Original Research Paper

The Relationship Between Compliance With Iron Supplement (TTD) Consumption and the Incidence of Anemia Among Adolescent Girls at SMPN 16 Sukabumi City

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Abstract

Background: Adherence to blood-boosting tablet consumption among adolescent girls is vital for preventing anemia and maintaining optimal hemoglobin levels to support overall health. **Objective:** This study aimed to examine the relationship between adherence to blood-boosting tablet consumption and anemia incidence among adolescent girls. **Methods:** A quantitative cross-sectional study was conducted among 36 randomly selected grade VII students at SMPN 16 Sukabumi City, using the MMAS-8 questionnaire for adherence and the Homovue tool for hemoglobin measurement, analyzed with the Kendall tau test. **Results:** The findings revealed a significant relationship between adherence and anemia incidence, with a p-value of 0.002 (<0.05). Students with low adherence showed a higher prevalence of anemia, while those with moderate to high adherence maintained normal hemoglobin levels. The results also indicated that knowledge, motivation, and family support influenced adherence behavior. These findings confirm that consistent consumption of blood-boosting tablets effectively reduces anemia risk among adolescents. **Conclusion:** There is a significant correlation between adherence to blood-boosting tablet intake and anemia prevention, highlighting the importance of continuous education, motivation, and parental involvement to improve adolescent health outcomes

Keywords: Anemia; Blood Supplement Tablets; Adolescent.

Introduction

Entering the productive age, both male and female adolescents must maintain their health to support optimal growth and development. One of the common health issues experienced by adolescents, especially females, is anemia[1]. Anemia is a condition where the number of red blood cells or the concentration of hemoglobin in the blood is below normal levels, which can disrupt overall bodily functions[2]. This issue requires serious attention as anemia in adolescents can affect their academic performance, physical activity, and overall quality of life. Based on global data, anemia in adolescents is also an important indicator in assessing public health status.

One effort to prevent anemia in adolescent girls is the consumption of iron tablets (TTD), either through government programs or independently[3]. This supplementation program aims to increase hemoglobin levels and prevent the adverse effects of anemia[4]. However, the success of this program heavily depends on the adherence of adolescent girls to consuming TTD[5]. According to the 2013 Basic Health Research (Riskesdas), the prevalence of anemia in Indonesia reached 37.01%, increasing to 48.9% in 2018[6]. In West Java Province, the

incidence of anemia among adolescent girls was reported to exceed 15%. Specifically in Sukabumi City, data from the local Health Department indicated that in 2023, 20,155 adolescent girls were registered as consuming iron tablets (TTD)[7]. However, the distribution and adherence to TTD consumption at several community health centers, including Sukakarya Health Center, remain suboptimal.

Anemia in adolescent girls is often influenced by several factors, such as monthly menstruation, an unbalanced diet, and inadequate nutritional intake[8]. This highlights the importance of healthcare professionals, especially nurses, in addressing anemia-related issues. The promotive role of nurses includes providing health education to improve hemoglobin levels, while the preventive role involves implementing iron tablet (TTD) programs[9]. Additionally, curative and rehabilitative roles are also crucial, such as offering advice on healthy eating habits and educating on the importance of adherence to TTD consumption to prevent anemia[10].

Previous studies have indicated a significant relationship between adherence to iron tablet (Fe) consumption and the incidence of anemia in adolescent girls[11]. However, specific data on how this adherence affects anemia incidence at the school level, particularly at SMPN 16 Kota Sukabumi, remains limited.

Anemia in adolescent girls is an urgent health issue that needs to be addressed due to its significant impact on quality of life, productivity, and their readiness to enter adulthood[12]. In the context of Sukabumi City, the high prevalence of anemia reflects the need for serious attention to the factors influencing it, including adherence to iron tablet (TTD) consumption. The TTD program has been implemented as a preventive strategy against anemia, but its success heavily relies on the level of adherence among adolescent girls in consuming it regularly[13].

This study aims to address the key question regarding the relationship between adherence to iron tablet (TTD) consumption and the incidence of anemia at SMPN 16 Kota Sukabumi. Additionally, the study seeks to identify factors influencing this adherence. The findings are expected to serve as a basis for developing more effective and evidence-based interventions to reduce anemia rates among adolescent girls, particularly in the Sukabumi City area.

