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Determinants Of Adolescent Girls' Knowledge And Attitudes Towards The Consistency Of Blood Supplement Consumption

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Abstract

Background. Anemia in adolescents is a significant global health problem. According to the World Health Organization (WHO), the prevalence of anemia in adolescents worldwide ranges from 40% to 88% of the total adolescent population, which reaches 1.2 billion people, or about 18% of the world's population.

Aims. This study aims to analyze the relationship between the knowledge and attitudes of adolescent girls and adherence to blood supplement tablet consumption by 2025.

Methods. This study uses a quantitative approach with an analytical descriptive design. This design was chosen to analyze the relationship between independent variables (adolescent girls' knowledge and attitudes about anemia) and dependent variables (adherence to the consumption of blood-boosting tablets).

Conclusion. These findings underscore the need for a holistic approach that combines enhanced knowledge with strategies to address environmental and behavioral barriers, thereby improving the consistency of blood booster supplement consumption.

Implementation. The results of this study are expected to contribute to efforts to prevent anemia through increasing compliance with TTD consumption.

Key words: anemia, blood, supplement, knowledge, adolescense girls

INTRODUCTION

In developing countries, the incidence of anemia in adolescent girls reaches 53.7%, while in women of productive age (15-49 years) globally, it is 29.9% (Sihombing Yulandari et al., 2023). In Indonesia, based on the 2018 Basic Health Research (Riskesdas), the prevalence of anemia in adolescents aged 5-14 years is 26.8%, while at the age of 15-24 years it reaches

32% (Riskesdas, 2019). In West Java, the incidence rate of anemia in 2019 was reported at 41.5% (Canjing Nuryanti et al., 2024).

Anemia in adolescent girls is very susceptible to occur because adolescence is characterized by rapid growth that increases the need for nutrients, especially iron. In addition, adolescent girls experience menstruation monthly, which increases the risk of iron deficiency compared to adolescent boys (Oktalia et al., 2023; Rusdiana & Zubaidah, 2024). The impact of anemia on adolescent girls includes decreased productivity, learning achievement, and immunity, as well as long-term risks such as low birth weight (BBLR) and stunting if anemia occurs during pregnancy (Rismayanti et al., 2023). Anemia can also lead to physical growth retardation as well as behavioral and emotional disorders (Oktalia et al., 2023).

Factors that contribute to adolescent female anemia include energy intake, protein, iron, vitamin C, tea consumption habits, worms, education, parental work, family income, and menstrual patterns (Budiarti et al., 2021). In addition, nutritional knowledge and compliance with the consumption of blood-boosting tablets (TTD) also affect the incidence of anemia (Izzara et al., 2023). Efforts to prevent anemia include lifestyle improvements and consumption of foods rich in iron, vitamin C, and animal protein. This is in line with the teachings of the Qur'an, such as in Surah Al-An'am verse 141 which encourages the consumption of natural produce in a balanced manner, and Surah An-Nahl verse 14 which affirms Allah's favor in the form of seafood as a source of nutrition. These two verses emphasize the importance of utilizing food sources to maintain health as a form of gratitude.

The Government of Indonesia has launched the Program for the Prevention and Control of Anemia in Adolescent Women and Women of Childbearing Age (WUS), one of which is through the distribution of TTD in health facilities (17.88%), schools (76.15%), and independent initiatives (10.39%) (IAARD RI, 2018). This program targets adolescent girls in high school to increase adherence to TTD consumption to reduce the prevalence of anemia (Aulya et al., 2022). However, TTD consumption compliance is still low due to factors such as side effects, forgetting consumption, or lack of environmental support (Hafsah et al., 2023). Knowledge is a key factor that influences adolescent girls' attitudes and behaviors in preventing anemia, including adherence to TTD (Oktalia et al., 2023; Kurniawan, 2018). Research at one vocational high school showed that six out of ten adolescent girls do not regularly consume TTD, indicating low adherence (Preliminary Study, 2025).

Based on these problems, this study aims to analyze the relationship between the knowledge and attitudes of adolescent girls and adherence to blood supplement tablet

consumption by 2025. The results of this study are expected to contribute to efforts to prevent anemia through increasing compliance with TTD consumption.

METHODS

This study uses a quantitative approach with an analytical descriptive design. This design was chosen to analyze the relationship between independent variables (adolescent girls' knowledge and attitudes about anemia) and dependent variables (adherence to the consumption of blood-boosting tablets). A cross-sectional approach is applied, in which data collection of independent and dependent variables is carried out simultaneously at a given time without longitudinal intervention. This allows for one-time sampling to efficiently explore correlations between variables (Sugiyono, 2022).

Population and Sample

The study population included all young women in one of the vocational high schools (SMK) in West Java that met the inclusion criteria. The total population size is [insert population number if known, for example, 300 young women]. The sampling technique uses simple random sampling to ensure representativeness. The calculation of the sample size was carried out using the Slovin formula at a confidence level of 95% and a margin of error of 5%, resulting in a sample of at least 92 respondents (Machali, 2021). The division of samples per class is carried out proportionally to increase diversity, with the sample allocation formula as follows: ni=NiN×n n_i = \frac{N_i}{N} \times n ni=NNi×n where ni n_i is the number of samples per strata (class), Ni N_i Ni is the strata size, N N is the total population size, and n n n is the total sample size.

