

THE ASSOCIATION BETWEEN LEVEL OF KNOWLEDGE AND CONSUMPTION OF IFA SUPPLEMENTATION IN ADOLESCENT GIRLS: A CASE STUDY IN SIDOARJO REGENCY

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ABSTRACT

Background: Anemia in adolescent girls remains a significant health problem, primarily due to iron deficiency. One preventative measure is the administration of Iron Folic Acid supplements. However, compliance with Iron Folic Acid supplements among adolescent girls remains suboptimal. Knowledge is suspected to be a factor influencing consumption behavior.

Purpose: This study aims to determine the association between the level of knowledge about iron supplements and the consumption of iron supplements in adolescent girls.

Methods: This research method used a quantitative design with a cross-sectional approach. The population are adolescent girls in Sidoarjo. A sample of 106 respondents was drawn using a probability sampling technique with a multistage sampling method. Data were collected using a questionnaire and analyzed using the Chi-Square test with a significance level of 0.05.

Results: The results showed that most respondents had a good level of knowledge (41.5%) and were compliant in taking IFA supplementation (54.7%). The Chi-square test showed a p-value of <0.01 ($<\alpha=0.05$), indicating a significant association between knowledge level and Iron Folic Acid supplementation.

Conclusion: This study concluded that there was an associate between knowledge and Iron Folic Acid supplementation among adolescent girls in Sidoarjo Regency. Increasing knowledge can be an important strategy for improving adherence to Iron Folic Acid supplementation.

Keywords: Adolescent Girls, Anemia, Iron Deficiency, Knowledge, Non-Communicable Disease

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BACKGROUND

Globally, anemia in adolescent girls remains a major public health concern. Recent reports indicate that the prevalence of anemia among women of reproductive age remains high and tends to stagnate in many developing countries (WHO, 2021). Indonesia, a developing country with a relatively high prevalence of anemia among adolescent girls, is a health problem that requires serious attention (Ministry of Health of the Republic of Indonesia, 2018; Ministry of Health of the Republic of Indonesia, 2023). The impact of anemia is not limited to physical conditions such as fatigue and decreased immunity, but also affects concentration, academic achievement, and productivity in adolescents.

Anemia remains a global public health problem faced by all countries. The global prevalence of anemia is 30.5% among women aged 15-49 years worldwide (World Health Organization, 2025). Meanwhile, in Indonesia, the prevalence of anemia among adolescent girls is 15.5% (Kementerian Kesehatan Republik Indonesia, 2023). Anemia is a condition where hemoglobin levels in the blood are below normal, generally caused by iron deficiency (Turner, Parsi, and Badireddy, 2023). Adolescent girls are a vulnerable group due to their monthly menstruation, which causes regular iron loss, and increased iron needs during growth. (WHO, 2021)

As an effort to prevent anemia, the government has implemented a program to routinely provide Iron Folic Acid (IFA) supplementation to adolescent girls. This program aims to meet iron needs and prevent anemia from an early age. IFA supplementation has been proven effective in increasing hemoglobin levels and reducing the risk of anemia when consumed regularly (Pasricha et al., 2014; De-Regil et al., 2011).

However, the implementation of IFA supplementation programs still faces various obstacles, particularly related to low consumption rates among adolescent girls. This is despite optimal IFA supplement distribution. This suggests that factors influence IFA supplement consumption behavior, one of which is knowledge level (Woldeyohannes et al., 2019).

Knowledge is a predisposing factor that plays a role in shaping individual health behaviors (Dewanti et al., 2024). Adolescents with a good level of knowledge about iron supplements tend to have a higher level of awareness about regularly consuming IFA supplementation. Conversely, a lack of knowledge can lead to misunderstandings regarding the benefits and side effects of IFA supplementation, which can lead to decreased compliance (Angraini and Sari, 2022; Rahmawati & Utami, 2021). Furthermore, several studies have shown that knowledge is significantly related to IFA supplement consumption among adolescent girls (Putri and Lestari, 2023). This suggests that increasing knowledge can be an effective strategy in increasing the success of anemia prevention programs.

Based on this description, it can be concluded that anemia in adolescent girls remains a health problem that requires serious attention. Although IFA supplementation programs have been implemented, their success is significantly influenced by behavioral factors, particularly knowledge levels. Therefore, research is crucial to examine the association between knowledge levels about IFA supplementation consumption and IFA supplementation consumption among adolescent girls.