Materials and Methods

Research Design

This study employs a quantitative approach to measure and analyze the relationship between adherence to iron tablet (TTD) consumption and the incidence of anemia. The study is designed as a cross-sectional study, aiming to provide a comprehensive overview of the relationship between the variables being examined. The data analyzed in this study were derived from secondary data obtained from relevant literature, without primary data collection.

Sample

The study sample consisted of 36 seventh-grade female students from SMPN 16 Kota Sukabumi. The sample selection was based on inclusion criteria, namely female adolescents who were willing to participate as respondents, had never undergone a hemoglobin (Hb) test, and had consumed at least one TTD tablet per week for a minimum of two weeks. The sample size was determined to ensure the representativeness of the population in analyzing the relationship between TTD consumption adherence and the incidence of anemia.

Data Collection Technique

Data were collected with the assistance of a research assistant who had been briefed on the data collection procedures to ensure consistent understanding with the researcher. The research assistant was a colleague in the Ausrem program at the community health center where the researcher worked, helping to align perceptions regarding the questionnaire used. The data collection process was conducted at SMPN 16 Kota Sukabumi and involved respondents filling out questionnaires to identify their demographic information, adherence to TTD consumption using the MMAS-8 (Morisky Medication Adherence Scale) instrument, and measurement of anemia incidence using the Hemocue device.

Data Analysis Technique

Data were analyzed univariately to describe the characteristics of each research variable, such as the level of adherence to TTD consumption and the incidence of anemia. Bivariate analysis was conducted to test the relationship between these variables using the Kendall Tau statistical test. This analysis aimed to identify the correlation between adherence to TTD consumption and the incidence of anemia among the respondents.

Ethical Clearance

All respondents were provided with a detailed explanation of the study's objectives, procedures, potential benefits, and possible risks prior to participation. Written informed consent was obtained from all participants. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and ensured strict confidentiality of participants' data while upholding their rights, dignity, and autonomy throughout the research process. Additionally, the research protocol received ethical clearance from the appropriate institutional review board to ensure compliance with established research ethics standards.

Results

The following table presents the results of a study examining the relationship between iron supplement consumption compliance and the incidence of anemia among adolescent girls at SMPN 16 Sukabumi City. This analysis highlights how varying levels of compliance with iron supplementation correlate with the occurrence of anemia in the studied population

The visualization illustrates three aspects of the respondents at SMPN 16 Sukabumi City (Figure 1). First, the age distribution shows that out of 36 respondents, the majority (72.2%) were 13 years old (26 respondents), while the remaining 27.8% (10 respondents) were 12 years old. Second, adherence to blood supplement tablets (TTD) reveals that 44.4% (16 respondents) demonstrated high adherence, 22.2% (8 respondents) had moderate adherence, and 33.3% (12 respondents) showed low adherence. Finally, anemia status indicates that 36.1% (13 respondents) were non-anemic, 38.9% (14 respondents) experienced mild anemia, and 25% (9 respondents) had moderate anemia. These findings highlight that while nearly half of the respondents adhere well to TTD, a significant portion still struggles with adherence, and anemia remains a notable issue, particularly mild anemia, which affects the highest percentage of respondents.

Table 1 illustrates the relationship between compliance with iron tablet consumption and anemia among adolescent girls at SMPN 16 Sukabumi City. Compliance levels were categorized as High, Moderate, and Low. Among highly compliant respondents, 62.5% were not anemic, 25% had mild anemia, and 12.5% had severe anemia. In the moderate compliance group, 37.5% had no anemia, 37.5% had mild anemia, and 25% had severe

