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A Descriptive Study of Knowledge, Iron Supplementation Compliance, and Nutritional Status among Adolescent Girls at SMP Negeri 4 Probolinggo

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ABSTRACT

Anemia remains a significant nutritional problem among adolescent girls, influenced by poor dietary habits, inadequate knowledge, and low compliance with iron supplementation. This study aimed to describe the levels of knowledge, compliance with iron tablet consumption, and nutritional status among adolescent girls. A descriptive study was conducted at SMP Negeri 4 Probolinggo involving 55 eighth-grade female students selected through proportional sampling. Data were collected using validated questionnaires and anthropometric measurements, then analyzed descriptively. Results showed that most respondents were 14 years old (83.6%) and had good to moderate knowledge about anemia (90.9%). However, only 16.4% complied with iron tablet consumption. Nutritional assessment showed that 58.2% had normal BMI-for-age, while 30.9% were undernourished. These findings reveal a gap between knowledge and behavior, emphasizing the need to strengthen school-based nutrition education and iron supplementation programs to prevent anemia in adolescent girls.

INTRODUCTION

Anemia is a condition characterized by a deficiency of hemoglobin in the blood, resulting in a reduced capacity to carry oxygen[1]. According to the Indonesian Ministry of Health (2010), anemia occurs when hemoglobin levels fall below 12 g/dL and can negatively impact concentration, growth, and increase pregnancy-related risks[2]. Adolescent girls are particularly susceptible to anemia due to unbalanced diets and restrictive eating habits[3]. Other contributing factors include lack of knowledge, attitudes, school support, and the prevalence of hypertension.

To address anemia, Indonesia is implementing a program aimed at improving the nutritional status of adolescent girls through the provision of iron supplement tablets, with a target of ranking 13th out of 54 FMDs (Functional Medical Districts) based on the 2022 Veritable Strategic Plan[4]. According to Riskesdas 2018, the coverage of iron supplementation among adolescent girls was 73.58%; however, only 1.4% consumed the tablets as recommended. Furthermore, approximately 76.2% of adolescent girls received iron tablets within the past 12 months, and in Probolinggo City, 56.04% of girls aged 10–19 received them[5].

Anemia in adolescent girls contributes to cognitive impairment, decreased academic performance and productivity, weakened immunity, and inhibited physical growth. If left unaddressed and carried into pregnancy, it increases the risk of complications such as miscarriage, preterm

delivery, low birth weight, stunting, and bleeding or infection during childbirth, all of which contribute to high maternal and infant mortality rates[6–8]. Therefore, preventing and managing anemia is a strategic priority for improving the health quality of the younger generation and reducing long-term health risks.

A preliminary study at SMP Negeri 4 Probolinggo revealed that although 80% of female students had good knowledge about anemia, 86% did not comply with iron tablet consumption, despite understanding its importance. Non-compliance was attributed to unpleasant taste, fishy odor, unusual color, and forgetfulness. Iron tablet was distributed only once a year, with each student receiving 20 tablets. Nutritional status data showed that 73.4% of students had normal status, 6.7% were undernourished, and 20% were overweight. The gap between knowledge and compliance highlights the urgency of conducting this study to describe the levels of knowledge, iron tablet compliance, and nutritional status of adolescent girls comprehensively.

MATERIALS AND METHODS

The study was conducted at SMP Negeri 4 Probolinggo from December to March 2023. The population consisted of all eighth-grade female students, with a sample of 55 participants selected using proportional sampling. Data were collected through both primary and secondary sources. Primary data included respondents' identity, anthropometric measurements, knowledge about anemia, and compliance with iron tablet consumption. Secondary data included the number of eighth-grade students and the school profile.

Nutritional status was assessed through anthropometric measurements (body weight and height), then Body Mass Index-for-Age (BMI-for-age) was calculated and categorized according to WHO standards. Knowledge about anemia was measured using a closed-ended questionnaire that had been tested for validity and reliability in a preliminary study. Compliance with iron tablet consumption was assessed based on the number of tablets consumed over the past 12 months.

Data were analyzed descriptively using SPSS software and presented in frequency distribution tables for each variable. No inferential statistical tests were conducted, as the purpose of the study was purely descriptive. This study obtained ethical approval from the Health Polytechnic of the Ministry of Health Surabaya.

RESULTS

Table 1. Frequency Distribution of Respondents by Age

Age	n	Presentase (%)
14 Years	46	83,6
15 Years	9	16,4
Total	**55**	**100**

Source : Primary Data 2023

Based on Table 1, the majority of respondents were 14 years old, totaling 46 individuals (83.6%), while the remaining 9 respondents (16.4%) were 15 years old. This indicates that most participants were in early adolescence, a critical stage of growth and development that is particularly vulnerable to nutritional problems such as anemia.

