

Factors Affecting Iron-Folic Acid (IFA) Supplement Consumption Behavior in Adolescent Women At Junior High School 1 Lebakwangi, Serang District

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Abstract. Anemia affects thirty-seven point one percent of the teenage girls in the Serang District, and a sizeable portion of the students at Junior High School 1 Lebakwangi are not participating in the iron and folic acid (IFA) program. This is a big problem since anemia is a condition that affects a substantial number of adolescents. An investigation of the factors that have an effect on the degree to which individuals comply with IFA supplementation is included in the scope of this study. A quantitative study with a cross-sectional design was conducted with the involvement of 86 female students who were selected using a stratified random sample approach. The research was carried out in the United States. According to the findings, there were significant links discovered between IFA compliance and attitude ($p = 0.034$), believe ($p = 0.016$), school support ($p = 0.016$), and peer support ($p = 0.023$). These interactions were shown to be significant associations. Attitude was the most significant predictor, with a p-value of 0.013 representing its significance. The results of this research shed light on the substantial role that social and psychological factors have in influencing the unhealthy behaviors that teenagers engage in. In addition, it is essential to enhance the palatability of iron tablets in order to increase the number of people who stick to supplementation programs.

Keywords: iron tablets (Fe), anemia, adolescents

1 Introduction

Anemia is a condition characterized by a hemoglobin (Hb) concentration below the normal level, which reduces the blood's ability to transport oxygen throughout the body. It remains a pressing public health issue in Indonesia. Anemia reflects inadequate nutrition and poor overall health status. The condition arises when the number or size of red blood cells, or the concentration of hemoglobin, falls below established thresholds, thereby impairing oxygen delivery to tissues. Consequently, anemia is widely recognized as a key indicator of both nutritional deficiencies and general health status. Globally, anemia poses a critical health challenge, affecting 24.3% of the population in 2021, with an estimated 192 million cases worldwide [1]. In Indonesia, the prevalence remains high, with 24.4% reported among children

aged 5–14 years and 30% among adolescents aged 15–24 years [2]. In Serang District, the burden is even more pronounced, with a prevalence of 37.1% among adolescent girls [3].

Iron deficiency anemia is the most common type of anemia in adolescents, primarily due to their increased iron requirements for growth. Adolescent girls are particularly vulnerable to anemia because of menstrual cycles, which increase their iron needs. Additionally, nutritional imbalances contribute to anemia in this age group. Many adolescent girls tend to focus on their body shape, leading them to restrict their food intake and adhere to various food taboos [4].

Many women suffer from anemia, primarily due to menstruation, which results in a monthly loss of iron. To maintain health, it is crucial for women to balance this loss with adequate nutritional intake. The main cause of anemia in this context is iron deficiency, which happens when women do not receive enough essential nutrients. Approximately 30% of women worldwide are affected by anemia caused by insufficient iron. Anemia in adolescent girls can have long-term consequences, not only for their own health but also for their future children. Although the effects of anemia may not be immediately visible, they can significantly impact the lives of adolescents later on. The long-term effects of anemia include physical weakness, fatigue, reduced intelligence, and a higher risk of anemia during pregnancy, which can increase maternal and infant mortality [1].

Anemia in adolescents is one of the causes of stunting because when adolescent girls become pregnant, they are unable to fulfill the nutritional needs of themselves and their fetuses, which can increase the risk of stunting [3].

Several risk factors can lead to anemia in this population, including rapid growth, inadequate intake of iron or vitamin C, adherence to a vegetarian diet, calorie-restricted diets, frequently skipping meals, engaging in intense exercise, and experiencing heavy menstrual bleeding. These factors can increase the risk of anemia in adolescents, resulting in various issues such as impaired growth and development, fatigue, increased susceptibility to infections due to a weakened immune system, higher vulnerability to poisoning, and compromised cognitive function [5,6].

