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Correlation Between Nutritional Status and Risk of Anemia in Students at SDN Cijagra 1 Bojongsoang, Bandung Regency

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ABSTRACT

Anemia is a global health problem that can affect the growth and development of school-aged children. Nutritional status is suspected to be associated with the incidence of anemia, but this relationship requires further study. This study aims to analyze the correlation between nutritional status and the risk of anemia in students of SDN Cijagra 1 Bojongsoang, Bandung Regency. This study used an observational analytical design with a cross-sectional approach. The sample consisted of 69 students aged 10-12 years old who were selected using purposive sampling based on inclusion and exclusion criteria. Nutritional status was measured by assessing weight and height to determine Body Mass Index (BMI), while hemoglobin levels were measured using the POCT (Point of Care Testing) method. Due to non-normal data distribution, bivariate analysis was performed using Spearman's rank correlation test. The majority of students had good nutritional status (65%) and were free of anemia (94%). A small proportion experienced mild anemia (3%) and moderate anemia (3%), with no cases of severe anemia. Statistical analysis showed a correlation coefficient of -0.118 with a p-value of 0.335, indicating a very weak and statistically insignificant relationship between nutritional status and the incidence of anemia ($p>0.05$). The results of this study indicate that good nutritional status is not always the primary factor in preventing anemia in elementary school children. Other factors such as diet, infections, and genetic conditions likely play a more significant role in the incidence of anemia. It can be concluded that there was no significant correlation between nutritional status and the risk of anemia in students at SDN Cijagra 1 Bojongsoang, Bandung Regency. Interventions in the form of nutrition education regarding iron intake and regular health check-ups are still needed to prevent anemia.

Keywords: anemia, elementary school students, hemoglobin, nutritional status, point of care testing

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INTRODUCTION

Anemia is a condition in which the blood's ability to carry oxygen is reduced due to a low number of red blood cells or decreased hemoglobin levels, resulting in symptoms such as fatigue, cold intolerance, and pallor caused by inadequate oxygen delivery throughout the body. Anemia remains a major global public health problem, particularly among children, adolescents, and women, with a high prevalence in developing countries, including Indonesia. According to the 2018 Basic Health Research (*Riskesdas*), anemia affected 26.8% of children aged 5–14 years and increased to 32.0% among individuals aged 15–24 years. In the local context, data from the Bojongsoang Community Empowerment (PKM) profile indicate that nutrition-related anemia in Bojongsoang is classified by the World Health Organization as a moderate public health problem, with a prevalence exceeding 20%. This condition poses a significant health concern, especially among elementary school students. Anemia in adolescents commonly occurs due to increased iron requirements during periods of rapid growth and may be aggravated by unbalanced dietary patterns, particularly insufficient intake of animal protein. Poor nutritional status is a key risk factor for anemia because deficiencies in essential nutrients such as iron, protein, and folic acid can impair red blood cell production. In addition, limited parental knowledge regarding balanced nutrition, as well as social and economic factors, also contribute to the risk of anemia. Among elementary school children, anemia can lead to reduced immunity, impaired growth and development, and decreased concentration during learning activities, which may negatively affect academic performance. Previous studies have demonstrated a significant association between nutritional status and the occurrence of anemia in elementary school children. Therefore, this study was conducted in Bojongsoang to examine the relationship between nutritional status and anemia among students at SDN Cijagra 1 Bojongsoang, Bandung Regency, as early intervention is essential for preventing anemia in school-aged children.

METHOD

This study used a quantitative observational approach to look at how nutritional status relates to the risk of anemia among students at SDN Cijagra 1 Bojongsoang in Bandung Regency. The total number of students was 264, aged between 10 and 12 years. The minimum sample size was calculated using an analytical formula for unmatched categorical variables. The calculation incorporated a significance level (α) and statistical power (1−β), represented by $Z\alpha = 2.58$ and $Z\beta = 2.33$, respectively, along with the expected proportions in each group. Based on this calculation, the minimum required sample size was 58 students. Therefore, a total of 58 participants were selected using purposive sampling based on specific inclusion and exclusion rules. The inclusion criteria for this study were students registered as active students at SDN Cijagra 1 Bojongsoang, Bandung Regency, willing to participate in the study with the consent of their parents or guardians, and able to undergo nutritional status and hemoglobin level examinations. Exclusion criteria included students who were absent during the study and students who did not obtain parental permission to participate. Nutritional status was measured through physical measurements like height and weight using a digital scale and a measuring tape. Anemia was checked by measuring hemoglobin levels using a Point of Care Testing (POCT) method. Data were analyzed using univariate and bivariate methods, with the Spearman test applied to evaluate the correlation. Statistical analyses were carried out using SPSS, considering the p-value and correlation coefficient (r) to determine the significance and strength of the association. This research was permitted and has received an ethical clearance certificate from the Health Research Ethics Commission, registered with the National Health Research and Development Ethics Commission (KEPPKN) under number 13/KEPKes/i/ix/2024.