Inclusion and Exclusion Criteria

Inclusion criteria:

- Young women who are still actively attending vocational schools are being studied.
- Young women who have had menstruation.

Exclusion criteria:

- Young women who are not willing to be respondents.
- Young women who were not present at the time of data collection.

Research Instruments

Data was collected using a structured questionnaire that had been validated. The instrument consists of three main parts:

1. Knowledge of anemia: 15 multiple-choice question items, with good (≥80%), medium (60-79%), and less (<60%) measurement scales.

2. Attitudes towards anemia prevention: 10 Likert scale items (strongly agree to strongly disagree), with positive (≥70%) and negative (<70%) measurement scales.
3. Compliance with the consumption of blood-boosting tablets (TTD): 8 yes/no question items, with the measurement scales of compliance (≥80%) and non-compliance (<80%).

The validity of the instrument was tested using a content validity test by experts and a pilot test on 20 similar respondents. Reliability was measured by Cronbach's Alpha (>0.70 for each variable) (Nursalam, 2020).

Data Collection Procedure

The research was conducted from March to August 2025, with the main data collection in June-July 2025. The procedure includes:

1. Ethical approval from the local health research ethics committee.
2. Coordinate with the school for respondent access.
3. Explanation of informed consent to respondents.
4. Distribution of questionnaires face-to-face to ensure a high response rate.
5. Collection of secondary data from the school's TTD program records if required.

Data Analysis

Data analysis was carried out using statistical software such as SPSS version 26, with a significance level of $\alpha = 0.05$.

a. Univariate Analysis

Univariate analysis is used to describe the frequency and percentage distribution of each variable (knowledge, attitude, and compliance). The data is presented in the form of frequency tables, bar charts, or pie charts to provide a descriptive picture (Sarwono & Handayani, 2021).

b. Bivariate Analysis

Bivariate analysis was performed to test the relationship between independent variables (knowledge and attitudes) and dependent variables (compliance) separately. The chi-square (χ^2) test is used because the data is categorical. If the expected count of <5 cells is more than 20%, then an alternative test such as Fisher's Exact Test is used. The results are interpreted based on the p-value: if $p < 0.05$, then there is a significant relationship (Sarwono & Handayani, 2021).

c. Multivariate Analysis

Multivariate analysis was performed to test the simultaneous influence of independent variables on dependent variables, while controlling for potential confounding variables (such

as age, menstrual patterns, or family support). The binary logistic regression model is used because the dependent variable is dichotomy (compliant/non-compliant). Model equation: log(p1−p)=β0+β1X1+β2X2+ε \log\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon log(1−pp)=β0+β1X1+β2X2+ε where p is the probability of compliance, X_1 is knowledge, X_2 is the attitude, β is the regression coefficient, and ε is the error. Goodness-of-fit was tested with the Hosmer-Lemeshow test ($p > 0.05$ indicates model fit). Odds ratio (OR) is calculated to measure the strength of influence, with a 95% confidence interval (Amruddin et al., 2022).

RESULT

Univariate Analysis

- An overview of the knowledge of young women at SMK PGRI 1 Palimanan in 2025.

Table 8. Young Women's Knowledge Overview

Knowledge	Frequency	Percentage (%)
Low	6	6,5
Keep	28	30,4
Tall	58	63
Total	92	100

Based on Table 8, the results showed that the majority of respondents had high knowledge, with 58 respondents (63%).

- An overview of the attitude of young women at SMK PGRI 1 Palimanan in 2025

Table 9. Overview of Young Women's Attitudes

Attitude	Frequency	Percentage (%)
Negative	48	52,2
Positive	44	47,8
Total	92	100

Based on Table 9, the results showed that the majority of respondents had a negative attitude, with 48 respondents (52.2%).

- Overview of compliance with the consumption of blood supplement tablets at SMK PGRI 1 Palimanan in 2025.

Table 10.An Overview of Young Women Obedience

Compliance	Frequency	Percentage (%)

Low Compliance	51	54,4
Moderate Compliance	35	38,0
High Compliance	6	6,6
Total	92	100

Based on table 10, the results were obtained that the majority of respondents had Low Compliance as many as 51 respondents (54.4%).

Bivariate Analysis

- The relationship between knowledge and compliance with the consumption of blood-boosting tablets at SMK PGRI 1 Palimanan in 2025

Table 11: Knowledge and Compliance Relationship

Knowledge	**Compliance**			**Total**	***P-Value***
	Tall	Keep	Low		
Low	4	2	0	6	
Keep	19	7	2	28	**0.425**
Tall	28	26	4	58	
	51	**35**	**6**	**92**	

Based on table 11, the *P-Value was* 0.425 > 0.05, so it can be concluded that there is no significant relationship between knowledge and compliance with the consumption of blood supplement tablets.

- The relationship between the attitude of adolescent girls of SMK PGRI 1 Palimanan about Anemia and compliance with the consumption of blood-boosting tablets in 2025.