The government has implemented an intervention to reduce anemia among adolescent girls through iron and folic acid supplementation using IFA Supplement [6]. These tablets are provided by health facilities, schools, and self-initiatives, targeting girls in junior high schools, high schools, and out-of-school women to address malnutrition.

The Indonesian government is actively addressing anemia in adolescent girls and pregnant women through targeted programs that are essential for improving health outcomes. These initiatives include: 1) Promoting a Balanced Nutritional Diet to ensure proper nutrition. 2) Providing iron tablets as vital supplements to address deficiencies. 3) Fortifying wheat flour to enhance dietary iron intake. 4) Treating related infectious diseases to support overall health.

This initiative is part of the Anemia Prevention and Management Program for Adolescent Girls and Women of Childbearing Age, designed to enhance adherence to iron and folic acid (IFA) supplementation and ultimately reduce anemia prevalence among adolescent girls. However, national coverage of IFA supplementation in Indonesia has shown a decline, decreasing from 39.1% in 2020 to only 31.1% in 2021 [2]. Moreover, the implementation of the IFA supplementation program in five provinces—West Java, Central Java, East Java, West

Nusa Tenggara, and East Nusa Tenggara—was reported to have very low acceptance rates in 2024 [7].

Preliminary observations at Junior High School 1 Lebakwangi revealed that the majority of female students did not comply with the recommended IFA supplementation regimen. This low adherence underscores the urgent need to identify and address the underlying barriers. Therefore, this study aims to explore the factors influencing compliance with IFA tablet intake among adolescent girls in Junior High School 1 Lebakwangi, Serang Regency.

2 Methods

This observational analytic study aimed to identify factors influencing IFA supplement compliance among adolescent girls. Using a cross-sectional design, it found that knowledge, attitude, belief, peer support, and school support positively affect IFA consumption behavior.

The total population for this study consists of 322 female students, of which 86 female students were selected using a stratified random sampling technique. The sample included female students from grades 7 and 8 at Junior High School 1 Lebak Wangi who met the inclusion criteria and were willing to participate. Samples were calculated using Slovin's formula. The sample used to determine the proportion of classes represented 25% of the total population, calculated using the following formula:

$$\text{Proportion of class} = \frac{\text{Total number of students in grade 7 or 8}}{\text{student}} \times \text{Total Sample (86)} = 43$$
$$\text{Total Population (322)}$$

The sampling process involved separating the data for grades 7 and 8 and placing slips of paper with each student's attendance number into a box. From this, 43 female students were randomly selected from grades 7 and 8.

Data was collected using questionnaires distributed to participants.

The data were analyzed using univariate and bivariate analysis. Univariate analysis was utilized to analyze research variables and test the normality of the data. Univariate analysis was conducted to describe respondents' perceptions regarding knowledge, attitudes, beliefs, peer support, school support, and IFA supplement consumption behavior, presented in terms of mean and standard deviation.

The analysis included three components: univariate, bivariate, and multivariate analyses.. Univariate analysis determined the frequency distribution of knowledge, attitudes, beliefs, and supports concerning iron and folic acid (IFA) supplement consumption. Bivariate analysis used the chi-square test ($\alpha < 0.05$) to identify the relationships between variables and their influence on IFA consumption. Variables with a p-value < 0.25 in the bivariate analysis were included in the multivariate analysis. Multiple logistic regression tests were conducted, with results deemed significant at $p < 0.05$.

3 Results

Table 1. Overview of knowledge, attitude, belief, peer support, and school support (n=86)

Variable	Category					
	Good		Sufficient		Bad	
	n ^a	f ^b	n ^a	f ^b	n ^a	f ^b
Knowledge	24	27.9	26	30.2	36	41.9
Attitude (positif/negative)	46	53.5			40	46.5
Belief	42	48.8	-	-	44	51.2
Peer Support	45	52.3	-	-	41	47.7
School support	42	48.8	-	-	44	51.2

