

Dietary Diversity Score and Nutritional Status of Adolescent Girls with Anemia in Bandung Region

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ABSTRACT

This study aimed to determine the association between Dietary Diversity Scores (DDS) and nutritional status among adolescent girls with anemia. Seventy-one adolescent girls aged 15–17 years from high schools in Bandung were selected using Probability Proportional to Size (PPS). The data on the sociodemographic characteristics, health and nutritional status, and DDS of the subjects were collected. Results showed that the mean DDS was classified as high. There was no significant association between DDS and BMI-for-age Z-score (BAZ) and Waist-Hip Ratio (WHR) in adolescent girls with anemia ($p>0.05$). Therefore, DDS was not associated with nutritional status in adolescent girls with anemia.

Keywords: adolescent girl, anemia, dietary diversity score

INTRODUCTION

Iron deficiency anemia is the most common form of nutritional deficiency with a prevalence of about 30% worldwide, and the prevalence is increasing in developing countries such as Indonesia. The prevalence of anemia in adolescents is 32% and 84.6% of adolescent girls (aged 15–24 years) have anemia. Inadequate intake of nutrients, especially iron, occurs because of the lack of diversity in the iron-rich foods consumed. One of the iron-rich foods are animal products. In relation to inadequate iron intake, lack of protein intake can delay iron transport (Maharani 2020). According to Mokoginta *et al.* (2016), the lack of diversity and small amount of food consumption leads to low nutrient intake in adolescents. Adolescents in Indonesia have developed poor eating habits, such as consuming foods high in sugar and fat. These habits will lead to micronutrient deficiency and increased incidence of obesity among adolescents. The aim of this study was to determine the association between dietary diversity scores and nutritional status in adolescent girls with anemia.

METHODS

This cross-sectional study was conducted in Bandung from April to November 2022. The

subjects were high-school adolescent girls aged 15 to 17 years with anemia. A total of 71 subjects were selected using PPS based on data from the Ministry of Education, Culture, Research, and Technology. The protocol of the study was approved by the Ethics Committee of the Health Polytechnic of Mataram. The aims and principles of this study were explained to the subjects and their legal guardians.

The data on the socio-demographic characteristics and the health status of the subjects were collected using a questionnaire. BAZ and WHR were measured to determine the nutritional status of the subjects. Nutritional assessment to obtain DDS used the FFQ and a scoring system of 16 food groups from the FAO. Statistical analyses were performed using SPSS Version 20. Normality of data was assessed by Kolmogorov-Smirnov test. Pearson's test was used to assess the association of categorical variables.

RESULTS AND DISCUSSION

The mean age of the subjects was 16.25 ± 0.67 years, and the mean serum hemoglobin level was 10.81 ± 1.00 g/dL. The nutritional status of the subjects was measured by using two types of measurements: BMI-for-age and WHR. The results showed that 7.0% and 12.7% of the subjects were classified as obese according to

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BAZ and WHR measurement, respectively (Table 1). High WHR was significantly associated with central obesity in adolescent girls. Obesity is a state of overnutrition, but a lack of balanced diet can result in deficiencies of nutrients such as iron. Thus, obese adolescents tend to be more prone to anemia (Syah 2022).

Most (97.2%) of the subjects had a high DDS, with a mean DDS of 12.7 ± 2.3 . The most commonly consumed food groups were starchy staples, flesh meats, eggs, oils and fats, and sweets (Table 2). This result indicates that anemia is inevitable in adolescent girls even though they consume diverse foods. Adolescents tend to choose foods that are readily available and inexpensive, but these types of foods are generally high in calories but low in nutrients. An unbalanced diet will limit their ability to meet their micronutrient needs (Todd *et al.* 2015). Lack of information about a balanced diet, food accessibility, and economic factors may all contribute to the development of adolescent girls' eating habits (Regasa & Haidar 2019).

Pearson's test showed no significant correlation between DDS and BAZ and WHR in adolescent girls with anemia ($p > 0.05$). The DDS is an instrument to measure the diversity of food groups consumed by subjects, but it does not specify nutrient intake and may not directly correlate with nutritional status. Adequate energy and nutrient intakes allow for optimal growth and development in adolescent girls. Therefore, avoiding high caloric intake is necessary to prevent the onset of obesity (Todd *et al.* 2015).

Table 1. Distribution of subjects by nutritional status

Variable	n	%
BMI-for-age Z-score		
Healthy	56	78.9
Overweight	10	14.1
Obese	5	7.0
Waist-Hip Ratio		
Healthy	62	87.3
Obese	9	12.7

Table 2. Food groups consumed by subjects in Bandung City, West Java in 2022

Variable	n	%
DDS Category		
High	69	97.2
Medium	2	2.8
Food groups		
Starchy staples	69	97.2
White roots and tubers	54	76.0
Vitamin A-rich vegetables	44	60.6
Dark green leafy vegetables	54	76.1
Other vegetables	43	60.6
Vitamin A-rich fruits	44	62
Other fruits	54	76.1
Organ meats	43	60.6
Flesh meats	69	97.2
Eggs	68	95.8
Fish and seafood	50	70.4
Legumes, nuts, and seeds	57	80.3
Milk and dairy products	65	91.5
Oils and fats	71	100
Sweets	71	100
Spices	60	84.5

DDS: Dietary Diversity Scores

CONCLUSION

DDS was not associated with BAZ and WHR. A high DDS was not a guarantee that adolescent girls would be free from anemia and obesity. Information on a balanced diet, iron-rich foods, and iron absorption enhancer is needed to improve the health status of adolescent girls with anemia.

DECLARATION OF CONFLICT OF INTERESTS

The authors have no conflicts of interest to declare.

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