

Relationship between Body Image and Adequacy of Iron Intake with Hemoglobin Levels in Adolescent Females

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ABSTRACT

The aim of this study was to analyze the relationship between body image and adequacy of iron intake with blood hemoglobin levels in adolescent females. A total of 26 female students were randomly selected from State High School 2 and State High School 9 Semarang, Indonesia. Data were analyzed using Spearman's rank correlation test. The results showed no association between body image and hemoglobin levels ($p=0.795$, $r=-0.053$), or between adequacy of iron intake and hemoglobin levels ($p=0.345$, $r=0.193$). Based on the results, there is no relationship between body image and iron intake adequacy with blood hemoglobin levels in female adolescents.

Keywords: body image, female adolescents, hemoglobin, iron intake adequacy

INTRODUCTION

Anemia is a condition in which the level of hemoglobin in the blood is lower than normal. Based on the Basic Health Survey (2018), the prevalence of anemia in women of childbearing age was 27.2%, which was higher than in men (20.3%). The prevalence of anemia in the 15–24 years age group was 32% in 2018 (MoH RI 2018). Female adolescents often feel uncomfortable with the rapid body changes, so they tend to limit food intake (Amalia *et al.* 2014).

The tendency to limit food intake can lead to iron deficiency in adolescent females. Iron deficiency affects reproductive health, motor development, intelligence and learning performance. On the basis of this elaboration, the researchers were interested in conducting research on the relationship between body image and adequacy of iron intake with blood hemoglobin levels in adolescent females.

METHODS

The present study was a cross-sectional observational study conducted in October 2022 in State High School 2 and State High School 9 Semarang, Indonesia. Samples were selected using a simple random sampling method with a total of 26 participants, which were determined using correlation coefficient formula (r). Body image data were obtained by asking respondents

to complete a Body Shape Questionnaire (BSQ) consisting of 34 questions, with a scale ranging from 1 (never) to 6 (always), while iron intake adequacy data were assessed by Semi Quantitative Food Frequency Questionnaire (SQ-FFQ) and then processed using the NutriSurvey software to calculate total iron intake. Body image status was determined by the questionnaire proposed by Cooper *et al.* (1987), where body image was negative if the score was >110 and positive if the score was ≤ 110 . Adequacy of iron intake was determined by the Recommended Dietary Allowances (2019), which categorizes nutrient intake as inadequate if it is $<77\%$ and adequate if it is $\geq 77\%$. On the basis of hemoglobin levels, as determined by the World Health Organization (WHO) (2011), one is classified as anemia if the hemoglobin level is <12 g/dL and as not anemia if it is ≥ 12 g/dL. Hemoglobin levels were determined by point-of-care blood tests using Easy Touch GCHB. Blood collection was performed by a medical laboratory technology student. Based on the Shapiro-Wilk test for normality, the data were not normally distributed, so a non-parametric statistical test of Rank Spearman correlation was used.

RESULTS AND DISCUSSION

Characteristics of respondents

Table 1 showed the results of the BSQ, 46.2% of the respondents had negative body

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Table 1. Body image, adequacy of iron intake and blood hemoglobin profile of respondents (n=26)

Variable	n	%
Body image		
Negative	12	46.2
Positive	14	53.8
Iron intake adequacy		
Inadequate	23	88.5
Adequate	3	11.5
Hemoglobin levels		
Anemia (<12 g/dl)	4	15.4
Not anemia	22	84.6

image with a mean and standard deviation of 105.23±41.95. Based on the results of SQ-FFQ, 88.5% of the respondents had inadequate iron intake (<77%) with a mean and standard deviation of 46.95±26.07%. Based on the blood test results, 15.4% of the respondents had anemia (<12 g/dL) with a mean and standard deviation of 13.94±1.67 g/dL.

Relationship between body image and hemoglobin levels

Table 2 showed no relationship between body image and hemoglobin levels in adolescent females ($r=-0.053$; NS). Negative body image does not always motivate respondents to reduce food intake, which may result in lower.

Table 2. Comparisons of body image and adequacy of iron intake with blood hemoglobin levels using Spearman's rank correlation test

Variable	r	p
Body image	-0.053	0.795
Adequacy of iron intake	0.193	0.345

Relationship between iron intake adequacy and hemoglobin levels

The results showed no relationship between iron intake adequacy and hemoglobin levels in female adolescents ($r=0.193$; NS). Respondents consumed more non-heme iron than heme iron. Most respondents also took iron inhibitors frequently. A person with iron deficiency is not always anemic, because the liver still has sufficient iron reserves to meet iron requirements. Women on average have iron stores of about 300 mg, which is sufficient for 6 months, because 25% of the iron is stored as ferritin in the cells and circulates in the blood (Kristin N *et al.* 2022).

CONCLUSION

The main findings of the study indicate that the prevalence of anemia was 15.4% and 46.2% of students had poor body image. However, there was no significant association of body image and adequacy of iron intake adequacy with blood hemoglobin levels in adolescent females in this study. Recommendations for adolescent females may include reducing the consumption of unhealthy snacks and other iron inhibitors, and increasing awareness of the importance of nutrients, especially iron, during their growth period.

DECLARATION OF CONFLICT OF INTERESTS

The authors have no conflicting interest.

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