Table 1 shows that the majority of respondents (41.9%) demonstrated poor knowledge about IFA supplements, while only 27.9% had good knowledge. The content includes a definition of anemia, its signs and symptoms, contributing factors, the impact of anemia, and prevention methods.. In terms of attitude, 53.5% of respondents showed a positive attitude, and 46.5% had a negative attitude. Beliefs were nearly balanced, with 51.2% holding negative beliefs and 48.8% positive. Peer support was slightly more prevalent (52.3%) compared to those who lacked it (47.7%). Similarly, school support was perceived by 48.8% of respondents, while 51.2% reported a lack of such support

Table 2. Overview of IFA Supplement Consumption Behavior (n=86)

Variable	Category			
	Good		Bad	
	n ^a	f ^b	n ^a	f ^b
IFA Supplement Consumption Behavior	59	63.6	27	31.4

Table 2 shows that a majority of respondents (63.6%) exhibited appropriate IFA supplement consumption behavior, whereas 31.4% demonstrated inadequate adherence to the recommended intake.

Table 3. Relationship of Knowledge, Belief, Attitude, Peer Support, and School Support to IFA Supplement Consumption Behavior (n=86)

Variable	Category				Total		P Value
	Good		Bad		n ^a	% ^b	
	n ^a	% ^b	n ^a	% ^b			
Knowledge							
Good	19	79.1	5	20.9	24	100	0.385
Sufficient	16	61.5	10	38.5	26	100	
Bad	24	66.7	12	33.3	36	100	
Belief							
Good	34	81	8	19	42	100	0.016*
Bad	25	56.8	19	43.2	44	100	
Attitude							
Possitive	27	58.7	19	41.3	46	100	0.034*
Negative	32	80	8	20	40	100	
Peer Support							
Good	26	57.8	19	42.2	45	100	0.023*
Bad	33	80.5	8	19.5	41	100	

School Support							
Good	34	81	8	19	42	100	0.016*
Bad	25	56.8	19	43.2	44	100	

Table 3 shows that the statistical analysis reveals a significant relationship between belief, attitude, peer support, and school support with a p -value < 0.05 . Respondents with higher knowledge levels tend to have better consumption behavior; the statistical test shows that this relationship is not significant, with a p -value of 0.385 ($p > 0.05$).

This indicates that, in this sample, knowledge alone was not significantly associated with IFA Supplement consumption behavior. Other factors such as attitudes, beliefs, or social and environmental influences—may play a more substantial role in determining behavior, even among those with adequate knowledge

The selection of multivariate variable candidates with a p value < 0.25 , namely attitudes, beliefs, school support, and peer support as the independent variables, and the behavior of consuming IFA Supplement as the dependent variable.

Table 4. Omnibus Test for Analysis Multivariate Logistic Regression Multiple Final Modeling

Variables	Coefficient (B)	P Value	OR	(CI 95%)	Omnibus Test (P Value)	R-squared bridge
Attitude	-1.408	0.013*	0.245	0.081-0.742		
Peer Support	-1.083	0.043*	0.339	0.118-0.969	0.001	0.260
Belief	0.312	0.838	1.366	0.069-27.108		
School Support	1.194	0.441	3.299	0.158-68.692		

Table 4 shows that the final logistic regression model is deemed feasible, as indicated by a significant Omnibus test result ($p = 0.001$). The Nagelkerke R Square value of 0.260 suggests that the independent variables explain 26% of the variance in iron tablet consumption behavior. Among the variables analyzed, attitude ($p = 0.013$; OR = 0.245; 95% CI: 0.081–0.742) and peer support ($p = 0.043$; OR = 0.339; 95% CI: 0.118–0.969) emerged as the most significant and dominant predictors, even after controlling for belief and school support. This indicates that positive attitudes and strong peer support play a crucial role in influencing IFA Supplement consumption behavior among adolescents.

4 Discussions

4.1 IFA Supplement Consumption Behavior.

Iron tablets are a dietary supplement containing iron and folate. Iron plays a vital role in the production of red blood cells, which carry oxygen from the lungs to the tissues. Therefore, taking iron tablets monthly is useful for replacing iron lost through menstruation and meeting iron requirements not met through daily dietary intake [8,9]. Based on the frequency distribution of IFA Supplement consumption behavior, that the majority (68.6%) of female students regularly consume IFA Supplement, whereas 31.4% demonstrated inadequate adherence to the recommended intake.