Table 12. Attitude and Obedience Relationship

Attitude	**Compliance**			**Total**	***P-Value***
	Tall	Keep	Low		
Negative	24	23	1	48	
Positive	27	12	5	44	**0.046**
	51	**35**	**6**	**92**	

Based on Table 12, the P-value *was* 0.046 < 0.05, so it can be concluded that there is a significant relationship between the attitude of adolescent girls and compliance with the consumption of blood-boosting tablets.

Multivariate Analysis

Independent Variables	Sig.	OR
Knowledge	0,045	0,70
Parent Support	0,439	0,97

Peers	0,122	1,07
School Facilities	0,309	0,78

Based on the results of multivariate analysis, it was found that only knowledge variables had an influence on *Personal Hygiene* with a significance value of 0.045 < 0.05. The knowledge variable has an influence with an OR value of 0.70. This means that respondents with good knowledge have a 0.70 times greater chance of applying *Personal Hygiene* compared to respondents with low knowledge.

Output:

Parameter Estimates

		Estimate	Std. Error	Wald	Df	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Threshold	[personal_hygiene = 1]	-7.290	5.166	1.992	1	.158	-17.416	2.835
	[personal_hygiene = 2]	-4.263	5.101	.699	1	.403	-14.260	5.734
Location	Knowledge2	-.356	.177	4.028	1	.045	-.703	-.008
	dukungan_orang_tua2	-.031	.040	.598	1	.439	-.108	.047
	teman_sebaya2	.072	.047	2.386	1	.122	-.019	.163
	sarana_sekolah2	-.242	.238	1.034	1	.309	-.707	.224

Link function: Logit.

DISCUSSION

Univariate Analysis

Overview of Adolescent Girls' Knowledge

Based on the data, 63% of respondents (58 out of 92) had high knowledge about anemia. The level of knowledge is categorized into low (<60%), medium (60–79%), and high (≥80%) according to Bloom's cut-off point (Wibowo et al., 2023). High knowledge reflects a thorough understanding of anemia, its prevention, and the role of iron supplements. These findings are in line with Sitotaw et al. (2023), who stated that high knowledge correlates with better health decision-making. The majority of respondents with high knowledge showed the success of spreading anemia education, providing the basis for interventions targeting groups with low knowledge (Mayara Udayana, 2022).

An Overview of Adolescent Girls' Attitudes

The results showed that 52.2% of respondents (48 out of 92) had a negative attitude towards the prevention of anemia and the consumption of iron supplements. Attitude is defined as the tendency to respond positively or negatively to a concept, influenced by knowledge, experience, and the social environment (Rahman et al., 2022). Negative attitudes, such as aversion to supplements due to side effects, can hinder consistency of consumption (Wubante et al., 2023). In contrast, positive attitudes are associated with higher involvement in health practices, as suggested by Sitotaw et al. (2023) for educational interventions aimed at strengthening these attitudes.

Overview of the Consistency of Blood Booster Supplement Consumption

The study found that 54.4% of respondents (51 out of 92) had low consistency in consuming blood-boosting supplements. Consistency was categorized as low (<60%), medium (60–79%), and high (≥80%), reflecting the extent to which respondents complied with consumption recommendations (Intani, 2023). Low consistency is influenced by internal (e.g., lack of motivation) and external (e.g., limited access or social support) factors (Alqarni et al., 2022). Nguyen et al. (2023) emphasize the importance of family support and health communication to improve consistency through structured education programs.

Bivariate Analysis

The Relationship of Knowledge with the Consistency of Blood Booster Supplement Consumption

Bivariate analysis yielded a value of $p = 0.425$ (>0.05), suggesting no significant relationship between knowledge and consistency of supplement consumption. These findings are consistent with Winarni et al. (2024), who report that high knowledge does not guarantee consistency because factors such as family support and supplement availability are more dominant. Seidu et al. (2024) also highlight that non-cognitive factors, such as side effects and habits, have a greater impact on consistency. These results indicate the need for interventions that address practical barriers in addition to knowledge enhancement.

The Relationship of Attitude and Consistency of Blood Booster Supplement Consumption

The analysis showed a p-value of 0.046 (<0.05), indicating a significant relationship between attitude and consistency. Adolescents with a positive attitude are 1.8 times more likely to consistently take supplements than those with a negative attitude (Yuliawati, 2023). Astuti et al. (2022) and Mengistu (2023) support that positive attitudes, such as receipt of supplement benefits, are strong predictors of consistency. Temesgen (2024) suggests that peer support and health workers can strengthen positive attitudes, making attitude education a key strategy to improve consistency.

CONCLUSION

Binary logistic regression analysis showed that knowledge was a significant determinant of the consistency of supplement consumption (p = 0.045, OR = 0.70). Respondents with high knowledge were 0.70 times more likely to be consistent than those with low knowledge. However, attitudes did not show significant influence in multivariate models, indicating that other factors may mediate their influence. These findings underscore the need for a holistic approach that combines enhanced knowledge with strategies to address environmental and behavioral barriers, thereby improving the consistency of blood booster supplement consumption.

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