between Eating Patterns and Nutritional Status with the Incidence of Anemia in Female Students at Annuriyyah Rambupuji Islamic Boarding School," which obtained a p-value of 0.070, indicating that there is no relationship between nutritional status and the incidence of anemia in adolescent girls. However, another study conducted by Qomarasari, D., & Mufidaturrosida, A. (Ana & pola, 2022) titled "The Relationship Between Nutritional Status, Eating Patterns, and Menstrual Cycles with the Incidence of Anemia in Adolescents" found a p-value of 0.035, which means there is a relationship between nutritional status and the incidence of anemia. In a similar study conducted by Putra, K.A.D. (Monna et al., 2024), titled "The Relationship Between Knowledge and Nutritional Status with the Incidence of Anemia in Adolescent Girls in Bandung Regency," a p-value of 0.301 was obtained, indicating that there is no relationship between knowledge and nutritional status with the incidence of anemia in adolescent girls.

The absence of a relationship between nutritional status and the incidence of anemia in adolescent girls in this study is because most subjects fall into the normal nutritional status category. Nutritional status based on the IMT/U indicator is more influenced by the intake of macronutrients (carbohydrates, fats, proteins) (Sheehy & Kolahdooz, 2015). Carbohydrates, fats, and proteins are the largest energy-supplying nutrients for the body (Sari,2023). Energy intake less than the requirement over a certain period will cause a decrease in nutritional status, while balanced energy intake will help maintain normal nutritional status, and excessive energy intake or reduced energy expenditure has the potential to cause obesity (Haryani, 2024). The intake of micronutrients does not affect nutritional status based on BMI/U because they contain little energy, and if a deficiency occurs, it may have been happening for a long time (Apoina, 2014) (Nurhaedar & Marini, 2020).

Anemia is a decrease in the amount of hemoglobin from the normal range, making it unable to fulfill its function of carrying sufficient oxygen to the peripheral tissues (Nasution, Z, 2023). Anemia can be caused by disturbances in erythrocyte formation by the bone marrow, blood loss (hemorrhage), premature erythrocyte destruction (hemolysis), and a lack of iron, vitamin C, vitamin B12, and folate intake (Apoina, 2014).

The implications of the research for the relevant parties are to create a policy regarding

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the provision of health education to school-aged adolescents, or to include materials related to nutritional status and the incidence of anemia in the student learning curriculum. The purpose of providing this education is to reduce the prevalence of anemia and malnutrition in Indonesia. For future researchers, it is hoped that a larger sample size will be used with a population of adolescents within the age range of 10-18 years.

CONCLUSIONS

The research results showed that there is no significant relationship between nutritional status and the incidence of anemia in adolescent girls. The absence of a relationship between nutritional status and the incidence of anemia in adolescent girls in this study is because the majority of the subjects fall within the normal nutritional status category. Nutritional status based on the IMT/U indicator is more influenced by the intake of macro nutrients.

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