The research findings from 86 students with a low level of knowledge, it was found that 12 of them (33.3%) do not routinely consume IFA supplement tablets, while 24 students (66.7%) consume them regularly. The chi-square test results indicated that there is no significant relationship between attitudes and the consumption behavior of IFA supplement tablets among female adolescents at Junior High School 1 Lebakwangi in Serang District. The p-value obtained was 0.385, which is greater than the significance level (α) of 0.05. The results of the study in Serang City, from several literature reviews, found that adolescent girls had sufficient knowledge about anemia, and 77 (53.1%) adolescent girls had insufficient knowledge about anemia [10].

Additionally, the analysis suggests that adolescent girls' understanding of the risks associated with consuming iron (Fe) tablets during menstruation plays a significant role in their behavior. Those who lack sufficient knowledge about these risks tend to exhibit less risky behavior in their consumption of Fe tablets during menstruation compared to those who have a good understanding of these risks [4].

4.2 Relationship of Knowledge, Belief, Attitude, Peer Support, and School Support to IFA Supplement Consumption Behavior

The research finding that the relationship between attitude and the behavior of consuming iron tablets. This indicates that adolescents who have stronger beliefs regarding the benefits and importance of IFA Supplement tablets are more likely to consume them regularly and appropriately. These findings align with other studies that support this research, including a study by Andani et al. (2020), which involved 73 respondents. Among these respondents, 11 (or 15.1%) exhibited positive traits. The statistical analysis yielded a p-value of 0.048, indicating that $p < 0.05$. This result suggests that there is a significant relationship between attitudes and the behavior of consuming iron tablets [11].

A study by [4] examined factors influencing iron tablet consumption among adolescent girls during menstruation. The findings indicated a strong relationship between the girls' attitudes and their behavior regarding the intake of iron tablets, with a p-value of 0.0005.

Research shows that adolescent girls' attitudes toward preventing anemia are shaped by their understanding of its symptoms, causes, and prevention strategies. This aligns with Lawrence Green's theory, which states that knowledge and attitudes are key to influencing behavior. Changes in behavior typically begin with increased knowledge, followed by shifts in attitudes, ultimately leading to different actions [12].

The relationship between belief and the behavior of consuming IFA Supplementation. These findings align with the research of [13], which involved 324 female students. Of these participants, 125 (or 38.1%) indicated that they believed in the benefits of consuming iron-fortified tablets. The statistical analysis yielded a p-value of 0.000, indicating that $p < 0.05$. This suggests a significant relationship between beliefs and the behavior of consuming iron tablets.

These results reveal that side effects are the primary factor discouraging respondents from adhering to the consumption of the IFA Supplement (TTD). Additionally, personal beliefs about the benefits of IFA supplements play a role; if individuals believe that TTD is beneficial for their health, they are more likely to comply with its consumption [14,15].

The relationship between peer support and the behavior of consuming IFA Supplementation. This study is supported by the research, which involved 129 respondents. Among them, 28 (68.3%) reported receiving support from friends, while 13 (31.7%) stated that they did not receive such support [8]. The statistical analysis yielded a p-value of 0.019, indicating a significant relationship between friend support and the behavior of consuming iron tablets, as the p-value is less than 0.05.

Another study that aligns with these findings, which examined the factors influencing the consumption of IFA Supplement (TTD) among adolescent girls y. Their results also showed a significant relationship between attitudes and the behavior of consuming IFA supplements, with a p-value of 0.000 [16].

These results highlight the important role that peers play in encouraging and reminding teenage girls to regularly consume IFA supplements, which likely refers to a specific nutritional supplement or food. It is essential to improve knowledge and awareness about anemia and related topics among young women, with support from teachers and parents. By educating young women, they can share this knowledge with their peers, promoting more consistent consumption of TTD, driven by their friends' habits [17].