Each respondent's guardian who participated in this study was provided with an informed consent form to ensure they understood the purpose, objectives, and potential impacts of the study. If the respondent did not agree or was unwilling to participate, the researcher did not coerce them and respected their rights. The confidentiality of the information provided by respondents is guaranteed by the researcher by not including the respondents' names.

RESULT

The results of the bivariate analysis of the correlation between nutritional status and the incidence of anemia in elementary school children were obtained using the Spearman correlation test. The results are presented in Table 1, a cross-sectional table with the incidence of anemia in children at SDN Cijagra 1 Bojongsoang, Bandung Regency.

Table 1: Correlation between Nutritional Status and Incidence of Anemia in Children

Variables		Anemia Incident					Coefficient and correlation	p-value
		No Anemia	Mild Anemia	Moderate Anemia	Severe Anemia	Total		
Nutritional status	Not enough	4 (100)	0 (0)	0 (0)	0 (0)	4 (100)	- 0.118	0.335
	Enough	41 (91.1)	2 (4,4)	2 (4,4)	0 (0)	45 (100)		
	More	12 (100)	0 (0)	0 (0)	0 (0)	12 (100)		
	Obesity	8 (100)	0 (0)	0 (0)	0 (0)	8 (100)		
	Total	65 (94.2)	2 (2.9)	2 (2.9)	0 (0)	69 (100)		

Based on Table 1, the following observations can be made. Among children with poor nutritional status, all 4 respondents (100%) were not anemic. Of the 45 children with adequate nutritional status, 41 (91.1%) were not anemic, while 2 (4.4%) had mild anemia and 2 (4.4%) had moderate anemia. All 12 children classified as overweight and all 8 children classified as obese were not anemic. In this study, 4 respondents (100%) were malnourished, the majority were not anemic, and none were classified as having mild, moderate, or severe anemia.

The Spearman rank correlation analysis demonstrated a correlation coefficient of−0.118, indicating a very weak negative relationship between nutritional status and the incidence of anemia. The p-value obtained was 0.335, which exceeds the significance threshold of 0.05, suggesting that the observed correlation is not statistically significant. Consequently, the research hypothesis proposing a correlation between nutritional status and the incidence of anemia among children at SDN Cijagra 1, Bojongsoang, Bandung Regency is not supported. Therefore, the alternative hypothesis (H_1) is rejected, and the null hypothesis (H_0) is accepted.

DISCUSSION

The results of the statistical test using Spearman’s correlation yielded a p-value of 0.335 (p > 0.05). Therefore, it can be concluded that there is no significant correlation between nutritional status and the incidence of anemia among children at SDN 1 Cijagra Bojongsoang, Bandung Regency, based on hemoglobin testing. This means that, although some children have poor or good nutritional status, it cannot be confirmed that nutritional status influences the incidence of anemia in elementary school children.

The results of this study differ from other studies because they show that anemia is not always directly related to nutritional status. Research by Handayani et al. explains that anemia has various causes, such as blood loss, chronic infections, worm infections, impaired nutrient absorption (e.g., celiac disease), and certain micronutrient deficiencies.

Furthermore, other studies emphasize that factors such as iron, vitamin B12, and folate intake, breakfast frequency, socioeconomic status, and parental education have a greater influence on the incidence of anemia than general nutritional status.

Therefore, anemia prevention requires more than just attention to nutritional status; it also requires nutritional education, particularly regarding iron, vitamin B12, and folate intake. Worm infections and conditions that interfere with nutrient absorption also need to be addressed. Education about a balanced diet and infection prevention are crucial interventions. Further research is recommended to explore other risk factors, such as diet and infection, so that interventions can be more comprehensive and effective in reducing the prevalence of anemia in elementary school-aged children.

CONCLUSION

The results of this study indicate that the majority of children at SDN Cijagra 1 Bojongsoang, Bandung Regency, have good nutritional status, with a prevalence of 65%. Furthermore, the prevalence of anemia among children at the school is mostly in the non-anemic category, with a prevalence of 94%. Based on the statistical analysis conducted through hemoglobin level measurements, no significant correlation was found between nutritional status and the incidence of anemia in children at SDN Cijagra 1 Bojongsoang, Bandung Regency ($r = -0.118$, $p = 0.335$).

RECOMMENDATION

Schools are advised to continue monitoring students' nutritional status by regularly measuring weight and height to ensure nutritional status is maintained. For students of the Pasundan University Faculty of Medicine, this study can serve as a source of information and literature review regarding the correlation between nutritional status and the incidence of anemia in elementary school children. Parents are expected to continue supporting the provision of balanced nutrition and ensuring adequate micronutrient intake to prevent anemia and support optimal child growth and development. Meanwhile, for future researchers, the results of this study can be a reference in compiling similar scientific works more optimally, considering that this study still has limitations, so it is hoped that it can be further developed in examining the relationship between nutritional status and the incidence of anemia in elementary school children.

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