OBJECTIVE

The aim of this study is that the researcher wants to know the association between the level of knowledge about IFA supplements and the consumption of IFA supplements among adolescent girls in the Sidoarjo.

METHODS

Research Design

This study is a quantitative, observational analytical design using a cross-sectional approach. The independent variable is knowledge level about IFA supplementation and the dependent variable is consumption of IFA supplementation were measured simultaneously.

Research Location and Time

The research was conducted in Sidoarjo Regency from October to December 2025.

Population and Sample

The population in this study was all adolescent girls in Sidoarjo Regency. Samples of this study are each adolescent girls who met the inclusion criteria. The sample size of 106 respondents was determined using a probability sampling technique with a multistage sampling method (Cluster Sampling and Simple Random Sampling). The sampling steps consist of sample size calculation, calculation of the average of adolescent girls in each villages, randomize the number of villages in Sidoarjo to met the minimum sample size, and samples were taken at each integrated service post (posyandu) for adolescents using simple random sampling.

The sample size was calculated using the Lemeshow formula with a 95% confidence level ($Z=1.96$), a proportion of 0.5, and a precision of 10%. This resulted in a minimum sample size of 96 respondents. An additional 10% was added to account for dropouts, resulting in a total sample size of 106 respondents.

Sample Criteria

Inclusion criteria included adolescent girls aged 12-18, do not have congenital diseases related to iron deficiency, residing in the Sidoarjo, willing to participate, and completing the questionnaire completely. Exclusion criteria included respondents who did not complete the questionnaire completely or were currently ill.

Research Variables

The independent variable was the level of knowledge about IFA supplements, while the dependent variable was IFA supplement consumption.

Research Instrument

The instrument used was a structured questionnaire consisting of knowledge and IFA supplement consumption. This questionnaire was compiled using references obtained. The questionnaire did not use a standard from any source. Knowledge was measured using the

Gutman scale (True = 1, False = 0) and categorized as good, sufficient, and poor. IFA supplement consumption was categorized as compliant and non-compliant.

Validity and Reliability

Validity testing was conducted using Product Moment correlation, and reliability testing using Cronbach's Alpha with a value of ≥ 0.70 .

Data Collection Procedure

Data collection was conducted after obtaining permission from the relevant agencies. Respondents were explained the research objectives and signed informed consent. Next, respondents completed the questionnaire independently, and the researcher checked the data for completeness.

Data Analysis

Data analysis was conducted using univariate and bivariate methods. Univariate analysis was used to describe the frequency distribution of variables. Bivariate analysis used the Chi-Square test with a significance level of 0.05 (95% CI).

Research Ethics

This research has obtained ethical approval. Respondents' identities were kept confidential, and all respondents provided informed consent.

RESULTS

Table 1. Level of Knowledge about IFA Supplements

Knowledge's Categories	n	%
Good	44	41.5
Enough	36	34.0
Lack	26	24.5

Based on Table 1, half of respondents had a good level of knowledge (44 respondents (41.5%).

Table 2. Consumption of IFA Supplementation

IFA Consumption	n	%
Obedient	58	54.7
Diobedient	48	45.3

Based on table 2, most of the respondents classified as comply with taking IFA supplementation that is as many as 58 respondents (54.7%)

Table 3. Association between Knowledge Level and Consumption of IFA Supplementation

Knowledge	Consumption of IFA Supplementation		p-value of Chi Square Test
	Obedient (%)	Diobedient (%)	
Good	36 (81.8%)	8 (18.2%)	<0.01*

Enough	18 (50.0%)	18 (50.0%)
Not enough	4 (15.4%)	22 (84.6%)

*lower than $\alpha(0.05)$

The Chi-square test results showed a p-value of <0.01 ($<\alpha$ (0.05)), indicating a significant association between knowledge level and IFA supplement consumption among adolescent girls.

DISCUSSION

Bivariate analysis results showed a significant association between knowledge level and IFA supplementation consumption. Respondents with a good level of knowledge tended to be more compliant with IFA supplementation compared to those with moderate and poor knowledge. This suggests that knowledge plays a significant role in shaping individual health behaviors.