The research findings that the relationship between school support and the behavior of consuming IFA Supplementation. Other research that supports our study is the results of the study by Fenti et.al (2024) showed that 26.4% of teenage girls received support from their teachers to take iron supplements regularly, and the majority of teachers did not support this (73.5%). Another study in India found that teachers, parents, and peers influence students' regular use of iron and folic acid (IFA) supplements. Positive factors include supervised distribution, health education, availability of tablets, and encouragement from adults and classmates [18,19].

A significant study firmly established the crucial factors that drive adolescent girls to consume iron tablets during menstruation. It is essential to prioritize nutritional support during this vital period to ensure optimal health and well-being.. The findings indicated a relationship between attitudes and the behavior of consuming iron tablets, with a p-value of 0.443. The successful adherence of adolescent girls to IFA Supplement consumption is influenced by the support provided by teachers. Given that adolescents spend a substantial portion of their time in the school environment, teachers can function as influential role models in promoting positive health behaviors [20].

The results indicate that the crucial role of teachers in encouraging adolescent girls to take the IFA Supplement. Since adolescent girls spend more time at school than at home, the support from teachers is essential. Teachers can remind these students to consume Signature and provide valuable information about its benefits. This guidance fosters a positive attitude among young women, leading to the desirable behavior of adhering to the recommended consumption of TTD [18].

4.3 The dominant factor in the behavior of consuming the IFA Supplement.

The research findings that the most dominant factor in the behavior of consuming the IFA Supplement. Among the four variables examined, only attitude and peer support demonstrated a statistically significant influence on IFA Supplement consumption behavior among adolescent girls. This suggests that efforts to improve IFA Supplement adherence should prioritize interventions aimed at modifying attitudes and strengthening peer support systems.

Various studies have explored the factors influencing IFA Supplement consumption behavior among adolescents. A study identified several contributing factors, including knowledge, attitude, environmental support, and the availability of IFA supplements [20]. Similarly, [4] highlighted knowledge, attitude, family support, and household income as key determinants. Consistent findings were also reported by Risva and Rahfiludin (2016), who stated that attitude, knowledge, availability, and environmental support significantly influence IFA Supplement consumption behavior among adolescent girls [13,21].

Self-efficacy is crucial for adherence to iron supplement intake. Healthcare providers must emphasize compliance, using compliant pregnant women as role models while involving families as supportive companions [22].

Acceptance of the IFA supplementation (TTD) program in five provinces in Indonesia: West Java, Central Java, East Java, West Nusa Tenggara, and East Nusa Tenggara, is generally very low and far below the national iron supplementation consumption target of 58% for 2024 [23]. Factors influencing the acceptance of the iron supplementation program include personal factors, including knowledge, motivation, self-efficacy, and attitudes; sociopsychological factors, including parents and peers; school policies and commitment; and the iron supplementation provided. The low acceptance of the iron supplementation program is primarily due to a lack of knowledge among parents and adolescents about anemia, including its causes, symptoms, and the benefits of iron supplements. Misconceptions about anemia in girls, limited school support for the program, and supplements that may not appeal to adolescent tastes also contribute to this issue.

An alternative support program could reduce the incidence of anemia in adolescent girls by enhancing the training of health workers on nutrition and TTD monitoring, while fostering collaboration among health services, schools, and communities for continuous education [23].

5 Conclusion

The consumption of IFA supplement tablets is influenced by various factors, including attitudes, beliefs, and the support provided by educational institutions and peers. Research shows that attitudes toward iron tablet consumption are the strongest predictors of this health behavior. Positive attitudes and peer encouragement are crucial in motivating adolescent girls to consume IFA tablets regularly. By improving their knowledge and receiving support from teachers and parents, young women can positively influence their peers, promoting consistent consumption. Modeling results confirm that attitude and peer support are the dominant factors, which aligns with theoretical expectations.

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