Table 2. Distribution of Respondent Frequency Based on Knowledge of Anemia

Knowledge About Anemia	n	Presentase (%)
Good	26	47,3
Enough	24	43,6
Less	5	9,1
Total	**55**	**100,0**

Source : Primary Data 2023

Based on Table 2, which presents the frequency distribution of knowledge about anemia, it was found that 26 respondents (47.3%) had good knowledge, 24 respondents (43.6%) had moderate knowledge, and 5 respondents (9.1%) had poor knowledge. These findings indicate that the majority of adolescent girls have good to moderate knowledge about anemia. However, a small proportion still have low knowledge, which may affect their compliance with anemia prevention measures, such as iron tablet consumption.

Table 3. Distribution of Respondent Frequency Based on Compliance of Taking Iron Tablets

Iron Tablet Consumption	n	Presentase (%)
Compliant	9	16,4
Non-Compliant	46	83,6
Total	**55**	**100,0**

Source : Primary Data 2023

Based on Table 3, which shows the frequency distribution of respondents based on compliance with iron tablet consumption, only 9 respondents (16.4%) were categorized as compliant, while the majority, 46 respondents (83.6%), were non-compliant. This data indicates a low level of compliance among adolescent girls, despite the fact that most of them have good to adequate knowledge about anemia. This suggests a gap between knowledge and preventive behavior related to anemia.

Table 4. Frequency Distribution of Respondents Based on Nutritional Status (BMI-for-Age)

Nutritional Status	n	Presentase (%)
Undernourished	17	30,9
Good nutrition	32	58,2
Overweight	3	5,5
Obese	3	5,5
Total	**55**	**100,0**

Source : Primary Data 2023

Based on Table 4, which presents the frequency distribution of respondents by nutritional status (BMI-for-age), the majority of respondents had a normal nutritional status, totaling 32 individuals (58.2%). However, 17 respondents (30.9%) were classified as undernourished (thinness), while 3 respondents (5.5%) were categorized as overweight and another 3 (5.5%) as obese. These

findings indicate that although most adolescent girls fall within the normal nutritional category, a considerable proportion are undernourished, which may increase their vulnerability to anemia and other health problems.

DISCUSSION

Characteristics of Respondents by Age

Adolescence is the transition period from children to adults, with an age range of 10 to 19 years. In this study, the majority of respondents were 14-year-old female students. Adolescent girls are at higher risk of developing anemia, with a prevalence of 32%, mainly due to iron loss during menstruation[5]. Unhealthy diets, such as food intake restrictions and haphazard snacking habits, often affect their nutritional status[9]. Adolescents tend to skip meals and choose food carelessly, so that nutrient intake becomes uncontrollable[10].

Characteristics of Respondents Based on Knowledge about Anemia

Based on the results of the above study, it was found that most of the students, namely 26 students (47.3%) had good knowledge about anemia and only 5 (9.1%) students had less knowledge about anemia. It can be concluded that most students at SMPN 4 Probolinggo have a good knowledge of anemia. This can be influenced because well-informed people have a high level of curiosity so they get additional information that can support their level of knowledge[11]. Young women can now access information through mass media using their mobile devices. The information available in the mass media tends to be more comprehensive than that obtained from parents, teachers, or health workers[12]. The internet is an easily accessible and unlimited source of information, helping teens who want to know more about anemia. Research shows that information from reliable and accurate sources enhances individual knowledge[13].

One of the factors that affect knowledge about anemia is internal motivation. Lack of motivation and awareness among young women can impact their efforts to obtain health information[14]. Some respondents with limited knowledge get information from parents, who may not provide a comprehensive explanation of anemia, and there are limitations in the respondents' ability to understand the information conveyed[15]. Knowledge is the result obtained by a person after sensing a certain object[16]. Most human knowledge is acquired through sight and hearing, and generally comes from experience, and can be obtained from information conveyed by teachers, parents, friends, books, and the mass media[17].

The younger generation is also expected to have knowledge about anemia. The results of this study are in line with Fajriyah and Fitriyanto (2016) the more we know about anemia, the better we understand it at adolescent[18]**.** According to Notoadmodjo 2003, the lack of knowledge about anemia among adolescents leads to a lack of understanding of anemia. If adolescent girls' knowledge of

anemia remains at an unconscious level and is not reflected in daily life, how can they avoid iron-rich foods frequent drinking iced tea after meals and regular exercise increases the risk of anemia[19].