anemia. The low compliance group had the highest anemia incidence, with 58.3% experiencing mild anemia and 41.7% severe anemia. Overall, the prevalence of no anemia, mild anemia, and severe anemia was 36.1%, 38.9%, and 25%, respectively. A p-value of 0.002 indicates a statistically significant relationship between compliance and anemia, showing that higher compliance with iron supplementation is associated with a lower incidence of anemia.
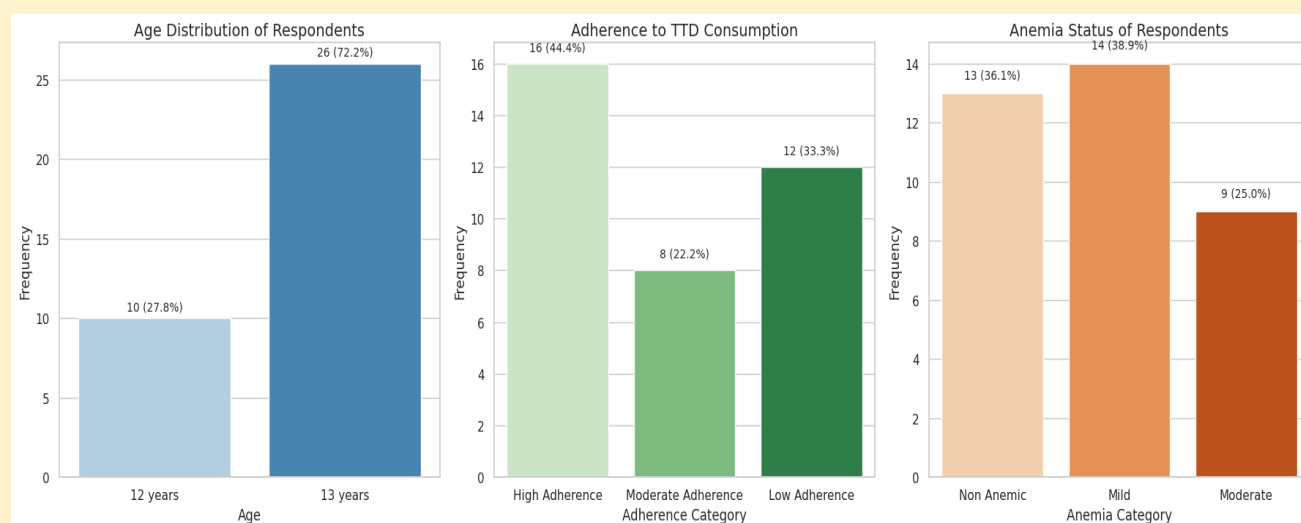

Figure 1. Distribution of Respondents by Age, Adherence to Blood Supplement Tablets (TTD), and Anemia Status at SMPN 16 Sukabumi City

Table 1. Relationship between Iron Supplement Consumption and Anemia Incidence in Adolescent Girls at SMPN 16 Sukabumi City

| Compliance Level | Anemia Incidence | | | | P-Value |
	No Anemia (F%)	Mild Anemia (F%)	Severe Anemia (F%)	Total (F%)	
High	10 (62.5%)	4 (25.0%)	2 (12.5%)	16 (100%)	0.002
Moderate	3 (37.5%)	3 (37.5%)	2 (25.0%)	8 (100%)	
Low	0 (0%)	7 (58.3%)	5 (41.7%)	12 (100%)	
Total	13 (36.1%)	14 (38.9%)	9 (25.0%)	36 (100%)	

Discussion

Compliance with Consumption of Iron Supplement Tablets

The findings of this study indicate that, based on respondents' answers to the compliance questions in the questionnaire, the majority of respondents did not consume iron supplements at least once a week over the course of 52 weeks. This suggests that they did not adhere to the proper dosage and frequency of iron supplement intake. According to the interviews, it was found that most respondents disliked the side effects of iron supplements, such as nausea and dizziness, which were caused by the odor of the tablets. As a result, the respondents did not consistently follow the prescribed regimen for taking iron supplements. Some respondents specifically mentioned that the smell of the tablets triggered nausea, making it difficult for them to consume them. In line with the study by Thifal et al. (2023), 51.8% of respondents reported experiencing nausea as a side effect, which led

to non-compliance[14]. Another contributing factor, as reported by 48.2% of respondents, was the unpleasant taste and fishy odor of the tablets. Additionally, some respondents cited boredom, laziness, and forgetfulness as reasons for not taking the iron supplements. Adolescent girls are at a higher risk of anemia due to the menstrual cycle, which increases the demand for iron and leads to a decrease in the body's iron stores[15].

In line with these findings, a study by Jayadi et al. (2021) explains that consuming iron supplementation tablets may sometimes cause side effects, such as abdominal pain or discomfort, nausea and vomiting, and black-colored stools[16]. However, these symptoms are generally harmless. To minimize these side effects, it is highly recommended to take iron supplementation tablets after meals (on a full stomach) or at night before bed. For female adolescents and women of reproductive age (WRA) who have gastric issues, it is advised to consult a doctor for proper guidance and management.