Theoretically, knowledge is a predisposing factor that can influence a person's behavior. Individuals with good knowledge will more easily understand the benefits of a health intervention and are therefore more likely to implement it. Conversely, a lack of knowledge can lead to misunderstandings and negative perceptions of a health intervention, including IFA supplementation (Usman, Maria, and Widiatrilupi, 2025).

The results of the study showed that most respondents had a good level of knowledge about IFA supplementation. In addition to good knowledge, there was also variation between levels of adequate and inadequate knowledge. This variation reflects differences in access to information, understanding, and individual experiences regarding the importance of IFA supplementation in preventing anemia. Respondents with a good level of knowledge generally understood the function of IFA supplementation as a source of iron, which plays a role in hemoglobin formation. Theoretically, according to Seokidjo Notoatmodjo (2014), knowledge is a cognitive domain that forms the basis for a person's actions.

These study results align with research by Angraini and Sari (2022), which demonstrated a association between knowledge level and IFA supplementation compliance. Research by Putri and Lestari (2023) also stated that knowledge is a crucial factor influencing IFA supplementation behavior in adolescent girls.

Individuals with good knowledge tend to have more positive health awareness and behaviors, including adherence to iron supplementation. Respondents with adequate knowledge generally understood the general benefits of iron supplements but did not yet have a comprehensive understanding of the dosage, frequency of consumption, and long-term impacts of anemia. According to health promotion and health behavior, incomplete knowledge will affect an individual's ability to make appropriate health decisions. This indicates that the education provided is not optimal and still needs to be improved in terms of both quality and frequency. Meanwhile, respondents with inadequate knowledge tended to have erroneous or limited understanding of iron supplements, such as the assumption that iron supplements are only necessary when sick or fear of side effects. This condition can impact low iron supplement consumption. This difference in knowledge levels can be explained by Lawrence Green's

health behavior theory, which states that knowledge is a predisposing factor in shaping health behavior (Huong et al., 2022).

Most respondents in this study were considered compliant with iron supplementation. However, a significant proportion of respondents were non-compliant, indicating that iron supplementation compliance is suboptimal. IFA supplementation is a key intervention in the prevention and management of anemia, particularly iron deficiency anemia, which remains a global public health problem. Iron supplements generally contain iron (Fe) and folic acid, which play a crucial role in the formation of hemoglobin and red blood cells. Physiologically, iron is needed for the synthesis of hemoglobin, a protein in erythrocytes responsible for transporting oxygen throughout the body. Iron deficiency inhibits erythropoiesis, leading to anemia (Hall & Guyton, 2021). A study by Nuryanto et al. (2021) showed that adolescent girls who regularly consumed iron supplementation experienced significant increases in hemoglobin levels compared to those who were non-compliant.

However, in practice, iron supplementation remains a challenge. Several factors influence compliance, including knowledge, attitudes, family support, side effects, and perceptions of the benefits of iron supplementation. Side effects such as nausea, constipation, and stomach discomfort are often the main reasons for non-compliance (Gibson, 2005). Therefore, appropriate health education is essential to increase adolescents' understanding and awareness of the importance of iron supplementation. Behavioral factors also play a crucial role in the success of IFA supplementation programs. According to Lawrence Green's health behavior theory, health behavior is influenced by predisposing factors (knowledge and attitudes), supporting factors (availability of facilities), and reinforcing factors (social support). These three factors must be considered for optimal intervention (Hidayanty et al., 2025).

Thus, these study results confirm that increasing knowledge is a crucial strategy for improving IFA supplementation. Therefore, ongoing health education efforts across various sectors are needed to increase adolescent girls' understanding of the importance of IFA supplementation. Limitations of this study is that it was conducted only in Sidoarjo Regency and involved only one independent variable. Further research is recommended to add variations to this independent variable and expand the scope of the study.

CONCLUSION

This study shows that the majority of adolescent girls have a good level of knowledge about IFA supplementation and generally compliant with their IFA supplementation. This study concluded that knowledge and IFA supplementation among adolescent girls in Sidoarjo Regency was associated. Therefore, better of adolescent girl's knowledge in line with the higher IFA supplementation. Improving knowledge can be an important strategy for increasing IFA supplementation as a preventative measure for anemia in adolescent girls.

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CONFLICTS OF INTEREST

The authors declare there was no conflict of interest in this study.

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