Characteristics of Respondents Based on Taking Iron Tablets

Based on the results of the above research, it is known that at SMP Negeri 4 Probolinggo there are 46 students (83.6%) who do not comply in the consumption of blood supplement tablets and only 9 (16.4%) students are compliant. Qualitative feedback indicated that perceived health and side effects were barriers to compliance, it was revealed that they received only one blood supplement tablet in a year, and most of them did not take the blood supplement tablets given. The reason behind this is because female students feel the need to take iron tablets, in the belief that their bodies are still healthy and do not show symptoms of anemia.

The government's blood-boosting program aims to improve the nutritional status of adolescent girls, break the cycle of decline and increase the body's iron reserves that are not used properly. This is in line with a 2021 study by Sri Suciat which found that the lower the intake of blood preparations, the greater the risk of anemia in adolescent girls[19]. In addition, schools play an important role in increasing adherence to blood-boosting supplements. According to research, several factors that affect student involvement in consuming iron tablet are school support, especially teachers. Schools and health offices should be able to provide support in the form of counseling or counseling on the importance of taking iron tablets[20]. Some students have good knowledge but are not obedient when taking iron tablets. They only go through the knowledge phase and do not follow its application in daily life, for example skipping iron tablets every week and lack of trust in iron tablets among young people. They don't like the effects of taking iron tablets, so young people are less likely to fully support taking iron tablets. Meanwhile, students with sufficient knowledge and less obedience took blood tablets because students' actions on habits did not increase after the second counseling, even though knowledge changed. This is in accordance with Bloom's theory which states that stimuli are received by objects directly and provoke action. A person can act or implement a new behavior without first knowing the meaning of the stimulus received. In other words, a person's actions are not based on knowledge and attitudes[21].

Characteristics of Respondents Based on Nutritional Status

Based on the results of the above research, it is known that 32 students (58.2%) and 17 students (30.9%) have poor nutrition status, as well as 3 students (5.5%) each have overnutrition and obesity status. In general, adolescent girls are at risk of experiencing nutritional problems. Various factors can affect the nutritional status of young women and can have an impact on their health status. The main thing that causes nutritional problems in adolescent girls is consumption patterns. Inappropriate consumption patterns can cause health problems that reduce appetite, disrupt the digestive system and result in nutritional problems[22]. Factors that cause malnutrition in adolescents can be caused by

psychosocial reasons such as physical appearance can affect body image and body satisfaction which will ultimately have an impact on food consumption behavior and weight control[23].

Bad eating behavior carried out by adolescents, including eating irregularly and often skipping certain meal times, such as dinner, for fear of becoming fat. The fear of being obese causes teenagers to skip meals and this behavior is considered the first step to losing weight[10]. In addition, the factors causing overnutrition status and obesity in adolescents are caused by high calorie consumption patterns and the frequency of excessive snack consumption as well as lack of daily activities that cause their bodies to expend less energy. Therefore, if the intake of excess energy is not balanced by balanced physical activity, a teenager is prone to overnutrition and obesity[24].

Adolescent status has a close relationship with the incidence of anemia, this is supported by a study conducted by Homsiyah (2021) that there is a link between nutritional status and the incidence of anemia in adolescents. The direct cause of anemia is the daily intake of foods that contain little iron[25]. Generally, food consumption is closely related to nutritional status. If the food eaten has good nutritional value, then the nutritional status is also good, on the other hand, if the food eaten has a poor nutritional value, it will cause malnutrition and can cause anemia[16]. Therefore, the school is expected to pay more attention and provide education about balanced nutrition knowledge and nutritional status. For health services, it is expected to monitor and coach UKS and PMR more often in schools[26].

Potential biases in this study include recall bias, as respondents may not accurately remember their iron tablet consumption over the past 12 months, and social desirability bias, where students may have answered in ways they believed were expected, particularly in questions related to knowledge and behavior. To minimize these biases, the researchers ensured anonymity and confidentiality, provided clear and neutral instructions, and emphasized that there were no right or wrong answers. The questionnaires were administered in a private setting without teacher presence to reduce pressure and encourage honest responses.

This study was limited to eighth-grade female students at SMP Negeri 4 Probolinggo, which may not represent the broader adolescent population in other regions or educational levels. The use of a cross-sectional descriptive design also restricts the ability to determine causal relationships between knowledge, compliance, and nutritional status. Additionally, compliance with iron tablet consumption was self-reported, which may affect data accuracy due to recall limitations.

CONCLUSION

This study concludes that although most adolescent girls at SMP Negeri 4 Probolinggo have good to moderate knowledge about anemia, their compliance with iron tablet consumption remains very low, and a considerable proportion are undernourished. These findings highlight a gap between

knowledge and preventive behavior, indicating the need for strengthened school-based nutrition education and iron supplementation programs. It is recommended that schools and health authorities improve iron tablet distribution, provide ongoing counseling to address barriers such as taste and forgetfulness, and promote balanced diets to reduce anemia risk among adolescent girls.

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