According to the study by Abibah and Sumarmi (2024), a person's adherence can be influenced by several factors, including age, knowledge, and behavior[17]. Behavior itself is shaped by various elements, such as regulations, community commitment that supports or facilitates the behavior, opinions of others, social support, peer influence, constructive criticism from the surrounding environment, and feedback provided by healthcare professionals.

Incidence of Anemia

The results of the study at SMPN 16 Sukabumi City showed that among the 36 respondents who experienced anemia, most had poor dietary habits, such as a dislike for vegetables, unhealthy dieting practices, and non-adherence to consuming iron supplementation tablets.

Penelitian ini sesuai dengan jurnal penelitian yang telah dilakukan oleh[11] yang berjudul "Hubungan Kepatuhan Konsumsi Tablet Fe Terhadap Kejadian Anemia" menyatakan bahwa sebagian besar remaja yang mengalami anemia sebanyak 33 (66,0%) responden. Remaja putri memiliki peluang besar mengalami anemia, disebabkan karena setiap bulannya remaja putri mengalami menstruasi yang menjadikan kebutuhan zat besi dalam tubuh berkurang.

Female adolescents are at risk of developing anemia because they experience menstruation once a month, which increases their need for iron. Adolescents with prolonged and heavy menstrual periods require a higher amount of iron to meet their body's demands[18].

According to research Putra et al (2020), in low-income countries, anemia is most commonly caused by nutritional deficiencies due to inadequate nutrient intake. Anemia can be prevented by ensuring sufficient nutritional intake and regularly consuming iron supplementation tablets[19]. According to the researcher, anemia can occur in female adolescents, and this condition must always be closely monitored. Anemia in female adolescents requires particular attention as they experience monthly menstruation, which can result in blood loss. Recognizing anemia in female adolescents involves understanding its symptoms, which include fatigue, frequent dizziness, blurred vision, and a general feeling of malaise.

Iron Tablet Consumption and Anemia Incidence Among Female Adolescents

The relationship between adherence to iron tablet consumption and the incidence of anemia among female adolescents at SMP Negeri 16 Sukabumi City was analyzed using the Kendall's tau statistical test. The results showed a p-value of 0.002 ($p < 0.05$), indicating a

significant relationship between adherence to iron tablet consumption and the incidence of anemia. Therefore, it can be concluded that higher adherence to consuming iron tablets is associated with a lower incidence of anemia among female adolescents.

This study is consistent with the research conducted by Suaib et al. (2024) titled "The Relationship Between Adherence to Iron Tablet Consumption and the Incidence of Anemia" Their analysis, using the chi-square test with a significance level of $\alpha = 0.05$, showed a p-value of 0.01 ($p < \alpha$). This indicates a significant relationship between adherence to iron tablet consumption and the incidence of anemia among female adolescents in Mumbulsari District, Jember Regency, in 2021[20].

This study is consistent with the findings of Afiah and Syafrianai (2024), which revealed a significant relationship between adherence to consuming iron (Fe) tablets and the incidence of anemia among students at MTS Dinul Hasanah, located in the working area of Puskesmas Balai Jaya, Rokan Hilir Regency. The study reported a Prevalence Odds Ratio (POR) of 6.163 (95% CI: 2.039–18.621), indicating that students who are non-adherent to consuming Fe tablets are six times more likely to experience anemia compared to those who adhere to the consumption of Fe tablets[21].

The findings of this study align with previous research and several established theories, which state that the more compliant respondents are in consuming iron supplementation tablets, the lower their risk of experiencing anemia. Conversely, the less compliant a respondent is in consuming iron supplementation tablets, the higher the likelihood of developing anemia. This reinforces the importance of adherence to iron supplementation in reducing anemia prevalence.

Conclusion

Based on the results of this study, it can be concluded that there is a significant relationship between adherence to consuming iron supplementation tablets and the incidence of anemia among female adolescents at SMPN 16 Sukabumi City, as indicated by a p-value of 0.002 ($p < 0.05$). These findings highlight the importance of regular consumption of iron supplementation tablets as a preventive measure against anemia, which remains a common nutritional problem in adolescents. For future researchers, this study may serve as a reference to explore the topic further by employing different research variables, study populations, or methodological approaches, such as longitudinal or experimental designs, to deepen the understanding of the relationship between adherence and anemia. Furthermore, for SMPN 16 Sukabumi City, the study provides valuable input to strengthen health education, improve monitoring programs, and encourage female students to consistently take iron supplementation tablets as part of comprehensive anemia prevention strategies.

Acknowledgment

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